FINAL
2019 SHELTER ISLAND YACHT BASIN DISSOLVED COPPER TOTAL MAXIMUM DAILY LOAD MONITORING AND PROGRESS REPORT

Submitted to:
California Regional Water Quality Control Board
San Diego Region

Prepared by:

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9210 Sky Park Court, Suite 200
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Prepared for:

Port of San Diego

March 2020

Wood Project No. 1715100624

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PORT of
SAN DIEGO

March 25, 2020

Mr. Wayne Chiu
California Regional Water Quality Control Board
San Diego Region
2375 Northside Drive, Suite 100
San Diego, CA 92108-2700

Subject: Submittal of the 2019 Shelter Island Yacht Basin Total Maximum Daily Load Monitoring and Progress Report

Dear Mr. Chiu,

Please find enclosed a hard copy and CD of the 2019 Shelter Island Yacht Basin Total Maximum Daily Load Monitoring and Progress Report.

Following submission of this report, the Port and the Shelter Island Yacht Basin stakeholders would like to meet with you and go over the report, address any of your questions, and discuss the final compliance expectations for the TMDL.

I will be following up shortly to schedule a meeting at your convenience.

Please feel free to contact me at (619) 725-6073 if you have any questions on the information provided above.

Respectfully,

Karen Holman
Director, Environmental Protection
San Diego Unified Port District

Attachments: 2019 Shelter Island Yacht Basin Total Maximum Daily Load Monitoring & Progress Report & CD
CC: Jason H. Giffen, Vice President
John Carter, Deputy General Counsel V
D2#: 1627277

KH/KT/aa

March 2020

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Karen Holman
Director
Environmental Protection
San Diego Unified Port District

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ACRONYMS AND ABBREVIATIONS

303(d) list	Clean Water Act Section 303(d) list of water quality impaired segments
AB	Assembly Bill
AFP	antifoulant paint
ASTM	ASTM International
Basin Plan	Water Quality Control Plan for the San Diego Basin – Region 9
BMP	best management practice
CCC	criterion continuous concentration
CCR	California Code of Regulations
CMANC	California Marine Affairs and Navigation Conference
CMC	criterion maximum concentration
COC	chain-of-custody
CTD	conductivity, temperature, and depth
CTR	California Toxics Rule
CWA	Clean Water Act
DO	dissolved oxygen
DOC	dissolved organic carbon
DPR	Department of Pesticide Regulation
DPR Rule	Section 6190 of Title 3, California Code of Regulations
EC_{50}	median effective concentration
ELAP	California Environmental Laboratory Accreditation Program
ER	equipment rinsate
FAQ	frequently asked question
FB	field blank
H_2SO_4	sulfuric acid
HPD	Harbor Police dock
ICPMS	inductively coupled mass spectrometry
ID	identification
Investigative Order	Investigative Order No. R9-2011-0036
J-flag	below the reporting limit; estimated value
JRMP	Jurisdictional Runoff Management Plan
LC_{50}	median lethal concentration
LCS	laboratory control sample
LID	low-impact development
LIMS	Laboratory Information Management System
LOEC	lowest observed effect concentration
MAR	marine habitat beneficial use
MIACC	Marina Inter-Agency Coordinating Committee
Monitoring Plan	SIYB Dissolved Copper TMDL Monitoring Plan
MS	matrix spike
MS4	Municipal Separate Storm Sewer System
MSD	matrix spike duplicate
N/A	not applicable
Named TMDL Parties	the parties named in the TMDL, namely the Port, marinas and yacht clubs, hull cleaners, boaters, and the City of San Diego
Nautilus	Nautilus Environmental
NOEC	no observed effect concentration
OAL	Office of Administrative Law
PDF	Portable Data Format
pH	hydrogen ion concentration
PMSD	percent minimum significant difference
Port	San Diego Unified Port District
PTI	Pesticide Toxicity Index
QA	quality assurance

ACRONYMS AND ABBREVIATIONS (continued)

QAPP	Quality Assurance Project Plan
QC	quality control
REF	reference
Regional Board	San Diego Regional Water Quality Control Board
SBE	Sea-Bird Electronics
SIML	Shelter Island Master Leaseholders
SIYB	Shelter Island Yacht Basin
SM	Standard Method
SoCal SETAC	Southern California Society of Environmental Chemistry and Toxicology
SOP	standard operating procedure
SPAWAR	Space and Naval Warfare Systems Command
SUSMP	Standard Urban Stormwater Mitigation Plan
SWAMP	Surface Water Ambient Monitoring Program
SWQMP	Stormwater Quality Management Plan
SWRCB	State Water Resources Control Board
TIE	toxicity identification evaluation
TMDL	Total Maximum Daily Load
TOC	total organic carbon
TSS	total suspended solids
TST	test of significant toxicity
USEPA	United States Environmental Protection Agency
Weck	Weck Laboratories, Inc.
Weston	Weston Solutions, Inc.
WILD	wildlife habitat beneficial use
Wood	Wood Environment & Infrastructure Solutions, Inc.
WQO	water quality objective
YSI	YSI Incorporated

UNITS OF MEASURE

~	approximately
%	percent
±	plus or minus
°C	degree(s) Celsius
<	less than
>	greater than
≤	less than or equal to
≥	greater than or equal to
µg/cm^2/day	microgram(s) per square centimeter per day
µg/L	microgram(s) per liter
µm	micrometer(s)
kg/yr	kilogram(s) per year
m^2	square meter(s)
mg/L	milligram(s) per liter
mL	milliliter(s)
ppt	part(s) per thousand

EXECUTIVE SUMMARY

This report is the annual Shelter Island Yacht Basin (SIYB) Dissolved Copper Total Maximum Daily Load (TMDL) Monitoring and Progress Report for 2019, which has been prepared in compliance with Investigative Order No. R9-2011-0036 (Investigative Order), issued by the San Diego Regional Water Quality Control Board (Regional Board) to the San Diego Unified Port District (Port) on March 11, 2011. The report tracks the progress of (1) the number of vessels that have converted from using copper-based hull antifoulant paints (AFPs) to using alternative AFPs (low- and non-copper based), and (2) the dissolved copper concentrations and toxicity in the water column.

The 2019 monitoring period is the second year in the final phase of the TMDL compliance period. Per the TMDL implementation, the continuation of a 40 percent load reduction is required. Looking ahead, a 76 percent load reduction is required to meet TMDL compliance by the end of 2022. Per the requirements of the Investigative Order, the SIYB TMDL Monitoring Plan (Wood Environment & Infrastructure Solutions, Inc. [Wood], 2019a) describes the monitoring program that is used to track the progress of implementing the SIYB Dissolved Copper TMDL and achieving the required dissolved copper load reductions.

This 2019 Monitoring and Progress Report follows the approach described in the most recent Monitoring Plan. It presents best management practice (BMP) implementation in SIYB and San Diego Bay, vessel conversions to low-copper paints and non-copper alternatives, and water quality monitoring results, as required by the Investigative Order.

Best Management Practice Implementation

A variety of BMPs intended to reduce dissolved copper loading and improve water quality have been identified and initiated. A summary of the 2019 highlights is included below and further detailed in Section 3.1.1 of this report.

- Continuing to keep all Port vessels copper free by painting with non-copper hull paints, which contribute no load to SIYB;
- Improving the accuracy of vessel tracking efforts through the use of tracking templates, meetings, and one-on-one consulting with groups responsible for vessel tracking;
- Focusing on policy and regulation approaches that would improve water quality and reduce copper loading, including a review of the Port's In-Water Hull Cleaning Permit Program and In-Water Hull Cleaning Ordinance and associated BMPs;
- Ongoing education and outreach efforts, such as regular meetings with stakeholders and up-to-date web content, workshops, and presentations at conferences;
- Conducting five public engagement sessions focused on the Port's In-Water Hull Cleaning Permit and In-Water Hull Cleaning Ordinance Review;
- Preparation of a Conceptual Model Review that evaluated the best available science and overall loading contributions associated with current in-water hull cleaning practices;
- Pursuing alternative methods for copper reduction and removal in marine waters through the Port's Blue Economy Incubator, which supports research and development of pilot projects aimed at solving environmental issues (e.g., the Rentunder Boatwash Pilot Project); and

- Collaborating with the California Department of Pesticide Regulation (DPR) and Los Angeles County Department of Beaches and Harbors to stay engaged on state and regional copper-related initiatives, TMDL issues and progress.

Vessel Conversions and Reduction of Dissolved Copper

Based on the vessel tracking assumptions discussed in Section 2.3.4 of this report, the transition of a vessel from a high-copper to non-copper hull paint was assumed to reduce annual loading by 0.9 kilogram per year (kg/yr) and the transition to DPR Category I or low-copper hull paints was assumed to reduce loading by 50 percent (i.e., 0.45 kg/yr). Vessel tracking indicates that, in 2019, there has been a reduction of 45.7 percent (approximately 960 kg/yr) in annual dissolved copper loading to SIYB from vessels when compared with the SIYB TMDL assumed baseline load of 2,100 kg/yr[1].

The 2019 load reduction of 45.7 percent indicates the continued achievement of the required 40 percent load reduction. Several notable points from the 2019 vessel tracking data are as follows:

- A 92 percent response rate was accomplished for the 2019 vessel tracking dataset. This response rate may be attributed to continual improvements by marina and yacht club representatives in vessel tracking efforts from year to year. As a result, the vessel tracking dataset may be considered more reliable in reflecting actual basin conditions.
- A reduction in vacant slips was observed in 2019; 17 slips that were considered vacant in previous monitoring years are now occupied by vessels.
- The vessel tracking data indicate continued transitions to DPR Category I paints (an increase of 20 percent from the 2018 monitoring year).
- The vessel tracking data indicate an increase of 4 percent in the reporting of non-copper alternatives in yacht clubs and marinas (as compared with results from the 2018 monitoring year). These data represent the use of non-copper paints, slip liners, HydroHoists®, and vessels with no hull paint.

Water Quality Monitoring

Monitoring of water column dissolved copper and toxicity is required to track progress toward water quality objectives (WQOs). In August 2019, water quality was sampled at six stations in SIYB and at one reference station (located adjacent to SIYB near the main San Diego Bay navigation channel) to determine dissolved copper concentrations in the basin, test for acute and chronic toxicity, and assess water quality trends.

Results from the August 2019 monitoring event showed that the basin-wide average dissolved copper level was 8.5 micrograms per liter (µg/L), which was similar to the 2005–2008 baseline average (8.3 µg/L). Dissolved copper concentrations at all six SIYB sampling stations exceeded the California Toxics Rule (CTR) criterion continuous concentration (CCC) WQO of 3.1 µg/L. In previous monitoring years (2012–2018), dissolved copper concentrations exceeded the CCC at only five of the six SIYB sampling stations. Results from the 2019 monitoring event showed that

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[1] The total dissolved copper load per the SIYB TMDL equals 2,100 kilograms per year (kg/yr) from vessel paints (the total includes contributions from passive leaching and in-water hull cleaning). The estimated load contributions from background sources, urban runoff, and atmospheric deposition are not included in this total.

dissolved copper concentrations at five of the six sampling stations exceeded the CTR acute criterion maximum concentration (CMC) WQO (4.8 µg/L), which is consistent with results from previous monitoring years.

The results from the 2019 monitoring program indicated that one station (SIYB-1, the station farthest inside the basin) had statistically significant effects on developing mussel larvae. This finding is consistent with results of previous studies.

Conceptual Model Update

Shelter Island Yacht Basin TMDL Investigative Order No. R9-2011-0036 requires that the Conceptual Model be updated as needed. In particular, refinements and updates are required when new information becomes available. An update to the Conceptual Model is currently under consideration. The Port conducted the 2019 TMDL Conceptual Model Review (Appendix F) during this reporting period to compare the TMDL Conceptual Model to the best available science life cycle dynamic model developed by Space and Naval Warfare Systems Command (Earley et al., 2013). Based upon this detailed comparison, it was concluded that the copper load to the water column attributable to in-water hull cleaning occurs over an extended period following each hull cleaning event over the life of the paint, and therefore is likely considerably higher than the load identified in the TMDL. Consequently, the Port is conducting an extensive review of in-water hull cleaning that includes policy review, additional research into water quality impacts from a variety of hull cleaning practices and cleaning frequencies, and evaluation of potential modifications to in-water hull cleaning practices to further reduce copper loading from this activity.

Adaptive Management through the Final TMDL Phase

Since the initiation of the TMDL monitoring program, multiple copper load reduction strategies have been developed and implemented. While these strategies have resulted in copper load reduction that has met TMDL interim compliance targets, annual water quality monitoring has not shown a corresponding decrease in water column dissolved copper levels.

From an adaptive management standpoint, the water quality monitoring results to date indicate that further copper load reduction strategies should emphasize a direct relation to water quality improvement. Consequently, greater emphasis by all Named TMDL Parties needs to be focused on identifying additional load reduction strategies that will reduce copper loads and produce measurable improvements in water quality and movement toward the CTR CCC WQO (3.1 µg/L). Meeting the final TMDL compliance point is likely to require additional direct load reductions coupled with the load reduction efforts already in place (e.g., the recently implemented DPR Rule and continued transition to non-copper alternatives) and a closer examination of water quality with those efforts. The Port’s ongoing initiative to reassess copper loading attributed to in-water hull cleaning is one such strategy that needs to be further evaluated. In addition, as continued transition to DPR Category I paints occurs, it will be critical to understand the effects this has on water quality. It is important to note that the full hull paint transition and its effect on water quality is likely to extend beyond the TMDL timeline. During this period, it will also be critical to understand whether load reductions alone can meet the water quality standard and incorporate adaptive management strategies reflective of such findings.

A suite of recommendations has been provided in this report to guide implementation strategies for the Port and other Named TMDL Parties. The Port will continue to conduct outreach and engage with individual marinas and yacht clubs, hull cleaners, and boaters to better understand the direct load reduction commitments that all Named TMDL Parties will be initiating to achieve 2022 TMDL load reduction compliance.

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1.0 INTRODUCTION

This report is the annual Shelter Island Yacht Basin (SIYB) Dissolved Copper Total Maximum Daily Load (TMDL) Monitoring and Progress Report for 2019, which has been prepared in compliance with Investigative Order No. R9-2011-0036 (Investigative Order), issued by the San Diego Regional Water Quality Control Board (Regional Board) to the San Diego Unified Port District (Port) on March 11, 2011 (Regional Board, 2011). The Investigative Order, issued under Section 13325 of the Porter-Cologne Water Quality Control Act, requires that the Port provide technical reports on the progress of implementation of the SIYB TMDL. The progress is to be determined by tracking data on the number of vessel hulls converted from using copper-based antifoulant paints (AFPs) to using non-copper or low-copper alternatives and by monitoring dissolved copper concentrations and toxicity in the water column. These measures are used to assess copper load reductions and to evaluate progress toward attaining water quality objectives (WQOs) and protecting beneficial uses.

1.1 Background

Shelter Island Yacht Basin is a recreational yacht basin near the mouth of San Diego Bay, California, and is composed of marinas and yacht clubs, an anchorage, a fuel dock, and other facilities that support recreational boating (Figure 1-1).

Copper is commonly used as a biocide in vessel AFPs because of its effectiveness in reducing fouling of vessel hulls. In the State of California, the Department of Pesticide Regulation (DPR) regulates the use of copper in vessel paints; it is currently legal to use copper-based paints. However, these paints leach copper into the water column. Copper is toxic not only to the targeted fouling organisms on vessel hulls, but possibly also to other non-targeted organisms that inhabit the basin.

SIYB waters contain dissolved copper concentrations that have exceeded the dissolved copper numeric WQO as well as the toxicity and pesticides narrative WQOs and may threaten and impair the wildlife habitat and marine habitat beneficial uses in the basin. Because of this exceedance, SIYB was placed on the list of impaired water bodies compiled pursuant to federal Clean Water Act (CWA) Section 303(d) (the 303(d) list). The SIYB TMDL was developed to address and resolve this impairment by reducing the loading of dissolved copper into SIYB waters.

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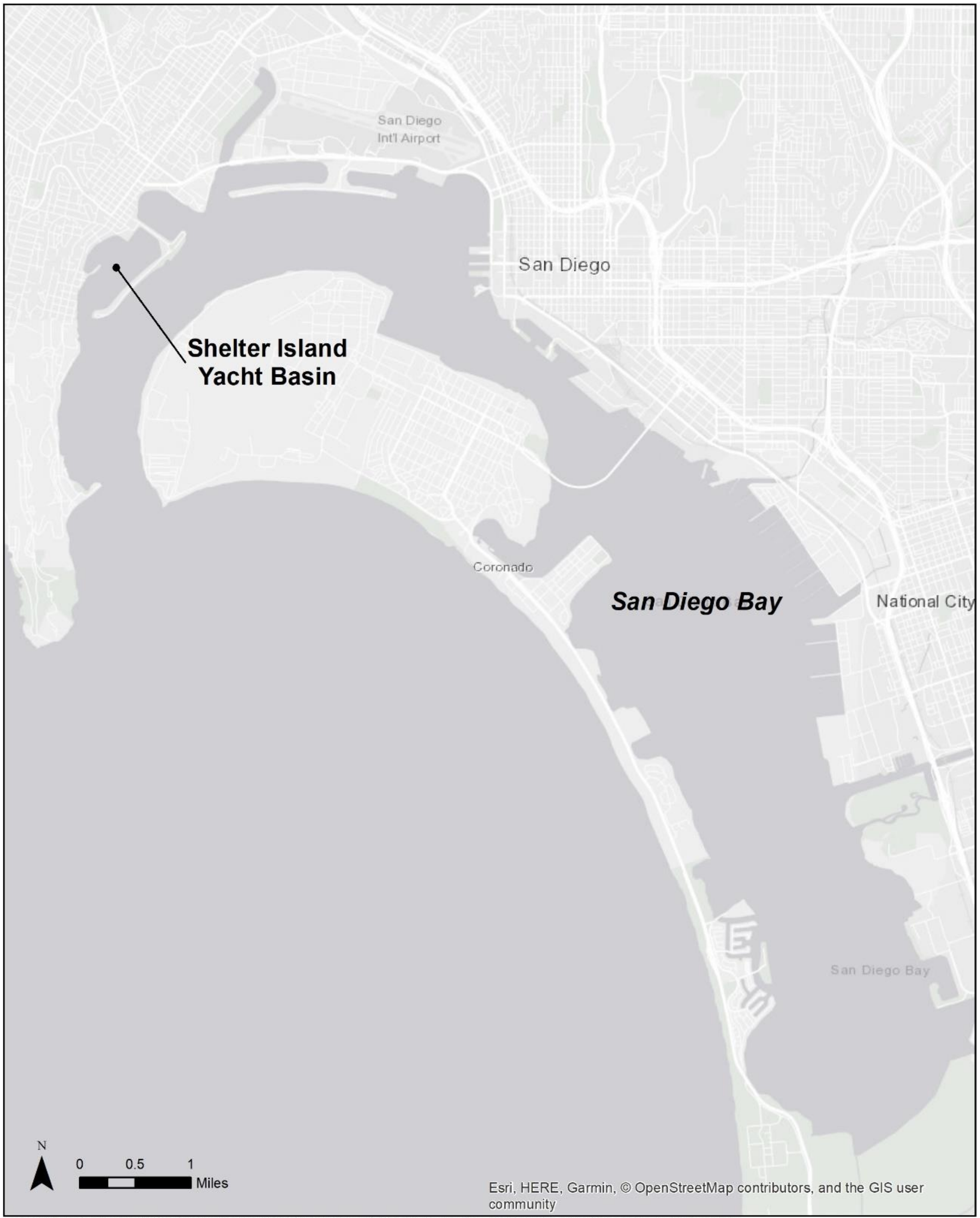

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wood.

Shelter Island Yacht Basin
San Diego Bay, CA

Figure 1-1. Location of Shelter Island Yacht Basin Within San Diego Bay

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1.2 SIYB TMDL Compliance Schedule

Under Resolution R9-2005-0019, the SIYB TMDL requires that the parties named in the TMDL, namely the Port, marinas and yacht clubs, hull cleaners, boaters, and the City of San Diego (Named TMDL Parties), reduce loading of dissolved copper into the water column by 76 percent, from 2,163 kilograms per year (kg/yr) to 567 kg/yr over a 17-year period (Regional Board, 2005). This period extends to 2022, based on the official SIYB TMDL approval date[2] of February 9, 2005. No reductions in dissolved copper loading were required during the initial two-year orientation period (2005–2007). The subsequent 15-year period requires incremental reductions of dissolved copper loading by 10 percent within 7 years (2012); by 40 percent within 12 years (2017); and by 76 percent within 17 years (2022) (Table 1-1).

Table 1-1.
Loading Targets for SIYB TMDL Attainment

Stage	Time Period	Percent Reduction from SIYB TMDL Estimated Loading	Reduction to be Attained by End of Year	Estimated Target Loading (kg/yr of Dissolved Copper)
1	2005–2007	0	N/A	N/A
2	2008–2012	10[a]	2012 (7 years)	1,900
3	2013–2017	40[b]	2017 (12 years)	1,300
4	2018–2022	76	2022 (17 years)	567

Notes:
[a] Loading calculations presented in the 2012 SIYB TMDL Monitoring and Progress Report showed that a 17 percent load reduction had been achieved. Compliance with the 2012 load reduction goal of 10 percent or greater was confirmed by the Regional Board in a letter to the Port dated July 26, 2013.
[b] Loading calculations presented in the 2017 SIYB TMDL Monitoring and Progress Report showed that a 40 percent load reduction had been achieved. Compliance with the 2017 load reduction goal of 40 percent or greater was confirmed by the Regional Board October 10, 2018 Executive Officer's Report as part of the monthly Regional Board meeting.
kg/yr = kilogram(s) per year; N/A = not applicable; SIYB = Shelter Island Yacht Basin; TMDL = Total Maximum Daily Load

For the first SIYB TMDL compliance year (2012), loading calculation estimates presented in the 2012 Monitoring Report indicated a 17 percent reduction in dissolved copper loading to SIYB, thus exceeding the 10 percent requirement. In a letter dated July 26, 2013, the Regional Board stated, "*Based on the data submitted and information provided in the Report [2012 SIYB TMDL Monitoring and Progress Report], the 10 percent reduction in dissolved copper loading required to demonstrate compliance with the SIYB TMDL by the December 1, 2012 compliance date was achieved"* (Regional Board, 2013). This letter is provided in Appendix E.

Similarly, loading calculation estimates presented in the 2017 Monitoring Report indicated a 45 percent reduction in dissolved copper loading to SIYB, exceeding the 40 percent compliance requirement for the third stage of the SIYB TMDL (2017). In a letter to the Port dated September 11, 2018, the Regional Board stated, *"The Port District's 2017 Report marks the end of Stage 3 of the interim loading targets, and suggests that overall the Yacht Basin is meeting the 40 percent reduction target as a result of improved used of best management practices and vessel conversions to less toxic hull coatings"* (Regional Board, 2018). At the October 10, 2018 Regional Board Monthly Meeting, the Executive Officer's Report confirmed and memorialized that the SIYB TMDL efforts had successfully achieved the 2017 compliance requirement. The letter from the Regional Board and the October 2018 Executive Officer's Report are included in Appendix E.

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[2] For a TMDL to be incorporated into the *Water Quality Control Plan for the San Diego Basin – Region 9* (Basin Plan; 1994), it must be approved by the Regional Board, State Water Resources Control Board (SWRCB), Office of Administrative Law (OAL), and United States Environmental Protection Agency (USEPA) Region 9. The official TMDL approval date is the OAL approval date.

The fourth and final stage of the TMDL began in 2018. The TMDL requires a 76 percent reduction in the loading of dissolved copper into SIYB by the end of 2022.

1.3 Sources of Dissolved Copper

Based on the Regional Board's source analysis, the total mass load of dissolved copper to SIYB was estimated to be 2,163 kg/yr, of which 98 percent of the inputs were attributable to passive leaching of copper from copper-based hull paints on vessels and to hull-cleaning activities (Table 1-2). The TMDL identifies the Port, marinas and yacht clubs, hull cleaners, and boaters as responsible for reducing loads in their respective areas, operations, and activities. The total copper load from the SIYB TMDL equals 2,100 kg/yr from vessel paints. The estimated load reduction resulting from background, urban runoff, and atmospheric deposition (which equates to approximately 63 kg/yr) is not included in this total. This report evaluates the dissolved copper loading based on the vessel-related contribution, totaling 2,100 kg/yr, originating from the Harbor Police dock, transient dock, and weekend anchorage, as well as marinas and yacht clubs, where boats reside and hull-cleaning activities occur.

Table 1-2.
Sources of Dissolved Copper per the SIYB TMDL

Source	Estimated Mass Load to SIYB (kg/yr)	Contribution to SIYB (Percent Dissolved Copper)
Passive Leaching	2,000	93
Hull Cleaning	100	5
Urban Runoff	30	1
Background	30	1
Direct Atmospheric Deposition	3	<1
Sediment	0	0
Total	2,163	100

Notes:
< = less than; kg/yr = kilogram(s) per year; SIYB = Shelter Island Yacht Basin

1.4 Water Quality Objective Criteria

The WQO for dissolved copper in SIYB is equal to the National Recommended Water Quality for Aquatic Life of the United States Environmental Protection Agency (USEPA) and the California Toxics Rule (CTR) water quality values for dissolved copper in marine environments (USEPA, 2000). Continuous or chronic exposures may not exceed 3.1 micrograms per liter (µg/L) over a 4-day average; acute exposures may not exceed 4.8 µg/L over a 1-hour average. In addition, numeric WQOs must not be exceeded more than once every three years.

In addition to numeric WQOs, the *Water Quality Control Plan for the San Diego Basin – Region 9* (Basin Plan) established narrative WQOs for toxicity and pesticides (Regional Board, 1994) as follows:

> **Toxicity Objective** – *All waters shall be maintained free of toxic substances in concentrations that are toxic to, or that produce detrimental physiological responses in human, plant, animal, or aquatic life. Compliance with this objective will be determined by use of indicator organisms, analyses of species diversity, population density, growth anomalies, bioassays of appropriate duration, or other appropriate methods as specified by the Regional Board.*

> **Pesticide Objective** – *No individual pesticide or combination of pesticides shall be present in the water column, sediments or biota at concentration(s) that adversely affect beneficial uses. Pesticides shall not be present at levels which will bioaccumulate in aquatic organisms to levels which are harmful to human health, wildlife or aquatic organisms.*

Two beneficial uses within SIYB are threatened by elevated dissolved copper concentrations: marine habitat (MAR) and wildlife habitat (WILD). The Regional Board indicated that if numeric WQOs are met for dissolved copper, then narrative WQOs will also be considered to be met. However, because current numeric WQOs are not site-specific, direct assessments of toxicity, as well as SIYB biota, also directly indicate basin-wide attainment of beneficial uses and narrative WQOs.

1.5 Monitoring Purpose

The Investigative Order requires the Port to complete an annual evaluation, interpretation, and tabulation of vessel information, best management practices (BMPs), and water quality sampling. Because of the proportional contribution of copper loading to SIYB from copper-based hull paints, tracking of vessel conversions from copper to non-copper or lower copper hull paints is the primary method used to assess compliance with SIYB TMDL load reduction targets. Water quality monitoring is required because it assesses long-term trends in the basin and provides comparisons with the numeric and narrative WQOs, as measured by surface water dissolved copper concentrations and toxicity. Monitoring is a necessary component to evaluate whether the trajectory of water quality values will meet water quality objectives. By conducting both vessel tracking and water quality monitoring on an annual basis, the program may eventually be able to evaluate the relationship between load reductions and water quality. Additionally, this approach will provide the data needed to assess the overall effectiveness of the SIYB TMDL implementation in attaining both loading reductions and numeric WQOs to protect the basin's MAR and WILD beneficial uses.

1.6 Revision of Monitoring Plan

The Monitoring Plan (Revision 5) (Wood Environment & Infrastructure Solutions, Inc. [Wood], 2019a) was updated for the 2019 monitoring year to reflect the 2019 monitoring period dates. In addition, due to unexplained toxicity observed during the 2018 monitoring program, toxicity testing methods were updated to include conditions that may necessitate a toxicity identification evaluation (TIE).

1.7 Implementation of Best Management Practices

The Port has incorporated a comprehensive copper reduction program and BMPs to reduce copper loads at the Harbor Police dock, transient dock, and weekend anchorage, as well as to support the other Named TMDL Parties with their load reduction and BMP implementation efforts in SIYB and throughout San Diego Bay. The five elements of this program are:

- Testing and research
- Transition to non-copper hull paints and DPR Category I paints (i.e., paints with leach rates less than or equal to (≤) 9.5 micrograms per square centimeter per day [μg/cm²/day])
- Policy development and legislation

- Education and outreach to boaters
- Monitoring and data assessment

The marinas and yacht clubs in SIYB also implement BMPs and compile vessel information from boat owners to assist in the preparation of this report.

Over the course of the SIYB TMDL program, multiple quality control measures have been integrated to build on previous knowledge and to help effectively implement the SIYB TMDL program.

Additional measures include:

- Meetings between the Port and other stakeholders in SIYB about the SIYB TMDL
- Increased scrutiny of water quality data and analytical methods
- Ongoing reassessment of field sampling techniques, including additional oversight of field procedures
- Review of methods used to track the types of hull paints used on vessels in SIYB

These measures have been implemented to collect relevant useful data and to enhance communication among the marinas and yacht clubs and other Named TMDL Parties. The intent of this iterative and collaborative process is to provide transparency and provide a known and scientifically defensible dataset to support the SIYB TMDL compliance requirements.

1.8 New Initiatives and Adaptive Management

A TMDL Conceptual Model review was conducted by the Port in 2019. The review that was completed and the proposed Conceptual Model update under consideration address an alternative approach to evaluate copper loading which takes into account the life cycle load contributions from passive leaching and in-water hull cleaning based on a scientific investigation (Earley et al., 2013). This alternative approach suggests that loading from hull cleaning occurs over an extended period following each hull cleaning event over the life of the paint, and therefore is responsible for a greater copper load compared to the TMDL estimate. The findings of the review were compiled into a report (Wood and Dudek, 2019), which is included in Appendix F.

Based upon the Conceptual Model review finding that hull cleaning is likely responsible for a greater copper load compared to previous estimates, the Port planned and implemented a series of workshops with the public to discuss the potential for modifying the Port's regulations related to in-water hull cleaning. The primary focus of these meetings was to discuss ways in which the copper load from in-water hull cleaning could be reduced, thus contributing to water quality improvements and load reductions needed to meet the TMDL load reduction target by the end of 2022.

These Port initiatives are discussed in more detail in Section 4.0.

1.9 Content of Report

This TMDL Monitoring and Progress Report for SIYB presents the monitoring results for 2019 and includes the following:

- Methods to assess, estimate, and reduce copper loads
- TMDL implementation, including BMPs implemented by the Port in SIYB and throughout San Diego Bay
- TMDL implementation, including BMPs and guidance documents prepared and implemented by the Shelter Island Master Leaseholders (SIML) TMDL Group, marinas, and yacht clubs
- Evaluation, interpretation, and tabulation of data collected by the Port, marinas, and yacht clubs on vessel tracking and hull paint conversions
- Water quality monitoring data, including results from chemical and toxicological evaluations of surface water samples collected in August and September 2019[3]
- Information regarding ongoing copper initiatives and other copper-related issues considered germane to the SIYB TMDL
- Discussion of the 2019 TMDL monitoring program findings
- A summary of the Port's recommendations related to the TMDL

The report also includes several appendices with additional supporting data. Appendix A is the 2019 SIYB TMDL Monitoring Plan. Appendix B contains BMP plans for the Port, as well as marinas and yacht clubs. Appendix C is the vessel tracking data spreadsheet (including information for each available slip) for the entire SIYB. Appendix D contains the water quality monitoring results for the August and September 2019 sampling events, including field-collected data, the analytical chemistry reports, and the toxicity testing reports. Appendix E includes SIYB-related correspondence between the Port and other agencies and other pertinent information. Appendix F includes the SIYB TMDL Conceptual Model Review (Wood and Dudek, 2019). Appendix G contains comments received during the 2019 Port in-water hull cleaning outreach efforts.

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[3] During toxicity testing for samples collected on August 19, 2019, toxicity was observed at station SIYB-4 (see Section 3.3.2). To confirm the toxicity at SIYB-4 and determine whether a TIE was warranted, a second set of water samples for toxicity and select chemistry testing were collected from SIYB-4, and SIYB-REF for comparison, on September 9, 2019.

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2.0 METHODS

This section describes in detail the BMP plans in place to reduce copper loads, methods used to estimate load reductions (e.g., vessel hull paint tracking), field program methods to assess dissolved copper levels in SIYB, and project-specific quality assurance (QA) and quality control (QC) procedures used during water quality monitoring and data analysis.

2.1 SIYB Implementation of Best Management Practices

The Port has developed a copper reduction program and maintains a cumulative list of copper reduction BMPs implemented in support of the TMDL since 2007 (Appendix B). In addition, the marinas and yacht clubs created specific BMP plans. Information is submitted annually to the Port that details the BMPs and actions that marinas and yacht clubs have implemented throughout the year to reduce dissolved copper loads to SIYB. The BMP plans are provided in Appendix B.

2.2 San Diego Bay-Wide Implementation of BMPs

The report in Appendix B also describes BMPs or other actions implemented by the Port to reduce dissolved copper discharges from vessel hulls into harbors or marinas within San Diego Bay. The Port reported the actions that were taken to reduce dissolved copper discharges to marinas beyond San Diego Bay, including actions with statewide or national applicability.

2.3 Dissolved Copper Load Analysis

This section describes the methods and procedures used to estimate dissolved copper loading into SIYB during the 2019 monitoring period, including vessel tracking methodologies and estimates of the contribution of dissolved copper into SIYB attributable to in-water hull cleaning.

2.3.1 SIYB Hull Paint Guidance List

The comprehensive SIYB Hull Paint Guidance List (Port, 2017) was used to assist with vessel tracking efforts. This guidance list provides the individual AFPs by DPR leach rate categories and contains relevant product information such as paint name, product number, copper content, and DPR registration number. The list is based on the DPR Paint List (DPR, 2017) and includes new products available since 2012 as well as other non-copper biocide AFPs (e.g., zinc, Irgarol, etc.) and non-biocide (e.g., foul-release) coatings and products.

This guidance tool was developed to help marina and yacht club operators compile more accurate annual vessel census data. It is also intended to help demonstrate transparency in reporting the updated vessel tracking, enhance vessel tracking and reporting efforts, and reduce variability in vessel data.

2.3.2 Vessel Tracking

Annual reduction of copper loading was assessed by tracking conversions of hull paints from copper to non-copper or lower copper products (i.e., either by leach rate or copper content) for vessels moored in SIYB.

Yacht club and marina operators collect vessel data by surveying their boaters for vessel-related information. A standard survey form has been made available to all marinas and yacht clubs in SIYB. An example of this survey form is in Appendix B.

If no response was initially received or if the form lacked pertinent information, yacht clubs and marina operators made follow-up efforts to obtain missing or incomplete records. Vessel information was then submitted to the Port in mid-January 2020.

Since 2018, the Port has also required all marinas and yacht clubs as Named TMDL Parties to provide a self-certification statement to the Port along with their vessel tracking data submittals. For each facility, the signed self-certification statement states that the data were prepared under the signatories' knowledge and direction and that the data represented truthful, accurate, and complete information. Self-certification letters for each marina and yacht club are provided in Appendix E.

Once the survey results were received by the Port, annual hull survey data from marinas and yacht clubs were crossed-checked first against the USEPA registration number (when applied) and then by the product number and product name in the SIYB Hull Paint Guidance List. If the information conformed to the SIYB Hull Paint Guidance List, the vessel's paint was tracked as identified in the aforementioned categories. The vessel tracking information that is collected by the marinas and yacht clubs during the hull survey is listed in Table 2-1. Vessel tracking data are provided in Appendix C.

Table 2-1.
Vessel Survey Data Collected in 2019

Vessel Tracking Data Fields	
1.	Name of Marina or Yacht Club
2.	Slip/Mooring Reference Number
3.	Percentage of Time Occupied
4.	Vessel Type (power or sail)
5.	Vessel Length
6.	Vessel Beam Width
7.	Paint Type (Copper, DPR Category I, Low-copper, or Non-copper)
8.	Paint Product Name
9.	Paint Product Number
10.	Boatyard Name or Purchase Date
11.	Painting Date (month)
12.	Painting Date (year)[a]
13.	Percent Copper
14.	USEPA Registration Number (when applicable)

Notes:
[a] Aged-copper paints are determined by the painting date. To be considered an aged paint for the 2019 survey, the vessel would have had to be painted on or prior to December 31, 2016.
DPR = Department of Pesticide Regulation; USEPA = United States Environmental Protection Agency

Vessel tracking data from SIYB included the percentage of time that slips were unoccupied or were occupied by vessels with copper, lower copper (DPR Category I and low-copper paints), aged-copper paints, non-copper, or unknown hull paints, as required by the Investigative Order (Table 2-2). The occupancy rate at most marinas and yacht clubs in SIYB was calculated using a nightly count of empty slips. The annual percentage of time that the slip was occupied was determined by dividing the total number of days occupied by 365 days.

Table 2-2.
Vessel Tracking Data Collected for 2019

Vessel Tracking Data Fields	
1.	Total number of slips or buoys in facility available to be occupied by vessels
2.	Number of unoccupied slips or buoys and length of time unoccupied during each year
3.	Number of vessels confirmed with copper-based hull paints and approximate length of time occupying a slip or buoy in facility each year
4.	Number of vessels confirmed with aged-copper-based hull paints[a] and approximate length of time occupying a slip or buoy in facility each year
5.	Number of vessels confirmed with DPR Category I or low-copper paints[b] and approximate length of time occupying a slip or buoy in facility each year
6.	Number of vessels confirmed with alternative hull paints, by hull paint type, and approximate length of time occupying a slip or buoy in facility each year
7.	Number of vessels with unconfirmed information regarding hull paints and approximate length of time occupying a slip or buoy in facility each year
8.	Estimate of the dissolved copper load reduction achieved for the year (kg/yr and percent)

Notes:
[a] Per Regional Board letter dated July 26, 2013.
[b] Per Regional Board email dated October 21, 2015.
DPR = Department of Pesticide Regulation; kg/yr = kilogram(s) per year

For all vessel tracking data submittals, lower copper (DPR Category I or low-copper) and non-copper hull paints were confirmed if the required supporting data that were provided (i.e., all of the required data fields were completed) for a given hull paint confirmed the USEPA registration number or product number and product name of a reported paint (Table 2-1). Vessels stored out of the water (e.g., on HydroHoists®) or in slip liners, or reported to have no bottom paint, were also confirmed as having non-copper paint for that slip. For vessels to be considered as having hulls with aged-copper paints, the painting date submitted must have been on or before December 31, 2016, for the 2019 monitoring year.

To be conservative, loading was calculated for unconfirmed paints by assuming that paint was copper-based if the vessel owner did not know the paint's USEPA registration number or product number. These data were used to calculate the annual dissolved copper load to SIYB from vessels under both confirmed and unconfirmed scenarios, as described further in Section 2.3.4.

2.3.3 Annual Copper Loads from Passive Leaching and In-Water Hull Cleaning

To estimate dissolved copper loads attributed to vessels for the SIYB TMDL monitoring program, the in-water hull-cleaning load (100 kg/yr) and passive leaching load (2,000 kg/yr) identified in Appendix 2 of the SIYB TMDL[4] were combined to form a total vessel-related load of 2,100 kg/yr. This vessel-related baseline load was divided by the total vessel population identified in the TMDL (2,363 vessels), which resulted in an annual per-vessel load of 0.89 kg/yr (rounded to 0.9 kg/yr). Therefore, any reference to the annual per-vessel dissolved copper load is considered to be 0.9 kg/yr.

The dissolved copper load attributed to in-water hull cleaning was identified in Appendix 2 of the SIYB TMDL (Regional Board, 2005) as approximately 100 kg/yr. As part of the Regional Board's load estimation, it was assumed that all SIYB vessel hulls were painted with copper paint, all hulls

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[4] Appendix 2 of the SIYB TMDL is at the following website address:
http://www.waterboards.ca.gov/sandiego/water_issues/programs/watershed/souwatershed.shtml

were cleaned approximately monthly, and in-water hull-cleaning BMPs were used during half of the cleaning events. As discussed above, the annual per-vessel dissolved copper load is 0.9 kg/yr. This total annual per-vessel load is composed of the load from passive leaching (approximately 0.86 kg/yr) and in-water hull cleaning[5] (approximately 0.04 kg/yr) per Appendix 2 of the SIYB TMDL (Regional Board, 2005).

As recommended in the 2015 Monitoring and Progress Report, starting in 2016 and continuing through 2019, the copper loads from passive leaching and in-water hull cleaning are presented separately. The copper loading estimates in Section 3.2.3 present separate load estimate calculations for passive leaching and in-water hull cleaning contributions using the assumption in Appendix 2 of the SIYB TMDL (Regional Board, 2005).

2.3.4 Annual Dissolved Copper Load

The SIYB TMDL copper load reduction is assessed by tracking the number of vessel hulls with copper paint, lower copper paint (DPR Category I or low-copper), aged-copper paint, or non-copper paint, as well as by counting the number of vacant slips in SIYB. Vessels that have aged-copper paint are considered to have a lower copper load (i.e., 0.45 kg/yr), but are tracked separately.

The vessel tracking program estimates loading reductions conservatively. If the hull paint name and type are unknown, the paint is assumed to be copper-based. Additionally, if the most recent painting date is unknown, the vessel is assumed to be painted recently. Lastly, if the occupancy time of a slip or mooring is not reported, the slip or mooring is assumed to be occupied 100 percent of the time (i.e., 365 days per year). Data on paint categories for transient vessels visiting the transient dock and weekend anchorage were not available; therefore, these vessels were assumed to have copper hull paints.

The assumptions below were used by the Regional Board to derive the baseline copper loading identified in Appendix 2 of the SIYB TMDL (Regional Board, 2005). Calculation of loading reductions for the 2019 SIYB TMDL monitoring program was based on comparisons with these baseline conditions:

- All 2,363 SIYB slips or buoys were occupied by a number of vessels (N_v).
- All 2,363 recreational vessels moored within SIYB have copper-based paints 100 percent of the time.
- Annual loading from passive leaching basin wide (L_p) equals 2,000 kg/yr.
- Annual loading from hull cleaning (L_h) equals 100 kg/yr.
- Average annual loading per vessel (L_v) with copper hull paint equals 0.9 kg/yr, where $L_v = (L_p + L_h)/N_v$.

In accordance with the SIYB TMDL, this loading reduction analysis assumed an average loading reduction of approximately 0.9 kg/yr for every vessel in SIYB that converted from copper-based to non-copper-based paints. The use of lower copper hull paints was also recognized in the SIYB TMDL as a viable means of reducing copper loading to the basin. Lower copper paints are

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[5] The annual copper load contribution from in-water hull cleaning (0.04 kg/yr) presented in this report is based on the TMDL load assumption of 5 percent.

identified as DPR Category I paints and paints having a copper content of less than 40 percent (i.e., low-copper). This loading reduction analysis also assumed that, on average, each vessel that transitioned to lower copper hull paints reduced annual dissolved copper loading by 50 percent (0.43 kg/yr for passive leaching + 0.02 kg/yr for in-water hull cleaning). Aged-copper paints also were considered as a 0.45 kg/yr load if they were applied prior to December 31, 2016.

The assumptions for the calculations of annual dissolved copper loading are in Table 2-3.

Table 2-3.
Dissolved Copper Loading Calculation Assumptions

Dissolved Copper Loading Assumptions	
1.	All vessels moored in SIYB at the enactment of the TMDL had copper hull paints.
2.	Average annual dissolved copper load from a vessel with copper paint equals 0.9 kg/yr.
	a. The passive leaching load from a vessel with copper paint equals 0.86 kg/yr.
	b. The cleaning load from a vessel with copper paint equals 0.04 kg/yr.
3.	Vessels with unknown hull paints have copper paint.
4.	Slips/moorings for which occupancy data are not provided are considered to be 100 percent occupied.
5.	Annual dissolved copper load from a vessel with non-copper hull paint equals 0 kg/yr.
6.	DPR Category I paints are paints with leach rates ≤9.5 µg/cm²/day. These paints are considered as lower copper.
7.	Low-copper hull paints are paints with less than 40 percent copper. These paints are also considered as lower copper.
8.	Average annual dissolved copper load from a vessel with lower copper paint equals 0.45 kg/yr.
	a. The passive leaching load from a vessel with lower copper paint equals 0.43 kg/yr.
	b. The cleaning load from a vessel with lower copper paint equals 0.02 kg/yr.
9	Vessels determined to have aged-copper paint (i.e., copper paint applied to a vessel hull prior to December 31, 2016[a]) have an annual dissolved copper load equal to 0.45 kg/yr.
10.	Annual loads are normalized by the percent of time vessels are docked in SIYB.

Notes:
[a] December 31, 2016 is the cutoff date for vessels to be considered to have aged-copper paint for the 2019 annual monitoring and progress report load calculation. This cutoff date will advance by one year for each subsequent annual load calculation.
µg/cm²/day = microgram(s) per square centimeter per day; ≤ = less than or equal to; DPR = Department of Pesticide Regulation; kg/yr = kilogram(s) per year; SIYB = Shelter Island Yacht Basin; TMDL = total maximum daily load

Annual loading was calculated for each slip by multiplying the reported dissolved annual loading for a given hull paint category by the percentage of time a slip was reported to be occupied (e.g., the product of 0.9 kg/yr for copper hull paints and 90 percent occupancy results in an annual loading of 0.81 kg/yr). In the case of the weekend anchorage, data on the number of three-day permits issued weekly were used to calculate annual occupancy and loading. For each issued permit, it was assumed that the vessel occupied the anchorage for an average of three days, and because no hull paint data were collected, all vessels were assumed to have copper paints. Therefore, annual dissolved copper loading due to passive leaching and hull cleaning was calculated by multiplying the annual dissolved copper load (0.9 kg/yr) by the average number of vessels occupying the anchorage weekly in 2019 and the average percentage of time that slips were occupied.

2.4 Water Quality Monitoring

Water quality samples were collected to measure the average concentration of dissolved copper in the basin. The monitoring methods used were consistent with those of prior studies conducted by the Regional Board in SIYB, as reported in Appendix 6 of the SIYB TMDL Technical Report (Regional Board, 2005). To maintain consistency with these prior studies, water quality was monitored at six stations in SIYB and at one reference station in the main channel of San Diego Bay adjacent to SIYB. These station locations were similar to those sampled by the Regional Board and met the Investigative Order requirement of spatially representing dissolved copper concentrations in SIYB, as described in the original Monitoring Plan and most recent update (Weston Solutions, Inc. [Weston], 2011; Wood, 2019a).

Dissolved copper concentrations were compared with the surface water baseline level of 8.3 ± 1.4 µg/L (mean plus or minus standard error). This value was calculated using surface water quality data collected between 2005 and 2008 from stations in the immediate vicinity of the Regional Board monitoring station network (Weston, 2011).

2.4.1 Sampling Station Locations

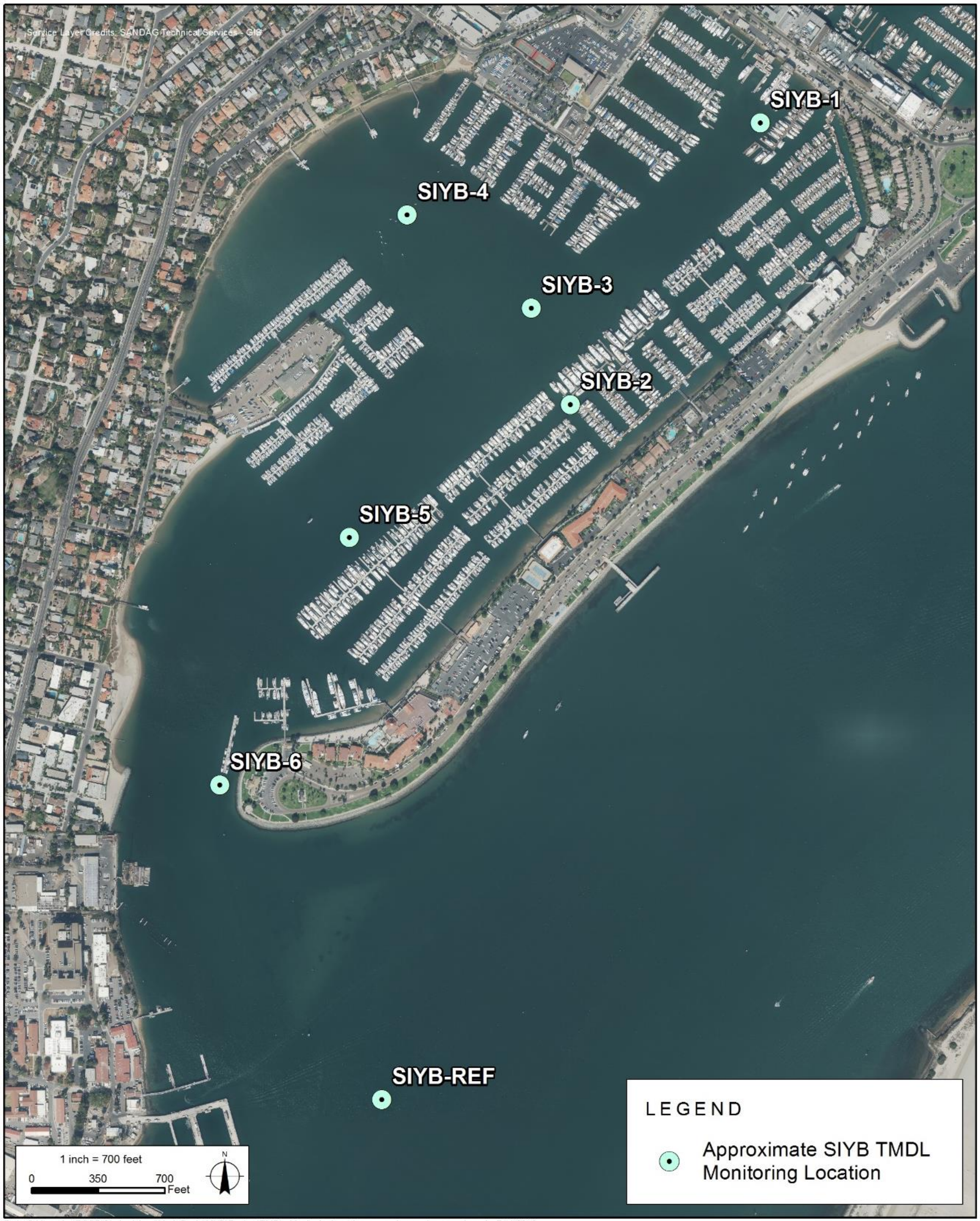
The SIYB water quality monitoring station network was composed of six stations within SIYB (i.e., SIYB-1 to SIYB-6) and one reference station in the main channel of San Diego Bay outside of the mouth of the basin (SIYB-REF) (Table 2-4 and Figure 2-1). To the greatest extent possible, samples were collected within approximately ±3 meters of the target coordinates.

Table 2-4.
Sampling Station Coordinates

Station	Target		Actual	
	Latitude	Longitude	Latitude	Longitude
SIYB-1	32.71821	-117.22601	32.71824	-117.22592
SIYB-2	32.71412	-117.22921	32.71414	-117.22916
SIYB-3	32.71550	-117.22989	32.71550	-117.22977
SIYB-4[a]	32.71683	-117.23203	32.71685	-117.23206
SIYB-5	32.71217	-117.23297	32.71217	-117.23295
SIYB-6	32.70858	-117.23514	32.70875	-117.23515
SIYB-REF[a]	32.70406	-117.23232	32.70406	-117.23225

Notes:

[a] Water samples were recollected from Station SIYB-4, and SIYB-REF for comparison, on September 9, 2019 to confirm acute toxicity observed at SIYB-4 during the initial toxicity testing. Sampling coordinates were 32.71686, -117.23196 for SIYB-4 and 32.70404, -117.23234 for SIYB-REF.



Path: Q:\Aquatics\POSD\ShelterIsland\YachtBasin\MXD\Review\TMDL_MonitoringLocations_overview.mxd, corey.sheredy 7/11/2016

Figure 2-1. Shelter Island Yacht Basin TMDL Sampling Station Locations

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2.4.2 Sampling Date

Surface water at the seven sampling stations (six SIYB stations and one San Diego Bay reference station) was sampled on August 19, 2019[6]. In accordance with the Monitoring Plan, water sampling bracketed slack high tide during the summer, as depicted in Figure 2-2.

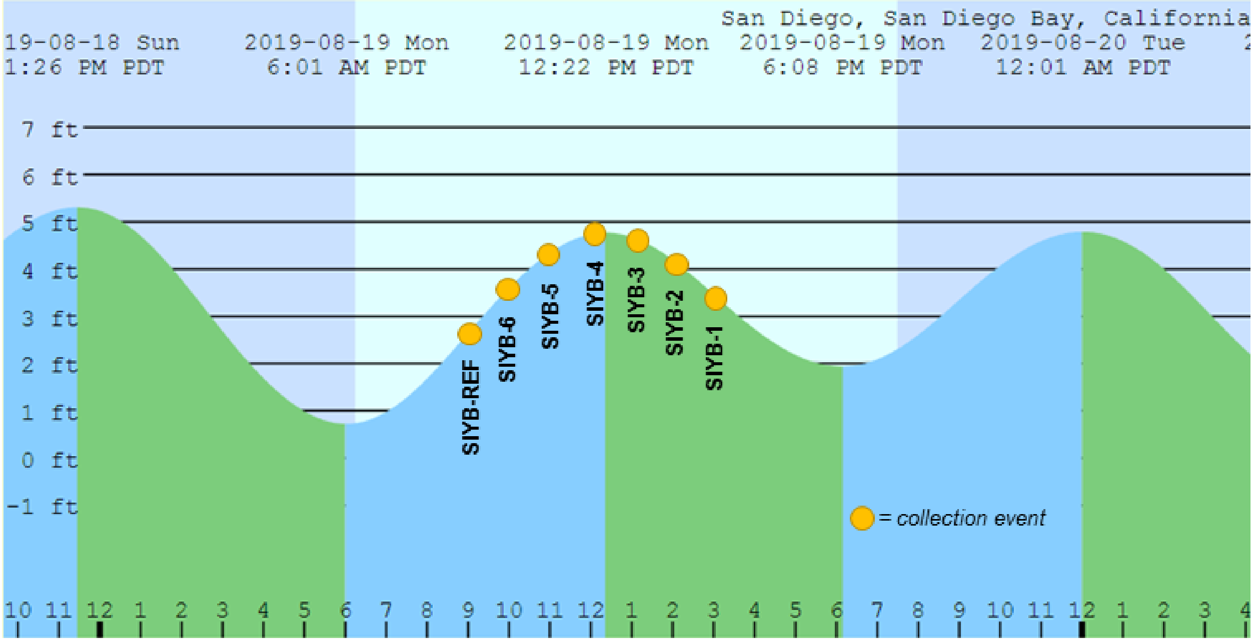

Figure 2-2. August 19, 2019 Sample Collection Times Versus Tide

2.4.3 Sample Collection

Discrete water samples were collected at each station using a Niskin bottle deployed from a sample collection vessel. "Clean-hands" sampling techniques were used, consistent with the project-specific and approved SIYB TMDL Quality Assurance Project Plan (QAPP) (Wood, 2019b). All stations were located using the Differential Global Positioning System.

Samples were collected within the top 1 meter of the basin surface; these samples are referred to as "surface water." Field measurements were taken at each station for hydrogen ion concentration (pH), salinity, and temperature using a YSI Incorporated (YSI) Pro Plus data sonde. Following the collection and preservation of water samples, a top-to-bottom water quality profile using a Sea-Bird Electronics (SBE) Conductivity, Temperature, and Depth (CTD) profile instrument was conducted to evaluate pH, temperature, light transmittance, dissolved oxygen (DO), and salinity at the station. In situ analytical methods and detection limits are listed in Table 2-5.

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[6] During toxicity testing for samples collected on August 19, 2019, toxicity was observed at station SIYB-4 (see Section 3.3.2). To confirm the toxicity at SIYB-4 and determine whether a TIE was warranted, a second set of water samples for toxicity and select chemistry testing were collected from SIYB-4, and SIYB-REF for comparison, on September 9, 2019.

Table 2-5.
In Situ Analytical Methods and Detection Limits

Water Quality Measurement	Method	Instrument Sensitivity
Salinity	SBE CTD and YSI Pro Plus	± 0.1 ppt
Temperature	SBE CTD and YSI Pro Plus	± 0.1 °C
pH	SBE CTD and YSI Pro Plus	± 0.1 pH unit
Dissolved Oxygen	SBE CTD	± 0.1 mg/L
Light Transmittance	SBE CTD	± 0.1%

Notes:
% = percent; °C = degrees Celsius; mg/L = milligram(s) per liter; CTD = conductivity, temperature, and depth; pH = hydrogen ion concentration; ppt = part(s) per thousand; SBE = Sea-Bird Electronics; YSI = YSI Incorporated

After collection, water samples were transferred to labeled containers for analysis of total and dissolved copper and zinc, total organic carbon (TOC), dissolved organic carbon (DOC), total suspended solids (TSS), and toxicity[7].

Detailed field notes were recorded during sample collection at each station and all samples were logged on a chain-of-custody (COC) form, and then placed in a cooler on ice. Samples were stored at 4 degrees Celsius (°C) in the dark until delivered to the appropriate laboratory for analysis, within 24 hours of collection. Water chemistry analyses were conducted by Weck Laboratories, Inc. (Weck) of City of Industry, California; toxicity tests were conducted by Nautilus Environmental (Nautilus) of San Diego, California. Both laboratories are accredited through the California Environmental Laboratory Accreditation Program (ELAP). Photographs taken during field sampling are presented in Figure 2-3.

2.4.4 Equipment Decontamination and Cleaning

The Niskin bottle was cleaned prior to sampling with clean, soapy water and thoroughly rinsed with deionized water. Upon deployment, the Niskin bottle received a thorough site water rinse prior to sample collection. After collection, water samples were transferred using the clean-hands method from the Niskin bottle to laboratory-certified, contaminant-free, high-density polyethylene bottles. The Niskin bottle was also rinsed thoroughly with deionized water between sites, and then rinsed with the site water of each station before sample collection.

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[7] Samples recollected from stations SIYB-4 and SIYB-REF on September 9, 2019 were only tested for total and dissolved copper and zinc, TSS, and acute topsmelt toxicity.

Photo A. Following sample collection, a water column profile of temperature, salinity, conductivity, and transmissivity is conducted using a CTD profiler.

Photo B. Recording of weather conditions, activities such as boat cleaning, and any other observations that may have an impact on water quality is an important component of the field monitoring program.

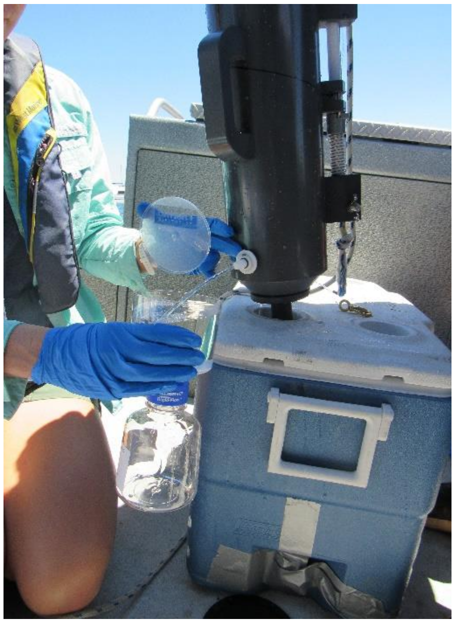

Photo C. Water sample collection for trace-level copper analysis uses a Niskin bottle following clean sampling techniques.

Photo D. Water samples are filtered in the field immediately after collection for analysis of dissolved metals.

Figure 2-3. Field Sampling Photographs

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2.4.5 Chemical Analyses

After collection was completed, samples were transported to the laboratory under customary COC protocols. Samples were analyzed for total and dissolved copper, total and dissolved zinc, TOC, DOC, and TSS, following certified USEPA or Standard Method (SM) test methods. Test method selection was based on the best available combination of sensitivity (low-level detection limits), accuracy (minimum susceptibility to bias or matrix interference), and precision (reproducibility), in accordance with the QAPP.

General water quality measurements (of salinity, temperature, TOC/DOC, TSS, and pH) were also taken at each station. Natural water quality parameters such as DOC are well known to affect the bioavailability and toxicity of copper in marine environments (Delgadillo-Hinojosa et al., 2008; Rosen et al., 2005; and Zirino et al., 2002). Zinc was also included for testing because it can be used as an alternative biocide in AFPs. Both total zinc and dissolved zinc were measured to determine whether concentrations are increasing as vessel hull paints are converted from copper-based to non-copper-based paints.

Analysis of water quality data included calculations of average surface water dissolved copper concentrations to compare with the dissolved copper CTR criterion continuous concentration (CCC) WQO (3.1 µg/L). In Section 3.0, the 2019 dissolved copper results are compared with the 2005–2008 baseline data as reported in the original Monitoring Plan (Weston, 2011) to evaluate the change in dissolved copper levels in the surface waters over time.

The laboratory analytical methods and target detection and reporting limits are specified in Table 2-6.

Table 2-6.
Laboratory Analytical Methods

Water Quality Measurement	Method	Method Detection Limit	Reporting Limit
Total Copper	USEPA 1640	0.0038 µg/L	0.010 µg/L
Dissolved Copper	USEPA 1640	0.0038 µg/L	0.010 µg/L
Total Zinc	USEPA 1640	0.036 µg/L	0.20 µg/L
Dissolved Zinc	USEPA 1640	0.036 µg/L	0.20 µg/L
TOC	SM 5310 B	0.016 mg/L	0.10 mg/L
DOC	SM 5310 B	0.016 mg/L	0.10 mg/L
TSS	USEPA 2450 D	1.0 mg/L	5.0 mg/L

Notes:
µg/L = microgram(s) per liter; DOC = dissolved organic carbon; mg/L = milligram(s) per liter; SM = Standard Method; TOC = total organic carbon; TSS = total suspended solids; USEPA = United States Environmental Protection Agency

2.4.6 Toxicity Testing

Toxicity testing consisted of a 96-hour acute bioassay test to be consistent with the SIYB TMDL guidance (Regional Board, 2005) using Pacific topsmelt (*Atherinops affinis*). Additionally, a 48-hour chronic bioassay test using mussel larvae (*Mytilus galloprovincialis*) was performed. Previous studies have used the 48-hour mussel larvae chronic test as their primary indicator of toxicity because *Mytilus galloprovincialis* is considered one of the most sensitive species used in the calculation of the water quality criterion for copper in marine environments (USEPA, 1995a). However, both tests were used to assess compliance with the narrative toxicity objective.

2.4.6.1 Topsmelt 96-Hour Acute Bioassay

Topsmelt acute toxicity tests were initiated on August 19, 2019 (the day of sample collection) following the procedures described in *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms* (USEPA, 2002).

Juvenile topsmelt were exposed for 96 hours to three sample concentrations (0.5 dilution series) and a control. Each concentration was tested with six replicates and five topsmelt per replicate. Water quality measurements of DO, temperature, pH, and salinity were conducted daily. Test conditions are summarized in Tables 2-7 and 2-8. After 96 hours, percent survival was calculated. The test was considered acceptable if mean survival was greater than or equal to 90 percent in the controls.

During the initial topsmelt acute toxicity tests (initiated on August 19, 2019), the lab controls did not meet the minimum test acceptability criterion of 90 percent mean survival. Therefore, the undiluted samples were retested on August 22, 2019 using a new batch of topsmelt[8].

Toxicity was again observed in the 2019 sample from SIYB-4 during the topsmelt retest initiated on August 22, 2019, as observed in 2018. To further investigate these results, samples were recollected on September 9, 2019 from SIYB-4 and the reference site. These samples were tested on September 10, 2019 to confirm toxicity and determine whether a TIE was warranted[9].

A 96-hour reference toxicant test using copper chloride was conducted concurrently with each SIYB toxicity test to evaluate the relative sensitivity of test organisms to a single known chemical, as well as the laboratory’s proficiency with the test procedure. The topsmelt reference toxicant tests were conducted with copper concentrations of 0, 50, 100, 200, 400, and 800 µg/L. The reference toxicant tests were conducted concurrently with the SIYB testing and used test organisms from the same batch. Following each test termination, the median lethal concentration (LC_{50}) was calculated and compared with historical laboratory reference toxicant test data for this species. Test organisms are considered appropriately sensitive when the test LC_{50} is within two standard deviations of the historical laboratory standard.

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[8] Due to an insufficient number of acceptable test specimens available for the August 22, 2019 retest, only the undiluted sample from each station (100 percent concentration) and control treatment could be initiated by the toxicity testing laboratory.

[9] Because this test was initiated as part of an investigation to confirm toxicity noted in the previous test, only the samples for the station that showed toxicity (SIYB-4) and the reference site were tested. In addition, the tests on these two samples were set up with two treatments only: undiluted (100 percent) and control.

Table 2-7.
Conditions for the 96-Hour Pacific Topsmelt Bioassay – 8/19/19 Sample Collection

96-Hour Acute Fish Survival Bioassay Conditions	
Samples Tested	SIYB-1, SIYB-2, SIYB-3, SIYB-4, SIYB-5, SIYB-6, SIYB-REF
Date Sampled	August 19, 2019
Test Dates	August 19–23, 2019 August 22–26, 2019
Test Species	Pacific topsmelt *(Atherinops affinis)*
Test Protocol	USEPA Acute Manual, 2002 (EPA-821-R-02/012)
Test Acceptability Criterion	≥90 percent mean survival in the laboratory control
Test Type and Duration	Acute survival/96-hour static-renewal (48-hour water renewal)
Organism Supplier	Aquatic BioSystems, Fort Collins, Colorado
Control Water Source	Scripps Pier seawater, 20-µm filtered
Acclimation Time	August 19, 2019 test: 2 days August 22, 2019 test: 2 days
Age at Test Initiation	August 19, 2019 test: 15 days old August 22, 2019 test: 11 days old
Test Concentrations	August 19, 2019 test: 0 (laboratory control), 25, 50, and 100 percent sample August 22, 2019 test: 0 (laboratory control) and 100 percent sample
Replicates per Sample	6
Organisms Exposed per Replicate	5
Exposure Volume	250 mL

Notes:
≥ = greater than or equal to; µm = micrometer(s); mL = milliliter(s); USEPA = United States Environmental Protection Agency

Table 2-8.
Conditions for the 96-Hour Pacific Topsmelt Bioassay – 9/9/19 Sample Collection

96-Hour Acute Fish Survival Bioassay Conditions	
Samples Tested	SIYB-4, SIYB-REF
Date Sampled	September 9, 2019
Test Dates	September 10–14, 2019
Test Species	Pacific topsmelt *(Atherinops affinis)*
Test Protocol	USEPA Acute Manual, 2002 (EPA-821-R-02/012)
Test Acceptability Criterion	≥90 percent mean survival in the laboratory control
Test Type and Duration	Acute survival/96-hour static-renewal (48-hour water renewal)
Organism Supplier	Aquatic BioSystems, Fort Collins, Colorado
Control Water Source	Scripps Pier seawater, 20-µm filtered
Acclimation Time	3 days
Age at Test Initiation	15 days old
Test Concentrations	0 (laboratory control) and 100 percent sample
Replicates per Sample	6
Organisms Exposed per Replicate	5
Exposure Volume	250 mL

Notes:
≥ = greater than or equal to; µm = micrometer(s); mL = milliliter(s); USEPA = United States Environmental Protection Agency

2.4.6.2 Bivalve 48-Hour Bioassay

The 48-hour bivalve larvae tests were initiated on August 20, 2019, for all samples collected in SIYB and followed the procedures described in *Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine and Estuarine Organisms* (USEPA, 1995b).

Bivalves were exposed to five sample concentrations and a control. Each concentration was tested with five replicates and approximately 150 larvae were targeted for inoculation into each replicate. Daily water quality measurements included DO, temperature, pH, and salinity. Test conditions are summarized in Table 2-9.

After test termination, the percentage of surviving embryos with normal development was calculated to determine whether normality had been significantly reduced. The test was considered acceptable if (1) at least 50 percent of larvae survived in the controls, and (2) an average of 90 percent of surviving larvae developed normally in the controls. In addition, the percent minimum significant difference in the test must be less than 25. A combined endpoint of normal surviving embryos is reported.

Table 2-9.
Conditions for the 48-Hour Mussel Development Bioassay

48-Hour Chronic Bivalve Survival and Shell Development Bioassay Conditions	
Samples Tested	SIYB-1, SIYB-2, SIYB-3, SIYB-4, SIYB-5, SIYB-6, SIYB-REF
Date Sampled	August 19, 2019
Test Dates	August 20–22, 2019
Test Species	Mediterranean mussel *(Mytilus galloprovincialis)*
Test Protocol	USEPA/600/R-95/136 (USEPA, 1995b); ASTM, 1998; PTI, 1995
Test Acceptability Criteria	Mean percent survival in the laboratory control must be 50 percent, and 90 percent of surviving organisms must have normal shell development. The PMSD in the test must be less than 25.
Test Type/Duration	Bivalve larvae survival and development (endpoint reported as normal development of surviving embryos) – Static/48 hours
Organism Source	Mission Bay, San Diego, California
Control Water Source	Scripps Pier seawater, 20-µm filtered
Age Class of Mussels Exposed	<4 hour-old embryos
Test Concentrations	0 (laboratory control), 6.25, 12.5, 25, 50, and 100 percent sample
Replicates/Sample	5
Initial Density of Organisms Exposed per Replicate	~150
Exposure Volume	10 mL

Notes:
~ = approximately; < = less than; µm = micrometer(s); ASTM = ASTM International; mL = milliliter(s); PMSD = percent minimum significant difference; PTI = Pesticide Toxicity Index; USEPA = United States Environmental Protection Agency

A 48-hour reference toxicant test using copper chloride was conducted concurrently with the project sampling to evaluate the relative sensitivity of test organisms and the laboratory's proficiency with the test procedure. The bivalve reference toxicant test was conducted with copper concentrations of 0, 2.5, 5.0, 10, 20, and 40 µg/L. The same batch of test organisms was used for both the reference toxicant test and the project samples. At test termination, the median effective concentration (EC_{50}) was calculated and compared with historical laboratory reference toxicant test data for this species. Test organisms are considered to be responsive and appropriately sensitive if the test EC_{50} was within two standard deviations of the respective historical laboratory mean.

2.4.7 Toxicity Statistical Analyses

Determinations of toxicity using the 96-hour topsmelt and 48-hour mussel bioassays were statistically assessed using the Comprehensive Environmental Toxicity Information System™, Tidepool Scientific Software. Survival of topsmelt fish and normal development of surviving mussel embryos in each test dilution from SIYB were compared with organism performance observed in control exposures to filtered clean seawater collected from the end of the pier at Scripps Institution of Oceanography in La Jolla, California. Results were used to determine LC_{50} and EC_{50} values. If fish survival and normal embryo development in the controls did not differ significantly from those of the treatments, then conditions within were considered nontoxic at the station. The test of significant toxicity (TST) method was used to identify any samples that exhibited a statistically significant difference from the control (USEPA, 2010).

2.5 Quality Assurance and Quality Control

This section describes the QA/QC procedures for all field activities and laboratory analyses. Specific QA/QC procedures are provided in detail in the approved project-specific SIYB TMDL QAPP (Wood, 2019b).

2.5.1 Field QA/QC

Sampling process QA/QC included preparation prior to, during, and after sample collection to minimize the possibility of compromising sample integrity. The sample collection team was trained in and followed field sampling standard operating procedures (SOPs), as described in the SIYB QAPP (Wood, 2019b). As part of the updated field collection protocol, QA/QC reviewers from the Port and Wood were onboard the sampling vessel at all times to review each step of the sample and data collection process. Additionally, Port-approved field checklists were used throughout the sampling event to ensure that all procedures were consistent at each station, all samples were collected in exactly the same manner at every station, and all required field data were properly recorded (see Appendix D). Observations of activities (e.g., vessel hull cleaning) surrounding the sampling area were recorded on field data sheets at each station and during movement between stations.

Field staff members were careful to avoid contamination of samples at all times, wore powder-free nitrile gloves during sample collection, and used the clean-hands technique. All samples were collected in laboratory-supplied, laboratory-certified, contaminant-free sample bottles. Field measurement equipment was checked for operation in accordance with the manufacturer's specifications and was inspected for damage prior to use and when returned from use. The QA/QC checks for the 2019 monitoring year are summarized as follows:

- QAPP updates
- Verification of laboratory certifications
- Field mobilization and equipment checklists
- Field sampling QA/QC checklists
- Staff training on QAPP-required field procedures
- Field conditions and water quality data sheets
- Onboard QA/QC oversight

- Field equipment calibrations records
- Observations of water clarity
- Observations for hull cleaning or other water-quality-impacting activities near sampling station locations

As required by Surface Water Ambient Monitoring Program (SWAMP) protocols, the monitoring program also included the addition of a field replicate. The field replicate sample consisted of a second complete set of samples collected at one of the sampling stations (SIYB-1 in the 2019 monitoring program). The purpose of the field replicate is to assess variability in sampling procedures as well as ambient conditions.

Chemistry and toxicity samples were uniquely identified on sample labels using indelible ink. All sample containers were identified by the project title, appropriate identification number, date and time of sample collection, and preservation method. Sample labels were inspected by a QA reviewer before and after bottles were filled at each station to ensure that every sample and analysis type was labeled correctly before moving to the next station. All samples were kept on ice from the time of sample collection until delivery to the analytical laboratory for analysis within method-specified holding times (Table 2-10). Wood delivered samples on the same day as sample collection to Nautilus; samples were delivered by courier to Weck the same day or following day (August 20, 2019 and September 9, 2019). Both Weck and Nautilus are accredited by the California ELAP for the specific tests that were performed at the time they were conducted.

Table 2-10.
Sample Holding Times

Analyte	Holding Time
TOC	28 days
DOC	28 days[a]
Total Copper	180 days
Dissolved Copper	48 hours[b]
Total Zinc	180 days
Dissolved Zinc	48 hours[b]
TSS	7 days
48-hour Acute Bioassay	36 hours
96-hour Chronic Bioassay	36 hours

Notes:

[a] The holding time is applicable to preserved sample. The sample is filtered in the field into a bottle with H_2SO_4 preservative for DOC analysis.

[b] The holding time for metals after preservation is 180 days. The dissolved fraction is filtered in the field through a 0.45- µm glass fiber filter using a bottle top vacuum filtration system. Samples are preserved at the laboratory immediately upon receipt from the courier, within 24 hours of sample collection.

µm = micrometer(s); DOC = dissolved organic carbon; H_2SO_4 = sulfuric acid; TOC = total organic carbon; TSS = total suspended solids

2.5.2 Laboratory Analytical QA/QC

The QA objectives for chemical analysis conducted by the participating analytical laboratories are provided in their individual laboratory QA manuals. The objectives for accuracy and precision involved all aspects of the testing process, including:

- Methods and SOPs
- Calibration methods and frequency

- Data analysis, validation, and reporting
- Internal QC
- Preventive maintenance
- Procedures to ensure data accuracy and completeness

Results of all laboratory QA/QC analyses are reported in Appendix D. Any QC samples that failed to meet the specified QA/QC criteria in the methodology or QAPP were identified, and the corresponding data were appropriately qualified. Furthermore, in cases where laboratory data were not within control limits, follow-up testing was performed by the laboratory to verify results wherever applicable. All QA/QC records for the various testing programs are kept on file for review, as applicable.

2.6 Chain-of-Custody Procedures

COC procedures were used for all samples throughout the collection, transport, and analytical process. The principal documents used to identify samples and to document possession were COC records, field logbooks, and field tracking forms. COC procedures were initiated during sample collection. A COC record was provided with each sample or group of samples. Each Wood employee who had custody of the samples signed the form and ensured that the samples were always attended unless properly secured.

Documentation of sample handling and custody included the following:

- Client and project name
- Sample identifier
- Sample collection date and time
- Any special notations on sample characteristics or analysis
- Initials of the person collecting the sample
- Date the sample was sent to the analytical laboratory

Completed COC forms were placed in a plastic envelope and kept inside the cooler containing the samples. As previously noted, the bay water samples were couriered to Weck and Nautilus on the same day that the samples were collected or the following day (August 19–20, 2019 for initial collection and September 9, 2019 for follow-up collection). This level of effort provided additional security for the COC process and ensured that all holding times were met.

Upon sample delivery to the analytical laboratory, the COC form was signed by the person receiving the samples. COC records were included in the final reports prepared by the analytical laboratories. Following completion of the analytical analyses, remaining sample material was stored until the holding time expired; samples were then disposed of properly.

2.7 Data Review and Management

Field and laboratory data were reviewed for completeness and accuracy prior to data analysis and reporting, and were stored in a database, as described in Sections 2.7.1 and 2.7.2.

2.7.1 Data Review

After each survey, field data sheets were checked for completeness and accuracy by the field crew and the QA reviewer. In addition, all sample COC forms were checked against sample labels at the end of the day prior to sample transport to the laboratories. In the laboratory, technicians documented sample receipt in laboratory logbooks, and samples were logged into the electronic Laboratory Information Management System (LIMS) for sample tracking purposes to ensure that holding times were met and samples were efficiently analyzed. Logbooks were maintained at each instrument to provide hardcopy documentation of analytical runs, and data generated by each instrument were directly uploaded to the LIMS system for data review and processing. Data validation was performed within the LIMS and included application of both performance-based and project-specific QC criteria to reject or accept specific data. Data for laboratory analyses were entered directly onto data sheets. The technician who generated the data had primary responsibility for the accuracy and completeness of the data. Each technician reviewed the data to ensure the following:

- The sample description information was correct and complete.
- The analysis information was correct and complete.
- The results were correct and complete.
- The documentation was complete.

All data were subsequently reviewed and verified by each section supervisor and released to the laboratory project manager to determine whether data quality objectives had been met for final reporting, and whether appropriate corrective actions had been taken when necessary. Any necessary corrective actions were coordinated with the laboratory project manager, the laboratory QA/QC director, and the Wood project manager for resolution.

2.7.2 Data Management

All laboratories supplied analytical results in Adobe Portable Data Format (PDF) files. After completion of the data review by participating team laboratories, laboratory results were forwarded to Wood for review and reporting. All laboratory records that were submitted, including any raw data, are included in Appendix D with each laboratory report.

3.0 RESULTS

This section provides details on the Port's dissolved copper BMP implementation activities; the marinas and yacht clubs' dissolved copper BMP implementation activities; results of the vessel tracking census; estimates of copper load reduction; and results of the ambient water quality and toxicity monitoring performed in SIYB in 2019.

3.1 SIYB TMDL Implementation

Evaluation, interpretation, and tabulation of data and information are provided in this section. Through enhanced activities by marina and yacht club managers to survey boaters, approximately 92 percent of boat owners responded (based on the final combined 2019 survey) and reported information regarding their hull paint. This response rate is indicative of continual reporting improvements and invested effort from year to year. Figure 3-1 illustrates the changes in response rate over previous surveys.

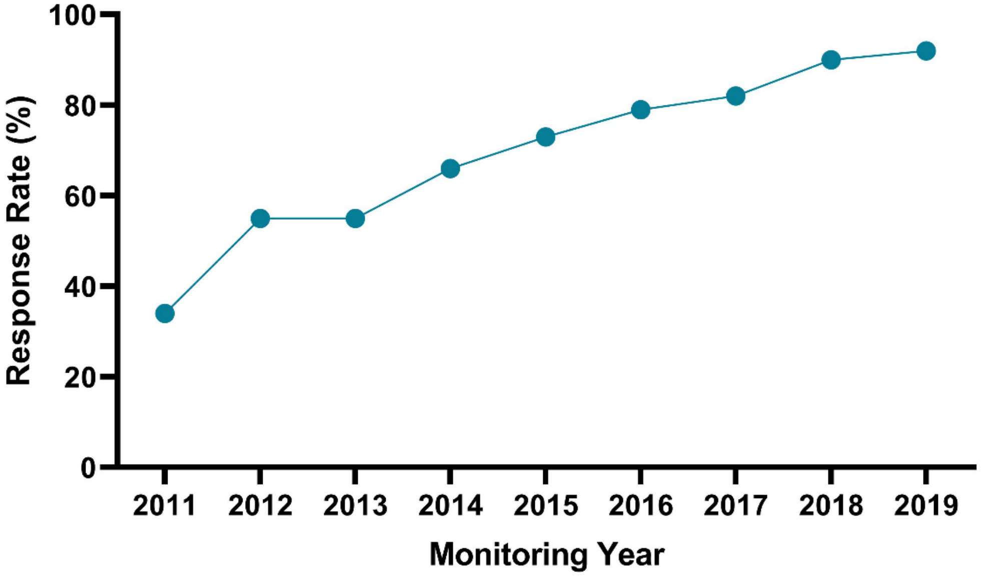


Figure 3-1. Vessel Census Response Rate by Monitoring Year

3.1.1 BMP Implementation

All Named TMDL Parties have obligations to meet copper loading reduction requirements outlined in the SIYB TMDL (i.e., a 76 percent reduction in copper loading by the end of 2022). The Port continues to address copper loading at the Harbor Police dock, the transient dock, and the weekend anchorage, and continues to support the load reduction efforts of the other Named TMDL Parties. The Port, along with the marinas and yacht clubs, have implemented or are in the process of planning and implementing several categories of BMPs and other actions to reduce dissolved copper discharges to SIYB, including:

- Hull paint transition
- Hull-cleaning BMPs
- Monitoring
- Reporting

- Education and outreach
- Grant funding and incentives
- Alternative hull paint studies
- Agency-wide activities
- Policy/regulation
- Testing and research
- Structural and mechanical BMPs

Sections 3.1.1.1 and 3.1.1.2 describe specific BMPs used during the 2019 monitoring year. Section 3.1.1.1 was provided directly by the Port and Section 3.1.1.2 was provided directly by individual marinas and yacht clubs and the SIML TMDL Group, as applicable.

3.1.1.1 Port of San Diego BMPs to Reduce Copper Loading

The Port has taken the lead in developing a program to reduce copper in SIYB and throughout San Diego Bay. A critical “launch” component of the program was the adoption of the Board of Port Commissioner’s Resolution 2009-230 in 2009. This resolution memorialized the strategies and commitments the Port would employ for the Copper Reduction Program to reduce dissolved copper in and around San Diego Bay. As part of its Copper Reduction Program, the Port has initiated, and is in the process of planning and implementing, a number of BMPs and other actions to reduce discharges of dissolved copper into harbors and marinas within SIYB, throughout San Diego Bay, and statewide. The Port’s program is a pragmatic approach that complies with the interim and final goals of the SIYB TMDL. The program focuses on the largest source contributions, identifies a strategic approach for implementing projects over the short and long term, and effectively achieves regulatory compliance for loading and improved water quality while balancing economic and public interests.

The projects implemented by the Port since the Regional Board adopted the SIYB TMDL have reduced dissolved copper discharges to SIYB and also have supported the load reduction efforts of the other Named TMDL Parties, including the marinas and yacht clubs, hull cleaners, and boaters. The Port’s Copper Reduction Program began in 2007 and identified over 30 key initiatives, many of which enabled the Port and the other Named TMDL Parties to comply with the SIYB TMDL’s first and second interim targets.

During the 2019 reporting period, the Port placed a large focus on policy and regulation approaches that would improve water quality as well as reduce copper loading. In September 2019, the Port began a review of both its In-Water Hull Cleaning Permit Program and the In-Water Hull Cleaning Ordinance and associated BMPs; the review is currently ongoing. A Conceptual Model Review was completed in September 2019, which evaluated the best available science and overall loading contributions associated with current in-water hull cleaning practices. Outreach and education remained a valuable component, as it was necessary to engage stakeholders and interested parties in both the Permit and Ordinance review process and other load reduction discussions. In addition, the Port is currently refocusing a greater emphasis on the Harbor Police dock, the transient vessel docks, and the weekend anchorage facilities in SIYB to further reduce and eliminate copper loading, while continuing to support and encourage the other Named TMDL Parties (i.e., boaters, in-water hull cleaners, and marinas and yacht clubs) in copper reduction efforts within their leaseholds and operations/activities.

In addition to large focuses on policy and regulation as well as education and outreach, the Port made progress across all focused areas of the Copper Reduction Program:

- **Policies and Regulation**: A variety of separate initiatives were completed, including collaborating with the DPR and facilitating sampling in SIYB as part of a DPR statewide special study, establishing conference calls with Los Angeles County Department of Beaches and Harbors to stay engaged on regional TMDL issues and progress, and implementing an increased in-water hull cleaning inspection schedule.
- **Testing and Research:** Phase 1 of the Rentunder Boatwash Pilot Project was completed as part of the Port's Blue Economy Incubator. The pilot project is evaluating how the technology may assist with copper remediation.
- **Implementation and Facilitation of Hull Paint Transitions**: All Port vessels continue to be painted with non-copper hull paints, contributing no load to SIYB.
- **Boater Education and Outreach**: All interested parties were exposed to the issues via outreach efforts such as TMDL status updates to stakeholder groups, regular meetings with the marinas and yacht clubs, information dissemination through print material and digital efforts, conference presentations, newspaper articles, and other outreach initiatives. In addition, as part of the September 2019 In-Water Hull Cleaning Permit and In-Water Hull Cleaning Ordinance Review, five public engagement sessions were held in October and December 2019, re-engaging many from the boating, in-water hull cleaning, boatyard, and marina and yacht club communities with the TMDL (i.e., other Named TMDL Parties), and discussing the need for additional reductions in copper loading in and around SIYB and San Diego Bay.
- **Companion Programs**: Construction site inspections, commercial business inspections, and Standard Urban Stormwater Mitigation Plan (SUSMP) implementation continued.
- **Monitoring and Reporting**: A Conceptual Model Review was completed for the SIYB TMDL, where the contribution of copper loading from in-water hull cleaning was evaluated.

The main elements of the Port's 2019 Copper Reduction Program efforts are described below. A complete list of the Port's BMPs, the status of each, and brief effectiveness assessments are in Appendix B. Unless otherwise noted, the following BMPs have been implemented for the SIYB TMDL.

Policies and Regulation to Reduce Copper Loading

Policies, regulations, and legislative efforts to reduce copper loading are instrumental to the Port's Copper Reduction Program, not only to help meet regulatory compliance requirements, but also to work toward reducing copper throughout San Diego Bay.

When the Port adopted Resolution 2009-230 in 2009, the objective was to specifically detail strategies for reducing copper throughout San Diego Bay, including the following:

- Complying with the provisions of regulatory requirements and achieving reductions in copper levels within or in advance of the time frames specified in the SIYB TMDL,
- Identifying viable options for reducing copper levels in San Diego Bay,
- Supporting regulations on hull paints at a state or federal level,

- Developing, as necessary, policies, ordinances, procedures, and/or programs to achieve load reductions,
- Working with tenants and stakeholders to identify and implement copper reduction strategies, and
- Maintaining the Port vessel fleet as 100 percent non-copper.

Strategies outlined in Resolution 2009-230 have resulted in the Port's policy, regulation, and legislative efforts to date, all of which are in place to assist in copper reduction throughout San Diego Bay.

Copper Hull Paint Legislation

DPR Copper Paint Rule: Implementation and Coordination

The new DPR Rule (3 California Code of Regulations [CCR] section 6190) went into effect on July 1, 2018, establishing a maximum leach rate for copper antifouling paints. This regulation is the result of joint efforts by the Port and state legislators with the passing of Assembly Bill (AB) 425, requiring the DPR to adopt a leach rate protective of aquatic environments. Under the new regulation, paint manufacturers are no longer allowed to import or sell paints in the state of California with leach rates greater than 9.5 $\mu g/cm^2/day$. It should be noted that any existing stock can be sold until June 30, 2020. While this new point-of-sale regulation will assist in TMDLs, the DPR has cautioned that additional mitigation measures are still required.

For the 2019 reporting year, the grace period for all high-copper paints that are currently in stock at stores and boatyards remained in place; however, local boatyards have indicated that they do not keep large stores of paint at their facilities.

Port and DPR staff held several conference calls, continuing their ongoing collaborative partnership that promotes consistency in copper paint-related regulations across the state. In 2019, the Port collaborated with the DPR for their statewide special study to evaluate whether Category I paints are improving water quality in impaired basins over time. This study is anticipated to be conducted every other year for the next several years, if DPR funding is available.

In August 2019, Port staff assisted DPR staff in conducting their study. These efforts included providing access to SIYB for sampling, providing a sampling vessel, and facilitating communications between the DPR and the marinas, yacht clubs, and other SIYB stakeholders during the special study planning process. The Port plans to continue collaborating with the DPR by offering similar support in future years.

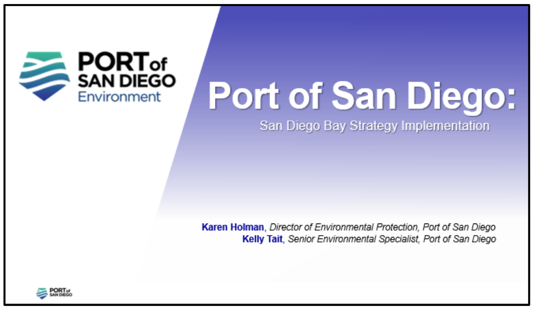
This partnership enables long-term copper reduction planning to align with state efforts. Specifically, the special study being conducted by the DPR will inform the Port on the effectiveness of the 2018 Copper Paint Regulation in improving water quality.

Correspondence with State and Federal Agencies

Regular communications with state and federal agencies, policy makers, and legislators promote consistency in requirements being developed across the state. They also provide a valuable networking mechanism to discuss strategies for implementation of activities and lessons learned and to build upon successful activity models. During 2019, the following correspondences occurred:

San Diego Regional Water Quality Control Board

At the August 14, 2019 monthly San Diego Regional Water Quality Control Board meeting, the Regional Board staff gave a presentation on the update to the San Diego Bay Strategy. Within this presentation, Regional Board staff updated their board on efforts to improve water quality, sediment quality, and ecosystems and habitats in San Diego Bay. **Port staff attended this meeting and delivered a supporting presentation titled *Port of San Diego: San Diego Bay Strategy Implementation,* where several environmental and water quality initiatives were highlighted, and shared missions and goals of both agencies were reiterated.**



PORT of SAN DIEGO Environment

Port of San Diego:

San Diego Bay Strategy Implementation

Karen Holman, *Director of Environmental Protection, Port of San Diego*
Kelly Tait, *Senior Environmental Specialist, Port of San Diego*

2019 California Marine Affairs and Navigation Conference Washington Week

In March 2019, the Port participated in the California Marine Affairs and Navigation Conference (CMANC) committee's annual "Washington Week" trip to Washington D.C. The purpose of Washington Week is to bring high-level issues related to California ports and harbors to the attention of elected officials and federal agency administrative offices. Key meetings with the USEPA and California congressional delegates focused on bays and harbors and included topics such as dredging, harbor maintenance, and water quality. One of the key issues raised by CMANC was the concern about the various dissolved copper TMDLs facing California and the need for regulatory agencies to work together when setting product use regulations and water quality objectives. Another discussion point related to the achievement of final TMDL targets and predicted water quality improvements. Additionally, Port staff were able to participate in idea-sharing discussions with other California port/harbor staff from Newport Beach and other cities facing similar water quality and TMDL challenges.

Florida Department of Environmental Protection

On March 27, 2019, Port staff held a conference call at the request of the Florida Department of Environmental Protection with their TMDL and water quality staff. Their staff had reached out to the Port to ask questions about copper impairments, the SIYB Copper TMDL, and the Copper Reduction Program. Their staff also discussed how they are starting to look at copper impairments in the state of Florida and were looking at the Port's Copper Reduction Program and SIYB TMDL progress to date as examples to guide their research for Florida impairments. **The Port's Copper Reduction Program continues to serve as an example of management strategies for copper impairments at the local, regional, state, and national level.**

Marina Inter-Agency Coordinating Committee

Two Marina Inter-Agency Coordinating Committee (MIACC) meetings occurred during the 2019 reporting year, one on May 30, 2019, and the second on December 3, 2019.

For the May 30, 2019 meeting, during stakeholder updates, Port staff announced the draft update to the *Recreational Boater's Guide to Using Hull Paint in California,* announced the comment period, and sent the draft to the MIACC distribution list. Topics of discussion for the May 2019 meeting included Biofouling Management from the perspective of the State Lands Commission, a presentation on a Non-Biocide Hull Paint Study and Floating Dry Docking System at Marina Del Rey Harbor, an update on the Motor Vehicle Brake Friction Materials Law (California Brake Pad Law), and a presentation on the use of treated wood and alternative materials for building overwater and waterfront structures.

For the December 3, 2019 meeting, during stakeholder updates, Port staff discussed the implementation of its draft In-Water Hull Cleaning Ordinance Review, the public comment period, and the associated public engagement sessions. Port staff took questions and encouraged interested stakeholders to sign up for email updates. The December 2019 meeting included a presentation for Biofouling Management and new Best Management Practices as well as a presentation titled *Environmental Risks Associated with Commercial Vessel In-Water Cleaning Options.*

Coordination with Other Regions on Copper TMDLs and Impairments

In 2019, Port staff began having regular “check-ins” with Los Angeles County Department of Beaches and Harbors to discuss both agencies’ TMDL programs and share lessons learned for copper reduction efforts. Staff from both agencies discussed alignment in regional approaches to copper reduction, where applicable, that greatly strengthen both programs, such as looking at BMPs associated with hull cleaning.

On May 10, 2019, Port staff attended a public workshop hosted by the Santa Ana Regional Water Quality Control Board in Newport Beach, California titled *Basin Plan Amendments to Incorporate Total Maximum Daily Loads for Copper and Non-TMDL Action Plans for Other Metals in Newport Bay*. Many examples were drawn from the SIYB TMDL and the Port’s Copper Reduction Program.

On July 9, 2019, Port staff attended a public workshop hosted by Los Angeles County Department of Beaches and Harbors in Marina Del Rey, California titled *Public Workshop for the Marina Del Rey Copper Site-Specific Objective Study*. The Los Angeles County Department of Beaches and Harbors was initiating a special study to determine a potential site-specific objective for copper in Marina Del Rey. At the workshop, they presented the work plan for the study and ongoing water quality improvement activities.

Regulations for In-Water Hull Cleaning

Since October 2011, the Port’s in-water hull-cleaning regulations have been in place requiring hull-cleaning businesses to obtain Port-issued permits to conduct hull cleaning on tidelands, develop BMP plans and implement BMPs during all cleaning activities, and ensure that all hull cleaners are trained on the BMPs. The regulations also require marinas to check each hull cleaner for proof of a valid permit and to prohibit non-permitted divers from working in their facilities. At the end of 2012, the Port began issuing identification cards to all permitted hull cleaners to facilitate check-in at the marinas, a process that continued into 2019.

Diver cleaning a boat hull

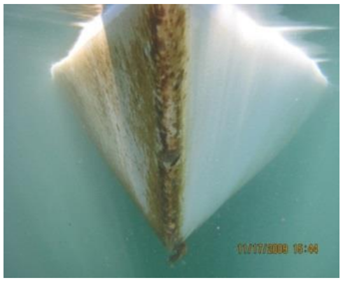
Validation of the permits continued in 2019 via collaborative efforts made by the Port, marinas, and yacht clubs to continue implementing the check-in process. Port staff conducted inspections of the Harbor

Police and transient docks, marinas, yacht clubs, and the hull cleaners that were conducting business in these areas.

Overall, the Port conducted 87 inspections for In-Water Hull Cleaning activities and 59 marina and yacht club inspections bay-wide in 2019. Consistent with the overall programmatic adjustment to place a greater focus on Port areas, in-water hull cleaning inspections of the Harbor Police dock and transient docks occurred bi-weekly from April through December, accounting for 33 percent (29 of 87) of the completed inspections.

In September 2019, the Port initiated a review of its current In-Water Hull Cleaning Ordinance, Permit, and required BMPs (see Section 4.2 for additional information related to the in-water hull cleaning regulation review process). As this process moves forward, all Permit terms will be extended and new permits will be issued on a conditional basis. For the 2019 reporting period, key permitting statistics are as follows:

- 94 permits have been issued since the onset of the regulation.
- 47 hull-cleaning permits are active (as of December 31, 2019, including those expired between September 5–December 31, 2019).
- 4 new hull-cleaning permits were issued in 2019.
- 1 new conditional hull-cleaning permit was issued in 2019.
- 6 hull-cleaning permits were renewed in 2019 (as of December 31, 2019).



Boat hull before and after cleaning

To date, the regulations helped to reduce copper loads from in-water hull cleaning via requiring the use of diver BMPs. Until a revised Ordinance and Permit Program is finalized, the in-water hull cleaning regulations will continue as they have in previous years.

Testing and Research

The Testing and Research component of the Copper Reduction Program was developed to assist all Named TMDL Parties in finding solutions to reduce their copper loads, conduct detailed assessments of water quality, and identify new or innovative solutions to improve water quality. Additional testing and research strategies that could further assist with copper reduction in SIYB include the following:

- Studying innovative ways to remove copper from the waters and/or sediments in SIYB,
- Exploring paint alternatives or options for paint replacement,
- Exploring basin hydrodynamics, and
- Addressing data gaps associated with the impact of in-water hull cleaning on water quality.

In 2017, new strategies were incorporated into the Copper Reduction Program via the Port's Blue Economy Incubator. These efforts continued through 2019.

Copper Removal Approaches

The Port's Blue Economy Incubator was established in 2016 to support entrepreneurship, foster sustainable aquaculture, and help drive blue tech innovation. Ideal candidates for the Port's Blue Economy Incubator include technologies that may help improve sediment and water quality in San Diego Bay. In 2017, two copper-related pilot projects were identified.

A San Diego-based company, Red Lion Chem Tech, proposed a one-year pilot project to demonstrate their core technology to remove soluble copper in seawater through an active and passive filtration system. This project has been delayed.

A Sweden-based company, Rentunder, proposed a two-year pilot project to demonstrate their drive-in boatwash technology, a new approach that offers an alternative to current in-slip hull-cleaning practices, which may help reduce copper particulates released into San Diego Bay.

In 2018, the Rentunder Boatwash Pilot Project commenced, demonstrating technology that offers an alternative to current in-slip hull-cleaning practices. Using this technology, vessel hulls are cleaned in an enclosed basin: a gate is opened and allows for boats to enter prior to cleaning; the gate is then raised for the duration of cleaning and lowered again after cleaning to allow the boat to exit. In addition, particulate matter resulting from the cleaning is captured in the basin floor and removed via vacuuming.

Boatwash Pilot Project water quality sampling event

This Boatwash Pilot Project consisted of two phases. In 2018, the enclosed boatwash technology was tested using both mechanical brushes and a diver. In 2019, a third round of testing using the brushes and a dome study to evaluate leach rates from the brushes were conducted. A summary report of Phase 1 results was published in June 2019 and is included in Appendix H of this report. Phase 2 is anticipated to begin in 2020.

Hull Paint Transitions

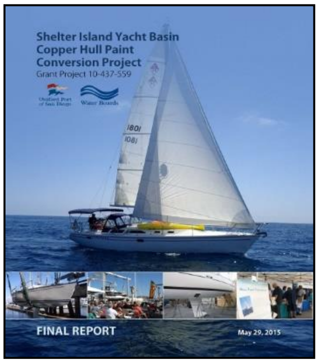
The transition from copper to non-copper alternatives is one of the most direct approaches to reduce copper loading. By transitioning to the available non-copper alternatives, load reduction is achieved by both active removal during in-water hull cleaning and passive leaching. The Port recognizes that while the new DPR paint regulation will assist in attaining TMDL goals, additional mitigation measures will still be necessary to achieve full compliance with the final loading target in SIYB. In addition to its proactive efforts to convert its own fleet of vessels, the Port continues to support efforts to assist other Named TMDL Parties in reducing their copper loads by encouraging hull paint transitions

Conversion of Port Fleet

During the previous compliance phase, the Port completed the transition of its fleet of boats to non-copper paints. Boats were painted with various alternatives, largely depending on their use patterns. In 2019, the Port continued to maintain a copper-free fleet, therefore eliminating any copper loading contributions from both in-water hull cleaning and passive leaching from its fleet of vessels.

All 14 of the Port's boats continue to use non-copper paints, resulting in a 12.6-kg/yr copper load reduction, and zero copper loading to SIYB.

Private Boaters



In 2011, the Port successfully secured a Clean Water Act Section 319(h) non-point source program grant from the State Water Resources Control Board (SWRCB) for $600,000 to help with hull paint transitions. The grant-funded SIYB Hull Paint Conversion Project provided cost offsets for SIYB boaters who use non-biocide paints. This project supported efforts to assist other Named TMDL Parties in reducing their copper loads and was completed in May 2015 and it is believed that some participants continue to use non-biocide paints. **A total of 41 boats were transitioned as a result of this effort, and it is the Port's understanding that most of these conversions currently remain in place. This effort resulted in a direct load reduction of 36.9 kg/yr.**

Education and Outreach

The Port has developed an extensive education and outreach program geared toward educating Named TMDL Parties and other stakeholders on the use of alternative hull paints and increasing their awareness of the environmental impacts of copper paints. The education and outreach program also serves to engage stakeholders in the TMDL issues at the local, regional, state, and federal level.

Audiences Reached in 2019

The Port continued to ensure that frequent and consistent messages were delivered through multiple media avenues. Outreach efforts continued via email and phone-call responses to public inquiries, regular meetings with marinas and yacht clubs, "one-on-one" meetings with SIYB marina and yacht club managers to discuss the TMDL and copper reduction efforts, and continued hosting of web-access to brochures and information. A new and significant effort in the 2019 reporting year included a series of public engagement sessions during the In-Water Hull Cleaning Ordinance and In-Water Hull Cleaning Permit Program review period. The efforts under the Education and Outreach component of the Copper Reduction Program were designed to reach different stakeholders and audiences, depending on the outreach mechanism (Table 3-1). While each component was designed for a primary audience, secondary audiences may also benefit from the information. The 2019 outreach efforts related to the various components are summarized below.

Table 3-1.
Target Audiences Reached by Outreach Events.

Outreach Component	Audience Reached							
	Regulators	Academics	Government Agencies	Boaters	Marinas	Boatyards	Paint Manufacturers	General Public
Booths at Events	S	S	P	P	S	S	S	P
Conference Attendance	P	P	P	-	-	-	-	-
Guest Speaking Engagements	P	P	P	P	P	P	S	S
Workshops	S	S	-	P	P	P	S	-
Printed Outreach Material	S	S	S	P	P	S	S	P
Dedicated Web Address to Copper Reduction Program	P	P	P	P	P	P	P	P
Peer-Based Testimonials	S	S	S	P	P	S	S	P
Newspaper Articles	P	S	P	P	P	P	P	P
“One-on-One” Meetings	-	-	-	P	P	-	-	-
Public Engagement Sessions	P	S	P	P	P	P	P	P

Notes:
P = Primary Audience, indicating the most likely audience reached with the associated outreach effort.
S = Secondary Audience, indicating audiences that could be potentially reached with the associated outreach effort.

SIYB TMDL Stakeholder Meetings

In 2018, Port staff began a series of one-on-one meetings with marina and yacht club managers to personalize outreach efforts and to foster collaborative relationships. The Port had three goals associated with the meetings:

1) Revisit TMDL requirements and discuss tenant responsibilities to reduce copper loads for the final compliance phase, recognizing that copper reduction at each facility may not be a “one-size fits all” approach.

2) Encourage managers to continue submitting complete vessel tracking records and offer Port assistance in areas with remaining deficiencies.

3) Discuss the new DPR regulation as it relates specifically to the SIYB TMDL compliance requirement. Managers and Port staff discussed how the regulation relates to the 2022 SIYB TMDL compliance requirement, and highlighted the importance of additional copper reduction efforts needed to achieve full compliance.

One-on-one meetings continued in 2019 at the request of the individual marinas and yacht clubs. Additionally, one-on-one meetings with other interested parties, including several in-water hull cleaners, also occurred. By request, Port staff also met with several larger groups of SIYB TMDL stakeholders as follows:

- In January 2019, Port staff met individually with several marina and yacht club managers that elected to evaluate their vessel tracking data for completeness and correctness with Port staff prior to data submittal.
- Throughout the summer of 2019, Port staff met twice with members of the SIML Group and the Port Tenants Association, where both groups voiced concerns about contributions of copper from current In-Water Hull Cleaning practices and the need to focus more attention on improving water quality in the basin and evaluating the best available science. The discussions focused on their requests that the Port align its hull cleaning BMP recommendations with mitigation measures identified by the California DPR.
- In August 2019, Port staff met with two yacht clubs to meet newly hired staff and discuss the current TMDL status as well as further copper reduction efforts needed.
- In September 2019, Port staff met with a marina manager who elected to incorporate additional in-water hull cleaning requirements and other environmental BMPs into their marina’s leasing agreements to help further reduce copper loading at their facility.
- In October and November 2019, Port staff met individually with several in-water hull cleaners to discuss the proposed draft amended Ordinance and get industry opinions on cleaning frequencies, methodologies, tools, record keeping, and enforcement of Port regulations.

Booths at Outreach Events

<u>Blue Tech Week</u>

Port staff attended Blue Tech Week from November 19-22, 2019. The Port also hosted a booth at the conference that highlighted the Port’s environmental initiatives and enabled attendees to discuss their innovative new technologies that could help the Port with improving water quality in San Diego Bay, including dissolved copper impairments.

Port of San Diego booth at Blue Tech Week

Workshops, Seminars, Conferences, and Public Engagement Sessions

Ongoing public education and outreach also can occur in the form of conference attendance and invited speaker opportunities. In addition to providing information on the Port’s Copper Reduction Program and TMDL status, staff in attendance may also gain valuable insight from other presentations that discuss regulatory framework and project examples. Further, seminars and workshops allow for more focused topics to be discussed in depth and at length, thus providing the opportunity to both disseminate proper information and provide additional learning experiences for Port staff.

Conferences

In 2019, Port staff attended three conferences, where content focused on sediment and water quality, regulatory updates, and technology to assist in water quality issues.

- Oceanology International in San Diego, CA (February 25–27, 2019)
    - The Oceanology International conference aims to match the latest technology with ocean protection efforts. Port Staff hosted a session titled "Meet the Port" where various environmental programs, including the SIYB TMDL, were discussed with attendees. Approximately 3,000 people attended the conference, and approximately 75 people attended the session. Other sessions included international speakers on the topics of biofouling, hull cleaning, and water quality impairments.
- Southern California Society of Environmental Chemistry and Toxicology (SoCal SETAC) in San Diego, CA (May 6–7, 2019).
- Blue Tech Week in San Diego, CA (November 19–22, 2019).

Meet the Port at Oceanology International

Conference content at each meeting included the latest science and policy regarding sediment and water quality at the international/national (Oceanology International and Blue Tech Week), state (Oceanology International, Blue Tech Week, SoCal SETAC), and regional (SoCal SETAC) levels. Further, both Oceanology International and Blue Tech Week allowed for Port staff to learn of technology initiatives that may help assist in copper reduction efforts.

Guest Speaker Invitations

In 2019, Port staff were invited to present at two speaking engagements at the local, regional, and national/international levels. Topics covered included the Port's In-Water Hull Cleaning Ordinance and Permit Program review process, as well as a presentation discussing future ocean health and security.

The following guest speaker appearances were made:

Port staff present at the Ocean Futures Forum at Oceanology International

- Ocean Futures Forum Panel Presentation and Discussion- Oceanology International, San Diego, CA- The Port's Environmental Protection Director was invited to present and sit on a panel during the Ocean Futures Forum, which offered insights into the role of ocean science, ocean health, and technology in the development of a sustainable blue economy. Other panel members included the current Administrator of the USEPA, the Assistant Director of the White House Office of Science and Technology Policy, the United States Coast Guard Chief of Office of Research, Development, Test and Evaluation and Innovation Programs and Acting Assistant Director of the National Oceanic and Atmospheric Administration (NOAA) (February 26, 2019). Approximately 150 people attended the forum.
- Dockmasters Meeting- Port staff were invited to present on the Ordinance and Permit Review process. The Dockmasters group is comprised of yacht club and marina managers from San Diego County, with many directly involved with SIYB (September 18, 2019). Approximately 35 people attended.

SIYB TMDL Stakeholder Workshop – Exploring Load Reduction Approaches for the Final TMDL Phase

On May 23, 2019, Port staff hosted a SIYB TMDL Stakeholder Workshop to better understand what further direct load reduction efforts other Named TMDL Parties were willing to explore in order to help achieve TMDL compliance by 2022. Marinas, yacht clubs, and boating representatives attended, and a healthy and robust discussion regarding additional direct loading reductions ensued. From this workshop and stakeholder input, Port staff learned the following:

- Other Named TMDL Parties had potential interest in structural/mechanical BMPs.
- Other Named TMDL Parties wished to further engage other entities such as boatyards and the Regional Board.
- Other Named TMDL Parties expressed concerns and interest in the loading impact that results from in-water hull cleaning.

Public Engagement Sessions

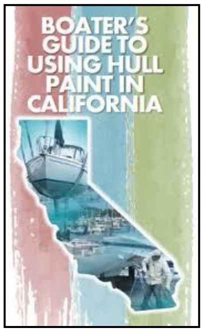
During 2019, the Port held several public engagement sessions related to the in-water hull cleaning regulations. Topics included the current and proposed BMP requirements, the Permit issuance process, recordkeeping, and enforcement. The purpose of these meetings was to provide the public an opportunity to comment on proposed adjustments and develop policies that could improve water quality related to cleaning the boat hulls underwater.

- On October 2–3, 2019, Port staff held two Public Engagement Sessions to gather public input and feedback on the aforementioned topics prior to release of the draft Ordinance. The input was intended to assist Port staff in crafting Ordinance language. Over 80 people, primarily those representing the other Named TMDL Parties, were in attendance over the course of the two nights and over 100 comments were received by the Port. Many varying perspectives about cleaning and painting frequencies were shared by the stakeholder community, including concerns about cleaning frequencies, tools, and education. The comments received are included in Appendix G.
- A second series of three public engagement sessions followed the November 22, 2019 release of the draft Ordinance, occurring on December 2–4, 2019. Approximately 80 individuals attended the December 2019 sessions. The Port presented the proposed major changes and opened the floor for public comment at these sessions. Overall, those attending the public engagement sessions included primarily other Named TMDL Parties.

Outreach Materials – Printed Literature

Development of printed literature such as paint brochures, event flyers, project frequently asked questions (FAQs), and handouts serve as an effective way to disseminate information to the public. Event attendees can take the information home and read it at their leisure, rather than having to wait to get information during the event. In addition, the printed materials also provide a web link and other contact information so that readers can do additional research.

Updates to Printed Literature



Boater's Guide to Using Hull Paint in California brochure

With the adoption of the new DPR Rule, the printed pamphlet titled *Boater's Guide to Using Hull Paint in California* required an update to remove information regarding paint types that are no longer available in the state of California. A series of conference calls with the Port, Los Angeles County Department of Beaches and Harbors, the DPR, and the Department of Boating and Waterways were held starting in the fall of 2018 to revise the pamphlet. A draft of the updated brochure was completed in December 2018, discussed at the May 2019 MIACC meeting, and a public comment period followed May–June 2019. Based on public comments, the collaborators continued to update the brochure based on comments received and a final digital copy was completed in November 2019.[10]

Web and Media Tools

The use of a dedicated website for Copper Reduction Program information is another effective mechanism to reach the public.

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[10] The updated literature is available on the Department of Boating and Waterways website at: https://documents.coastal.ca.gov/assets/water-quality/marina-boating/meeting-notes/Marinas%20mtg%20notes%20&%20materials%202019/May%202019%20mtg%20agenda%20&%20materials/Updated%20Boater's%20Guide%20to%20Using%20Hull%20Paint_May%202019.pdf

Dedicated Web Address

The Port has developed a dedicated web address, www.sandiegobaycopperreduction.org, that links viewers to all elements of its Copper Reduction Program. The link, which was started in 2010, provides information on hull paint conversion efforts such as the 319(h) grant project, hull-cleaning regulations, and general paint research information. The site also contains downloadable materials such as FAQs, applications to obtain a hull-cleaning permit, and recent press releases relevant to copper reduction. Monitoring studies are also available on the website.

In 2019, Port staff provided updated lists of permitted hull cleaners as new information became available. During the In-Water Hull Cleaning Ordinance and Permit review process, five website updates were made between September–December 2019 to continually update the public on the Ordinance review process and public engagement sessions. In addition, a dedicated email address, hullcleaning@portofsandiego.org, was created to facilitate information transfer among interested parties. Staff also ensured that the website was readily available and that information remained current and easy to find.

Peer-Based Testimonials

Another media tool is peer-based marketing, with local boaters discussing their experiences using alternative paint products. During 2012, video testimonials were developed and displayed at the 2012 expo. In 2013, the video was posted on the Port's website. Additional written testimonials were also included so that readers could learn about other local boaters' experiences***. As of December 31, 2019, the video had been viewed 1,071 times.***

Newspaper Articles

The Log newspaper has a 52,000-person readership in southern California and is available at more than 500 boating-related locations throughout the region. **In 2019, two articles appeared in The Log related to the Port's Copper Reduction Program, and specifically SIYB. The Log publication reaches many in the local boating community and has served as an important vehicle for informing the public about the Port's efforts regarding copper reduction in San Diego Bay:**

- July 3, 2019: This article, "Port of San Diego reports continued compliance of TMDL Program", summarized and recapped the results of the 2018 SIYB Annual Report, and discussed the continued efforts being explored for the final compliance phase of the Dissolved Copper TMDL.
- October 24, 2019: This article, "Port of San Diego looks into updating in-water hull cleaning policy", summarized the Port's review of the In-Water Hull Cleaning Ordinance and Permit program as well as the October 2019 public engagement sessions.

Internal Education

Increasing Port-wide awareness about the copper reduction program, alternative paint use, and status of water quality regulations is vital to a successful program. A solid understanding of the program attracts support by the Port's decision makers, such as the Board of Port Commissioners and executive team, and so enables projects and policy decisions to move forward. An informed executive team can also ensure that adequate funding is available to implement the program. As such, Port staff continually seek opportunities to provide information on key items of the copper reduction program. The following information was provided to the Port Board and executives during 2019:

- March 5, 2019: A Port Board memorandum provided notification of the USEPA's Interim Decision on Copper Compounds.
- March 13, 2019: A Port Board memorandum provided notification of the DPR's request to collaborate with the Port on a statewide special study that includes SIYB.
- April 4, 2019: A Port Board memorandum provided notification of the submittal of the 2018 SIYB Dissolved Copper TMDL Annual Monitoring and Progress Report.
- May 14, 2019: Port staff appeared before the Board to present updates on the Port's clean water initiatives, including pollution prevention, sediment cleanups, and bay water quality monitoring.
- June 18, 2019: Port staff appeared before the Board to present updates on the Blue Economy Incubator's Rentunder Drive-In Boatwash.
- June 18, 2019: Port staff appeared before the Board to present program status and updates for the SIYB TMDL and seek Board direction to move forward policy directives aimed at reducing copper loads and improving water quality.
- August 8, 2019: A Port Board memorandum provided notification of the completion of the Rentunder Boatwash Phase 1 study and the receipt of the associated technical memorandum.
- September 5, 2019: A Port Board memorandum provided notification of the review of the In-Water Hull Cleaning Ordinance and Permit program.
- October 3, 2019: A Port Board memorandum provided notification of the Conceptual Model Technical Review.
- October 8, 2019: Port staff appeared before the Board to present an informational update on in-water hull cleaning benchmarking and the conceptual model update as well as to review the Port's In-Water Hull Cleaning Regulation.
- November 21, 2019: A Port Board memorandum provided notification of the draft In-Water Hull Cleaning Ordinance and Permit available for public review and comment.
- December 11, 2019: Port staff appeared before the Board during the President's Report to provide a status update on the draft amended Ordinance review.
- December 12, 2019: A Port Board memorandum provided a summary of the In-Water Hull Cleaning Public Engagement events.

Partnerships and Collaboration

Since the inception of the SIYB TMDL, the Port has been working to identify opportunities with other Named TMDL Parties, academia, and other agencies to develop and provide outreach, testing opportunities, funding opportunities, and policies. As of December 2019, the Port has participated in multiple collaborative opportunities with groups within San Diego and throughout the California boating and regulatory communities. These activities and groups include:

- Coordination with hull cleaners on In-Water Hull-Cleaning regulations;

- Coordination with the SIML TMDL Group and other SIYB marinas on SIYB TMDL annual reporting;
- Regular participation in state-led MIACC meetings for antifouling and marina-related topics;
- One-on-one meetings with SIYB TMDL listed tenants (i.e., marinas and yacht clubs) to foster collaborative relationships that may result in accurate vessel tracking and innovative copper reduction efforts that are facility specific;
- Collaborative discussions with Los Angeles County Department of Beaches and Harbors to discuss Copper Reduction Program efforts and lessons learned from the SIYB TMDL to date; and
- Public engagement efforts with all interested SIYB TMDL stakeholders, including the other Named TMDL Parties, through public engagement sessions.

Additional Efforts (Companion Programs)

Several other Port programs directly or indirectly support the Copper Reduction Program's efforts. The Blue Economy Incubator (discussed above) will continue to be instrumental in identifying potential pilot studies that may assist in continued efforts to reduce copper concentrations and improve water quality throughout San Diego Bay.

The Port's Stormwater Program incorporates BMPs to decrease copper loading from landside activities bay-wide and specifically into SIYB. These efforts, described below, are primarily related to compliance requirements set forth in the Municipal Separate Storm Sewer System (MS4) Permit. Information related to the implementation efforts for these programs can be found in the Port Jurisdictional Runoff Management Plan (JRMP) Annual Report at:

> https://pantheonstorage.blob.core.windows.net/environment/SDUPD-FY-2019-JRMP-Annual-Report-and-Supplemental-Tables.pdf

Construction Site Inspections

Construction inspections ensure that sites undergoing development or redevelopment control pollution and prevent discharges. For construction sites and facilities that do not comply, the Port takes enforcement action.

Commercial Business Inspection Program

Per the requirements of the Municipal Permit, the Port inspects commercial facilities in SIYB and bay-wide. One component, the Port's marina inspection program, provides opportunities to educate boat owners about pollution prevention, focusing on visual observations to identify sources of pollution and the pollution prevention practices implemented at the marinas and yacht clubs, including over-water work and boat maintenance. The goal of the inspections is to help implement behavior changes that will help reduce pollution (including copper) in bay waters.

Stormwater Quality Management Plan and Development of Regulations

The Port incorporates Stormwater Quality Management Plan (SWQMP) requirements on applicable development and redevelopment projects bay-wide. Depending on the type and size of the projects, SWQMP requirements could include site design, source controls, and treatment controls such as low-impact development (LID). All efforts help reduce copper loading into San Diego Bay. Since 2009, 34 bay-wide projects overall with metals as priority pollutants have been implemented, treating a total of 114.25 acres. In SIYB, there have been five existing projects overall with metals as priority pollutants, treating a total of 9.19 acres.

Monitoring and Reporting

The main goal of the Monitoring and Reporting component of the Copper Reduction Program is to assess long-term improvements in water quality. Several special studies have been implemented to address data gaps in basin water quality dynamics and copper loading. The data collected for the annual monitoring program and through various special studies have all contributed to a better understanding of basin water quality dynamics in SIYB.

Conceptual Model Technical Review

A review of the best available science was initiated to assess the overall contribution of dissolved copper loading into the water from in-water hull cleaning activities. The Conceptual Model Review summarized relevant findings from SIYB-related in-water hull cleaning studies, conducted a cross-comparison of loading allocations, and used this information to model various in-water hull cleaning scenarios. Detailed information regarding this effort is in Section 4.1.

Regional Harbor Monitoring Program

This bay-wide monitoring program assesses the ambient conditions in San Diego Bay and other southern California harbors on the basis of comparisons with historical data and comparisons of contaminant concentrations with known surface water and sediment thresholds. The program samples water, sediment, benthic infauna, and a variety of fish species in San Diego Bay. Upon completion of the study, a comprehensive report is generated. The Port is the lead agency on this project.

The core monitoring program was conducted at 58 stations in San Diego Bay from July through September 2018, with 10 of these stations in marina strata. Each station was sampled for water quality, sediment quality, and benthic community health. **In 2019, data analysis as well as data QA/QC was performed. A final report is expected in June 2020.**

3.1.1.2 Marina, Yacht Club, and SIML TMDL Group BMPs to Reduce Copper Loading

The SIYB marinas and yacht clubs implement BMPs annually to reduce copper loading from their respective facilities and operations. The marinas and yacht clubs’ BMP manual and summary of marina and leasehold vessel tracking was provided to the Port and is included in Appendix B of this report.

In addition to the BMP information mentioned above, the Bay Club Marina revised its wharfage agreement during the past year to include a number of environmental conditions, including those related to copper loading and the TMDL. These facility-specific BMPs are included as part of the Bay Club Marina contract for private wharfage that is signed by the owners that berth their vessels at this facility. The portions of the Bay Club Marina Hotel contract with its vessel-owner tenants that specifically address copper reduction are summarized below.

- "Owner also understands that he/she will be required to provide an annual bottom paint questionnaire to the marina office by November 15 each year that includes the following information: paint name, color, product number, brand, copper percentage, boatyard name, and date of paint was applied."
- "Marina recommends the use of non-toxic, biocide free bottom paints."
- "Hull cleaning must utilize Best Management Practices to minimize discharge of bottom paint into the water."
- "Vessel Owners are required to use environmentally friendly hull cleaning companies who are licensed by the Port of San Diego and use Best Management Practices and monitor their divers."

3.2 Vessel Counts by Hull Paint Type

Vessel conversion calculations were based on data provided by SIYB marinas and yacht clubs, in addition to data from the Harbor Police dock, transient dock, and weekend anchorage. The 2019 census of the hull paint types reported by all SIYB marinas and yacht clubs is as follows:

- A total of 2,133 vessels were included in the 2019 census of hull paint types in marinas and yacht clubs.
- 624 vessels have copper or unknown (assumed to be copper) hull paint.
- 850 vessels have paints considered as lower copper. These vessels consist of the following:
  - 803 vessels have paint that is listed as a DPR Category I (low-leach) paint.
  - 47 vessels have low-copper paint (confirmed [28 vessels] and unconfirmed [19 vessels]).
- 540 vessels have aged-copper hull paint.
- 119 vessels have either non-copper paints or no paint at all (confirmed [105 vessels] and unconfirmed [14 vessels]).

The 2019 census of the hull paint types reported from the Harbor Police dock, transient dock, and weekend anchorage is as follows:

- 14 Port vessels berthed at the Harbor Police dock have non-copper paints or no bottom paint.
- There are 66 spaces in SIYB where transient vessels can be berthed (26 slips at the transient dock and 40 mooring locations at the weekend anchorage). All of the vessels that were berthed at these two locations in 2019 are considered to have unknown (assumed to be copper) hull paint.

3.2.1 Slip Count and Occupancy

Based on the information provided by the Port and SIYB marinas and yacht clubs, 2,298 slips[11] in SIYB were available to be occupied by vessels in 2019, including the weekend anchorage with a capacity of up to 40 guest vessels, 26 transient dock slips, and 17 slips at the Harbor Police dock. The total 2019 slip count (2,298 slips[12]) is comparable to the 2018 monitoring year count (2,313 slips). There was a decrease of 65 slips in 2019 compared with the 2,363 identified slips and moorings reported in the SIYB TMDL.

Of the 2,298 slips and moorings in SIYB during 2019, 85 slips (82 slips in the marinas and yacht clubs and 3 slips at the Harbor Police dock) were reported to be vacant year-round, leaving 2,213 slips that were occupied for at least a portion of time in 2019. Slip occupancy rates for each hull paint type are also shown in Tables 3-2 through Table 3-5. On average, slips and moorings in SIYB were occupied 91 percent of the time.

3.2.2 Vessel Dimensions

The average-size vessel in SIYB in 2019, based on reported hull lengths and beam widths, was 38.9 feet (11.9 meters, total length) by 12.2 feet (3.7 meters, beam width) (Appendix C). The average wetted hull surface area of 2019 SIYB vessels was calculated to be 37.6 square meters (m^2). Figure 3-2 depicts average wetted hull surface area from 2012–2019.

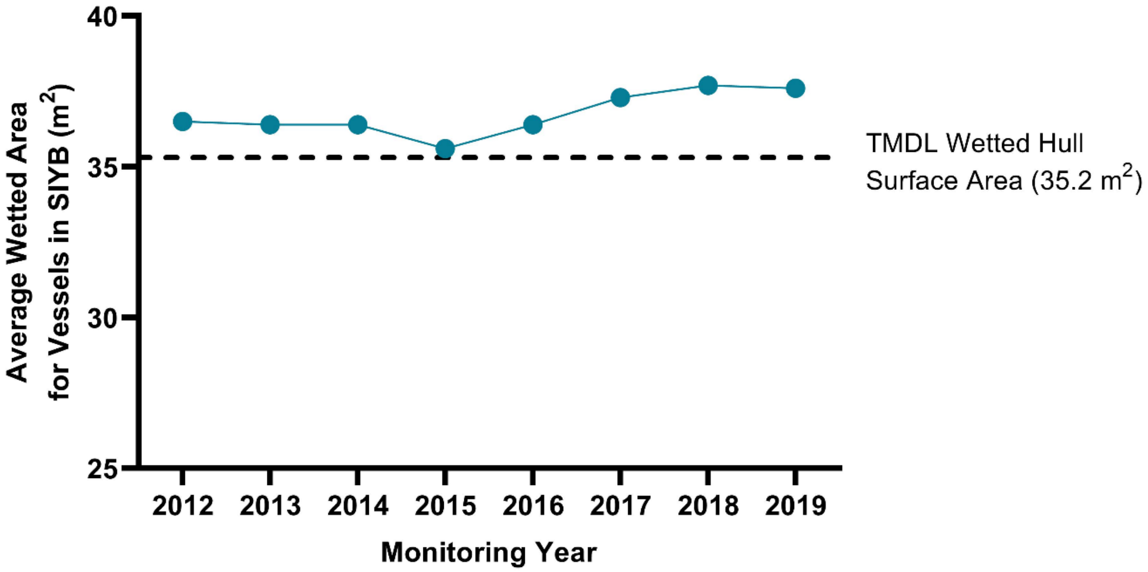

Figure 3-2. Average Wetted Hull Surface Area in SIYB by Monitoring Year, 2012-2019

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[11] At several locations in SIYB, single slips can be occupied by more than one vessel. In these cases, the slip count may include each vessel within the slip. For example, if two vessels occupy a single slip, the slip count for this location may have been reported as two slips, not one. Efforts to improve consistency on this issue remain ongoing.

[12] The decrease in slip number between 2019 and 2018 is due to a decrease in slips reported by Crow's Nest and La Playa Yacht Club in 2019.

3.2.3 Estimated Copper Load

Dissolved copper loads in 2019 attributed to the TMDL-derived passive leaching load allocation are shown in Table 3-2 (yacht clubs and marinas) and Table 3-3 (Harbor Police dock, transient dock, and weekend anchorage). Dissolved copper loads in 2019 attributed to the TMDL-derived in-water hull cleaning load allocation are shown in Table 3-4 (yacht clubs and marinas) and Table 3-5 (Harbor Police dock, transient dock, and weekend anchorage).

Passive load estimates were calculated by multiplying the number of vessels in each category by either 0.86 kg/yr (for copper, assumed copper, and unconfirmed low-copper paints, or unconfirmed non-copper paints) or 0.43 kg/yr (for DPR Category I, low-copper, and aged-copper paints). In-water hull cleaning load estimates were calculated by multiplying the number of vessels in each category by either 0.04 kg/yr (for copper, assumed copper, and unconfirmed low-copper paints, or unconfirmed non-copper paints) or 0.02 kg/yr (for DPR Category I, low-copper, and aged-copper paints).

The load estimate for each category was then corrected for average vessel occupancy (i.e., Average Time Occupied in Tables 3-2 through 3-5). The combined 2019 load estimates from passive and in-water hull cleaning sources are presented in Table 3-6 and as follows:

- Vessels with copper (or assumed copper) paints contributed a load of 536 kg/yr. This total includes 508 kg/yr from vessels in yacht clubs and marinas and hull cleaning activities occurring in those facilities, roughly 95 percent of the loading from this paint type category, and 27.6 kg/yr from vessels at the transient dock and weekend anchorage and hull cleaning activities occurring in those locations, roughly 5 percent of the loading from this paint category.
- DPR Category I paints are present in marinas and yacht clubs and contributed a dissolved copper load of approximately 342 kg/yr.
- Low-copper hull paints are present in marinas and yacht clubs and contributed a dissolved copper load of 11.0 kg/yr.
- Aged-copper paints are present in marinas and yacht clubs and contributed an annual dissolved copper load of 224 kg/yr.
- Vessels that were reported to have unconfirmed low-copper (15.8 kg/yr) or unconfirmed non-copper (11.9 kg/yr) paints contributed an annual dissolved copper load of 27.7 kg/yr.
- No dissolved copper load was contributed to SIYB by 119 vessels with either confirmed non-copper paint, vessels in slip liners or HydroHoists®, or vessels that were unpainted. This includes 105 vessels in marinas and yacht clubs and all 14 Port vessels berthed at the Harbor Police dock.
- A total of 82 slips within the SIYB marinas and yacht clubs and 3 slips at the Harbor Police dock were reported to be vacant year-round, and so were not loading dissolved copper into the basin.

Table 3-2.
2019 Copper Load by Vessel Hull Type and Reported Occupancy at Yacht Clubs and Marinas as a Result of Passive Leaching Using TMDL Assumptions

Vessel Hull Paint Category	Number per Category	Average Time Occupied[c]	Copper Load per Vessel (kg/yr)[d]	Total Copper Load (kg/yr)
Copper or Unknown (Assumed Copper)	624	90.5%	0.86	485
DPR Category I (Low Leach)	803	94.7%	0.43	327
Low-Copper (Confirmed)	28	87.2%	0.43	10.5
Low-Copper (Unconfirmed)[a]	19	92.7%	0.86	15.1
Aged-Copper Paint[b]	540	92.0%	0.43	214
Non-Copper (Confirmed or Not Painted)	105	92.7%	0	0
Non-Copper (Unconfirmed)[a]	14	94.5%	0.86	11.4
Vacant Slips (Yacht Clubs and Marinas) (Note: vacant slips are not included in the total vessel count below)	82	--	--	0
Total Vessels (Yacht Clubs and Marinas)	***2,133[e]***	**--**	**--**	***1,063***

Notes:
[a] Low- or non-copper paints that were not confirmed are counted as high-copper paint (0.86 kg/yr load for passive leaching), per the Monitoring Plan.
[b] Calculations for aged-copper paints are similar to those for low-copper paints (0.43 kg/yr load for passive leaching).
[c] The average total occupancy was derived by the count within each vessel hull paint category multiplied by the average percent occupancy for that category; values are presented to three significant figures.
[d] Based on per-vessel load identified for passive leaching in Appendix 2 of the SIYB TMDL.
[e] Note: Vacant slips are not included in this total.
% = percent; DPR = Department of Pesticide Regulation; kg/yr = kilogram(s) per year

Table 3-3.
2019 Copper Load by Vessel Hull Type and Reported Occupancy at the Harbor Police Dock, Transient Dock, and Weekend Anchorage as a Result of Passive Leaching Using TMDL Assumptions

Vessel Hull Paint Category	Number per Category	Average Time Occupied[b]	Copper Load per Vessel (kg/yr)[c]	Total Copper Load (kg/yr)
Port Fleet (Confirmed Non-Copper)	14	92.9%	0	0
Transient Dock[a] (Copper or Unknown and Assumed to be Copper)	26	59.8%	0.86	13.4
Weekend Anchorage[a] (Copper or Unknown and Assumed to be Copper)	40	37.6%	0.86	12.9
Vacant Slips (Port HPD Dock)	3	--	--	0
Total Vessels	***80[d]***	**--**	**--**	***26.3***

Notes:
[a] Calculated as an average, based on total number of days a slip was occupied by a guest vessel.
[b] The average total occupancy was derived by the count within each vessel hull paint category multiplied by the average percent occupancy for that category; values are presented to three significant figures.
[c] Based upon per vessel load identified for passive leaching in Appendix 2 of the SIYB TMDL.
[d] Note: Vacant slips are not included in this total.
% = percent; kg/yr = kilogram(s) per year; HPD = Harbor Police dock

Table 3-4.
2019 Copper Load by Vessel Hull Type and Reported Occupancy at Yacht Clubs and Marinas as a Result of In-Water Hull Cleaning Using TMDL Assumptions

Vessel Hull Paint Category	Number per Category	Average Time Occupied[c]	Copper Load per Vessel (kg/yr)[d]	Total Copper Load (kg/yr)
Copper or Unknown (Assumed Copper)	624	90.5%	0.04	22.6
DPR Category I (Low Leach)	803	94.7%	0.02	15.2
Low-Copper (Confirmed)	28	87.2%	0.02	0.49
Low-Copper (Unconfirmed)[a]	19	92.7%	0.04	0.70
Aged-Copper Paint[b]	540	92.0%	0.02	9.94
Non-Copper (Confirmed or Not Painted)	105	92.7%	0	0
Non-Copper (Unconfirmed)[a]	14	94.5%	0.04	0.53
Vacant Slips (Yacht Clubs and Marinas) (Note: vacant slips are not included in the total vessel count below)	82	--	--	0
Total (Yacht Clubs and Marinas)	***2,133[e]***	***--***	***--***	***49.5***

Notes:

[a] Low- or non-copper paints that were not confirmed are counted as high-copper paint (0.04 kg/yr load for cleaning), per the Monitoring Plan.

[b] Calculations for aged-copper paints are similar to those for low-copper paints (0.02 kg/yr load for cleaning).

[c] The average total occupancy was derived by the count within each vessel hull paint category multiplied by the average percent occupancy for that category; values are presented to three significant figures.

[d] Based upon per vessel load identified for in-water hull cleaning in Appendix 2 of the SIYB TMDL.

[e] Note: Vacant slips are not included in this total.

% = percent; DPR = Department of Pesticide Regulation; kg/yr = kilogram(s) per year

Table 3-5.
2019 Copper Load by Vessel Hull Type and Reported Occupancy at the Harbor Police Dock, Transient Dock, and Weekend Anchorage as a Result of In-Water Hull Cleaning Using TMDL Assumptions

Vessel Hull Paint Category	Number per Category	Average Time Occupied[b]	Copper Load per Vessel (kg/yr)[c]	Total Copper Load (kg/yr)
Port Fleet (Confirmed Non-Copper)	14	92.9%	0	0
Transient Dock[a] (Copper or Unknown and Assumed to be Copper)	26	59.8%	0.04	0.62
Weekend Anchorage[a] (Copper or Unknown and Assumed to be Copper)	40	37.6%	0.04	0.60
Vacant Slips (Port HPD Dock)	3	--	--	0
Total	***80[d]***	***--***	***--***	***1.22***

Notes:

[a] Calculated as an average, based on total number of days a slip was occupied by a guest vessel.

[b] The average total occupancy was derived by the count within each vessel hull paint category multiplied by the average percent occupancy for that category; values are presented to three significant figures.

[c] Based upon per vessel load identified for in-water hull cleaning in Appendix 2 of the SIYB TMDL.

[d] Note: Vacant slips are not included in this total.

% = percent; HPD = Harbor Police dock; kg/yr = kilogram(s) per year

In summary, vessels painted with copper paints, DPR Category I paints, low-copper hull paints, and aged-copper paints contributed a combined passive and in-water hull cleaning load of 1,140 kg/yr of dissolved copper to SIYB in 2019. This is comprised of approximately 1,113 kg/yr (97.6 percent) for vessels in yacht clubs and marinas and hull cleaning activities occurring in those facilities plus approximately 27.6 kg/yr (2.4 percent) for vessels at the Harbor Police dock, transient dock, and weekend anchorage and hull cleaning activities occurring in those locations.

3.2.4 Estimated Copper Load Reduction

The dissolved copper load reduction for 2019 is shown in Table 3-6. Load reduction is determined by subtracting the estimated dissolved copper load from the 2,100-kg/yr baseline load attributed to vessels identified in the SIYB TMDL Technical Report (passive leaching = 2,000 kg/yr and in-water hull cleaning = 100 kg/yr).

Based upon these calculations, the 2019 estimated copper load reduction is 960 kg/yr (i.e., 2,100 kg/yr minus 1,140 kg/yr = 960 kg/yr), which is a 45.7 percent reduction compared with the baseline load identified in the TMDL.

Table 3-6.
2019 Estimated Copper Load Reduction

Copper Loading Category	Total Copper Load (kg/yr)
SIYB Vessels in Yacht Clubs and Marinas with Copper or Unknown Paint (Assumed Copper)	508
SIYB Vessels in Yacht Clubs and Marinas with DPR Category I (Low Leach Paint)	342
SIYB Vessels in Yacht Clubs and Marinas with Confirmed Low-Copper Paint	11.0
SIYB Vessels in Yacht Clubs and Marinas with Unconfirmed Low-Copper Paint	15.8
SIYB Vessels in Yacht Clubs and Marinas with Aged-copper Paint	224
SIYB Vessels in Yacht Clubs and Marinas with Confirmed Non-Copper Paint or No Paint	0
SIYB Vessels in Yacht Clubs and Marinas with Unconfirmed Non-Copper Paint	11.9
Port HPD Fleet	0
Transient Dock and Weekend Anchorage in SIYB	27.6
SIYB Yacht Club and Marina Year-Round Vacancies	0
Port HPD Year-Round Vacancies	0
Grand Total Load	1,140
Load Reduction from TMDL[a]	**960** (**45.7**%)

Notes:
[a] The total copper load from the TMDL equals 2,100 kg/yr from vessel paints (passive leaching and in-water hull cleaning, combined). The estimated load due to background, urban runoff, and atmospheric deposition is not included in this total.
% = percent; DPR = Department of Pesticide Regulation; HPD = Harbor Police dock; kg/yr = kilograms per year; SIYB = Shelter Island Yacht Basin; TMDL = Total Maximum Daily Load

3.3 SIYB TMDL Water Quality Monitoring

This section summarizes the results of the 2019 annual analytical chemistry and toxicity monitoring program conducted by the Port in SIYB. Detailed laboratory reports are provided in Appendix D.

3.3.1 Surface Water Chemistry

Annual water quality monitoring was performed on August 19, 2019[13]. Surface water samples were tested for concentrations of total and dissolved copper and zinc, DOC, TOC, and TSS. Results of the monitoring survey are presented in Table 3-7; a QA/QC summary of all analytical laboratory data is in Section 3.3.1.2. The chemistry results reports submitted by the analytical laboratory are in Appendix D.

Table 3-7.
Chemistry Results for SIYB Surface Waters, August 2019 Event

Station	Dissolved Copper (µg/L)	Total Copper (µg/L)	Dissolved Zinc (µg/L)	Total Zinc (µg/L)	DOC (mg/L)	TOC (mg/L)	TSS (mg/L)
SIYB-1	**15**	20	37	29	1.6	1.7	5
SIYB-2	**8.1**	8.7	19	21	2.2	1.7	5
SIYB-3	**11**	11	27	20	2.1	2.3	3 J
SIYB-4	**8.1**	9.0	21	20	1.9	1.8	5
SIYB-5	**4.9**	5.5	13	11	2.3	1.5	6
SIYB-6	**4.1**	5.6	11	11	2.8	1.6	4 J
SIYB-REF	1.9	2.6	5.5	6.3	2.9	1.6	5

Notes:
Values in **bold** are above the USEPA National Recommended Water Quality criterion continuous concentration (CCC) for dissolved copper of 3.1 µg/L in marine waters.
No values were above the zinc CCC of 81 µg/L.
High tide on 08/19/2019 was +4.78 feet at 12:22 pm; tidesandcurrents.noaa.gov
µg/L = microgram(s) per liter; DOC = dissolved organic carbon; J = below the reporting limit, value is estimated; mg/L = milligram(s) per liter; REF = reference; SIYB = Shelter Island Yacht Basin; TOC = total organic carbon; TSS = total suspended solids

Dissolved Copper – Dissolved copper levels within SIYB ranged from 4.1 to 15 µg/L. The lowest concentration within the basin occurred at the outermost station (SIYB-6); the highest level was recorded at the innermost station (SIYB-1). The concentration of dissolved copper at the reference station (SIYB-REF) was 1.9 µg/L. Dissolved copper concentrations at all six SIYB stations exceeded the dissolved copper USEPA National Recommended Water Quality CTR CCC WQO of 3.1 µg/L. The concentration of dissolved copper at the reference station (SIYB-REF), located outside of SIYB, was below the WQO.

Total Copper – Total copper concentrations measured in SIYB followed a similar spatial pattern, ranging from 5.5 µg/L at SIYB-5 to 20 µg/L at the innermost station (SIYB-1). The total copper concentration at the reference station (SIYB-REF) was 2.6 µg/L.

Dissolved Zinc – Dissolved zinc levels in SIYB followed a spatial pattern similar to that of dissolved copper. Concentrations ranged from 11 to 37 µg/L within SIYB (lowest at SIYB-6 and highest at SIYB-1). The concentration at SIYB-REF was 5.5 µg/L. Dissolved zinc levels in SIYB have remained well below the USEPA CCC of 81 µg/L during all SIYB TMDL monitoring events.

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[13] As discussed in Section 2.4.3, a second set of water samples were collected from SIYB-4, and SIYB-REF for comparison, on September 9, 2019 to confirm toxicity observed at SIYB-4 during the initial testing. These samples were analyzed for TSS and dissolved/total copper and zinc to provide additional information in the event that a TIE was warranted. Dissolved copper concentrations were 9.5 µg/L and 0.42 µg/L at SIYB-4 and SIYB-REF, respectively. The full chemistry laboratory report is provided in Appendix D.

Total Zinc – Total zinc concentrations followed the same spatial pattern, with values ranging from 11 µg/L at SIYB-6 to 29 µg/L at SIYB-1. The concentration of total zinc at the SIYB-REF station was 6.3 µg/L.

DOC – DOC concentrations in the water column, which have been shown to affect the bioavailability of free copper, were relatively consistent throughout SIYB, ranging from 1.6 milligram(s) per liter (mg/L) at SIYB-1 to 2.8 mg/L at SIYB-6. The concentration of DOC at SIYB-REF was 2.9 mg/L.

TOC – Similarly, measured concentrations of TOC were relatively consistent for all samples, ranging from 1.5 mg/L to 2.3 mg/L. The concentration of TOC at SIYB-REF was 1.6 mg/L.

TSS – Measured concentrations of TSS were relatively consistent for all six stations, ranging from 3 (J) mg/L at SIYB-3 to 6 mg/L at SIYB-5. The concentration of TSS at SIYB-REF was 5 mg/L.

3.3.1.1 Comparison of SIYB Dissolved Copper Levels over Time

An average basin-wide dissolved copper concentration was calculated (excluding the reference station) for comparison with the prior SIYB TMDL monitoring results (Figure 3-3). The basin-wide average concentration of dissolved copper measured in 2019 was 8.5 µg/L ± 1.6 µg/L (mean ± standard error), which is similar to the 2005–2008 baseline level (8.3 µg/L). The basin-wide average dissolved copper levels in the surface waters increased during the 2019 monitoring period compared with results from the past several monitoring events (2012–2018).

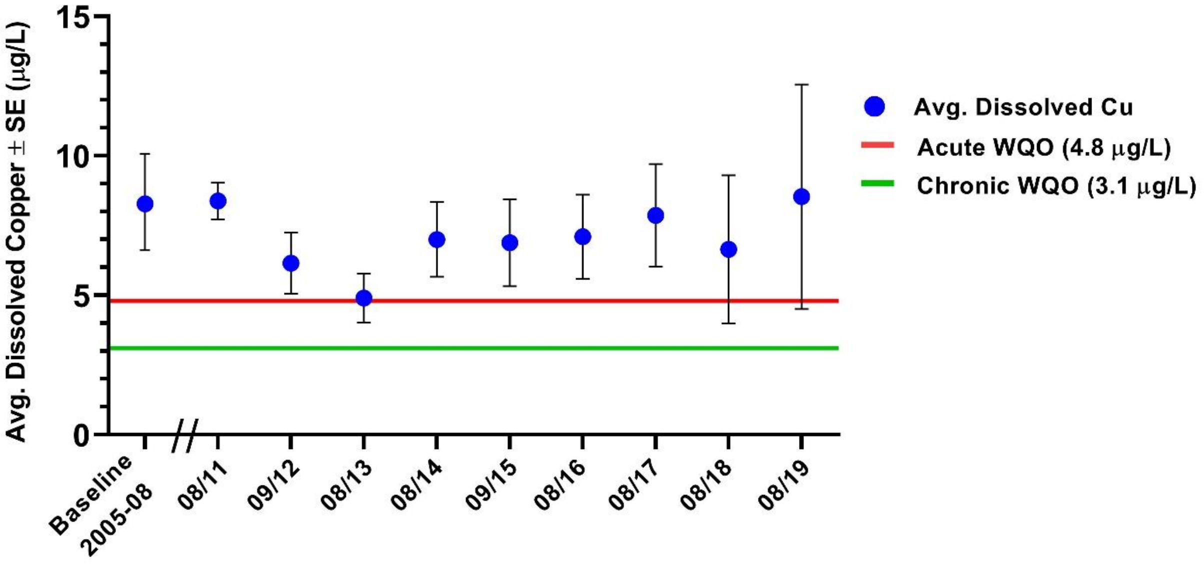

Figure 3-3. Dissolved Copper Concentrations in SIYB Relative to Baseline Conditions

3.3.1.2 Analytical Chemistry QA/QC

All samples were submitted to the analytical laboratory on the day after they were collected (August 20, 2019). The samples were received in good condition at Weck at 3.6°C and on ice. The samples for dissolved metals analyses were field-filtered by Wood and preserved by the laboratory immediately upon receipt. All samples met holding time requirements for analysis. Due to toxicity issues associated with the original SIYB-4 sample, a confirmation resample of SIYB-4, and SIYB-REF for comparison, was collected on September 9, 2019 and tested for chemistry, as detailed in Section 3.3.2.1. All analytical chemistry issues described below pertain to the original August 19, 2019 dataset.

Analytical chemistry results underwent a thorough QA/QC evaluation; they were determined to meet the data quality objectives in the QAPP and were deemed acceptable for reporting purposes, with the qualifications noted in the QA section of the individual laboratory reports (these issues are summarized below). The analytical laboratory reports in Appendix D have specific QA/QC sections that highlight any qualified data.

The following information summarizes the relevant data QA/QC-related findings associated with the 2019 SIYB TMDL study:

- **Issue** – Seawater samples were diluted between 1 to 10 times due to matrix interference, resulting in elevated detection limits.
  - **Resolution** – The analytical laboratory routinely dilutes samples to reduce the matrix interference from the salts found in the test samples. Diluting the samples allows the laboratory to provide more accurate results by eliminating the potential matrix effect often observed in metal analyses of seawater samples. The final concentrations reported by the laboratory are well above the required reporting limits. Therefore, the analytical QA/QC officer determined that there is no impact on data usability.
- **Issue** – Similar to results in previous events (e.g., 2016–2018) low-level detections of dissolved and total zinc were observed in the equipment rinsate (ER) blank.
  - **Resolution** – Ideally, the level of metals in this QA sample should be very low or non-detect. The field blank (FB) contained non-detect concentrations of zinc, with the ER results indicative of potential trace contamination of the Niskin sampler. The concentrations of the metals in the ER are approximately five times lower than the concentrations measured at the reference station for zinc, and therefore are not considered a significant data bias.
- **Issue** – Dissolved concentrations for zinc were higher than the corresponding total zinc concentrations. Several dissolved zinc values were considerably higher than the total (e.g., up to 38 percent higher for the SIYB-1 field replicate).
  - **Resolution** – Prior testing results have on occasion reported dissolved zinc concentrations greater than the corresponding total zinc value. However, a majority (5 of 8) of the dissolved zinc values were higher than the corresponding total zinc measurements. Review of the analytic blank, ER, and FB results for zinc did not indicate any significant contamination that may have resulted during field filtration, and the corresponding dissolved copper analytical sequence did not show the same trend. The source of the elevated dissolved zinc values is unknown. Although zinc carry-over during inductively coupled mass spectrometry

  (ICPMS) analysis is possible, carry-over is unlikely to have affected most samples. This issue was brought to the attention of the laboratory QA manager during a laboratory audit on October 28, 2019, and the laboratory is investigating possible causes (e.g., possible batch specific filter contamination or contamination during preparation or testing). Based upon this finding, the total zinc concentrations should be considered more reliable than the dissolved zinc levels. The dissolved zinc levels reported by the laboratory should be considered suspect. Additional investigation into why this occurred will continue and will be addressed in the 2020 Monitoring Plan and QAPP revision.

- **Issue** – Low-level detections of DOC/TOC were observed in the ER blank and the FB. These low-level detections are of a range similar to those of previous events and may be representative of trace field and/or laboratory contamination. Corresponding laboratory QA/QC samples met all project-specific limits in the QAPP.
  - **Resolution –** Trace detections of metals, DOC, and TOC were measured in the ER. As similar low-level detections have been observed in previous events, extra care is taken in the field to ensure that sampling equipment is thoroughly cleaned and rinsed prior to collection of each sample. However, due to the ubiquitous nature of these constituents, some combined low-level contamination from the field and analytical testing is expected, even under clean room conditions. These low-level detections are not considered significant enough to warrant retesting or recollection of samples and testing. All results are considered usable for their intended data purposes and are reported as provided by the laboratory.
- **Issue –** DOC values in several cases were higher than the TOC values reported for the same sample. Corresponding laboratory QA/QC samples met all QAPP limits, and concentrations measured in the associated laboratory blanks were very low to non-detect. The magnitudes of these minor differences are in general agreement with results from previous events and these differences appear to be inherent to the method. The exact source of these low-level detections is unknown, but they may be a trace-level artifact introduced as part of the filtration step.
  - **Resolution –** The differences were not considered significant enough to warrant retesting or recollection of samples and testing. All results are considered usable for their intended data purposes and are reported as provided by the laboratory. However, Wood will continue to work with the analytical laboratory to determine the specific circumstances that resulted in this situation. Additional investigation into why this occurred will continue and will be addressed in the 2020 Monitoring Plan and QAPP revision.
- **Issue –** The copper matrix spike (MS) sample result was 58 percent, which was slightly below the laboratory performance-based recovery limits of 60 to 138 percent.
  - **Resolution –** The copper spike concentration was several-fold lower than the reported sample concentration. Therefore, the low MS recovery was flagged as allowed by the method, and the result was reported as measured. The low recovery may be associated with possible matrix interference due to the concentrations of copper inherent in the sample. The corresponding laboratory control sample (LCS) and matrix spike duplicate (MSD) were within laboratory control limits; therefore, the sample was not reanalyzed.

3.3.2 Toxicity

In addition to water chemistry analyses, the samples were tested for toxicity using an acute 96-hour survival exposure with a marine larval fish (Pacific topsmelt) and a chronic 48-hour survival and development test using bivalve embryos (Mediterranean mussel). The complete toxicity laboratory reports for the 2019 study are in Appendix D.

3.3.2.1 Pacific Topsmelt 96-Hour Acute Bioassay

During the initial Pacific topsmelt bioassay conducted on August 19, 2019, no toxicity was observed in the undiluted samples (Table 3-8). However, Pacific topsmelt survival ranged from 73.3 percent to 83.3 percent in the laboratory controls, and therefore did not meet the minimum test acceptability criterion of 90 percent mean survival.

Due to the variability in the initial Pacific topsmelt bioassay and the poor results in the laboratory controls, the undiluted[14] samples were retested out of holding time on August 22, 2019. The laboratory control for this test met the test acceptability criterion, with 93.3 mean percent survival. No toxicity was observed in the undiluted samples from SIYB with the exception of SIYB-4 (Table 3-9). A significant decrease in Pacific topsmelt survival was observed in the 100 percent concentration (i.e., undiluted SIYB water) sample from SIYB-4 relative to the control (a 14 percent reduction in survival) using both the USEPA 1995b statistical methods (i.e., a one-tailed t-test with the Bonferroni adjustment) and the TST[15] (USEPA, 2010).

To confirm the toxicity at SIYB-4 and determine whether a TIE was warranted, a second set of toxicity and select chemistry samples were collected from SIYB-4, and SIYB-REF for comparison, on September 9, 2019; acute toxicity tests were initiated on September 10, 2019. Pacific topsmelt survival was 100 percent in the laboratory control for the September 10, 2019 bioassay, which meets the test acceptability criterion. There was no statistically significant reduction in Pacific topsmelt survival in undiluted, unfiltered samples from SIYB-4 or SIYB-REF compared to the control (Table 3-10). As an additional QC measure, the Wood Aquatic Toxicology Laboratory performed Pacific topsmelt bioassays on the same samples from SIYB-4 and SIYB-REF collected on September 9, 2019. No toxicity was observed in tests performed by the Wood Aquatic Toxicology Laboratory.

Detailed results and QA/QC summaries for the toxicity testing performed by Nautilus and the Wood Aquatic Toxicology Laboratory are presented in the laboratory reports in Appendix D.

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[14] Due to the limited availability of test organisms, only the undiluted samples were retested on August 22, 2019.

[15] The TST is a USEPA-developed statistical approach to evaluate the whole effluent and ambient toxicity by using hypothesis testing techniques based on research and peer-reviewed publications.

Table 3-8.
Results of the 96-Hour Pacific Topsmelt Bioassay – 8/19/2019 Test

Concentration (% Sample)	Sample ID/Mean Survival (%)						
	SIYB-1	SIYB-2	SIYB-3	SIYB-4	SIYB-5	SIYB-6	SIYB-REF
Laboratory Control	73.3[a]	73.3[a]	73.3[a]	83.3[a]	83.3[a]	83.3[a]	76.7[a]
25	90.0	73.3	80.0	83.3	80.0	83.3	**70.0***
50	80.0	83.3	90.0	96.7	**70.0***	76.7	76.7
100	83.3	76.7	80.0	86.7	83.3	73.3	76.7
Test Results							
TST (Pass/Fail)	Pass	Pass	Pass	Pass	Pass	Pass	Pass
NOEC (%)	100	100	100	100	100	100	100
LOEC (%)	N/A	N/A	N/A	N/A	N/A	N/A	N/A
LC_{50} (%)	>100	>100	>100	>100	>100	>100	>100

Notes:
Values with a **bold** asterisk indicate a statistically significant decrease in survival compared to the lab control using the TST. No significant decreases were detected using the USEPA 2002 acute method guidance flowchart statistical methods.
The reference toxicant LC_{50} value (159 µg/L copper) for this test was within two standard deviations of the Nautilus historical mean (153 ± 136 µg/L copper), indicating typical organism sensitivity to copper.
a. The lab controls did not meet the minimum test acceptability criterion of 90 percent mean survival; therefore, the undiluted (100 percent) samples were retested on 8/22/2019 with a different batch of fish (see Table 3-9).
µg/L = microgram(s) per liter; > = greater than; % = percent; ID = identification; LC_{50} = concentration estimated to be lethal to 50 percent of the organisms; LOEC = lowest observed effect concentration; N/A = not applicable (because test treatment had NOEC of 100%); NOEC = no observed effect concentration; TST (Pass/Fail) = test of significant toxicity; TST Pass = sample is nontoxic according to the TST calculation; USEPA = United States Environmental Protection Agency

Table 3-9.
Results of the 96-Hour Pacific Topsmelt Bioassay – 8/22/2019 Test

Concentration (% Sample)	Sample ID/Mean Survival (%)						
	SIYB-1	SIYB-2	SIYB-3	SIYB-4	SIYB-5	SIYB-6	SIYB-REF
Laboratory Control	93.3	93.3	93.3	93.3	93.3	93.3	93.3
100	90.0	93.3	96.7	**80.0**	96.7	93.3	96.7
Test Results							
TST (Pass/Fail)	Pass	Pass	Pass	Fail	Pass	Pass	Pass
NOEC (%)	100	100	100	<100	100	100	100
LOEC (%)	N/A	N/A	N/A	<100	N/A	N/A	N/A

Notes:
Values in **bold** indicate a statistically significant decrease in survival compared to the lab control using both the TST and the USEPA 2002 acute method guidance flowchart statistical methods.
The reference toxicant LC_{50} value (232 µg/L copper) for this test was within two standard deviations of the Nautilus historical mean (154 ± 136 µg/L copper), indicating typical organism sensitivity to copper.
µg/L = microgram(s) per liter; < = less than; % = percent; ID = identification; LC_{50} = concentration estimated to be lethal to 50 percent of the organisms; LOEC = lowest observed effect concentration; N/A = not applicable (because test treatment had NOEC of 100%); NOEC = no observed effect concentration; TST (Pass/Fail) = test of significant toxicity; TST Pass = sample is nontoxic according to the TST calculation; TST Fail = sample is toxic according to the TST calculation; USEPA = United States Environmental Protection Agency

Table 3-10.
Results of the 96-Hour Pacific Topsmelt Bioassay – 9/10/2019 Confirmation Test

Concentration (% Sample)	Sample ID/Mean Survival (%)	
	SIYB-4	**SIYB-REF**
Laboratory Control	100	100
100	100	96.7
Test Results		
TST (Pass/Fail)	Pass	Pass
NOEC (%)	100	100
LOEC (%)	N/A	N/A

Notes:
The reference toxicant LC_{50} value (246 µg/L copper) for this test was within two standard deviations of the Nautilus historical mean (156 ± 140 µg/L copper), indicating typical organism sensitivity to copper.
µg/L = microgram(s) per liter; % = percent; ID = identification; LOEC = lowest observed effect concentration; N/A = not applicable (because test treatment had NOEC of 100%); NOEC = no observed effect concentration; TST (Pass/Fail) = test of significant toxicity; TST Pass = sample is nontoxic according to the TST calculation; TST Fail = sample is toxic according to the TST calculation

3.3.2.2 Bivalve Larvae 48-Hour Chronic Bioassay

Results of the mussel development tests conducted on SIYB surface water samples are summarized in Table 3-11. Results are presented as a combined endpoint of survival and development per the USEPA 1995b protocol.

Bivalve tests were conducted on both filtered and unfiltered samples (for the 100 percent treatments only). Filtration on the 100 percent concentration samples was conducted to safeguard against potential undesirable effects from resident organisms in the raw water samples.

A bivalve larvae test is considered acceptable (i.e., valid) if at least 50 percent of the control larvae survived and an average of 90 percent of surviving control larvae developed normally. Control survival for the 2019 tests ranged from 95.3 percent to 100 percent; average control survival was 98.3 percent (which exceeds the test acceptability criteria of 50 percent survival; see toxicity report in Appendix D). Bivalve larvae normality in the controls ranged from 98.1 percent to 99.1 percent; average control normality was 98.6 percent (which exceeds the test acceptability criteria of 90 percent normal development). Based upon these high levels of control survival and normal development, the 2019 SIYB bivalve larvae tests met the required acceptability criteria and the tests were deemed valid.

A statistically significant decrease in the combined survival and development endpoint using the TST test was observed in one of the six samples tested (SIYB-1) from within the basin. Exposure of bivalve larvae to the undiluted and unfiltered SIYB-1 sample (i.e., 100 percent concentration) resulted in 26.0 percent combined survival and normal development compared with the laboratory control level (98.3 percent); these effects were statistically significant using both the USEPA 1995b statistical approach and the TST analysis. For the undiluted and filtered samples tested, a statistically significant decrease in the combined survival and normal development endpoint was also observed in the SIYB-1 sample (21.7 percent combined survival and normal development). The EC_{50} was reported as 83.1 percent for the unfiltered SIYB-1 sample and greater than (>) 100 percent for the filtered SIYB-1 sample. Bivalve larvae toxicity was not observed in samples collected from any of the other stations in SIYB or the reference station. The full toxicity testing report is provided in Appendix D.

Table 3-11.
Results of the 48-Hour Bivalve Larvae Bioassay

Concentration (% Sample)	Mean Combined Survival and Normal Development						
	SIYB-1	**SIYB-2**	**SIYB-3**	**SIYB-4**	**SIYB-5**	**SIYB-6**	**SIYB-REF**
Laboratory Control	98.3	97.1	94.4	97.2	98.0	96.1	97.2
6.25	96.0	98.7	96.5	96.4	98.4	98.4	96.7
12.5	99.4	98.5	98.3	96.9	95.8	98.6	96.8
25	95.7	97.7	97.4	97.7	98.7	96.3	98.0
50	94.6	98.0	98.7	98.3	99.0	97.3	98.5
100	**26.0**	96.0	94.6	95.2	97.9	97.3	97.0
100 (0.45-µm filtered)[a]	**21.7**	98.0	93.2	98.4	98.1	97.8	98.6
Test Results							
TST (Pass/Fail) unfiltered sample	Fail	Pass	Pass	Pass	Pass	Pass	Pass
TST (Pass/Fail) filtered sample	Fail	Pass	Pass	Pass	Pass	Pass	Pass
EC_{50} (% unfiltered sample)	83.1	>100	>100	>100	>100	>100	>100
EC_{50} (% filtered sample)	<100	>100	>100	>100	>100	>100	>100

Notes:
The reference toxicant EC_{50} value (10.9 µg/L copper) for this test was within two standard deviations of the Nautilus historical mean (7.85 ± 4.28 µg/L copper), indicating typical organism sensitivity to copper.
Values in **bold** indicate a statistically significant decrease compared to control.
a. Each undiluted sample was also tested filtered through 0.45-µm filter to remove potentially harmful native algae that might interfere with test organism performance. Mean combined survival and normal development in the filtered control was 97.2 percent.
µg/L = microgram(s) per liter; µm = micrometer(s); > = greater than; < = less than; % = percent; EC_{50} = concentration estimated to cause an adverse effect on 50 percent of the organisms; TST (Pass/Fail) = test of significant toxicity; TST Pass = sample is nontoxic according to the TST calculation; TST Fail = sample is toxic according to the TST calculation

3.3.2.3 Toxicity QA/QC

Field Observations

On August 16, 2019, as well as the day prior to sample collection (August 18, 2019), reconnaissance surveys were conducted in SIYB to evaluate the study area for the presence of algal blooms and for general water clarity. In addition to these visual assessments, the reconnaissance surveys also included collection of several water samples that were sent to the laboratory to be analyzed for the presence of harmful algal species. Although an algal bloom was prevalent the week prior to the reconnaissance survey, the analysis showed that the water clarity in SIYB was acceptable and that the collected water samples did not contain an abundance of harmful algae species. Based upon these findings, it was determined that the collection project should proceed as planned. No other QA/QC issues were noted for this test, and all water quality parameters were within the appropriate ranges for the duration of the test.

Sample Receipt

Samples were received in good condition on the same day that they were collected (August 19, 2019 and September 9, 2019). The SIYB samples were delivered on ice and received in the laboratory within the USEPA recommended temperature range of 0–6°C. The mussel test and topsmelt tests on August 19, 2019, August 20, 2019, and September 10, 2019 were initiated within the 36-hour holding time requirement. The samples collected on August 19, 2019 were retested on August 22, 2019 outside of the 36-hour holding time period (73 to 79 hours past collection).

Toxicity Test Validity

The controls for the initial Pacific topsmelt acute toxicity test initiated on August 19, 2019 did not meet the minimum test acceptability criteria set by the USEPA; mean percent survival in all lab controls for this test ranged from 73.3 to 83.3 percent, which is below the 90 percent criterion. Therefore, the undiluted samples collected on August 19, 2019 were retested on August 22, 2019 out of holding time. Controls for the August 22, 2019 Pacific topsmelt test had 93.3 percent mean percent survival and met the minimum test acceptability criterion (greater than or equal to [≥] 90 mean percent survival). The bivalve test met all test acceptability criteria set by the USEPA, as well as internal laboratory QA program requirements. All other protocol-required minimum acceptability criteria were met for the Pacific topsmelt 96-hour acute survival and the bivalve 48-hour chronic development tests. The QA/QC summary of the toxicity test results provided by Nautilus is in Appendix D.

Reference Toxicant Tests

Concurrent topsmelt and bivalve reference toxicant results are summarized in Table 3-12 and Table 3-13, respectively. The controls for the bivalve larvae and Pacific topsmelt reference toxicant tests initiated on September 10, 2019 both met corresponding minimum test acceptability criteria. The controls for the Pacific topsmelt reference toxicant tests initiated on August 19, 2019 and August 22, 2019 did not meet the minimum test acceptability criteria (≥90 percent mean survival). However, ≥90 percent mean survival was observed in the lowest concentration reference toxicant samples (50 µg/L copper chloride) for the August 19, 2019 and August 22, 2019 tests (95 and 90 percent mean survival, respectively). In addition, the calculated EC_{50} value for the bivalve test and the LC_{50} for the Pacific topsmelt tests both fell within two standard deviations of the laboratory historical mean, indicating that the test organisms used during this round of testing exhibited typical sensitivity to copper. For these reasons, the August 19, 2019 and August 22, 2019 Pacific topsmelt tests were considered valid.

Curved Hinged Larvae

During the 2014 monitoring, it was noted that some of the abnormal larvae (approximately 70 percent) were enumerated as “abnormal” because they had a slightly curved-hinged shell (i.e., bean-shaped) rather than a straight-hinged D-shaped shell.[16] To evaluate the recurrence of this observation for future TMDL bivalve larvae tests, the laboratory scored the larvae as (1) larvae with a fully developed shell with a straight-hinged D-shape, (2) partially developed larvae with a concave or curved hinge, and (3) larvae that fail to develop a shell or display severe morphological defects.

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[16] Photographs of bivalve larvae with slightly curved hinged shells were included in the 2014 SIYB TMDL report (AMEC Environment & Infrastructure, Inc., 2015).

As described in Appendix D, approximately 1.4 to 3.0 percent[17] of the bivalve larvae in the undiluted, unfiltered samples for SIYB-1 and SIYB-3 for the 2019 study were partially developed but did not possess a straight hinge. One of these samples, from SIYB-1, resulted in statistically significant toxicity to bivalve larvae. Curved hinges were also observed in 0.1 percent of the SIYB-1 control replicates; however, no curved hinges were observed in samples from SIYB-2, SIYB-4, SIYB-5, SIYB-6, or SIYB-REF. A smaller percentage of the larvae were partially developed with a curve-hinged shell in 2019 compared with 2014. The factor(s) that contributed to the elevated number of curve-hinged shells observed in the SIYB-1 sample in 2014 (>70 percent) did not recur in 2019 (see the Nautilus study report contained in Appendix D for more information).

Table 3-12.
Summary of Reference Toxicant Test Results for Pacific Topsmelt

Copper Chloride Reference Toxicant Test				
Test Initiation Date	**Concentration (µg/L Copper)**	**Mean Percent Survival**	**LC_{50} (µg/L Copper)**	**Historical Mean ± 2 Standard Deviations (µg/L Copper)**
August 19, 2019	Laboratory Control	85[a]	159	153 ± 136
	50	95		
	100	65		
	200	40		
	400	0		
	800	0		
August 22, 2019	Laboratory Control	85[a]	232	154 ± 136
	50	90		
	100	85		
	200	65		
	400	0		
	800	0		
September 10, 2019	Laboratory Control	100	246	156 ± 140
	50	100		
	100	95		
	200	80		
	400	5		
	800	0		

Notes:
a. The laboratory controls did not meet the minimum test acceptability criterion of 90 percent mean survival.
µg/L = microgram(s) per liter; LC_{50} = concentration estimated to be lethal to 50% of the organisms

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[17] This proportion is lower than that observed in 2018, which ranged from 2.5 to 30 percent at stations SIYB-1 through SIYB-4.

Table 3-13.
Summary of Reference Toxicant Test Results for Bivalve Larvae

Copper Chloride Reference Toxicant Test			
Concentration (µg/L Copper)	**Mean Combined Survival and Normal Development**	**EC_{50} (µg/L Copper)**	**Historical Mean ± 2 Standard Deviations (µg/L Copper)**
Laboratory Control	97.1	10.9	7.85 ± 4.28
2.5	97.5		
5.0	95.5		
10	53.3		
20	0		
40	0		

Notes:
µg/L = microgram(s) per liter; EC_{50} = concentration estimated to cause an adverse effect on 50% of the organisms

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4.0 CONCEPTUAL MODEL UPDATE

The SIYB TMDL Investigative Order (No. R9-2011-0036) required the preparation of a Conceptual Model report as part of the SIYB TMDL implementation program. The initial Conceptual Model was submitted to the Regional Board in May 2011 (Weston, 2011) by the Port. It identified the physical and chemical factors that control the fate and transport of dissolved copper within the basin and the receptors (i.e., biota) that may be exposed to dissolved copper in surface water and sediment. The Conceptual Model also provided an overview of the state of knowledge (in 2011) for dissolved copper dynamics within SIYB (primarily based on the information provided in the SIYB TMDL Technical Report) and other relevant technical reports and scientific literature. Additionally, the 2011 Conceptual Model identified uncertainties and data gaps and described additional work that may be beneficial in addressing these gaps.

The Investigative Order also required the Conceptual Model to be updated as needed. In particular, refinements and updates to the Conceptual Model are required when new information becomes available.

During the 2015 reporting period, two updates to the Conceptual Model were completed: (1) a summary of scientific studies and new information was provided that specifically addressed the five SIYB TMDL data gaps identified in the 2011 Conceptual Model, and (2) details were provided on an analysis conducted to predict the expected water column dissolved copper levels in SIYB using multiple leach rate scenarios and SIYB-specific physical and chemical characteristics as input variables using the MAMPEC model (Amec Foster Wheeler Environment & Infrastructure, Inc., 2016). The MAMPEC model analysis was conducted in response to the DPR’s establishment of the maximum allowable dissolved copper leach rate (9.5 $\mu g/cm^2$/day) for copper-containing AFPs used on vessel hulls in California marine waters.

This Annual Report proposes a 2019 TMDL Conceptual Model update supported by the 2019 TMDL Conceptual Model Review (Wood and Dudek, 2019; Appendix F). Table 4-1 summarizes the Conceptual Model development and update process that has occurred during this TMDL timeline, including the 2011 data gaps and the discussion points presented in the 2015 update, as well as the current update.

4.1 Basis for Proposed 2019 Conceptual Model Update

One of the studies identified in the 2015 update was an investigation conducted by Space and Naval Warfare Systems Command (SPAWAR). This scientific study employed a “life cycle model” approach to assess leaching of dissolved copper from vessels paints. Specifically, the study (as described in Earley et al. [2013]) provided new “best available science” information with regard to addressing the following data gap from the 2011 Conceptual Model: *“What is the relative importance of passive leaching and hull cleaning to copper loading in SIYB?”*

The Port conducted the 2019 TMDL Conceptual Model Review (Appendix F) during this reporting period to compare the TMDL Conceptual Model and the life cycle dynamic model (Earley et al., 2013). Based upon a detailed comparison of the TMDL model and the Life Cycle Dynamic Model, it was concluded that the contribution of dissolved copper to the water column in SIYB attributable to in-water hull cleaning is likely considerably higher than previously modeled as part of the 2011 Conceptual Model.

This 2019 TMDL Conceptual Model Review indicates that copper loading is associated with both a continuous dissolution of copper AFP and additional dissolution related to a volatile timeframe of increased and dynamic copper release in the 30 days following periodic hull cleaning events, and that this loading of copper varies based upon the number of times a vessel is cleaned. Data indicate an active phase of copper loading and toxicity following hull cleaning events due to increased release of bioavailable free copper ions. Comparative analysis of the 2005 TMDL Instantaneous Model and the Life Cycle Dynamic Model finds that the total and per-vessel loads are consistent between the models. This finding demonstrates that the recent Life Cycle Dynamic Model provides total load calculations that are consistent with the TMDL and best represent real-time use conditions occurring in marina basins. As such, it stands to reason that the Life Cycle Dynamic Model developed by Earley et al. (2013) is appropriate and should be viewed as a scientifically credible and acceptable approach to update the 2005 TMDL Instantaneous Model.

Based on these findings, the Port is recommending that the SIYB TMDL Conceptual Model be updated to (1) incorporate the loading assumptions provided in the Earley et al. (2013) Life Cycle Dynamic Model, and (2) use the Life Cycle Dynamic Model moving forward for annually calculating copper loads for TMDL compliance and reporting purposes, starting in the next (2020) reporting period. This Conceptual Model update process will include meetings with Regional Board staff to evaluate the appropriate mechanism(s) for implementation.

Table 4-1.
2019 Update to Conceptual Model Data Gaps

Uncertainty and Data Gaps from 2011 Conceptual Model Report	2011 Conceptual Model Discussion	2015 Update	2019 Update
What is the relative importance of passive leaching and hull cleaning to copper loading in SIYB?	Hull cleaning has been reported to increase leaching of dissolved copper during cleaning, suspend particulates (i.e., total copper), and increase passive leaching rates following cleaning. Additionally, hull-cleaning events have been shown to increase copper leaching rates above baseline passive leaching rates for at least three days, which indicates that there may be a need to revise the definition of a hull-cleaning event from a one-day period to a three-day period following cleaning. Additionally, hull cleaning, particularly without the use of BMPs, releases particulates, including total copper, to the sediments. Once in the sediments, the copper is largely bound; however, increasing concentrations can increase the potential for sediments to serve as a source to the overlying waters. *Therefore, further studies are needed to assess the impact of hull cleaning on passive leaching rates and dissolved copper loading. Experimental studies that compare copper concentrations over time for vessels that are cleaned and uncleaned may be useful in determining the influence of hull cleaning on loading, both during and after cleaning events.*	• Earley, P.J., B.L. Swope, K. Barbeau, R. Bundy, J.A. McDonald, and I. Rivera-Duarte. 2013. *Life cycle contributions of copper from vessel painting and maintenance activities.* Biofouling: The Journal of Bioadhesion and Biofilm Research, DOI: 10.1080/08927014.2013.841891. *This study involved the design and implementation of a set of experiments to evaluate the in situ copper leaching from both epoxy and ablative AFPs at various times: post-application (i.e., initial exposure), passive leaching, and surface refreshment (e.g., following hull cleaning events), which provided a life cycle assessment of hull paint. The study was conducted using two protocols developed by the United States Navy: the dome method and the in-water hull-cleaning sampling method. Cleaning techniques investigated included a soft-pile carpet and a medium-duty 3M™ pad for fouling removal.*	A comparative analysis of the 2005 TMDL Instantaneous Model and the best available science Life Cycle Model (Earley et al., 2013) was conducted. The Life Cycle Model suggests that hull cleaning activities contribute greater than 5 percent of the annual copper loads to SIYB. Increased copper release for the 30-day period following hulling cleaning activity can vary the contribution of hull cleaning-related loading from 5 percent to more than 40 percent of annual copper load per vessel depending on the number of times a vessel is cleaned. From this comparative analysis, it was concluded that the Life Cycle Model more accurately estimates loading resulting from in-water hull cleaning, while concurrently providing the best representation of the boating practices and real-time use conditions observed in SIYB and other marina basins. *The Port is recommending that the SIYB TMDL Conceptual Model be updated to (1) incorporate the loading assumptions provided in the Earley et al. (2013) Life Cycle Model, and (2) use the Life Cycle Dynamic Model moving forward for annually calculating copper loads for TMDL compliance and reporting purposes.*

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4.2 Reassessment of In-Water Hull Cleaning Practices

As discussed above, the Life Cycle Dynamic Model developed as part of the Earley et al. (2013) investigation suggests that hull cleaning activities may contribute greater than 5 percent of the annual copper loads to SIYB. In addition, it has been further demonstrated that in-water hull cleaning can lead to sediment impacts. Previous reports have identified that particulate loading of copper occurs during hull cleaning and these particles can be deposited on the bay floor, even when in-water hull cleaning follows standard BMP protocols (Wood, 2019c; AMEC Earth & Environmental, 2006). As a result, various in-water hull cleaning factors appear to have the potential to affect copper loading and possibly water quality as well. Such factors include:

- Frequency of in-water hull cleaning on vessels that have copper-containing AFPs
- Hull cleaning practices
- Ablative paint contributions to copper loading
- Locations of in-water hull cleaning practices

In September 2019, the Port initiated a review of its current In-Water Hull Cleaning Regulations (Ordinance, Permits, required BMPs). The review was initiated as a result of Board direction given to Port staff requesting further evaluation of policy initiatives that reduce loading of copper into San Diego Bay, including those policies related to in-water hull cleaning.

Based on these factors, the Port has been conducting outreach to the other Named TMDL Parties, and the boating community of San Diego Bay, related to in-water hull cleaning practices, regulations, and BMP improvement options. The outreach and public engagement process occurred from September through December 2019 and included several general San Diego Bay-wide outreach events, coordination meetings with Named TMDL Party representatives, and targeted public input sessions to receive feedback on potential management action options. The process included the public release of a draft In-Water Hull Cleaning Ordinance Amendment in November 2019.

In all, approximately 300 comments were received during the five public engagement sessions and various Port stakeholder meetings. Many varying perspectives were shared by the stakeholder community. Generally, feedback included:

- Concerns about the effectiveness of monthly cleaning
- Various perspectives on cleaning frequency and duration of time needed between painting
- Various perspectives for cleaning ablative paints
- Questions and concerns about the water quality science
- A desire for improved education and training
- Clarification on the role of boatyards related to paint application and copper loading

Of the feedback, two overarching themes became evident. General public consensus expressed a strong need to clean more frequently than monthly with an array of cleaning materials, including abrasive materials, depending on the type or age of the paint. Many hull cleaners indicated that they are currently cleaning between 15 and 18 times per year, suggesting that the industry standard is moving toward a greater frequency than was previously occurring. They supported their position by saying that cleaning monthly with soft carpet could not effectively remove growth from aged paints and the DPR's new lower leach rate paints (Category I paints), especially in the warmer months.

The other key theme was related to the water quality science and the reliance on the studies used by the DPR. Specifically, hull cleaners and boaters commented that data gaps connecting hull cleaning to water quality impacts exist, and that additional data should be collected on cleaning frequency, cleaning tools, different paint types, etc., before any policy amendments occur.

The Port is taking all of the feedback and comments into consideration as the in-water hull cleaning review process continues. Additional outreach, coordination meetings, and targeted public input sessions are expected to continue into the next reporting period.

5.0 DISCUSSION

This section provides discussion related to copper loading and water quality findings based on data and information collected within this reporting period.

5.1 Dissolved Copper Load

The 2019 vessel tracking program estimated an annual dissolved copper load to SIYB of 1,140 kg/yr. The relative allocation of loading was approximately 1,113 kg/yr (97.6 percent) attributed to passive leaching for vessels moored in yacht clubs and marinas and hull cleaning occurring in these facilities and approximately 27.6 kg/yr (2.4 percent) attributed to passive leaching for vessels located at the Harbor Police dock, transient dock, and weekend anchorage, as well as hull cleaning occurring within these locations. These values were calculated by adding together the estimated contributions from (1) copper and assumed-copper paints, (2) DPR Category I and confirmed low-copper paints, and (3) aged-copper paints, and taking occupancy rate into account.

Figure 5-1 presents dissolved copper loads from 2011 to 2019 compared with the TMDL baseline load (2,100 kg/yr). This figure also includes the estimated annual load in relation to the TMDL interim and final load reduction targets. The results of the vessel tracking efforts were used to estimate a dissolved copper load reduction of 45.7 percent (960 kg/yr) for 2019 compared with the TMDL baseline load (2,100 kg/yr). The data indicate a lessening trend toward meeting the final TMDL target of 567 kg/yr by the 2022 milestone.

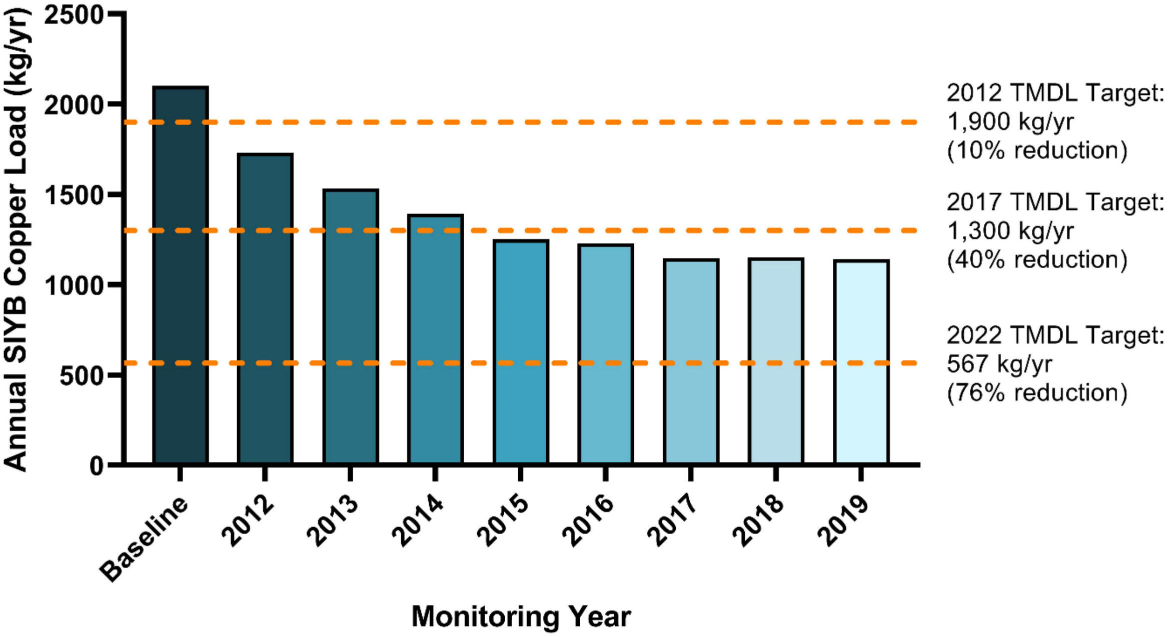

Figure 5-1. Annual SIYB Copper Load per Monitoring Year

5.1.1 Dissolved Copper Load Reduction Sources

The estimated load reduction of 45.7 percent was calculated by summing all individual load contribution sources and then subtracting this total from the TMDL baseline (i.e., 2,100 kg/yr minus 1,140 kg/yr equals 960 kg/yr). Load reduction sources include use of lower copper paints, aged-copper paints, non-copper paints or no paints, vacant slips, and slip occupancy rate. The relative load reduction from each reduction category is shown in Figure 5-2.

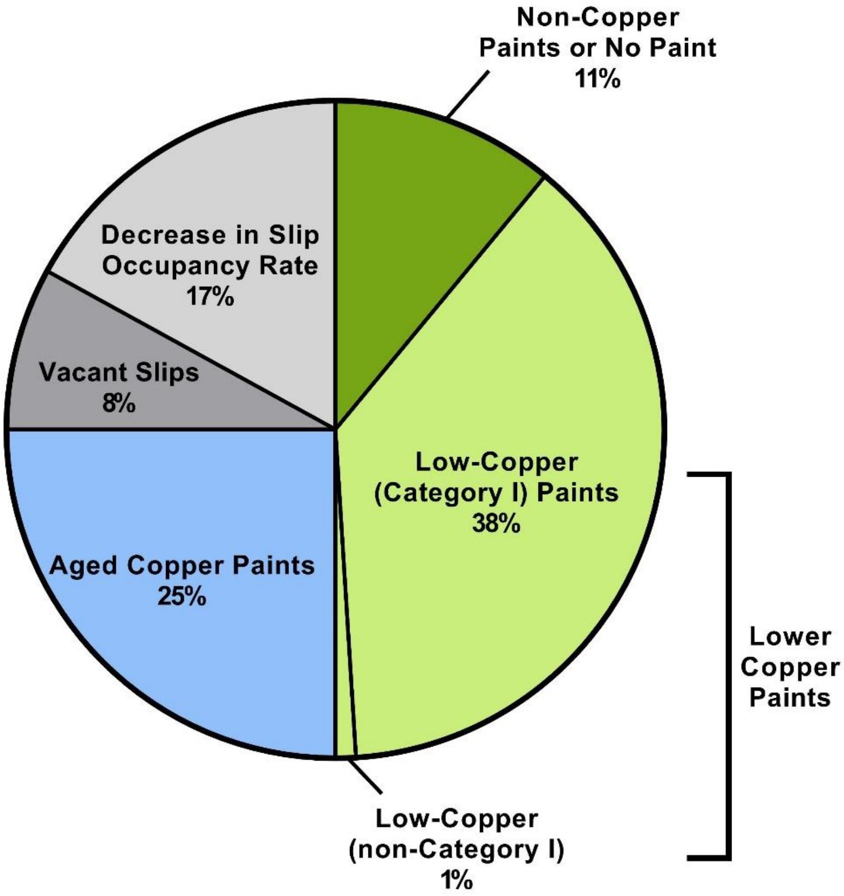

Figure 5-2. 2019 Estimated Load Reduction (960 kg/yr) Relative Percentage per Category[a]

Notes:
a. The 2019 estimated load reduction (960 kg/yr) does not include the load reduction due to the difference between the number of total slips used in the TMDL load calculation (2,363) and the number of slips reported in 2019 (2,298). Therefore, the percent breakdown per category is relative to the 960-kg/yr estimated load reduction.
b. Decrease in average slip occupancy represents the load reduction due to an average occupancy rate of 91% for all vessels in SIYB.

Overall, the data from 2019 indicate that low-copper paints (specifically Category I paints) and aged-copper paints account for the most substantial decrease in annual copper loads. Reductions in the overall occupancy rate (relative to the occupancy rate specified in the TMDL), as well as full vacancies (i.e., slips that are vacant for the entire 2019 monitoring year), account for the second largest copper load decrease. However, the number of full vacancies in 2019 (85 slips) decreased from 2018 (99 slips). Non-copper paints, slip liners, and HydroHoists® are all considered non-copper alternatives, which do not contribute any copper load (i.e., zero-load alternatives); use of non-copper alternatives accounted for the smallest fraction of copper reduction strategies in 2019. It should be noted that the Port fleet continues to have a "zero-load," as all Port vessels were converted to non-copper paints in 2012.

5.1.2 Annual Variation in Dissolved Copper Load Categories

The thorough annual vessel tracking program for the 2,213 vessels in SIYB is essential to document the load attributed to various classes of vessel paints. The tracking allows for documentation of changes in use of Category I and non-copper paints, as well as any substantial changes in the other load categories (e.g., occupancy and vacancy, aged-copper paints). Figure 5-3 presents the distribution of load categories throughout each monitoring year (2012–2019).

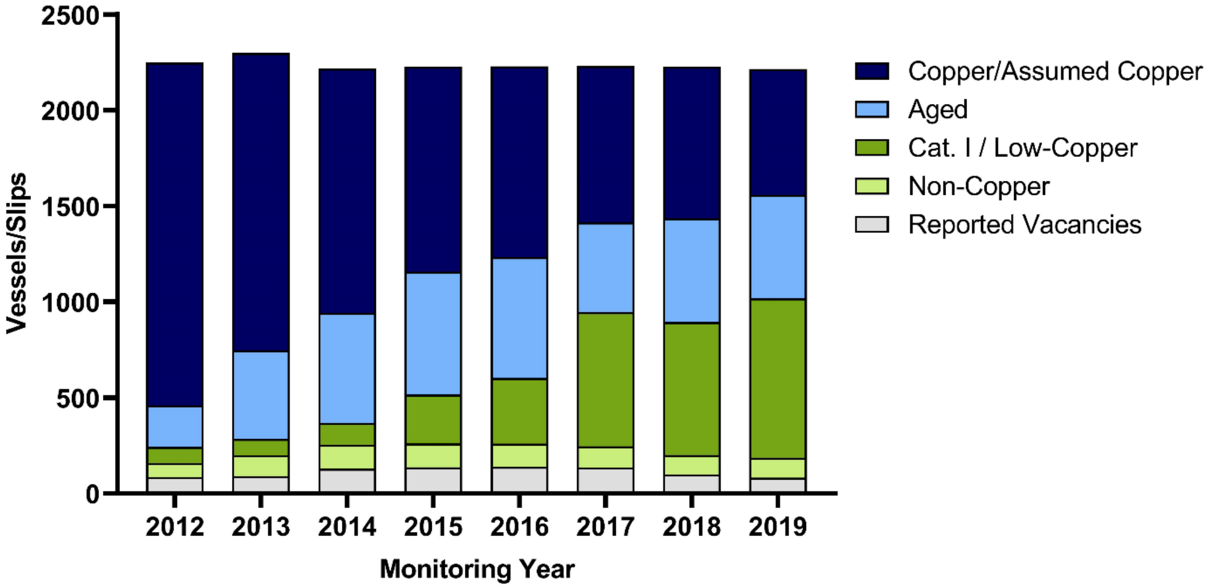

Figure 5-3. Load Categories per TMDL Year, 2012–2019

In 2019, the number of vessels with Category I and/or low-copper paints (831 vessels) increased by 20 percent relative to 2018 (695 vessels). In addition, the total number of vessels with high-copper (confirmed, unconfirmed, or unknown) paints in 2019 was considerably lower than that reported in 2018. The number of vessels with aged-paints in 2019 was comparable to 2018 data. A slight increase from 101 to 105 (4 percent) was reported in the number of vessels in yacht clubs and marinas using non-copper paint alternatives or those with no paint on their vessels. As described above, only 82 vacancies were observed in yacht clubs and marinas in 2019. This number represents an approximately 17 percent decrease in vacant slips compared to 2018 (see Figure 5-4).

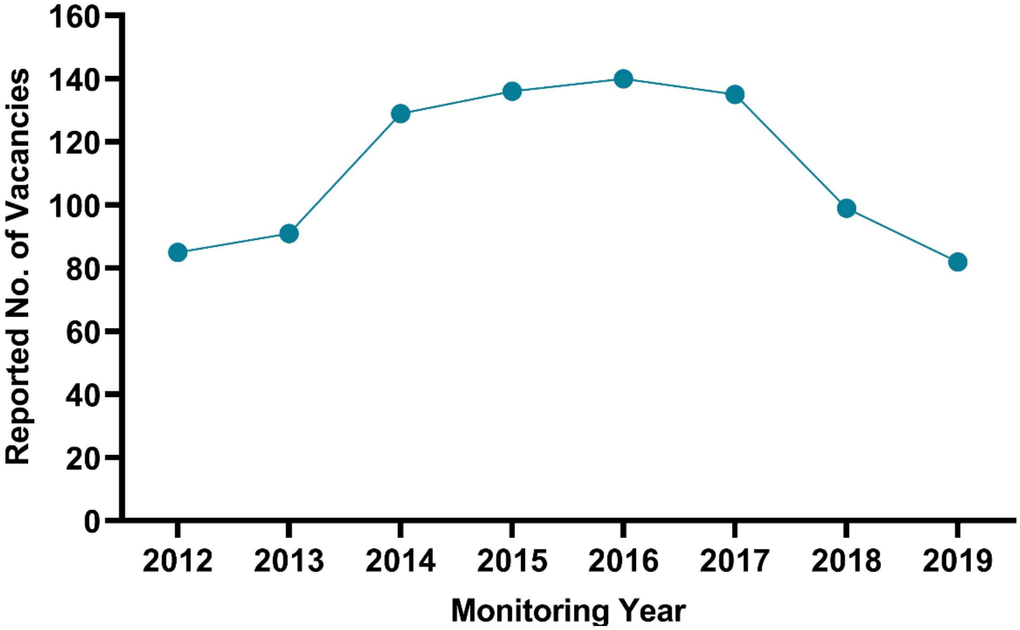

Figure 5-4. Reported Vacancies per TMDL Year, 2012–2019

5.2 Water Quality Monitoring

This section discusses the findings from the water quality monitoring conducted in SIYB in 2019.

5.2.1 Dissolved Copper Levels

The basin-wide average dissolved copper level during the 2019 monitoring program was 8.5 µg/L. Copper levels at all six SIYB sampling stations exceeded the CTR CCC WQO of 3.1 µg/L on the day of sample collection. During the 2019 monitoring event, concentrations of dissolved copper at the five innermost stations in SIYB also exceeded the CTR acute criterion maximum concentration (CMC) water quality objective (4.8 µg/L), which is consistent with 2018 water quality monitoring data collected in SIYB.

Figure 5-5 presents the dissolved copper levels measured at each station from 2011 through 2019. A consistent gradient in dissolved copper levels in SIYB exists where higher concentrations are found near the head of the basin and dissolved copper levels decrease moving toward the mouth (i.e., toward San Diego Bay).

The 2019 basin-wide dissolved copper average of 8.5 µg/L is approximately 1.8 µg/L higher than the basin-wide average measured in the 2018 monitoring program (6.7 µg/L), and was the highest level observed since annual monitoring was initiated in 2011. In addition, from a station-specific standpoint, the dissolved copper levels measured at the majority of stations in 2019 were the highest, or on the upper end of the concentration range measured since the monitoring program’s inception. This site-wide finding is also true for the dissolved copper level observed at the reference site (which is collected outside of the basin in San Diego Bay; see Figure 5-6). The 2019 reference level was found to be 1.9 µg/L. Only once was the reference dissolved copper level found to be higher than the level measured in 2019, and this occurred in 2011 when the dissolved copper level at the reference site was 2.1 µg/L and the respective basin-wide average dissolved copper level was 8.4 µg/L.

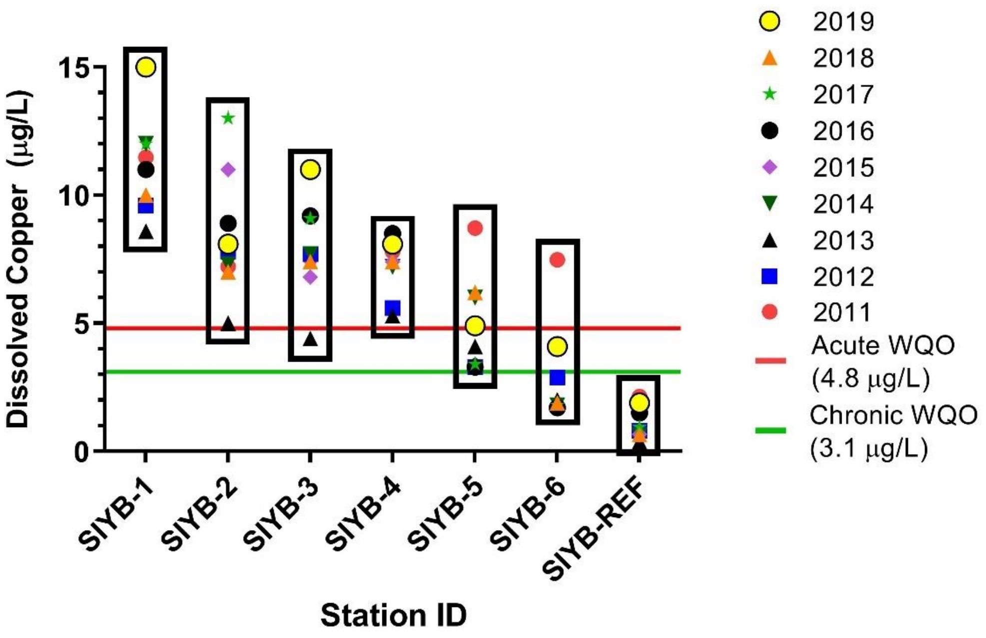

Figure 5-5. Dissolved Copper Comparison by Sampling Station

5.2.2 Toxicity

Bivalve larvae chronic survival is considered a primary indicator of copper toxicity, because the mussel species (*Mytilus galloprovincialis*) is considered one of the most sensitive genera used in the calculation of the water quality criterion for copper in marine environments (USEPA, 1995a). Since 2012, chronic toxicity of bivalve larvae has only been observed at two sampling stations (SIYB-1 and SIYB-2). Station SIYB-1 showed a toxic response in 2019. This station has also shown a toxic response during all monitoring events since the program began in 2011. While no toxic response was observed in station SIYB-2 in 2019, toxicity has been observed at this station periodically since the program began in 2011. As mentioned, Stations SIYB-1 and SIYB-2 are the closest to the head of the basin and have the highest concentrations of vessels within the immediate vicinity compared with other stations. Consistent with previous SIYB monitoring events, results from the 2019 monitoring indicated no chronic toxicity at the sampling stations in the middle or near the mouth of the basin.

The only station to display a statistically significant effect on topsmelt survival was station SIYB-4 (a statistically significant effect was also noted at this station during the 2018 monitoring program). Based on this result, further investigation of SIYB-4 was initiated. Further investigation of SIYB-4 did not result in toxicity to topsmelt. The cause of the toxicity noted in the initial test is unknown. Because toxicity was observed at this station in 2018 and 2019, careful attention will be paid to the topsmelt testing in future monitoring programs.

5.3 Comparison of Achieved Load Reduction to Monitored Water Column Dissolved Copper Concentrations

The calculated copper load from all vessel-related sources into SIYB in 2019 was 1,140 kg/yr. The 2019 load was 960 kg/yr less than the baseline used in the TMDL (2,100 kg/yr). Since 2011, the calculated annual load has decreased, although the load reduction has leveled off since 2017

(Figure 5-1). In contrast, the dissolved copper concentration in the water column in SIYB has generally remained consistent since monitoring began in 2011, except for the 2012 and 2013 monitoring periods when a decrease in the basin-wide average was observed. The 2019 basin-wide average and the reference site concentrations increased to approximate pre-TMDL levels. The basin-wide average concentration of dissolved copper measured in 2019 increased compared to 2012–2018 results to 8.5 µg/L ± 1.6 µg/L (mean ± standard error), which is similar to the 2005–2008 baseline level (8.3 µg/L) (Figure 3-3).

Conceptually, the calculated copper loading in SIYB should be positively related to observed concentrations of dissolved copper in the water column. The primary goal of copper load reduction efforts is to decrease water column copper concentration to meet the CTR regulatory criterion target of 3.1 µg/L. Hence, with greater copper load reduction, an associated decrease in water column dissolved copper concentrations is expected; however, to date, this has not occurred consistently. Some factors to consider are summarized below.

As noted above, there can be considerable variation in the dissolved copper levels from year to year, not only in the basin itself, but in the “reference” conditions. In 2011 and 2019, both the basin-wide and the reference station dissolved copper levels were on the higher end of the concentration spectrum compared to other years (Figure 5-6). Consequently, the higher than normal basin-wide dissolved copper level observed in 2019 should be evaluated with the knowledge that the “reference” concentration measured in San Diego Bay was also higher than normal.

Further evaluation of critical loading adjustments related to large-scale programmatic and/or policy actions were also compared to water quality findings. As shown in Figure 5-6, the greatest reduction in the average basin-wide dissolved copper level occurred between 2011 and 2013, decreasing from 8.4 µg/L to 4.9 µg/L. A potential contributing factor to this pattern is that this timeframe corresponded with the initial introduction of the Port’s enhanced in-water hull cleaning regulations.

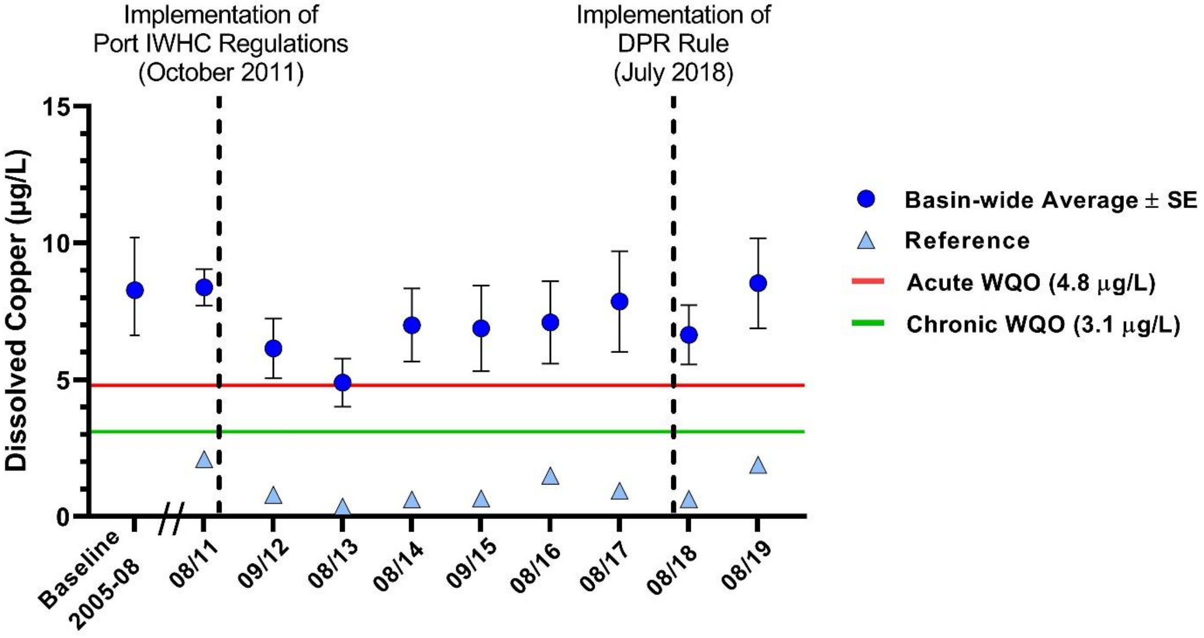

Figure 5-6. Key Load Reduction Initiatives and Water Quality

Additionally, the 2019 monitoring results indicate an increase of nearly 2 µg/L[18] in the basin-wide average of water column dissolved copper concentration compared to 2018 results. A significant load-related action that occurred recently was the implementation of new lower leach rate paints, as required under the DPR Rule (Figure 5-6). As discussed in Section 5.1.2, the number of vessels with Category I and/or low-copper paints (831 vessels) increased by 20 percent relative to 2018 (695 vessels). This trend is anticipated to accelerate in subsequent years as non-Category I copper paints are phased out. An interesting finding raised during the Port's 2019 in-water hull cleaning outreach events based upon feedback from industry professionals indicated that Category I paints appear to require a higher frequency of cleaning and additional effort (e.g., enhanced cleaning pressure and/or more abrasive tools) compared to non-Category I copper paints. If loading from hull cleaning is associated with cleaning frequency, these factors may contribute to the observed increase in dissolved copper observed in SIYB in 2019.

Additional monitoring and investigation to evaluate the impact of cleaning frequency, practices and tools, and paint type and age on water column dissolved copper concentration may be necessary. The goal of the monitoring and investigation will be to estimate the load contribution from in-water hull cleaning, and how modifications to this practice may contribute to the overall load reduction strategies currently in place. The proposed hull cleaning-specific investigations may contribute to development of appropriate management measures that could be considered by the Port, other Named TMDL Parties, and/or others to reduced dissolved copper concentrations in SIYB and meet the final TMDL compliance target. In addition, additional research into the effects of changes in copper concentrations at the reference station or throughout San Diego Bay may improve the understanding of copper dynamics in SIYB. Based upon the findings of these additional investigations and copper reduction strategies, further adaptive management approaches may need to be undertaken to achieve water quality improvement goals.

5.4 Future Load Reductions

Conceptually, the calculated copper loading into SIYB should be related to observed concentrations of dissolved copper in the water column. Ambient basin-wide water column dissolved copper monitoring results indicate, however, that load reduction strategies implemented to date have not resulted in significant improvement in SIYB water column dissolved copper levels. SIYB water column levels of dissolved copper have remained relatively consistent since 2014 and slightly increased in 2019. Consequently, the development and implementation of additional copper reduction strategies is necessary. In order to make measurable improvements on water quality, any new strategies will need to produce measurable and verifiable load reduction of copper into basin waters and demonstrate improvements to water quality.

The 2018 DPR Rule established a maximum dissolved copper leach rate for vessel hull paints purchased in California. Vessel tracking data collected as part of the SIYB TMDL monitoring program indicate a 20 percent increase in vessels painted with Category I paints in 2019 compared to 2018. While the ongoing transition to Category I paints is critical to future load reductions in SIYB, the complete transition process will require a considerable amount of time to fully realize. The process will likely take longer than the SIYB TMDL implementation schedule that requires that the full compliance target for copper loading be achieved by the end of 2022.

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[18] Note: as discussed in Section 5.2.1, the reference dissolved copper concentration was also higher in 2019 (1.9 µg/L) compared to 2018 (0.65 µg/L).

Using the 2019 vessel count and occupancy information as a guide, this future loading scenario (i.e., the transition from high-copper paints to DPR Category I paints) over the final phase of the TMDL would result in an approximately 60 percent copper load reduction compared with the TMDL baseline load. This scenario is depicted in Figure 5-7. It is anticipated that continued conversion to Category I vessel hull paints under the DPR Rule will support additional copper load reductions (Figure 5-7).

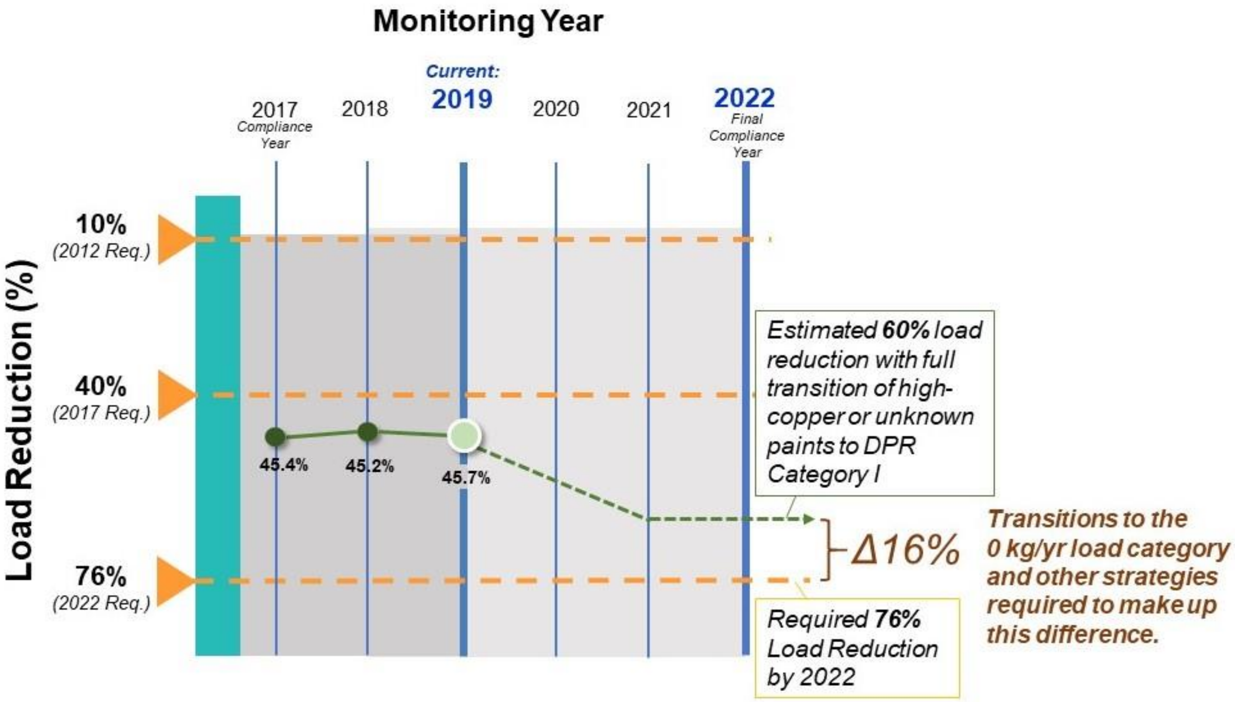

Figure 5-7. Estimated Load Reduction with Fully Realized DPR Rule and Required Reductions for TMDL Compliance

This potential future scenario may produce a significant dissolved copper load reduction compared to current load estimates, but this alone is not enough to achieve the ultimate TMDL target load of 567 kg/yr by the end of 2022. In addition, as mentioned above, it is not clear (1) how the transition to these paints is affecting in-water hull cleaning practices, or (2) how the ancillary effects of adjusting cleaning of the DPR Category I Paints (frequency, tools, etc.) relate to water quality concentrations of dissolved copper. It is anticipated that additional activities related to non-copper paint transition, in-water hull cleaning, or a combination of the two loading sources will be required. In addition, it appears that the time needed to fully assess the effects of the DPR Category I paints on water quality will likely be realized after the 2022 compliance timeline has ended.

Critical evaluations of copper load sources (e.g., remaining high-copper and ablative vessel hull paints, hull cleaning practices and frequency, storm drain inputs, etc.) need to be part of the future assessment and implementation of additional load reduction strategies during the TMDL period. For example, continued conversion of vessel paints to Category I paints is anticipated to contribute to future load reductions; however, based upon recent feedback related to hull cleaning practices on these paints, it is not clear whether this will have a positive or negative impact on water quality.

Moving forward, meeting the CTR dissolved copper water quality criterion will likely require a multipronged approach, including further development and implementation of additional load reduction strategies as well as shifts in current water quality-related policy. Any new strategy would need scientific validation that it would not only reduce copper loads into basin waters, but would also result in measurable improvements in water quality (i.e., decreases in the basin-wide dissolved copper levels).

Feasible and attainable strategies may include new policies, ordinances, and/or regulations, additional industry-specific BMPs, vessel-specific tailored management plans, and/or physical processes to improve water quality conditions in SIYB. Once verified reduction strategies are identified, all responsible parties and the regulatory community will need to collaborate on the best approach and scale (i.e., local, regional, statewide, etc.) to implement the identified strategies. In addition to the identification of additional strategies and significant policy shifts, more robust ambient water quality monitoring of the dissolved copper levels in the basin waters will also be needed to validate the success of any new strategies in producing measurable improvements in basin-wide water quality.

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6.0 CONCLUSIONS AND RECOMMENDATIONS

The SIYB TMDL monitoring program results indicate that the third interim target achieved in 2017, a 40 percent load reduction, continued through the second year of the final TMDL compliance phase. Current achievements have been a result of improved vessel tracking (92 percent response rate), implementation of various BMPs (see Section 3.1.1), and conversions from high-copper paints to DPR Category I paints, low-copper paints, and non-copper alternatives (i.e., non-copper paints, slip liners, HydroHoists®, etc.). The 2019 vessel tracking data show a load reduction of 45.7 percent (approximately 960 kg/yr) in annual dissolved copper loading to SIYB from vessels when compared with the SIYB TMDL-assumed baseline loading of 2,100 kg/yr (Table 6-1).

Table 6-1.
TMDL Interim Requirements and Achievements

TMDL Stage	Compliance Year	Required Load Reduction (%)	Required Load (kg/yr)	Actual Load Reduction (%)
1	2007	0%	2,163	Baseline
2	2012	10%	1,900	17.6% ✓
3	2017	40%	1,300	45.4% ✓
4	2022	76%	567	--

Two specific factors in 2019 moved the copper load reduction in a positive direction: (1) an increase in the number of vessels with DPR Category I paints as a result of the full implementation of the DPR Rule, and (2) an increase in the number of vessels with non-copper paints (or other non-copper alternatives). It is anticipated that the increase in the number of vessels in SIYB with DPR Category I paints will accelerate in the coming years as high-copper paints are phased out with the realization of the DPR Rule, and it will be critical to understand the water quality as this change progresses.

The average basin-wide dissolved copper concentration observed in 2019 was higher than the levels observed since the monitoring program began in 2011. Chronic toxicity continues to be limited to stations in the head of the basin where dissolved copper concentrations tend to be highest. Chronic toxicity was observed at only one station (SIYB-1) in 2019.

Continuing Actions for the Final TMDL Phase

Based on review of the 2011–2019 monitoring data, it is anticipated that additional activities to reduce copper loads will be needed to meet final TMDL targets and lower SIYB dissolved copper concentrations to meet CTR criteria. The Named TMDL Parties, including the Port, the marinas and yacht clubs, the hull cleaners, and the boaters, are responsible for achieving the final TMDL compliance requirement of a 76 percent load reduction by 2022. Recommendations for each Named TMDL Party include the following:

Port

- Use 2019 Conceptual Model update methods for load calculation.
- Consider biannual in-basin water quality monitoring to detect potential impacts of the DPR Rule realization.
- Consider incorporating a second reference station into the monitoring program that is further away from SIYB. This may provide a better understanding of the year-to-year variability in reference copper levels and how this variability relates to the dissolved copper levels in SIYB.
- Consider ordinances and/or other administrative measures to reduce or eliminate in-water hull cleaning activities at the Harbor Police dock, transient docks, and weekend anchorage.
- Consider collaborative communication with the Regional Board to share findings related to loading and water quality, discuss policy actions that address water quality at a broader scale than SIYB, and discuss the timing of recent initiatives and their impact on the TMDL.
- Consider pilot in-water hull cleaning water quality monitoring to assess the relative impact of cleaning frequency, tools, and methods on various vessel hull paint types and ages.
- Consider collaborative communication with the DPR to evaluate potential ancillary effects of conversion to Category I paints and other alternative paints.

Marinas and Yacht Clubs

- Continue vessel tracking and documentation to assist in identification of vessel hull paint conversion to DPR Category I and non-copper paint alternatives.
- Consider developing incentive programs to encourage vessel owners to transition to non-copper paint alternatives.
- Consider developing incentive programs to encourage the use of copper reduction BMPs such as HydroHoists® or slip liners.
- Consider exploring grant opportunities to fund hull conversions to non-copper paint alternatives, communicate these opportunities to boat owners, and assist with grant-related management.
- Consider development of coordinated communication with boaters to improve understanding of in-water hull cleaning options, operators, and potential water quality impacts.
- Consider development of or participation in a program to encourage boaters to utilize hull cleaners committed to hull cleaning practices that minimize potential water quality impacts.
- Consider implementation of vessel hull maintenance plan requirements for boaters.
- Consider participation in pilot in-water hull cleaning water quality monitoring to assess the relative impact of frequency, tools, and methods on various vessel hull paints and ages.
- Consider collaborative communication with DPR to evaluate potential ancillary effects of conversion to Category I paints and other alternative paints.

Hull Cleaners

- Continue compliance with current Port in-water hull cleaning regulations.
- Consider participation in pilot in-water hull cleaning water quality monitoring to assess the relative impact of frequency, tools, and methods on various vessel hull paints and ages.
- Consider development of or participation in a program to encourage boaters to utilize hull cleaners committed to hull cleaning practices that do not cause or contribute to a condition of nuisance or water quality impairment.
- Consider coordinated collaborative communication with the DPR to evaluate potential ancillary effects of conversion to Category I paints and other alternative paints.

Boaters

- Continue participation in vessel tracking and documentation to assist in identification of vessel hull paint conversion to DPR category I and non-copper paint alternatives.
- Consider the use of non-toxic, biocide free bottom paints.
- Consider development of coordinated communication with marinas and yacht clubs to improve understanding of in-water hull cleaning options, operators, and potential water quality impacts.
- Consider participation in a program to utilize hull cleaners committed to hull cleaning practices that do not cause or contribute to a condition of nuisance or water quality impairment.
- Consider implementation of vessel hull maintenance plans.
- Consider participation in pilot in-water hull cleaning water quality monitoring to assess the relative impact of frequency, tools, and methods on various vessel hull paints and ages.
- Consider collaborative communication with the DPR to evaluate potential ancillary effects of conversion to Category I paints and other alternative paints.

Moving forward, each Named TMDL Party will need to evaluate practices and activities within their purview leading to load contributions. Non-copper transitions, implementation of additional BMPs at SIYB facilities, adjustments to hull cleaning practices and/or frequencies, and other alternative mechanisms that result in direct copper load reductions are likely to be necessary. Further efforts should focus on actions that directly decrease copper loading both from passive leaching and in-water hull cleaning[19]. Direct load reductions should focus on closing the gap between the DPR Rule's estimated maximum 60 percent copper load reduction into SIYB and the TMDL compliance requirement of a 76 percent load reduction by 2022, as well as meeting the WQO for the basin.

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[19] This effort may include further consideration of the potential copper mitigation strategies identified the Port's Resolution 2009-230.

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APPENDIX A

SIYB DISSOLVED COPPER TMDL MONITORING PLAN (REVISION 5)

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FINAL
SHELTER ISLAND YACHT BASIN DISSOLVED COPPER TOTAL MAXIMUM DAILY LOAD MONITORING PLAN (REVISION 5)

Prepared for:
California Regional Water Quality Control Board
San Diego Region

Prepared by:

wood.

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In Coordination with:

PORT of SAN DIEGO

Port of San Diego

May 2011
Revised: August 2019

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ACRONYMS AND ABBREVIATIONS

APHA	American Public Health Association
ASTM	American Society for Testing and Materials
Basin Plan	*Water Quality Control Plan for the San Diego Basin – Region 9*
BMPs	best management practices
COC	chain-of-custody
CTD	Conductivity, Temperature, and Depth
CTR	California Toxics Rule
DO	dissolved oxygen
DOC	dissolved organic carbon
DPR	Department of Pesticide Regulation
ELAP	California Environmental Laboratory Accreditation Program
Implementation Plan	SIYB TMDL Implementation Plan
Investigative Order	Investigative Order No. R9-2011-0036
L_h	hull cleaning annual loading
L_p	passive leaching annual loading
LC_{50}	median lethal concentration
LOEC	lowest observed effect concentration
MAR	marine habitat
Monitoring Plan	SIYB TMDL Monitoring Plan
N_v	number of vessels
NOEC	no observed effect concentration
OAL	Office of Administrative Law
pH	hydrogen ion concentration
Port	Port of San Diego
QA	quality assurance
QA/QC	quality assurance and quality control
QAPP	Quality Assurance Project Plan
QC	quality control
RHMP	Regional Harbor Monitoring Program
Regional Board	San Diego Regional Water Quality Control Board
SBE	SeaBird Electronics
SIML	Shelter Island Master Leaseholders
SIYB	Shelter Island Yacht Basin
SM	Standard Methods
SOPs	Standard Operating Procedures
SWAMP	Surface Water Ambient Monitoring Program
State Board	State Water Resources Control Board
TIE	toxicity identification evaluation
TMDL	total maximum daily load
TOC	total organic carbon
USEPA	U.S. Environmental Protection Agency
TST	test of significant toxicity
Weston	Weston Solutions, Inc.
WILD	wildlife habitat
Wood	Wood Environment & Infrastructure Solutions, Inc.
WQO	water quality objective

UNITS OF MEASURE

%	percent
°C	degrees Celsius
µg/L	microgram(s) per liter
µg/cm²/day	microgram(s) per square centimeter per day
cm	centimeter(s)
ft	feet or foot
kg/yr	kilogram(s) per year
µm	micrometer(s)
m	meter(s)
mm	millimeter(s)
mg/L	milligram(s) per liter
mL	milliliter(s)
nm	nanometer(s)
ppt	part(s) per thousand
psu	practical salinity unit(s)
yr	year(s)

1.0 INTRODUCTION

The *Shelter Island Yacht Basin (SIYB) Total Maximum Daily Load (TMDL) Monitoring Plan* (Monitoring Plan) describes the approach for assessing loading reductions through tracking conversion of vessels from copper to non-copper hull paints to determine compliance with TMDL load reduction targets. The Monitoring Plan also details the specific elements of the annual water quality monitoring program that are performed in SIYB to quantify ambient dissolved copper concentrations and toxicity. Water quality monitoring is used to evaluate annual basin-wide improvements in dissolved copper concentrations and toxicity levels, and to determine progress towards complying with the numeric and narrative objectives of the final TMDL.

The original Monitoring Plan was submitted to the San Diego Regional Water Quality Control Board (Regional Board) in May 2011 in response to a requirement specified in Resolution No. R9-2005-0019 (in which the Regional Board incorporated the dissolved copper TMDL into the *Water Quality Control Plan for the San Diego Basin—Region 9*) (Regional Board, 2005).

Revision 1 was submitted in 2013 and included program modifications that were made as recommendations to the Regional Board in the 2012 SIYB TMDL Monitoring and Progress Report (AMEC, 2013). The modifications presented in Revision 1 were:

- Addition of the “aged-copper paint” category to the vessel classification template
- Modifications to the methods used to collect annual vessel census information
- Discontinuation of conducting *in situ* free copper analyses
- Analytical and data analysis method revisions

Revision 2 was submitted in March 2016 and included an additional paint tracking category to the annual SIYB vessel census. DPR Category I (low leach) was added as a paint tracking category for 2015. This category was added in response to the DPR’s February 23, 2015 list of hull paints by leach rate category. The Port recommended that Category I paint be added as tracking category during a 2015 project status meeting with the Regional Board held on October 5. This modification was approved by the Regional Board.[1] In addition, beginning in the 2015 Monitoring Year, the copper load contributions from passive leaching and in-water hull cleaning were presented separately. This is consistent with the loads provided in Appendix 2 of the SIYB TMDL (Regional Board, 2005). The vessel tracking template was also adjusted to include more relevant information for vessel tracking purposes.

Revision 3, submitted in August 2017, included the modification of several field procedures for the annual TMDL water quality monitoring program, as follows:

1. Field filtration of all samples collected for dissolved copper and zinc analyses, in agreement with the U.S. Environmental Protection Agency (USEPA) 1640 protocol.

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[1] Per E-mail correspondence between the Regional Board and Port dated October 21 and November 9, 2015.

2. Performing a top-to-bottom vertical water quality profile (using a conductivity, temperature, and depth [CTD] profiler) at each station to evaluate pH, temperature, light transmittance, and salinity with depth in the water column.
3. The addition of conducting total suspended solids (TSS) analyses.

Revision 4, submitted in July 2018, updated the language regarding the compliance schedule (further described in Section 1.1), as the second compliance period concluded in 2017. Modifications in Revision 4 of the Monitoring Plan were informational and did not require a response from the Regional Board.

Revision 5 was updated in July 2019 to reflect the 2019 monitoring period dates. Due to unexplained toxicity observed during the 2018 monitoring program, toxicity testing methods (Section 4.1.6.1) were updated to include conditions that may necessitate a toxicity identification evaluation (TIE).

This Monitoring Plan meets the requirements of Investigative Order No. R9-2011-0036 (Investigative Order), which directs the Port of San Diego (Port) to develop and submit a Monitoring Plan to track the progress of implementing the TMDL, and to revise the plan as needed. In addition, the project-specific Quality Assurance Project Plan (QAPP) is revised yearly (prior to the annual monitoring event). The QAPP defines project-specific objectives and organization, monitoring activities, data quality objectives, and quality assurance and quality control (QA/QC) procedures in compliance with the State Water Resources Control Board's *Surface Water Ambient Monitoring Program* (SWAMP) protocols.

1.1 Compliance Schedule

Under Resolution R9-2005-0019, the SIYB dissolved copper TMDL (herein referred to as "SIYB TMDL") requires that loading of dissolved copper into the water column be reduced by 76 percent to 567 kilograms per year (kg/yr) over a 17-year period (Regional Board, 2005). Based on the official TMDL approval date[2], this time period is set to end in 2022. No reductions in dissolved copper loading were required during the initial two-year orientation period (2005–2007). The subsequent 15-year period requires incremental reductions of dissolved copper loadings: a 10-percent reduction within seven years; a 40-percent reduction within 12 years; and a 76-percent reduction within 17 years (Table 1-1).

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[2] For a TMDL to be incorporated into the Basin Plan, it must be approved by the Regional Board, State Water Resources Control Board (State Board), Office of Administrative Law (OAL), and USEPA Region 9. The official TMDL approval date is the date of OAL approval.

Table 1-1.
Loading Targets for TMDL Attainment

Stage	Time Period	Target Reduction from TMDL Estimated Loading	Reduction To Be Attained by End of Year	Estimated Target Loading (kg/yr of Dissolved Copper)
1	2005–2007	0%	N/A	N/A
2	2008–2012	10%[a]	2012 (7 years)	1,900
3	2013–2017	40%	2017 (12 years)	1,300
4	2018–2022	76%	2022 (17 years)	567

Notes:

a. Loading calculations in the *2012 TMDL Monitoring and Progress Report* showed that a 17-percent load reduction had been achieved. Compliance with the 2012 load reduction goal of 10 percent was confirmed by the Regional Board in a letter to the Port dated July 26, 2013.

kg/yr = kilograms per year; N/A = not applicable

The first compliance year for the TMDL was 2012. Loading reduction estimates presented in the *2012 Monitoring and Progress Report* (AMEC, 2013) indicated that dissolved copper loading to SIYB by the end of compliance year 2012 had been reduced by 17 percent, exceeding the 10-percent target. In a letter dated July 26, 2013, the Regional Board stated the following, “Based on the data submitted and information provided in the Report [2012 TMDL Monitoring and Progress Report], the 10-percent reduction in dissolved copper loading required to demonstrate compliance with the SIYB TMDL by the December 1, 2012, compliance date was achieved.”

The second compliance period began in January 2013 and concluded in December 2017. Based on the results of the *2017 Monitoring and Progress* report (Amec Foster Wheeler, 2018), the 40-percent reduction in dissolved copper loading required by December 31, 2017 was achieved.[3]

The third and final compliance period began in January 2018 and will continue through 2022.

1.2 TMDL Implementation Plan

The *2011 SIYB TMDL Implementation Plan* (Implementation Plan) is the Named Parties' implementation strategy to reduce the loading of copper into the water column of SIYB, as directed by the SIYB TMDL and the Investigative Order. The Implementation Plan describes the approach to reducing copper loading into SIYB to preserve and restore water quality and beneficial uses of associated marine habitat (MAR) and wildlife habitat (WILD). The Implementation Plan takes a solutions-oriented approach of establishing and implementing best management practices (BMPs) that directly and indirectly help reduce copper loading into the basin to meet the SIYB TMDL interim and final dissolved copper loading compliance thresholds.

The Port has reviewed the BMP initiatives that were detailed in the SIYB TMDL Implementation Plan (Weston, 2011). Based upon this review, the strategic approach to planning and implementing copper reduction BMPs has not changed. The ongoing copper reduction program being implemented by the Port and the SIML TMDL Group is following the same adaptive

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[3] Dissolved copper loading results from the 2017 SIYB TMDL were presented to Regional Board staff in May 2017. In this meeting, Regional Board staff verbally confirmed that the second compliance period load reduction was achieved.

management strategy and concept for selecting BMPs as was outlined in the Implementation Plan. The Port and SIML TMDL Group provide updates on the BMP program in each annual monitoring and progress report submitted to the Regional Board. Consequently, no revisions to the Implementation Plan are necessary at this time.

1.3 Sources of Dissolved Copper

Based on the Regional Board's source analysis in the TMDL, the total mass load of dissolved copper to SIYB was estimated to be 2,163 kg/yr, of which 98 percent of inputs were attributable to (a) passive leaching of copper from copper-based hull paints on vessels, and (b) hull cleaning activities (Table 1-2).

Table 1-2.
Sources of Dissolved Copper to SIYB per the TMDL

Source	Estimated Mass Load (kg/yr)	Contribution (Dissolved Copper)
Passive Leaching	2,000	93%
Hull Cleaning	100	5%
Urban Runoff	30	1%
Background	30	1%
Direct Atmospheric Deposition	3	<1%
Sediment	0	0
Total	2,163	100%

Notes:
kg/yr = kilogram(s) per year

1.4 Water Quality Objective Criteria

The numeric water quality objective (WQO) for dissolved copper in SIYB is equal to the USEPA National Recommended Water Quality for Aquatic Life and California Toxics Rule (CTR) water quality values for dissolved copper in marine environments (USEPA, 2000). Continuous or chronic exposures may not exceed 3.1 micrograms per liter (µg/L) over a 4-day average; acute exposures should not exceed 4.8 µg/L over a 1-hour average. In addition, numeric WQOs must not be exceeded more than once every three years. Based on these numeric targets and existing monitoring data available at the time when the TMDL was implemented, the final waste load allocation was estimated to be 567 kg/yr. This includes a 10-percent margin of safety calculated to be 57 kg/yr.

In addition to numeric WQOs, the Basin Plan established narrative WQOs for toxicity and pesticides (Regional Board, 1994) as follows:

Toxicity Objective – All waters shall be maintained free of toxic substances in concentrations that are toxic to, or that produce detrimental physiological responses in, human, plant, animal, or aquatic life. Compliance with this objective will be determined by use of indicator organisms; analyses of species diversity, population density, and growth anomalies; bioassays of appropriate duration; or other appropriate methods as specified by the Regional Board.

Pesticide Objective – No individual pesticide or combination of pesticides shall be present in the water column, sediments, or biota at concentration(s) that adversely affect beneficial uses.

Pesticides shall not be present at levels that will bioaccumulate in aquatic organisms to levels that are harmful to human health, wildlife or aquatic organisms.

Beneficial uses within SIYB threatened by elevated dissolved copper concentrations are MAR and WILD. The Regional Board indicated that if numeric WQOs are met for dissolved copper, then narrative WQOs will also be met.

1.5 Monitoring Purpose

Results of the vessel tracking program will be used to assess both interim and final compliance with the TMDL loading reduction requirements for dissolved copper into SIYB. Water quality monitoring will be used to annually assess dissolved copper concentrations and toxicity levels, and also to determine progress towards final numeric and narrative objectives. These objectives are as defined in Resolution No. R9-2005-0019, in which the Regional Board incorporated the dissolved copper TMDL into the *Water Quality Control Plan for the San Diego Basin—Region 9* (Basin Plan; Regional Board, 2005). By annually tracking vessels and monitoring water quality monitoring, the program will eventually be able to evaluate the relationship between reducing loads and improving water quality. Additionally, this approach will provide the data needed to assess the overall effectiveness of the TMDL implementation in attaining both loading reductions and numeric WQOs that protect the basin's MAR and WILD beneficial uses.

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2.0 BEST MANAGEMENT PRACTICE IMPLEMENTATION FOR SIYB

The Port has incorporated an adaptive management approach to reducing copper loads in SIYB and throughout San Diego Bay. This process is outlined in the SIYB TMDL Implementation Plan. The five elements of the Port's program are: (a) alternative hull paint testing and research, (b) hull paint transition, (c) policy development and legislation (e.g., required permits for in-water hull-cleaning businesses), (d) education of and outreach to boaters, and (e) monitoring and data assessment. The SIML TMDL Group was formed to represent the marinas and yacht clubs in SIYB. The group's purpose is to compile information from marinas and yacht clubs collected from the boat owners in each of their facilities for TMDL Investigative Order reporting requirements. In addition, the SIML TMDL Group has developed a BMP program specific to the marinas and yacht clubs in SIYB with similar components.

Over the course of developing the TMDL, multiple additional BMPs have been integrated to build on previous knowledge and to facilitate effective implementation of the SIYB TMDL program. Additional measures include meetings between the Port and other stakeholders in SIYB about the TMDL; increased scrutiny of water quality data and analytical methods; reassessment of field sampling techniques, including additional oversight of field procedures; and review of methods to track the type of bottom paints on vessels in SIYB. These measures were intended to collect relevant, quality data; enhance communication among all involved parties; and develop an iterative and collaborative process that provides both transparency to the process and a known and scientifically defensible dataset to support the TMDL compliance objectives.

The Port has developed a comprehensive copper reduction program and maintains a cumulative list of copper reduction BMPs implemented in support of the TMDL since 2007. In addition, the SIML TMDL Group is involved in selecting and implementing BMPs that contribute to the dissolved copper load reductions in SIYB. In compliance with Investigative Order reporting requirements, the SIML TMDL Group submits information annually to the Port detailing the BMPs and actions implemented throughout the year to reduce dissolved copper loads to SIYB. The various Port and SIML TMDL Group BMP activities undertaken throughout the year will be tracked and reported in detail in the annual monitoring and progress report. In addition, any updates of the copper reduction BMP strategies outlined in the TMDL Implementation Plan will be included in an appendix to the annual monitoring and progress report.

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3.0 TRACKING VESSEL CONVERSIONS

Based on the Regional Board's TMDL source analysis, the vast majority (98 percent) of copper loading to SIYB was attributed to antifouling paints on vessels moored within the basin.

3.1 Vessel Tracking

Annual reduction of copper loading will be assessed by (a) tracking conversions of hull paints from copper to non-copper or lower copper (either DPR Category I paints or paints containing less than 40-percent copper) products, (b) identifying vessels with aged-copper paints, and (c) estimating the resultant contribution from in-water hull cleaning of copper paints for vessels moored within SIYB.

3.1.1 Tracking Approach

On an annual basis, marina and yacht club owners/operators are responsible for soliciting pertinent information from SIYB boat owners of the percent of time slips in their facilities are unoccupied or are occupied by vessels with copper, non-copper, lower copper paints, aged copper, and unknown hull paints. The information will be gathered by distributing a survey form prepared by the SIML TMDL Group to the SIYB yacht club and marina operators. It will be the responsibility of the operators to ensure the survey form is disseminated to individual vessel owners. The SIML TMDL Group will collect and compile the completed survey forms into a database. If no initial response is received, the SIML TMDL Group will follow up with telephone calls and emails to gather the requested information. An example of the current survey form is in Attachment A.

After compiling the information, the SIML TMDL Group will submit the vessel tracking information to the Port annually, no later than January 15 for the previous calendar year. The vessel tracking data requested is listed in Table 3-1. The tracking reports will be submitted to the Regional Board as an appendix to the annual monitoring and progress report.

Table 3-1.
Required Vessel Tracking Data

Vessel Tracking Data Fields	
1.	Name of marina or yacht club
2.	Date of report
3.	Slip/Mooring reference number
4.	Slip/mooring occupation data (percent of year occupied)
5.	Vessel-specific information
	a. Vessel type (sail, power, multi-hull, etc.)
	b. Vessel length
	c. Vessel beam width
6.	Paint Type (copper, low copper, non-copper, no paint, etc.)

As a data QA/QC and confirmation check, additional information on paint type will be required for vessels reported to have lower copper (either DPR Category I paints or paints containing less than 40 percent copper) or non-copper hull paints (Table 3-2).

Table 3-2.
Required Lower Copper and Non-Copper Hull Paint Vessel Data

Vessel Tracking Data Fields	
1.	Paint brand name
2.	Product number
3.	USEPA Registration Number (if applicable)
4.	Name of boatyard that applied paint or purchase date
5.[a]	Painting date (month and year)

Notes:
a. This information is required for determining whether a vessel has aged-copper paint.

The Port will evaluate the vessel tracking data from the SIML TMDL Group to determine the percentage of time that slips are unoccupied or are occupied by vessels with copper, lower copper, aged-copper paint, non-copper, or unknown hull paints as required by the Investigative Order (Table 3-3). These data will be used to calculate the annual dissolved copper load to SIYB from vessels, the number of vessels converted from copper to lower copper or non-copper hull paints, and the reduction in dissolved copper loading achieved annually, as described in Section 3.2 (Annual Dissolved Copper Load Analysis). Estimates of the reductions in basin-wide loading and annual loading reductions will be presented in the annual monitoring and progress reports.

Table 3-3.
Vessel Tracking Data for Annual Monitoring as Required in Investigative Order

Vessel Tracking Data Fields	
1.	Total number of slips or buoys in facility available to be occupied by vessels
2.	Number of unoccupied slips or buoys and length of time unoccupied during each year
3.	Number of vessels confirmed with copper-based hull paints and approximate length of time occupying a slip or buoy in facility each year
4.[a]	Number of vessels confirmed with aged-copper hull paints and approximate length of time occupying a slip or buoy in facility each year
5.	Number of vessels confirmed with alternative hull paints, by hull paint type, and approximate length of time occupying a slip or buoy in facility each year
6.	Number of vessels with unconfirmed information about hull paints and approximate length of time occupying a slip or buoy in facility each year
7.	Estimate of the dissolved copper load reduction achieved for the year (kg/yr and percent)

Notes:
a. This vessel tracking category was not included in the Investigative Order, but was added as a recommendation in the 2012 Monitoring and Progress Report. The recommendation was approved July 26, 2013, letter signed by David Gibson, executive officer of the San Diego Regional Water Quality Control Board titled, “Comments on 2012 Shelter Island Yacht Basin Total Maximum Daily Load Monitoring and Progress Report.”

3.1.2 Tracking Templates

The SIML TMDL Group will coordinate with the marina and yacht club owners and operators, who are responsible for soliciting pertinent vessel information from SIYB boat owners. This includes tracking the number and paint types of all vessels moored at the respective marinas and/or yacht clubs within SIYB (if known and reported). The Port will be responsible for collecting vessel tracking information for the Port-operated facilities in SIYB, including the Harbor Police dock, transient vessel docks, and temporary anchorage. Vessel data submitted in the annual report will consist of (a) the information provided by the marina and yacht club owners and operators, and (b) the information gathered by the Port for the facilities it operates.

The vessel tracking templates are in a spreadsheet format and contain fields for required vessel tracking information such as facility name, slip reference number, type and size of vessel, boatyard used for hull painting, type of hull paint (brand and product number and USEPA registration number, if applicable), the date (month and year) the hull was last painted (this information will be used to determine whether the vessel qualifies as having aged-copper paint), and approximate percentage of time occupying a slip in SIYB during the monitoring year. An example of the vessel tracking template is provided in Attachment A.

3.2 Annual Dissolved Copper Load Analysis

Compliance with interim and final TMDL loading reduction goals will be assessed through basin-wide vessel tracking. Annual dissolved copper loading will be assessed through tracking the number of vessel hulls with copper paint, lower copper paint, aged-copper paint, or non-copper paint, the number of slips using BMPs to isolate hulls from water (i.e., slip liners, Hydro Hoists®) as well as the number of vacant slips in SIYB and input from in-water hull cleaning. Vessels that have aged-copper paint are considered to be in the low-copper category, but will be tracked separately.

The annual tracking program will use a conservative approach to estimating loading reductions. If the hull paint name and type are unknown, the paint will be assumed to be copper-based. Additionally, if the occupancy time of a slip or mooring is not reported, the slip or mooring will be assumed to be occupied 100 percent of the time (i.e., 365 days). If the paint categories for transient vessels visiting the Port-operated transient vessel dock and temporary anchorage are not collected, these vessels will be assumed to have copper hull paints.

This annual assessment will incorporate the following assumptions that were used by the Regional Board in determining loading allocations (Regional Board 2005, Appendix 2).

- All 2,363 SIYB slips or buoys were occupied by vessels (N_v).
- All 2,363 recreational vessels moored within SIYB have copper-based paints 100 percent of the time.
- Annual loading from passive leaching basin-wide (L_p) equals 2,000 kilograms per year (kg/yr).

- Annual loading from hull cleaning (L_h) equals 100 kg/yr[4].
- Average annual loading (L_v) per vessel with copper hull paint equals 0.9 kg/yr, where: $L_v = (L_p + L_h)/N_v$.

Based on the Regional Board assumptions in determining dissolved copper loading via passive leaching and hull cleaning combined, there will be an average loading reduction of 0.9 kg/yr for every vessel in SIYB that converts from copper-based to non-copper-based paint (a reduction of 0.86 kg/yr from passive leaching, and 0.04 kg/yr from the cleaning load). Beginning in 2015, the Regional Board recognized the use of DPR Category I hull paints (i.e., paints with leach rates ≤ 9.5 micrograms per square centimeter per day [µg/cm²/day]) as a viable means of reducing copper to the basin. This category coincides with the use of low-copper hull paints (i.e., hull coatings with less than 40-percent copper but leach rates greater than 9.5 µg/cm²/day). Category I hull paints and low-copper hull paints are grouped together to represent the lower copper group. This loading reduction analysis assumes that each vessel transitioned to low-copper hull paint will reduce (on average) annual dissolved copper loading by 0.45 kg/yr. Aged-copper paints (boat hulls that have not been repainted as of the cutoff date [Table 3-4]) will be considered to have low-copper hull paint (i.e., 0.45 kg/yr per vessel). Based upon these loading scenarios, calculations of annual dissolved copper loading will be based on the assumptions listed in Table 3-4.

Annual loading will be calculated for each slip by multiplying the reported dissolved annual loading for a given hull paint category by the percent of time a slip is reported to be occupied (e.g., the product of 0.9 kg/yr for copper hull paints and 90-percent occupancy results in an annual loading of 0.81 kg/yr). In the case of the Port-operated anchorage, data on the number of three-day permits issued weekly will be used to calculate annual occupancy and loading. For each issued permit, it will be assumed that the vessel occupied the anchorage for an average of two days. If no hull paint data is collected for a vessel that occupies the Port-operated anchorage, it will be assumed to have copper paint. Therefore, annual dissolved copper loading due to passive leaching is calculated by multiplying the annual dissolved copper load (0.9 kg/yr) by the average number of vessels occupying the anchorage on a weekly basis and the average percentage of time slips are occupied.

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[4] The TMDL assumed that 50 percent of the in-water hull cleaning in SIYB would be conducted using BMPs. The Port's hull cleaning ordinance requires 100 percent use of BMP; therefore, the load calculations assume that 100 percent of in-water hull cleaning is conducted using BMPs.

Table 3-4.
Dissolved Copper Loading Calculation Assumptions

Dissolved Copper Loading Assumptions	
1.	All vessels moored in SIYB at the enactment of the TMDL had copper hull paints.
2.	Average annual dissolved copper load from a vessel with copper paint equals 0.9 kg/yr.
	a. The passive leaching load from a vessel with copper paint equals 0.86 kg/yr.
	b. The cleaning load from a vessel with copper paint equals 0.04 kg/yr.
3.	Vessels with unknown hull paints have copper paint
4.	Slips/moorings for which occupancy data are not provided are considered to be 100-percent occupied.
5.	Annual dissolved copper load from a vessel with non-copper hull paint equals 0 kg/yr.
6.	DPR Category I paints are paints with leach rates ≤9.5 µg/cm²/day. These paints are considered as lower copper.
7.	Low-copper hull paints are paints with less than 40-percent copper. These paints are also considered as lower copper.
8.	Average annual dissolved copper load from a vessel with lower copper paint equals 0.45 kg/yr
	a. The passive leaching load from a vessel with lower copper paint equals 0.43 kg/yr.
	b. The cleaning load from a vessel with lower copper paint equals 0.02 kg/yr.
9	Vessels determined to have aged-copper paint (i.e., copper paint applied to a vessel hull prior to December 31, 2016[a]) will have an annual dissolved copper load equal to 0.45 kg/yr.
10.	Annual loads will be normalized by the percent of time vessels are docked in SIYB.

Notes:

a. December 31, 2016, is the cutoff date for vessels to be considered to have aged-copper paint for the 2019 annual monitoring and progress report load calculation. This cutoff date will advance by one-year for each subsequent annual load calculation.

kg/yr = kilogram(s) per year; TMDL = total maximum daily load; µg/cm²/day = micrograms per square-centimeter per day

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4.0 WATER QUALITY MONITORING

Water quality will be assessed annually to determine the average concentration of dissolved copper and toxicity levels in SIYB using a spatially representative sampling design. Water quality monitoring will supplement vessel tracking studies to assess long-term improvements in dissolved copper concentrations and toxicity levels that occur as a consequence of loading reductions throughout the interim stages. Water quality monitoring will also be used to determine attainment of final WQOs.

4.1 Water Quality Sampling and Analyses

Water quality will be sampled annually throughout SIYB to determine the average concentration of dissolved copper in the basin and to assess water quality trends over time. The monitoring will use methods consistent with prior studies conducted by the Regional Board in SIYB (Appendix 6 of the TMDL, Regional Board, 2005). To be consistent with studies conducted by the Regional Board, this monitoring program will include annual sampling at six stations and one reference station in the main channel of San Diego Bay adjacent to SIYB. These station locations are similar to those sampled by the Regional Board for development of the TMDL and meet the Investigative Order requirement of spatially representing dissolved copper concentrations in SIYB.

Based on an assessment of monitoring water quality data collected between 2005 and 2008 in SIYB from the Regional Harbor Monitoring Program (RHMP) Pilot Study (WESTON, 2008), the 2008 RHMP (WESTON, 2010), and the Neira et al. study (2009), surface water dissolved copper concentrations ranged from 3.4–13.5 micrograms per liter (µg/L), and the average concentration was 8.28 ± 1.36 µg/L (mean ± standard error). This average concentration was determined by using the surface water dissolved copper monitoring data collected from six stations in the immediate vicinity of the sampling stations that comprise the monitoring network.

4.1.1 SIYB Sample Locations

The annual monitoring program is conducted at six stations within SIYB and one station in the main channel of San Diego Bay (Table 4-1 and Figure 4-1). Monitoring was conducted at these stations for all SIYB TMDL monitoring events since 2011.

Table 4-1.
Sampling Station Coordinates

Station	Target	
	Latitude	Longitude
SIYB-1	32.71821	-117.22601
SIYB-2	32.71412	-117.22921
SIYB-3	32.71550	-117.22989
SIYB-4	32.71683	-117.23203
SIYB-5	32.71217	-117.23297
SIYB-6	32.70858	-117.23514
SIYB-REF	32.70406	-117.23232

4.1.2 Frequency of Sampling

Sampling will be conducted at the seven water quality stations once per year during the summer (i.e., in August or September). By sampling in the summer, dissolved copper concentrations are likely to be at their highest level in the water column because the release rates of copper from antifouling paints is higher at warmer sea surface temperatures and with a greater frequency of hull cleaning. As a consequence, this sampling design will provide the most conservative estimate for dissolved copper concentrations for SIYB. In addition, annual monitoring during the summer will facilitate integration with the RHMP, which includes sampling of a broader range of chemical and biological parameters once every five years during the summer.

Sampling annually to bracket the slack high tide at the same station locations during the summer will allow repeated measurements and temporal trend analyses to determine changes in dissolved copper concentrations with time[5]. Revisiting the same spatially representative stations allows basin-wide assessments of water quality, facilitating better detection of trends. Additionally, correlation analyses can be used to assess relationships between estimated loading reductions from vessel conversions with surface water dissolved copper concentrations to track progress of the TMDL.

4.1.3 Sample Collection

Sample collection will start at the Reference station (SIYB-REF) located in San Diego Bay and continue northward to Station SIYB-1 located near the head of basin. Samples will be collected in the following order: SIYB-REF, SIYB-6, SIYB-5, SIYB-4, SIYB-3, SIYB-2, and SIYB-1. Collection of the samples will be timed so that the midpoint of the collection (SIYB-4) will occur as close to the slack high tide as possible. This sample collection approach will be followed for all annual water quality monitoring events to ensure consistency and repeatability.

Discrete water samples will be collected at each station using the “clean hands” techniques with a Niskin bottle deployed from a sampling vessel. In addition, the field manager will ensure that the sample collection boat is painted with a non-copper or non-zinc-containing hull paint. All stations will be located using the differential Global Positioning System. Samples will be collected within one meter of the surface. Upon collection, water samples will be transferred to labeled containers for analysis of total and dissolved copper, total and dissolved zinc, total organic carbon (TOC), dissolved organic carbon (DOC), total suspended solids (TSS), and toxicity testing. Water samples collected for dissolved metals analyses will be filtered in the field and preserved immediately upon arrival to the analytical laboratory. DOC samples will be filtered in the field into a bottle with sulfuric acid. Field measurements of the hydrogen ion concentration (pH), temperature, and salinity of the surface water at each station (i.e., within 1 meter (m) of the surface), will be made using a YSI meter according to manufacturer’s specifications.

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[5] Sampling schedule is adjusted annually to ensure that station SIYB-4 is sampled during the slack high tide to ensure consistency between monitoring years.

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Figure 4-1. Shelter Island Yacht Basin TMDL Monitoring Network

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Following the collection and preservation of water samples, Wood will use a Seabird Electronics SBE-19 Plus CTD instrument equipped with a YSI dissolved oxygen sensor (model SBE 43), a pH meter (model SBE 18 with Innovative pH Sensor), and a WET Labs C-Star laser transmissometer (25-centimeter [cm], 660-nanomether [nm]) to capture the profile of the entire water column at each station. The water quality characteristics collected by the CTD will be used for informational purposes only. For example, the CTD data can show how water quality parameters, such as water temperature and clarity, vary from top to bottom, at different locations in the basin, and from year to year.

All water samples will be logged on a chain-of-custody (COC) form (Attachment B) and placed in a cooler on ice. Samples will be stored at 4 degrees Celsius (°C) in the dark until delivered to the appropriate laboratory for analysis.

4.1.4 Equipment Decontamination and Cleaning

The Niskin bottle will be cleaned prior to sampling using clean soapy water and thoroughly rinse with deionized water. Upon deployment, the Niskin bottle will be rinsed with site water prior to sample collection. After collection, water samples will be transferred from the Niskin bottle to laboratory-certified, contaminant-free bottles that are of the appropriate type and containing the appropriate preservative for the required analyses.

4.1.5 Chemical Analysis

Water samples will be analyzed for total and dissolved copper, total and dissolved zinc, TOC, DOC, TSS, salinity, temperature, pH, dissolved oxygen, and transmissivity (Table 4-2). Zinc is commonly used as an alternative biocide in antifouling paints; therefore, total and dissolved zinc levels will be measured to assess changes in the ambient zinc levels in SIYB as vessels are converted from copper-based to non-copper-based paints.

Table 4-2.
Laboratory Analytical Methods and Detection Limits

Water Quality Measurement	Method	Method Detection Limit	Reporting Limit	Instrument Sensitivity
Total Copper	USEPA 1640	0.0038 µg/L	0.010 µg/L	NA
Dissolved Copper	USEPA 1640	0.0038 µg/L	0.010 µg/L	NA
Total Zinc	USEPA 1640	0.036 µg/L	0.20 µg/L	NA
Dissolved Zinc	USEPA 1640	0.036 µg/L	0.20 µg/L	NA
TOC	SM 5310 B	0.016 mg/L	0.10 mg/L	NA
DOC	SM 5310 B	0.016 mg/L	0.10 mg/L	NA
TSS	USEPA 2450 D	1.0 mg/L	5.0 mg/L	NA
Salinity	SBE CTD and YSI Pro Plus	NA	NA	± 0.1 ppt
Temperature	SBE CTD and YSI Pro Plus	NA	NA	± 0.1 °C
pH	SBE CTD and YSI Pro Plus	NA	NA	± 0.1 pH unit
Dissolved Oxygen	SBE CTD	NA	NA	± 0.1 mg/L
Light Transmittance	SBE CTD	NA	NA	± 0.1 %

Notes:
µg/L = microgram(s) per liter; °C = degrees Celsius; DOC = dissolved organic carbon; mg/L = milligram(s) per liter; pH = hydrogen ion concentration; ppt = part(s) per thousand; SM = Standard Methods; TOC = total organic carbon; TSS = total suspended solids; USEPA = U.S. Environmental Protection Agency; YSI = YSI Incorporated; SBE = SeaBird Electronics; CTD = conductivity, temperature, and depth.

Surface water characteristics (salinity, temperature, pH, and visual observations of water clarity) will be collected to compare ambient conditions from year to year. All analytical methods will follow USEPA or Standard Methods (SM) of the American Public Health Association (APHA), 1998). Required analytical methods, detection, and reporting limits are presented in Table 4-2.

4.1.6 Toxicity Testing

Water column toxicity will be assessed at the six SIYB sampling stations and the reference station. Toxicity testing will consist of a 96-hour acute bioassay test using Pacific topsmelt (*Atherinops affinis*), consistent with the TMDL guidance (Regional Board, 2005). Additionally, a 48-hour chronic bioassay test using a mussel (*Mytilus galloprovincialis*) will also be conducted because previous studies have used the 48-hour mussel chronic test as the primary indicator of toxicity. Both tests will be used to assess the narrative toxicity objective described in Section 1.4 (Water Quality Objective Criteria) because both species have ecological relevance to the marina environment and have previously been found to be sensitive to dissolved copper.

The 96-hour acute bioassay with topsmelt will be conducted in accordance with procedures described in *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms* (USEPA, 2002). Testing will be initiated within 36 hours of sample collection. Topsmelt will be exposed for 96 hours to three sample concentrations (25, 50, and 100 percent) and to a control. Each concentration will be tested with six replicates and five topsmelt per replicate. Water quality will be analyzed daily and include dissolved oxygen (DO), temperature, pH, and salinity. After 96 hours, percent survival will be calculated. The test will be considered acceptable if 90 percent or greater survive in the controls. Test conditions are summarized in Table 4-3.

A 96-hour reference toxicant test using copper chloride will be conducted concurrently with the SIYB project sample and using the same batch of test organisms to evaluate the relative sensitivity of test organisms as well as the laboratory's proficiency with the test procedure. The topsmelt reference toxicant test will be conducted with copper concentrations of 0, 50, 100, 200, 400 and 800 µg/L. At test termination, the median lethal concentration (LC_{50}) will be calculated and compared to historical laboratory reference toxicant test data for this species. Test organisms will be considered to be responsive and appropriately sensitive if the test LC_{50} is within two standard deviations of the historical mean from the previous 20 tests.

The 48-hour bivalve larvae test will be performed in accordance with procedures outlined in *Short Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine and Estuarine Organisms* (USEPA, 1995) and ASTM E724-98 (ASTM, 2006). Testing will be initiated within 36 hours of sample collection. The test will be run for 48 hours or up to 54 hours if necessary to ensure development of the bivalve larvae to the D-hinged stage in the control. Bivalves will be exposed to five sample concentrations (6.25, 12.5, 25, 50, and 100 percent), and a control. Each concentration will be run with six replicates and 150–300 larvae will be targeted for inoculation into each replicate. Water quality will include DO, temperature, pH, and salinity at test initiation and termination. The test will be considered acceptable if at least 50 percent of larvae survived and an average of 90 percent of surviving larvae developed normally in the controls. A combined endpoint of normal surviving embryos will be reported. Test conditions are summarized in Table 4-4.

Table 4-3.
Conditions for the 96-Hour Pacific Topsmelt Bioassay

Test Conditions 96-Hour Acute Bioassay		
Test Species		*Atherinops affinis*
Test Procedures		EPA-821-R-02-012 (USEPA, 2002)
Age and Size Class		7–15 days
Test Type and Duration		Acute static-renewal / 96-hours
Sample Storage Conditions		4°C, dark, minimal head space
Holding Time		36 hours
Control Water Source		Scripps Pier seawater, 20 µm filtered
Recommended Water Quality Parameters	Temperature	21 ± 1°C
	Salinity	34 ± 2 ppt
	Dissolved Oxygen	>4.0 mg/L
	pH	Monitor for pH drift
Photoperiod		16 hours light, 8 hours dark
Test Chamber		500-mL beaker or plastic cup
Concentrations		3 (25, 50, and 100 percent) and a control
Number of Replicates per Sample		6
Number of Organisms per Replicate		5
Exposure Volume		250 mL
Aeration		None, unless DO falls below 4.0 mg/L
Feeding		once daily
Water Renewal		48 hours
Statistical Analysis		Test of Significant Toxicity (TST) - Control and test sample comparisons

Notes:
µg/L = microgram(s) per liter; µm = micrometer; °C = degrees Celsius; mg/L = milligram(s) per liter; mL = milliliter(s); pH = hydrogen ion concentration; ppt = part(s) per thousand; USEPA = U.S. Environmental Protection Agency

A 48-hour reference toxicant test using copper chloride will be conducted concurrently with the SIYB project sample and using the same batch of test organisms; this test will evaluate the relative sensitivity of test organisms as well as the laboratory's proficiency with the test procedure. The bivalve reference toxicant test will be conducted with copper concentrations of 0, 2.5, 5.0, 10, 20 and 40 µg/L. At test termination, the median effected concentration (EC_{50}) will be calculated and compared to historical laboratory reference toxicant test data for this species. Test organisms will be considered to be responsive and appropriately sensitive if the test EC_{50} is within two standard deviations of the respective historical laboratory mean. At the termination of the study, survival and shell development will be compared between the control and test concentrations to determine whether significant mortality or reduction in normality exists.

A close look at the test receiving waters for any potentially interfering algal species is recommended prior to initiating tests with *Mytilus* embryos. If algae are prevalent and densities appear to be of concern, filtration of a subsample of water from each site through a 1–2-µm mesh filter to remove the algae is highly recommended. This filtered sample is then tested side-by-side to the unfiltered sample for comparison purposes.

Table 4-4.
Conditions for the 48-Hour Mussel Development Bioassay

Test Conditions **48-Hour Chronic Bioassay**		
Test Species		*Mytilus galloprovincialis*
Test Procedures		EPA/600/R-95/136 (USEPA, 1995)
Age and Size Class		<4-hour-old embryos
Test Type and Duration		Bivalve Larvae—Static / 48 hours
Sample Storage Conditions		4°C, dark, minimal head space
Holding Time		36 hours
Control Water Source		Scripps Pier seawater, 20 µm filtered
Recommended Water Quality Parameters	Temperature	15 ± 1°C
	Salinity	30 ± 2 ppt
	Dissolved Oxygen	> 4.0 mg/L
	pH	6-9; monitor for pH drift
Photoperiod		16 hours light, 8 hours dark
Test Chamber		20-mL glass shell vials
Concentrations		5 (6.25, 12.5, 25, 50, and 100 percent) and a control
Replicates and Sample		5
Number of Organisms/Replicate		Recommended: 15–30/mL
Exposure Volume		10 mL
Feeding		None
Water Renewal		None
Statistical Analysis		TST - Control and test sample comparisons

Notes:
µm = micrometer; °C = degrees Celsius; mg/L = milligram(s) per liter; mL = milliliter(s); pH = hydrogen ion concentration; ppt = part(s) per thousand; USEPA = U.S. Environmental Protection Agency

4.1.6.1 Toxicity Identification Evaluation (TIE)

During the 2018 TMDL monitoring program, unexplained toxicity was observed in the pacific top smelt bioassay. If similar results are observed in subsequent monitoring events, a TIE may be considered to identify potential sources of toxicity. If a TIE is deemed necessary, samples will be recollected from the station(s) in question, according to methods described in Section 4.1.3, and Nautilus will perform a TIE.

4.1.7 Water Quality Analysis

4.1.7.1 Water Chemistry

The basin-wide dissolved copper results (excluding the Reference site) will be used to calculate an average dissolved copper concentration. This average will be used to determine basin-wide compliance with the CTR dissolved copper chronic target (3.1 µg/L) or a potential site-specific objective. Because the same station locations will be revisited annually, repeated measurements will be used to evaluate reductions in dissolved copper levels with time.

4.1.7.2 Toxicity

Toxicity will be statistically assessed using the software program Comprehensive Environmental Toxicity Information System™ from Tidepool Scientific Software. With this software, survival of topsmelt fish and normal development of surviving mussel embryos in each test dilution from SIYB are compared to organism performance observed in control exposures to filtered clean seawater collected from the end of the pier at Scripps Institution of Oceanography in La Jolla, California. Results are used to determine LC_{50} and EC_{50} values. If fish survival and normal embryo development in the controls do not differ significantly from that of the treatments, then conditions are considered to be non-toxic at the station. The USEPA Test of Significant Toxicity[6] (USEPA, 2010) approach will be used to determine statistically significant effects for this study.

4.2 Field and Analytical QA/QC Procedures

Strict QA/QC procedures will be employed throughout the entire study, from mobilization through delivery of samples to the laboratories. Extra care will be taken to minimize the possibility of compromising sample integrity. The sample collection team will be trained in, and follow, field sampling standard operating procedures (SOPs), as described in the SIYB QAPP (Wood, 2019). As part of the field collection procedures identified in the 2012 and 2013 QAPP updates, a QA/QC reviewer from the Port and the field contractor will be present onboard the sampling vessel at all times to review each step of the sample and data collection process. Additionally, Port-approved field and QA/QC checklists will be used throughout the sampling event to ensure that all procedures are consistent at each location; samples are collected in exactly the same manner at every station; and all required field data are recorded correctly and completely.

Field staff members will take care to avoid contamination of samples at all times by employing the clean hands technique and will wear powder-free nitrile gloves during sample collection. In addition, the field manager will ensure that the sample collection boat is painted with a non-copper or non-zinc containing hull paint. All samples will be collected in laboratory-supplied, laboratory-certified, contaminant-free sample bottles containing the correct preservative (if applicable). The sampling team will be provided the updated QAPP and field sampling standard operating procedures (SOPs) to ensure all sampling personnel are trained accordingly. Additionally, the field staff will be made aware of the significance of the project's detection limits and the requirement to avoid contamination of samples at all times. Field measurement equipment will checked and calibrated for operation in accordance with the manufacturer's specifications (calibration records will be recorded and maintained), and will inspected for damage prior to use and when returned from use. Observations of activities surrounding the sampling area will be recorded on field data sheets at each station and during movement between stations (i.e., boat hull cleaning).

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[6] A recommendation was made by the Port to the Regional Board in the 2012 monitoring report to begin using this new statistical method in place of previous statistical tests. The Regional Board agreed with this recommendation in its July 26, 2013, letter regarding SIYB TMDL progress. The TST method was used to identify any samples that exhibited a statistically significant difference from the control.

As required by SWAMP protocols, the monitoring program will include the addition of a field replicate. The field replicate sample will consist of a second complete set of samples collected at one of the monitoring locations and will be analyzed for chemical constituents only (no toxicity analyses will be conducted on the field replicate sample). The purpose of the field replicate is to assess variability in sampling procedures as well as ambient conditions. In addition to the field replicate, each batch of samples that is submitted to the laboratories for analyses will be accompanied by an equipment rinse blank and field blank, as specified under SWAMP.

Chemistry and toxicity samples will be uniquely identified with sample labels in indelible ink. All sample containers will be identified with the project title, appropriate identification number, date and time of sample collection, and preservation method. Sample labels are inspected by a Port and contractor QA reviewers before and after bottles are filled at each station to ensure that every sample and analysis type are labeled correctly before moving to the next station; this information will be recorded on the field checklist. All samples will be kept on ice from the time of sample collection until delivery to the analytical laboratory for analysis within method-specified holding times (Table 4-5). Samples will be delivered by courier to the analytical laboratories following the day of collection. All analyses will be conducted by laboratories that are accredited by the California Environmental Laboratory Accreditation Program (ELAP) for the specific tests that are required to be performed at the time they are conducted.

Table 4-5.
Sample Holding Times

Analyte	Holding Time
TOC	28 days
DOC	28 days[a]
Total Copper	180 days
Dissolved Copper	48 hours[b]
Total Zinc	180 days
Dissolved Zinc	48 hours[b]
Total Suspended Solids	7 days
48-hour acute bioassay	36 hours
96-hour chronic bioassay	36 hours

Notes:

a The holding time is applicable to preserved sample. The sample will be filtered in the field into a bottle with sulfuric acid (H_2SO_4) preservative for DOC analysis.

b The holding time for metals after preservation is 180 days. The dissolved fraction will be filtered in the field through a 0.45-micrometer (µm) glass fiber filter using a bottle top vacuum filtration system. Samples will be preserved at the laboratory immediately upon receipt from the courier, the next day after sample collection.

DOC = dissolved organic carbon; TOC = total organic carbon

The annual TMDL monitoring program will include the following QA/QC elements:

- ✓ QAPP and SOP updates
- ✓ Verification of laboratory certifications
- ✓ Field mobilization and equipment checklists
- ✓ Field sampling QA/QC checklists
- ✓ Field equipment calibrations records
- ✓ Staff training on QAPP-required field procedures
- ✓ Field conditions and water quality data sheets
- ✓ On-board QA/QC oversight
- ✓ Observations for hull cleaning or other water-quality-impacting activities near sample collection locations

The analytical laboratory will (a) be certified to conduct the analyses for the constituents of concern for the SIYB TMDL study, (b) be certified for the specific analysis methods required for this program, and (c) hold a valid ELAP certificate at the time the monitoring program is initiated and the samples are analyzed. The QA objectives for chemical analysis to be followed by the participating analytical laboratories are detailed in their laboratory QA manuals and the QAPP. The objectives for accuracy and precision involve all aspects of the testing process, including the following:

- Methods and SOPs
- Calibration methods and frequency
- Data analysis, validation, and reporting
- Internal QC
- Preventive maintenance
- Procedures to ensure data accuracy and completeness

Results of all laboratory QC analyses will be reported with the final data. Any QC samples that fail to meet the specified QC criteria in the methodology or QAPP will be identified and the corresponding data will be appropriately qualified in the final report. The final report will include a separate section that discusses any QA/QC issues encountered during the monitoring event, as well as the corrective actions taken to satisfactorily address any issues.

All QA/QC records of the various testing programs will be kept on file for review by regulatory agency personnel.

4.3 Chain-of-Custody Procedures

Proper chain of custody (COC) procedures will be used throughout the sample collection, transport, and analytical process. The principal documents used to identify samples and to document possession are COC records, field logbooks, checklists, and field tracking forms. The COC process is initiated during sample collection. A COC record will be provided with each sample or group of samples. Each employee who has custody of the samples will sign the form and ensure that the samples are not left unattended and are properly secured.

Documentation of sample handling and custody included the following:

- Client and project name
- Sample identifier
- Sample collection date and time
- Any special notations on sample characteristics or analysis
- Initials of the person collecting the sample
- Date the sample was sent to the analytical laboratory
- Shipping company and waybill information

Completed COC forms will be placed into a plastic envelope and kept inside the cooler containing the samples. If possible, field staff should physically courier the bay water samples from the dock at SIYB to the analytical laboratory on the same day as collection. This level of effort will provide an additional level of security to the chain of custody process as well as ensure that all holding times are met. Upon delivery to the analytical laboratory, the COC form will be signed by the person receiving the samples. Copies of the COC records will be included in the final reports prepared by the analytical laboratories.

4.3.1 Health and Safety

Because sampling will be conducted from a boat, dangerous situations can arise. Field personnel need to be aware of safety hazards and take appropriate precautions. A health and safety tailgate meeting will be held prior to any on-site activity. During this meeting, site-specific hazards will be discussed and addressed appropriately.

4.3.2 Use of Boats and Working over Water

Work will be conducted from a boat over and around SIYB; therefore, special considerations are required. All watercraft will be operated according to the applicable navigational rules and regulations. The boat will be operated by a certified captain with U.S. Coast Guard small vessel training. Personnel working on the boat will be trained according to internal SOPs. The hazards associated with the operation and use of boats include drowning, heat stress, and injuries from falling. An approved personal flotation device must be available for each person onboard. Wet conditions increase the chances of slipping; therefore, engineering controls such as guardrails will be used.

Sampling will be conducted in the summer, which increases the risk of heat stress. To reduce this risk, plenty of water will be made available to field staff and wearing short pants will be acceptable. A float plan will be prepared for each trip and submitted to the safety officer or project manager. At a minimum, it will include destination, expected time of return, personnel on board, and description of vessel. The float plan will be used if the field crew does not return or notify the shore contact at a specified time and a rescue is needed. A weather forecast will be reviewed prior to field sampling. High winds may pose potential hazardous conditions within the harbor.

5.0 DATA REVIEW AND MANAGEMENT

Field and laboratory data will be reviewed for completeness and accuracy prior to analysis and reporting, and are stored in a database, as described in the following sections.

5.1 Data Review

After each survey, field data sheets and checklists will be checked for completeness and accuracy by the field crew and the QA reviewers. In addition, all sample COCs will be checked against sample labels at the end of the day prior to samples being transported to the laboratories. In the laboratory, technicians will document sample receipt and sample preparation activities in laboratory logbooks or on bench sheets.

Data validation will include dated and signed entries by technicians on the data sheets and logbooks used for samples, the use of sample tracking and numbering systems to track the progress of samples through the laboratory, and the use of QC criteria to reject or accept specific data. Data for laboratory analyses will be entered directly onto data sheets. Data sheets will be filled out in ink and signed by the technician, who is responsible for checking the sheet to ensure completeness and accuracy. The technician who generated the data will have the prime responsibility for the accuracy and completeness of the data.

Each technician will review the data to ensure the following:

- Sample description information is correct and complete
- Analysis information is correct and complete
- Results are correct and complete
- Documentation is complete

All data will be reviewed and verified by participating team laboratories to determine whether data quality objectives have been met and that appropriate corrective actions have been taken, when necessary, as detailed in the QAPP.

5.2 Data Management

The chemistry and toxicity laboratories will supply analytical results in both hard copy and electronic formats. Laboratories will have the responsibility of ensuring that both forms are accurate. After completion of the data review by participating team laboratories, hard copy results will be placed in a project file; results in electronic format will be imported into a database system. Additional details regarding data management are provided in the project-specific QAPP.

5.3 Laboratory Quality Assurance and Quality Control

Analytical laboratories will provide a QA/QC narrative that describes the results of the standard QA/QC protocols that accompany analysis of field samples. All hard copies of results will be maintained in the project files. In addition, back-up copies of results generated by each laboratory will be maintained at their respective facilities. At a minimum, the laboratory reports will contain results of the laboratory analysis, QA/QC results, all protocols and any deviations from the project Monitoring Plan, and a case narrative of COC details.

6.0 REPORTING

Reporting under the SIYB TMDL will include annual monitoring and progress reports to be submitted to the Regional Board by the Port no later than March 31 of each year. The purpose of the report is to document the methods and results of annual vessel tracking surveys and water quality monitoring. Reports will detail the number of vessels converted to non-copper or lower copper paints within SIYB to calculate loading reductions. Additionally, annual progress reports will describe water quality conditions, specifically focused on the concentrations of dissolved copper within the basin and observed toxicity levels.

At a minimum, the following information will be included in annual monitoring and progress reports.

SIYB TMDL Implementation: An evaluation, interpretation, and tabulation of data and information on SIYB Dissolved Copper TMDL activities undertaken by the Named Parties.

1. *Vessel Conversions.* Assess vessel conversions from copper-based antifouling paints to non-copper and lower copper hull paints, including:
   a. Total number of slips or buoys in SIYB available to be occupied by vessels
   b. Number of unoccupied slips or buoys and length of time unoccupied during each year
   c. Number of vessels confirmed with copper-based hull paint and approximate length of time occupying a slip or buoy in SIYB during each year
   d. Number of vessels confirmed with alternative hull paints, by alternative hull paint type, and approximate length of time occupying a slip or buoy in SIYB during each year
   e. Number of vessels with aged-copper paint and approximate length of time occupying a slip or buoy in SIYB during each year
   f. Number of vessels with unconfirmed information about hull paint and approximate length of time occupying a slip or buoy in SIYB during each year;
   g. An estimate of the dissolved copper load reduction achieved, in terms of kilograms and percent, for the year
   h. Any other data or information relevant to annual tracking of vessels in SIYB occupying slips or buoys and conversions from copper-based hull paints to alternative (non-copper or lower copper) hull paints.

SIYB BMP Implementation. Describe BMPs or other actions that have been implemented by the Named Parties to reduce dissolved copper discharges from boat hulls into SIYB. BMPs and other actions implemented and required to be implemented by in-water hull cleaners are also described in the BMP section of the annual monitoring and progress report. In addition, any updates of the copper reduction BMP strategies outlined in the TMDL Implementation Plan will be included in an appendix to the annual monitoring and progress report.

San Diego Baywide BMP Implementation. Describe BMPs or other actions that can be, will be, or have been implemented by the Port to reduce dissolved copper discharges from boat hulls into harbors or marinas, other than SIYB, within San Diego Bay.

SIYB TMDL Monitoring. An evaluation, interpretation, and tabulation of water quality sampling and analysis data, including:

2. *Sampling Locations and Numbers*. The locations, type, and number of samples must be identified and shown on a site map.
3. *Sample Analyses*. The sample collection and laboratory analytical methods, QA/QC results, time and date of sample collection, and other pertinent information must be described.
4. *QA/QC Summary.* Discusses the adherence to project-specific QAPP requirements, QA/QC issues that needed to be addressed, and any necessary corrective actions.
5. *Water Quality Trends.* Interpretations and conclusions, as to whether the "trajectory" of the measured water quality values points toward attainment of the dissolved copper water quality objectives, must be provided.

7.0 REFERENCES

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ATTACHMENT A

VESSEL TRACKING DATABASE TEMPLATE

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Attachment A
SIYB Dissolved Copper TMDL
Vessel Tracking Template Form

Facility (Marina or Yacht Club)	Slip/Mooring Reference Number	Percent of Time Occupied	Vessel Type (Power or Sail)	Vessel Length	Vessel Beam	Paint Type (Copper, Low, or Non, No Paint)	Paint Product Name	Product Number	Boatyard Name or Purchase Date	Painting Date Month (mm)	Painting Date Year (yyyy)	% Copper	USEPA Registration Number

ATTACHMENT B

CHAIN-OF-CUSTODY FORMS

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Weck Laboratories, Inc.
Analytical Laboratory Services - Since 1964

CHAIN OF CUSTODY RECORD

STANDARD

14859 East Clark Avenue : Industry : CA 91745
Tel 626-336-2139 ♦ Fax 626-336-2634 ♦ www.wecklabs.com

Page___1___Of___5_____

CLIENT NAME:	PROJECT: Port of San Diego - Shelter Island Yacht Basin
ADDRESS:	PHONE: FAX: EMAIL:
PROJECT MANAGER Rolf Schottle	SAMPLER

SPECIAL HANDLING

- ☐ Same Day Rush 150%
- ☐ 24 Hour Rush 100%
- ☐ 48-72 Hour Rush 75%
- ☐ 4 - 5 Day Rush 30%
- ☐ Rush Extractions 50%
- ☑ 10 Business Days
- ☑ QA/QC Data Package

Charges will apply for weekends/holidays

Method of Shipment:

ANALYSES REQUESTED

ID# (For lab Use Only)	DATE SAMPLED	TIME SAMPLED	SMPL TYPE	SAMPLE IDENTIFICATION/SITE LOCATION	# OF CONT.	**Total Copper** Method EPA 1640 MDL 0.004 µg/L, RL= 0.01 µg/L	**Dissolved Copper** [2] Method EPA 1640 MDL 0.004 µg/L, RL= 0.01 µg/L	**Total Zinc** Method EPA 1640 MDL 0.036 µg/L, RL= 0.20 µg/L	**Dissolved Zinc** [2] Method EPA 1640 MDL 0.036 µg/L, RL= 0.20 µg/L	**Total Organic Carbon (TOC)** Method USEPA 5310B MDL = 0.016 mg/L, RL = 0.10 mg/L	**Dissolved Organic Carbon (DOC)** [1] Method USEPA 5310B MDL = 0.016 mg/L, RL = 0.10 mg/L					COMMENTS

RELINQUISHED BY	DATE / TIME	RECEIVED BY
RELINQUISHED BY	DATE / TIME	RECEIVED BY
RELINQUISHED BY	DATE / TIME	RECEIVED BY

SAMPLE CONDITION:

Actual Temperature:

Received On Ice	Y / N
Preserved	Y / N
Evidence Seals Present	Y / N
Container Intact	Y / N
Preserved at Lab	Y / N

SAMPLE TYPE CODE:
AQ=Aqueous
NA= Non Aqueous
SL = Sludge
DW = Drinking Water
WW = Waste Water
RW = Rain Water
GW = Ground Water
SO = Soil
SW = Solid Waste
OL = Oil
OT = Other Matrix

SPECIAL REQUIREMENTS / BILLING INFORMATION

1) DOC samples were field filtered through 0.45 um Teflon filters, 2) LAB ACTION UPON RECEIPT:FILTER/PRESERVE DISSOLVED Cu/Zn IMMEDIATELY- 24hr HT; 3) 10 working day TAT;
4) FB = Field Blank; 5) ER = Equipment Rinsate (Equipment Blank); 6) Organic carbon will be measured by Weck using High Temperature Combustion Method (SM 5310 B)
7) Please see attached CAR for metals analysis / acid washing filters. Preserve extra of each sample for total copper and zinc AND filter and preserve extra for dissolved metals to archive
8) WECK will contact AMEC PM within 24 hours if any sample anomalies are found. 9) SPIKE level at the following amounts = Copper = 10 ug/L; Zinc = 30 ug/L; TOC/DOC = 2.0 mg/L
10) Select pages from AMEC QAPP included for reference; 11) HDPE Metals Bottles were provided to AMEC with NO acid (HNO3) in bottle. WECK to add acid in-house at appropriate time.

Enthalpy Analytical

4340 Vandever Ave. San Diego, CA 92120

Chain of Custody (electronic)

Date__________Page___of___

Sample Collection By:	AMEC Environment & Infrastructure		
	Report to:		Invoice to:
Company			
Address			
City/State/Zip			
Contact			
Phone			
Email			

	SAMPLE ID	DATE	TIME	MATRIX	CONTAINER TYPE	# OF CONTAINERS	COMMENTS	Topsmelt 96-hr Acute Survival	Mussel 48-hr Survival and Dev.							Receipt Temperature (°C)
								ANALYSES REQUIRED								
1																
2																
3																
4																
5																
6																
7																
8																

PROJECT INFORMATION	**SAMPLE RECEIPT**		**Relinquished By:**	**Received By (courier):**
Client:	**Total # Containers:**		**Signature:** Date	**Signature:** Date
P.O. No.:	**Good Condition?**		**Print Name:** Time	**Print Name:** Time
Shipped Via:	**Matches Test Schedule?**		**Company:**	**Company:**
Comments: Concurrent reference toxicant test for both species			**Relinquished By (courier):**	**Received By Lab:**
			Signature: Date	**Signature:** Date
			Print Name: Time	**Print Name:** Time
			Company:	**Company:**

Additional costs may be required for sample disposal or storage. Net 30 unless otherwise contracted.

APPENDIX B

BEST MANAGEMENT PRACTICE PLANS

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SAN DIEGO UNIFIED PORT DISTRICT
BMP PLAN IMPLEMENTATION

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Shelter Island Yacht Basin Total Maximum Daily Load BMP Workplan – San Diego Unified Port District
Summary of efforts completed /in progress (Jan–Dec 2019)

BMP TYPE	PROJECT NAME / DESCRIPTION	LOCATION	PURPOSE(S)	TARGETED OUTCOME(S)	ASSESSMENT MECHANISM	SCHEDULE / STATUS	FINDINGS / ACCOMPLISHMENTS
Defined Projects for Stage 4 (2018-2022)							
Policy/ Regulation	***Copper Hull Paint Legislation AB 425 (Atkins): The Port is involved in the development of state legislation that will require the Dept of Pesticide Regulation to adopt a leach rate that is protective of aquatic environments.***	***State-wide***	***This bill supports the Port's efforts to reduce copper pollution in San Diego Bay marinas by controlling copper loading throughout the state.***	***Completeness: Adoption of bill*** ***Load Reduction:*** ***(1) establish leach rate that is protective of aquatic environments.*** ***(2) Limit paints to only those meeting the leach rate.***		***Start Date: Feb 2013*** ***Completion Date:*** ***(1) Bill Complete – Oct 2013*** ***(2) Establish Leach Rate – Feb 2014*** ***(3) Leach Rate Use – TBD*** ***Status: Legislation Complete***	• ***AB425 was signed in October 2013.*** • ***The final DPR report was completed on January 30, 2014, and established the following:*** ○ ***Max Leach Rate of 9.5 µg/cm^2/day for paints w/ monthly soft carpet.*** ○ ***Max Leach Rate of 13.4 µg/cm^2/day for paints where cleaning is prohibited.*** ○ ***7 additional mitigation measures identified to be implemented.***
Policy/ Regulation	In-water Hull Cleaning Regulations – New Permits Issued	Bay-wide	In-Water Hull Cleaning regulations are intended to reduce or eliminate copper pollution caused by hull cleaning activities in San Diego Bay.	Completeness: Issue Permits to 100% of In-Water Hull Cleaning businesses operating in San Diego Bay. Load reduction: All hull cleaning businesses operating on Port Tidelands have obtained permits & use BMPs.	# of permitted in-water hull cleaning businesses/ total in-water hull cleaning businesses known to operate.	Start Date: FY10 Status: Ongoing Annually	• 94 companies were issued permits since the onset of regulation. There are currently 47 active permits as of December 2019. • 4 new hull cleaning permits issued in 2019*. • 1 Conditional hull cleaning permit issued in 2019**. **From September 5- December 31, 2019, the Ordinance and Permit Program Review process was in place. During this process, current permits will remain in effect.* *** During this period, Conditional hull cleaning permits are being issued on a case by case basis until the Ordinance and Permit revisions are completed.*

BMP TYPE	PROJECT NAME / DESCRIPTION	LOCATION	PURPOSE(S)	TARGETED OUTCOME(S)	ASSESSMENT MECHANISM	SCHEDULE / STATUS	FINDINGS / ACCOMPLISHMENTS
Policy/ Regulation	In-water Hull Cleaning- Permit Renewals	Bay-wide	In-Water Hull Cleaning Permit renewals are required every two years. A regular renewal process is intended to ensure divers stay up to date on education and training.	Completeness: Permit renewals issued Load reduction: All hull cleaning businesses operating on Port Tidelands possess valid permits & use BMPs.	# of permitted in-water hull cleaning businesses having permits expiring in 2018/ total # in-water hull cleaning businesses	Start Date: Jan 2013 Completion Date: Annually Status: Ongoing annually	• 6 Hull cleaning businesses renewed permits in 2019*. • 1 permit expired in 2019*. • Overall, 44 permits have expired since the onset of the regulation due to either companies going out of business or being sold to another already permitted in-water hull cleaning company. **From September 5- December 31, 2019, the Ordinance and Permit Program Review process was in place.* *During this process, current permits will remain in effect until the review is complete.* *New Conditional Permits will be issued on a case by case basis.* *As a result, renewals were less than previous years.*
Policy/ Regulation	In-water Hull Cleaning – Diver/Marina Inspections	Bay-wide	Inspections for IWHC activities and review of marinas' check-in practices verify whether businesses are complying with permit requirements. In general, compliance with permit requirements is indicative of divers using BMPs and controlling their pollution.	Completeness: compliance with regulations confirmed through visual inspections. Load reduction: All hull cleaning businesses operating on Port Tidelands have obtained permits & use BMPs.	# of inspections conducted/ # of citations/warnings issued	Start Date: FY10 Status: Ongoing Annually	• 87 In-Water Hull Cleaning Inspections completed in 2019. • 59 Marina Inspections completed in 2019. • 1 Citation issued in 2019.
Policy/Regulation	In-Water Hull Cleaning-Ordinance and Permit Program Review	Bay-wide	To amend the Port's In-Water Hull Cleaning Ordinance and Permit as necessary to address loading from In-Water Hull Cleaning.	Achieve Water Quality Standards Further reduce direct loading of dissolved copper into San Diego Bay	Water Quality Monitoring Improved direct load reduction calculations	New Initiative Start Date: August 2019	• Review of current IWHC Ordinance, Best Management Practices and IWHC Permit Program initiated September 5, 2019. • Five public engagement sessions held October 2019 and December 2019. • Draft Amended Ordinance Public Comment Period November 22-December 23, 2019. • Currently assessing public comments and determining next steps.

Shelter Island Yacht Basin Total Maximum Daily Load BMP Workplan – San Diego Unified Port District
Summary of efforts completed /in progress (Jan–Dec 2019)

BMP TYPE	PROJECT NAME / DESCRIPTION	LOCATION	PURPOSE(S)	TARGETED OUTCOME(S)	ASSESSMENT MECHANISM	SCHEDULE / STATUS	FINDINGS / ACCOMPLISHMENTS
Policy/ Regulation	Correspondence with State & Federal Agencies	State-wide	Promote consistency in requirements being developed across the state; discuss strategies for implementation activities, lessons learned, and build upon successful activity models.	Completeness: submittal of letters; response to request(s); public meeting comments	# of letters sent / # of requests satisfied/# of meetings present to comment on	Ongoing Annually • 2018: 1 state agency regularly corresponded with, 2 presentations at state meeting, 1 public comment at regional meeting	• Port and DPR staff continued an on-going collaborative partnership by holding multiple conference calls to discuss copper related issues and special study planning related to the new DPR Paint Rule (throughout 2019). • Florida Department of Environmental Protection conference call with Port staff to discuss the Port's Copper Reduction Program (March 27, 2019). • Port staff presented at the San Diego Regional Water Quality Control Board's Monthly Board Meeting in support of Regional Board staff presentation on the Update on the San Diego Bay Strategy. Port staff presented "Port of San Diego: Alignment with the San Diego Bay Strategy" where several environmental and water quality initiatives were highlighted and shared mission and goals of both agencies were reiterated (August 14, 2019). • Port staff attended the California Marine Affairs and Navigation Conference Washington week in March 2019. This provided an opportunity to discuss TMDL issues amongst the various Port and harbor agencies.
Policy/Regulation	Support for DPR Paint Reformulation	State-wide	Establish timeline to phase out high leach copper paint.	Completeness	Removal of high leach products from the market	Started: 2018 Completion Expected: 2020	• This DPR regulation set a maximum leach rate rule of 9.5 $\mu g/cm^2$/day for copper-based hull paints and became effective July 1, 2018. • The new regulation is the result of efforts associated with AB425. • 2019 was a continued grace period for all high copper paints that are currently in-stock at stores and boatyards. It is expected that after June 30,2020, no high copper paints will be available.
Policy/ Regulation	Coordination with other Regions on Copper TMDLs/impairments	State-wide	Promote consistency in requirements being developed across the state; discuss lessons learned, strategies for implementation activities, etc.	Consistency in regulations	Assessment mechanism is dependent on information being considered.	As-needed coordination	• Port began regular calls with LA County Department of Beaches and Harbors to discuss respective TMDL programs and identify areas for collaboration on copper reduction efforts at both a regional and state level (July, October, December 2019). • Port staff attended a Newport TMDL Workshop hosted by the Santa Ana Regional Water Quality Control Board (May 10, 2019). • Port staff attended a public workshop for the Marina Del Rey TMDL Site-Specific Objective Study (July 9, 2019).
Policy/ Regulation	Legislative or Policy Efforts	State-wide	Seek options for additional state controls on copper through legislative efforts.	Completeness: Adoption of bill Load Reduction: TBD dependent on bill content		Start Date: TBD Completion Date: TBD Status: As-Needed	• Will be analyzed and coordinated as needed.
Policy/ Regulation	Policy Efforts as deemed applicable and appropriate	SIYB/Bay-wide	Evaluate potential policy efforts locally and statewide, as deemed appropriate.	Completeness: Adoption of policy Load Reduction: TBD dependent on policy content		Start Date: TBD Completion Date: TBD Status: As-Needed	• Will be analyzed and coordinated as needed.

BMP TYPE	PROJECT NAME / DESCRIPTION	LOCATION	PURPOSE(S)	TARGETED OUTCOME(S)	ASSESSMENT MECHANISM	SCHEDULE / STATUS	FINDINGS / ACCOMPLISHMENTS
Testing and Research	*Hull Paint Research Grants*	*State-wide*	*Projects advance the understanding of available alternative technologies; 3 new technologies being tested (nanotechnology, surface adhesion, natural antifouling compounds).*	*Completeness: Development of test products*	*Deliverable of final report and ability to test product in Port panel testing.*	*Start Date: FY11* *Completion Date: FY13* *Status: Completed*	• *ePaint – Completed 2012* • *University of Washington – Completed March 2013* • *Xurex – Completed July 2013*
Testing and Research	*Hull Paint Testing Program: Development of a testing program to evaluate new and emerging coatings*	*SIYB*	*The objective of the project was to identify effective non-copper antifouling paints through panel testing.*	*Completeness/Change in Awareness*	*Identification of alternative hull paints that are comparable to copper hull paints.*	*Start Date: FY09* *Status: Complete* *Annual Totals:* • *2011: Five of 17 non-copper hull paints identified to be effective* • *2010: Four of 21 non-copper hull paints identified to be effective.*	• *Paint testing efforts have been completed; no new work anticipated for the paint testing program.*
Testing and Research	Blue Economy Incubator (BEI): Testing New Innovation and Technologies	SIYB	Utilize the Port's Blue Economy Incubator (BEI) to discover, test, and implement, where applicable, new and innovative copper reduction and/or water quality improvement technologies.	Successful trials and subsequent installations of demonstrated technologies.	Measured reduction in copper concentrations in the water column.	• 2018: Phase 1 of Rentunder Boatwash pilot project initiated; Red Lion Chem Tech Pilot Project submitted draft Work Plan • 2017: Two BEI agreements to conduct copper-related pilot projects • 2016: RFP issued for innovative hull cleaning and remediation technologies 7 proposal submitted	• The Rentunder Boatwash uses a technology that offers an alternative to current in-slip hull cleaning practices. The pilot project consists of two phases that test the technology: Phase 1 was initiated in 2018 and ran through 2019, while it is anticipated Phase 2 will begin in 2020. • In 2019, Phase 1 of the Rentunder Boatwash Pilot Project was completed, and results were analyzed to determine the approach to Phase 2 testing. • Phase 1 Report published (June 28, 2019).

Shelter Island Yacht Basin Total Maximum Daily Load BMP Workplan – San Diego Unified Port District
Summary of efforts completed /in progress (Jan–Dec 2019)

BMP TYPE	**PROJECT NAME / DESCRIPTION**	**LOCATION**	**PURPOSE(S)**	**TARGETED OUTCOME(S)**	**ASSESSMENT MECHANISM**	**SCHEDULE / STATUS**	**FINDINGS / ACCOMPLISHMENTS**
Testing and Research	Hull Paint Testing Program: Implementation of a testing program to evaluate new and emerging coatings	SIYB	The objective of the project is to identify effective non-copper antifouling paints through panel testing or other processes.	Completeness/Change in Awareness	A standardized protocol for testing the effectiveness of new coatings has been developed.	Implementation: On-going, as-needed.	• Program will be implemented as needed for new products and as budget allows.
Hull Paint Transition	***Transition of Port Fleet to Non-copper Hull Paints***	***SIYB/Bay-wide***	***To facilitate the reduction of copper loading to SIYB in compliance with interim and final loading reduction targets.***	***Load reduction: 100% of fleet transitioned to non-copper hull paints*** ***Completeness: conversion of entire Port fleet***	***# converted/ total***	***Start Date: FY09*** ***Completion Date: FY11*** ***Status: Complete.*** ***16 of 16 converted***	• ***All 14 Port boats remain converted, resulting in a 12.6 kg/yr load reduction for 2019.*** • ***The project was completed in 2011, the full fleet remains copper free through 2019.***
Hull Paint Transition	***Vessel Tracking Templates***	***SIYB/Bay-wide***	***Excel-based data sheets for marinas and yacht clubs to use to track hull paint in a consistent manner for reporting purposes.***	***Completeness/Change in Behavior***	***# of facilities using templates and tracking hull paint information***	***Start Date: FY11*** ***Completion Date: FY13*** ***Status: complete***	• ***The Port and all 11 facilities are currently using the template to track hull paint.***
Hull Paint Transition	***Comprehensive Paint List***	***SIYB/Bay-wide***	***Development of a comprehensive list of copper, non-copper, and non-biocide paints that includes paint names, product numbers, and (for copper products) AB425 leach rate categories for each paint product.***	***Completeness***	***Creation of a list***	***Start Date: FY15*** ***Completion Date: Dec 2015*** ***Status: Complete***	• ***A paint list was completed and was used to validate the vessel data in this annual report.***
Hull Paint Transition	***Web-based Vessel Tracking System***	***SIYB/Bay-wide***	***A web-based database to track vessel paint information for District and tenant facilities.***	***Completeness/Change in Behavior***	***Presence/absence of usable/accessible online vessel tracking database that calculates annual loading reductions.***	***Start Date: FY12*** ***Completion Date: FY13*** ***Status: Database complete, enhancements in progress***	• ***No new work was conducted on the database. Per stakeholder feedback, the database is not currently in use.***

Shelter Island Yacht Basin Total Maximum Daily Load BMP Workplan – San Diego Unified Port District
Summary of efforts completed /in progress (Jan–Dec 2019)

BMP TYPE	PROJECT NAME / DESCRIPTION	LOCATION	PURPOSE(S)	TARGETED OUTCOME(S)	ASSESSMENT MECHANISM	SCHEDULE / STATUS	FINDINGS / ACCOMPLISHMENTS
Grant Funding/ Incentives	***319h Hull Paint Conversion Project***	***SIYB***	***The project is designed to reduce the levels of copper in Shelter Island Yacht Basin by incentivizing boaters to switch from copper to non-biocide hull paint.***	***Load reduction targets (as of 2012 cost reallocation): 107 vessels converted to non-toxic hull paints and estimated 96.3 kg/yr copper load reduction***	***# of vessels converted and loading reduction as compared to targets.***	***Start Date: FY11 Completion Date: May 30, 2015 Status: Completed***	• ***7 boats converted in 2015*** • ***41 vessels converted overall*** • ***2015 Load reduction = 6.26 kg/yr*** • ***Overall load reduction = 38.51 kg/yr*** • ***Final report submitted to State Board on May 30, 2015*** • ***Report posted to website at https://www.portofsandiego.org/environment/copper-reduction-program/hull-paint-transition.html***
Education/ Outreach	Workshops/seminars to boating community & Stakeholders	SIYB/Bay-wide	Educate boat owners on environmental impacts of copper-based hull paints; provide information on alternative hull paints; inform boat owners of the Hull Paint Conversion Project; inform stakeholders of programs or policies.	Change in Awareness/Change in Behavior	# of people attending; results from public opinion/awareness surveys or pre/post-tests (as applicable)	Start Date: FY 09 Status: On-going Past Annual Totals: • 2018 – 12 events • 2017-- 7 events • 2016 – 6 events • 2015 – 5 events • 2014 – 6 events • 2013 – 1 event • 2012 – 3 events • 2011 – 2 events • 2010 – 1 event	• Workshop ○ May 23, 2019- SIYB Stakeholder Workshop: Port staff organized and facilitated a round table workshop with marinas and yacht club managers from SIYB with the goal to identify further direct load reductions that could be taken by individuals to help achieve the TMDL required load reductions. The TMDL was reviewed and was followed by a round table discussion on direct loading reduction methods. Approximately 15 stakeholders attended. • Public Engagement Sessions: ○ October 2 and 3, 2019: These sessions were held to receive public input on the current in-water hull cleaning regulations including the In-Water Hull Cleaning Ordinance, the In-Water Hull Cleaning Permit and associated Best Management Practices. Approximately 80 people attended the sessions. ○ December 2, 3, and 4, 2019: These sessions were held to discuss the proposed changes to the In-Water Hull Cleaning Ordinance released as a red-line draft to the public on November 22, 2019 and to gather public feedback. Approximately 90 people attended all three sessions. • Conferences: ○ February 25-27, 2019: Oceanology International, San Diego, CA. Port Staff hosted a session titled "Meet the Port" where various environmental programs, including the SIYB TMDL, were discussed with attendees. Oceanology International aims to match the latest technology with ocean protection efforts. Approximately 3,000 attended the conference, and approximately 75 people attended the session. Other sessions included international speakers on the topics of biofouling, hull cleaning and water quality impairments. ○ May 6-7, 2019: Southern California Society of Toxicology and Environmental Chemistry (SoCal SETAC), San Diego, CA. Port staff attended where topics covered water and sediment quality in southern California with both scientific and regulatory focuses. Approximately 200 people attended conference. ○ November 19-22, 2019: Blue Tech Week, San Diego, CA. Port staff attended Blue Tech Week where topics covered included "The Decade of Ocean Science: Promoting Industry and Science Collaboration", as well as sessions

BMP TYPE	PROJECT NAME / DESCRIPTION	LOCATION	PURPOSE(S)	TARGETED OUTCOME(S)	ASSESSMENT MECHANISM	SCHEDULE / STATUS	FINDINGS / ACCOMPLISHMENTS
							on aquaculture and water quality technologies. Approximately 550 people attended the conference. • Guest Speaker Invitations: ○ Ocean Futures Forum Panel Presentation and Discussion- Oceanology International, San Diego, CA- Port staff were invited to present and sit on a panel during the Ocean Futures Forum, which offered insights into the role of ocean science, ocean health and technology in the development of a sustainable blue economy. Other panel members included the current Administrator of the US EPA. (February 26, 2019). Approximately 150 people attended the forum. ○ Dockmasters Meeting- Port staff were invited to present on the Ordinance and Permit Review process. The Dockmasters group is comprised of yacht club and marina managers from San Diego County, with many directly involved with SIYB (September 18, 2019). Approximately 35 people attended. • Port Board Memorandums ○ 10 Board Memorandums ▪ U.S. EPA Interim Decision on Copper Compounds (March 5, 2019). ▪ DPR Request to Collaborate with District (March 13, 2019). ▪ Submittal of the 2018 Shelter Island Yacht Basin Dissolved Copper TMDL Annual Monitoring and Progress Report (April 4, 2019). ▪ Rentunder Boatwash Pilot Project: Completion of Phase 1 and Receipt of Water Quality Monitoring Study Phase 1 Technical Memorandum (August 8, 2019). ▪ Notification of Administrative Review of IWHC Ordinance and Permit (September 5, 2019). ▪ Update on Tenant Outreach for Copper Issues (September 12, 2019). ▪ Public Engagement Notifications (September 26, 2019). ▪ Conceptual Model Update (October 3, 2019). ▪ Amended Draft IWHC Ordinance (November 21, 2019). ▪ Summary of IWHC Public Engagement Events (December 12, 2019). • Port Board Meeting Agendas ○ 1 President's Report ▪ Status update on the draft amended Ordinance review (December 11, 2019). ○ 4 Board Agendas ▪ Presentation and Update on the District's Clean Water Initiatives: Healthy Bay Efforts Including Pollution Prevention, Sediment Cleanups, and Bay Water Quality Monitoring (May 14, 2019). ▪ Blue Economy Incubator Presentation and Update on Associated Pilot Projects, Including Seaweed Aquaculture, Drive-In Boatwash and Marine Debris Removal Vessel (June 18, 2019). ▪ Presentation and Update on the 2018 Copper Load Reduction Efforts Related to the Shelter Island Yacht Basin Total Maximum

BMP TYPE	PROJECT NAME / DESCRIPTION	LOCATION	PURPOSE(S)	TARGETED OUTCOME(S)	ASSESSMENT MECHANISM	SCHEDULE / STATUS	FINDINGS / ACCOMPLISHMENTS
							Daily Load and Direction to Staff on Future Loading Reduction Strategies (June 18, 2019). ▪ Presentation and Direction to Staff on In-Water Hull Cleaning Policy Approaches: (A) Informational Update on In-Water Hull Cleaning Benchmarking and Conceptual Model Update; (B) Review of Port District Regulation of In-Water Hull Cleaning; and (C) Additional Vessel Pollution Matters (October 8, 2019).
Education/ Outreach	Booths at Outreach Events	SIYB/Bay-wide	The Port makes efforts to host a booth at various boating-related events. The purpose is to educate the boating community on environmental impacts of copper-based hull paints; provide information on alternative hull paints; inform boat owners of the Hull Paint Conversion Project (2013-2015).	Change in Awareness/Change in Behavior	# of attendees; # of posted advertisements or pamphlets distributed Results from public opinion/awareness surveys (as applicable)	Start Date: FY 09 Status: On-going Past Annual Totals: • 2018 – 1 event • 2017 – 0 events • 2016 – 6 events • 2015 – 6 events • 2014 – 5 events • 2013 – 5 events • 2012 – 4 events • 2011 – 4 events • 2010 – 1 event • 2009 – 1 event	• Port staff hosted a booth during Blue Tech Week 2019 in San Diego, CA to highlight environmental initiatives at the Port, which in turn allowed a platform for discussions about potential technology solutions to water quality issues with representatives from the Blue Technology industry (November 19-22, 2019).

BMP TYPE	PROJECT NAME / DESCRIPTION	LOCATION	PURPOSE(S)	TARGETED OUTCOME(S)	ASSESSMENT MECHANISM	SCHEDULE / STATUS	FINDINGS / ACCOMPLISHMENTS
Education/ Outreach	Develop Partnerships/ Collaboration	SIYB/Bay-wide	Identify opportunities to collaborate with tenants, academia, and other agencies to develop and provide outreach, testing opportunities, funding opportunities, and policies.	Change in Awareness/Change in Behavior	# partnerships developed	Start Date: FY 09 Completion Date: On-going Status: In progress	• Marina and Yacht Club "1 on 1 Meetings" ○ Port staff met individually with marina and yacht club managers that elected to evaluate their Vessel Tracking Data with Port staff and consultants prior to data submittal (January 2019). ○ Port staff met with two yacht clubs to meet new staff and discuss the current status of the TMDL and further efforts needed (August 2019). ○ Port staff met with a marina manager to discuss the marina's approaches to regulating in-water hull cleaning (September 2019). • Coordination with hull cleaners on In-Water Hull-Cleaning Regulations. • Meeting individually with various In-Water Hull Cleaners to discuss the proposed draft amended Ordinance. • Coordination with SIMLG and SIYB TMDL Stakeholders on SIYB TMDL annual report and copper reduction efforts. • Regular participation in state-led Marina Interagency Coordinating Committee (MIACC) meetings for antifouling and marina-related topics (May 30 and December 3, 2019). • Regular meetings with SIMLG and other SIYB TMDL stakeholders to discuss copper reduction efforts and TMDL status.
Education/ Outreach	Website Development	SIYB/Bay-wide	Be an information source for staying up-to-date with boating trends, news, events and environmental issues. Provide tenants, stakeholders, and public information on copper hull paint related projects, policies and other items.	Change in Awareness/Change in Behavior	Web pages created and posted. Periodic updates to webpages (as necessary)	Start Date: FY 10 Status: On-going Past Annual Totals: • 2018 – 40 updates • 2017 – 36 updates • 2016 – 2 updates • 2015 – 2 updates • 2014 – 1 update • 2013 – 2 updates • 2012 – 2 updates • 2011 – 1 update	• The website was routinely checked to ensure content was available to the public and that information remained current and easy to find. • 5 website updates were performed between September-December 2019 to continually update the public on the Ordinance review process and public engagement sessions. • Approximately* 20 Updates to the In-Water Hull Cleaning permitted divers list (the list is updated and distributed to marinas and yacht clubs weekly, unless there are not changes to the list from the previous week). • A dedicated email address was established for stakeholders to facilitate correspondence and Q&A for In-Water Hull Cleaners during the review process: hullcleaning@portofsandiego.org **From September 5- December 31, 2019, the Ordinance and Permit Program Review process was in place. During this process current permits remained in effect and new Conditional Permits were only issued on a case by case basis. This resulted in fewer updates to the permitted divers list compared to previous years.*

BMP TYPE	PROJECT NAME / DESCRIPTION	LOCATION	PURPOSE(S)	TARGETED OUTCOME(S)	ASSESSMENT MECHANISM	SCHEDULE / STATUS	FINDINGS / ACCOMPLISHMENTS
Education/ Outreach	Literature Development: (brochures, handouts, print materials)	Bay-wide	Development and distribution of brochures and other educational materials for the public addressing the bay's copper problems and providing information on non-copper hull paint alternative hull paints.	Change in awareness	# of brochures or pamphlets created	Start Date: FY 10 Past Annual Totals: • 2018 – 1 item • 2017 – 0 items • 2016 – 1 item • 2015 – 1 item • 2014 – 2 items • 2013 – 4 items • 2012 – 1 item • 2011 – 2 items	• Port staff worked collaboratively with staff from the DPR, Department of Boating and Waterways, and LA County Department of Beaches and Harbors to update the Boater's Guide to Hull Paints in California to better reflect the new DPR Copper Paint Rule and current paints available in the state of California. A draft was completed in December 2018, the draft brochure was socialized at the May 2019 MIACC meeting, a public comment period commenced May-June 2019, and a final version was completed in November 2019.
Education/ Outreach	Media Development: (Videos, Web tools, Testimonials, Press releases)	SIYB/Bay-wide	Development and distribution of information for the public addressing the bay's copper problems, non-copper hull paints, policies, and testimonials from boaters/tenants using non-copper hull paints.	Change in awareness	# of press releases or videos created	Start Date: FY 09 Status: On-going Past Annual Totals: • 2018- 1 item completed • 2017- 1 press release; 1 item completed • 2016 – 1 press release; 3 items completed • 2015 – 1 press release; 2 items completed • 2014 – 7 press releases; 1 item completed • 2013 – 5 press releases, 3 items completed • 2012 – 9 press releases; 1 video, 2 posters • 2011 – 7 press releases • 2010 – 5 press releases • 2009 – 2 press releases	• The Log Newspaper articles ○ Article discussing the Port's progress towards TMDL compliance titled "Port of San Diego reports continued compliance of TMDL program (July 3, 2019). https://www.thelog.com/local/port-of-san-diego-reports-continued-compliance-of-tmdl-program/ ○ Article discussing the Port's review of the In-Water Hull Cleaning Ordinance and Permit Program titled "Port of San Diego looks into updating in-water hull cleaning policy" (October 24, 2019). https://www.thelog.com/local/port-of-san-diego-looks-into-updating-in-water-hull-cleaning-policy/

Shelter Island Yacht Basin Total Maximum Daily Load BMP Workplan – San Diego Unified Port District
Summary of efforts completed /in progress (Jan–Dec 2019)

BMP TYPE	**PROJECT NAME / DESCRIPTION**	**LOCATION**	**PURPOSE(S)**	**TARGETED OUTCOME(S)**	**ASSESSMENT MECHANISM**	**SCHEDULE / STATUS**	**FINDINGS / ACCOMPLISHMENTS**
Agency Wide Activities	Construction Site Inspections	Bay-wide	Construction inspections ensure that sites undergoing (re-)development control pollution and prevent discharges. For construction sites and facilities that do not comply, the Port will take enforcement action.	Change in Behavior	Total # sites, # Inspections; # of follow-up inspections Overall BMP rate	Status: On-going	• 22 construction projects bay-wide. • 196 inspections and 14 violations.
Agency Wide Activities	Commercial Business Inspections Program	Bay-wide	The Port inspects commercial facilities per the Municipal Permit in SIYB and bay-wide. One component, the Port's marina inspection program, has been an effort to educate boat owners about pollution prevention, focusing on visual observations designed to identify sources of pollution and the pollution prevention practices being implemented at the marinas.	Change in Behavior	Total # Inspections; # of follow-up inspections	Status: On-going Past Annual Totals: • 2018: 67 inspections bay-wide, 57 follow-ups required. • 2017: 77 inspections bay-wide, 38 follow-ups required. • 2015: 57 inspection bay-wide, 16 follow-ups required. • 2014: 45 inspections bay-wide; 18 follow-ups required. • 2013 - 26 inspections bay-wide; 4 follow-ups required. • 2012 - 9 inspections bay-wide, 0 follow-ups required.	• 65 inspections and 22 follow-up inspections bay-wide in 2019. • No SIYB commercial facilities received administrative citations. • 6 SIYB commercial facilities received written warnings for a total of 6 deficiencies. • Bay-wide - 1 administrative citation and 42 written warnings were issued to facilities to resolve deficiencies. [1]*Data gathered from the Jurisdictional Runoff Management Program (JRMP), which has a permit-required data collection period of July 1, 2018—June 30, 2019. To stay consistent with previous SIYB BMP workplan reporting, these dates were used for this report.*

Shelter Island Yacht Basin Total Maximum Daily Load BMP Workplan – San Diego Unified Port District

Summary of efforts completed /in progress (Jan–Dec 2019)

BMP TYPE	PROJECT NAME / DESCRIPTION	LOCATION	PURPOSE(S)	TARGETED OUTCOME(S)	ASSESSMENT MECHANISM	SCHEDULE / STATUS	FINDINGS / ACCOMPLISHMENTS
Structural and Mechanical BMP Implementation	SUSMP and Development Regulations	Bay-wide	The Port incorporates SUSMP requirements on applicable development and redevelopment projects bay-wide. Depending on the type and size of the projects, SUSMP requirements could include site design, source controls, and treatment controls such as LID.	Change in Behavior: Compliance	# of projects having metals as priority pollutant / # of completed SUSMP BMPs / # acres (sq. ft)	Status: On-going	• No new projects occurred in SIYB in 2019 having metals as priority pollutant.
Monitoring/ Reporting	***SIYB Special Study – Time Series Special Study***	***SIYB***	***Gain a better understanding on the effects tidal variations may have on concentrations of dissolved copper in surface waters at SIYB***	***Change in SIYB water quality concentrations during different stages of a full mixed semidiurnal tidal cycle.***	***Completeness: Assess water quality monitoring data and compare to previous water quality and modeling efforts.***	***Status: Completed***	• ***3 Special Study sites were located throughout SIYB and sampled every 2 hours for an entire mixed semidiurnal tidal cycle (26 hours).*** • ***Samples collected in January 2018 at mouth, mid-basin and back-basin.*** • ***Findings submitted as part of the 2017 Annual SIYB TMDL Report (March 2018)***
Monitoring/ Reporting	Conduct annual SIYB TMDL Water Quality Monitoring	SIYB	Assess water quality in SIYB basin; determine when vessel conversion starts to show water quality improvements	Completeness	Completed Report	Status: 2019 Monitoring Complete	• For 2019: Basin average for dissolved copper was 8.5 µg/L. • The trajectory does not show water quality improvement at this time.
Monitoring/ Reporting	Revisions to QAPP & Monitoring Plan	SIYB	Develop a water sampling and vessel tracking program to 1) use annually to assess conditions in SIYB, and 2) determine compliance with the TMDL.	Completeness	Submittal of plan updates	Start Date: May 2019 Completion Date: July 2019 Status: 2019 Revisions Complete	• Another round of revisions included various QA updates.

BMP TYPE	PROJECT NAME / DESCRIPTION	LOCATION	PURPOSE(S)	TARGETED OUTCOME(S)	ASSESSMENT MECHANISM	SCHEDULE / STATUS	FINDINGS / ACCOMPLISHMENTS
Monitoring/ Reporting	***Updates to SIYB TMDL Conceptual Model (as-needed)***	***SIYB***	***Update model using accepted modeling techniques that can predict current conditions and copper loading changes as paints are transitioned from current leach rates to AB425 Category 1 leach rates. Updates would include list of data inputs and comparisons to existing modeling efforts and data.***	***Completeness; annual review and update (when applicable)***	***Completed report; updates as needed***	***Start Date: March 2013*** ***Completion Date: By March 2016*** ***Status: Completed***	• ***Data from DPR Report was included in conceptual model.*** • ***SIYB-Specific MAMPEC model study completed; Identification of recent studies to fill data gaps and uncertainties completed.*** • ***Information provided in the SIYB 2015 Annual Report as Appendix E. (March 2016; see link below) https://www.portofsandiego.org/environment/copper-reduction-program/monitoring-and-data-assessment/shelter-island-yacht-basin-tmdl-annual-reports/7286-shelter-island-yacht-basin-tmdl-annual-report-2015.html***
Monitoring/ Reporting	Conceptual Model Technical Review	SIYB	Update model using accepted modeling techniques that predict current conditions and copper loading changes as paints are transitioned from current leach rates to AB425 Category 1 leach rates and the contributions of In-Water Hull Cleaning from cleaning frequencies.	Completeness	Completed report; updates as needed	Start Date: August 2019 Completion Date: September 2019 Status: Completed	• The Technical Review of the conceptual model reassessed the 2005 SIYB TMDL's loading assumptions to determine whether the SIYB TMDL copper targets may be achieved by reducing the frequency of, or eliminating, in-water hull cleaning. • Key findings suggest adaptive management measures to vessel hull cleaning frequency and adjustments to implementation practices may lead to copper load reductions and water quality improvements.

Shelter Island Yacht Basin Total Maximum Daily Load BMP Workplan – San Diego Unified Port District
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BMP TYPE	PROJECT NAME / DESCRIPTION	LOCATION	PURPOSE(S)	TARGETED OUTCOME(S)	ASSESSMENT MECHANISM	SCHEDULE / STATUS	FINDINGS / ACCOMPLISHMENTS
Monitoring/ Reporting	Support DPR Special WQ Study to evaluate effectiveness of Category 1 Paints	State-wide	Establish baseline and perform bi-annual subsequent sampling to determine if Category 1 paints are improving water quality around the state.	Currently impaired basins meeting Water Quality Objectives as the Category 1 Paint Rule is fully recognized	Water quality measurements compared to WQOs	Started: 2019 Completion Expected: TBD	• In 2019, the Port was approached by the DPR to include SIYB in their special study to evaluate the Category 1 paints and their effect on water quality in impaired basins over time. • Port staff worked with the DPR to facilitate the sampling efforts and communications between the DPR and interested SIYB stakeholders.
Monitoring/ Reporting	In Water Hull Cleaning Water Quality Pilot Project	SIYB	This pilot project would evaluate how the age of a copper paint, the frequency in which a hull is cleaned, and various cleaning methodologies impact water quality.	Completeness/Change in Awareness	Baseline, pre- and post- experimental water quality measurements for dissolved copper	Start Date: Planning in FY20; Implementation proposed for FY21, pending budget availability	• Testing will occur as budget allows.
Monitoring/ Reporting	Regional Harbor Monitoring Program (RHMP): 2018 Core Monitoring Program	Bay-wide	Assesses conditions found in San Diego Bay based on comparisons to historical data and comparisons to contaminant concentrations to known surface water and sediment thresholds.	Completeness	Water, sediment, & fish sampling in bay Report on findings of the study	Start Date: FY17 Completion Date: FY22 Status: Ongoing	• Core monitoring was conducted throughout San Diego Bay from July-September 2018. Data analysis and data QA/QC for water, sediment, benthic, and biota data occurred throughout 2019.
Monitoring/ Reporting	***Regional Harbor Monitoring Program (RHMP): 2013 Core Monitoring Program***	***Bay-wide***	***Assesses conditions in San Diego Bay based on comparisons of historical data and contaminant concentrations to known water and sediment thresholds.***	***Completeness***	***Water, sediment, & fish sampling in bay*** ***Report on findings of the study***	***Start Date: FY13*** ***Completion Date: FY15*** ***Status: 2013 Completed***	• ***Final report completed January 2016 (see link below)*** ***https://www.portofsandiego.org/document/environment/regional-harbor-monitoring-program/rhmp-2013.html***

BMP TYPE	PROJECT NAME / DESCRIPTION	LOCATION	PURPOSE(S)	TARGETED OUTCOME(S)	ASSESSMENT MECHANISM	SCHEDULE / STATUS	FINDINGS / ACCOMPLISHMENTS
Monitoring/ Reporting	*SIYB Hydrology Study*	*SIYB*	***Evaluate the potential for enhanced flushing of SIYB by adding culverts or pipes through to America's Cup Harbor or directly to the bay's main channel. Develop a preliminary engineering feasibility and cost assessment for the modeled scenarios.***	*Completeness*	*Completed report*	*Start Date: FY11* *Completion Date: FY13* *Status: Completed Feb 2013*	• *A culvert between SIYB and ACH was modeled to provide the greatest benefit in reducing copper in SIYB. The study predicted a potential 17% reduction on average throughout the basin and 21% reduction at the head (or enclosed end) of the basin.*
Ongoing Partnerships & Cooperative Efforts							
Policy/ Regulation	Coordination with other Regions on Copper TMDLs/impairments	State-wide	Promote consistency in requirements being developed across the state; discuss implementation strategies, lessons learned, etc.	Consistency in regulations	Assessment mechanism is dependent on information being considered.	As-needed coordination	• TBD
Vessel Tracking Program	Track vessel conversion from copper to non-copper and low-copper hull paints to determine annual loading reductions	SIYB	Monitor implementation progress and assess progress towards interim and final loading targets	Interim and final loading reduction targets	Annual basin-wide vessel tracking assessments and loading reduction calculations	Annually beginning in 2011; reporting to Regional Board March 31 annually	• All Named Parties.
Water Quality Monitoring	Monitor water quality basin wide to assess long term trends in dissolved copper levels and attainment of WQOs	SIYB	Monitor implementation progress and assess progress towards attaining dissolved copper concentrations protective of SIYB beneficial uses	Water quality conditions protective of beneficial uses	Annual basin-wide chemistry and toxicity assessments	Annually beginning August 2011; reporting to Regional Board March 31 annually	• All Named Parties.

Shelter Island Yacht Basin Total Maximum Daily Load BMP Workplan – San Diego Unified Port District
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BMP TYPE	PROJECT NAME / DESCRIPTION	LOCATION	PURPOSE(S)	TARGETED OUTCOME(S)	ASSESSMENT MECHANISM	SCHEDULE / STATUS	FINDINGS / ACCOMPLISHMENTS
Education/ Outreach	MIACC Meetings	State-wide	Promote consistency in requirements being developed across the state; discuss strategies for implementation activities, lessons learned, and build upon successful activity models.	Information transfer; consistency in messaging	Assessment mechanism is dependent on information being considered.	As-needed coordination	• TBD

* This list is subject to modification based on the availability of resources and results from other projects.

**Projects in bold italics denote projects completed during or prior to this reporting period

SHELTER ISLAND MASTER LEASEHOLDERS TMDL GROUP BMP PLAN IMPLEMENTATION

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2019

BEST MANAGEMENT PRACTICES AND RECOMMENDED ACTIONS FOR SHELTER ISLAND MARINAS AND YACHT CLUBS

Prepared by:
Shelter Island Master Leaseholder TMDL Group
For the Marinas and Yacht Clubs in Shelter Island Yacht Basin

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GUIDELINES

RECORD KEEPING

STAFF TRAINING/BOATER EDUCATION

This document is prepared solely for exclusive use by participating members of the Shelter Island Master Leaseholders TMDL Group

MISSION STATEMENT

Our goal is to apply Best Management Practices to marinas and yacht clubs to help reduce non-point sources of copper.

DEFINITIONS

- **SIYB -** The following entities make up the leaseholders in Shelter Island Yacht Basin (SIYB): Kona Kai Marina, Shelter Island Marina, Silver Gate Yacht Club, Bay Club Hotel and Marina, Humphrey's Half Moon Inn, Gold Coast Marina, Tonga Landing, Crow's Nest, San Diego Yacht Club, Southwestern Yacht Club, and La Playa Yacht Club.

- **SIMLG-** In an effort to comply with the TMDL, the Shelter Island Master Leaseholders TMDL Group (SIMLG) was formed in 2007. This group, which has proven to be an extremely important tool for compliance, unifies numerous individual efforts so that a single entity does not fail to comply. While participation in the group is voluntary, all Marina Operators (MO's) working in the SIYB are strongly urged to participate as much as possible. The following entities make up the SIMLG: Kona Kai Marina, Shelter Island Marina, Silver Gate Yacht Club, Bay Club Hotel and Marina, Humphrey's Half Moon Inn, Gold Coast Marina, Tonga Landing, Crow's Nest, San Diego Yacht Club, Southwestern Yacht Club, and La Playa Yacht Club.

- **BMP's** – Best Management Practices.

  BMPs are practices or procedures. They include methods to lessen or prevent identified substances from reaching receiving waters. A BMP plan organizes these actions, identifies goals, documents implementation, and evaluates progress and thereby assures effective use.

  BMPs are qualitative.
  They are designed to address a particular goal and the identification of that goal is a crucial part of the guidance plan.

  BMPs are flexible.
  Similar environmentally protective results can be achieved by multiple differing different practices. Marinas may elect to either use BMPs recommended by this guidance or selected by the marina.

  BMPs fill an unfilled role.
  Copper antifouling paints are legally sold for use in California. The use of these coatings however has been identified as a source of water quality impairment. Marinas have been identified as a responsible party in this impairment. Communicating this possible impairment seems to have been placed upon the shoulders of marina operators.

Background

Impairment of water quality due to dissolved copper, SIYB TMDL Resolution No. R9-2005-0019 amended the Water Quality Control Plan for the San Diego Basin (Basin Plan) to incorporate the SIYB TMDL, on February 9, 2005. The purpose of the TMDL is to identify and implement actions to reduce dissolved copper loads discharging into the SIYB to attain numeric water quality objectives for dissolved copper in San Diego Bay, which are equal to the California Toxics Rule (CTR) water quality values for dissolved copper in sea water. Chronic exposure concentrations must not exceed 3.1 micrograms per liter (µg/L) over a 4-day average, and acute exposure concentrations must not exceed 4.8 µg/L over a 1-hour average.

The SIYB TMDL requires that loading of dissolved copper into the water column be reduced by 76 percent to 567 kg/yr over a 17-year period (Regional Board, 2005). A 10 percent reduction in dissolved copper loading is required within seven years (December 2012); a 40 percent reduction in loading is required within 12 years, and a 76 percent reduction within 17 years (December 2022).

BMPs and the Investigative Order

Investigative Order, No. R9-2011-0036, issued to the Port on March 11, 2011, requires that the Port prepare and submit designated plans and annual technical reports on the progress of the SIYB TMDL implementation.

- The order states that data on the number of boat hulls converted from copper to alternative hull paints are needed to monitor the progress of implementing the SIYB Dissolved Copper TMDL and achieving the required dissolved copper load reductions.
- Water quality monitoring data are needed to quantify the dissolved copper concentrations in the water column in SIYB to determine when the water quality objectives are attained and beneficial uses restored.
- “Annual monitoring and progress reports must include a discussion of any BMPs or other actions that have been implemented by the Dischargers to reduce dissolved copper discharges from boat hulls into SIYB.”

BMPs selection and use under Section 319

Amendments to the Clean Water Act (CWA) established the Section 319 Nonpoint Source Management Program. Under this program, parties must identify best management practices and measures for impaired non-point sources, along with an implementation plan.

GUIDELINES

BMP 1-Marina Operators: TMDL Introduction, Compliance, Shelter Island Master Leaseholders Group (SIMLG), and Key Reference Articles

- **OVERVIEW-**The Total Maximum Daily Load (TMDL) for copper in Shelter Island Yacht Basin (SIYB) was adopted by the California Regional Water Quality Control Board (CRWQCB) in 2005, and over the years its implications have grown in complexity. The document adopting the CRWQCB's efforts is known as Resolution R9-2005-0019. Among many other important issues, the Resolution named Marina Operators (MO's), marina owners, boat owners, the Unified Port of San Diego (Port), and underwater hull cleaners (Divers) as "Dischargers."

- **VESSEL TRACKING-** Each MO is ultimately responsible for reporting the composition of hulls painted using copper, non-copper, and low-copper paint to the Port. The SIMLG offers a great deal of help on this submission, mainly through the hiring of a consultant, John Adriany, who is the Principal Scientist at ChemMetrics. The importance of complying with this aspect of the TMDL cannot be overstated. Completion and submission of an accurate report to the Port is mandatory for all MO's. Each year, our report is due by approximately January 15th. At this time, our report of BMP's is also submitted. A sheet of Guidelines can be found in the Appendix.

- **COLLECTING SURVEYS-** Each MO must determine the most effective way to ensure the Vessel Tracking report discussed above is as complete and accurate as possible. Therefore, it is imperative to make every effort to reach out to your boaters. From time to time a boater may completely ignore the request(s) to fill out the survey. Therefore, MO's are encouraged to record the number and types of (e.g. phone, email, etc.) of attempts made. It is acceptable to shift focus to other boaters more likely to submit a survey after three unsuccessful attempts. If three unsuccessful attempts are made, a MO should record those attempts and retain that record for seven years.

- **COMPLIANCE -**As "dischargers accountable for copper load and wasteload reductions" (R9-2005-0019 Technical Report), it is imperative that all MO's in Shelter Island Yacht Basin understand specific components of the TMDL. Examples of these components include surveying boaters, meeting copper loading reduction timelines, and the utilization of Best Management Practices (BMP's) in an effort to voluntarily comply with the TMDL.

- **TIMELINE-** As of the date of this document, the TMDL is in stage three, of four (Port Presentation, 2007). Stage three entails meeting a benchmark of a 40% reduction of the number of hulls in our marina with copper paint by the end of 2017. The next and final stage involves a 76% reduction in the number of hulls, *and* a measurement of 3.1 parts per billion (ppb), or less, of copper in the water column. Stage four ends in 2022.

BMP 2-Port of San Diego: Port’s Role, Grant, Expectations, and Diver Regulations

- **OVERVIEW-**SIYB, which consists of 153 acres, was placed onto the 303(d) Impaired Water Bodies List in 1996. This List currently categorizes our TMDL as a “high” priority.

- **TECHNICAL REPORT-** The 2005 Technical Report directed the Port to develop an Implementation Plan. A draft of this Plan was developed in 2009, and a final draft was submitted in May, 2011. This Plan pointed to BMP’s to facilitate the conversion of boat hulls with copper anti-fouling paints (AFP) to AFP’s with little or no copper.

- **INVESTIGATIVE ORDER** - On March 11, 2011, an Investigative Order (R9-2011-0036) was issued by the Water Board to the Port. This Order dictates that the Port reports to the Board measurements toward successful compliance by monitoring and tracking data on the number of hulls that have converted from copper to a non-copper or low-copper alternative, and monitoring the concentrations of dissolved copper and levels of toxicity in the water. This Order also requires the Port to submit BMP’s as part of their report. Accordingly, this document will be updated as necessary and submitted to the Port each year.

- **IMPLEMENTATION PLAN-** In May, 2011 the Port submitted their Implementation Plan to the Water Board. This document contains the quality assurance plan lays the groundwork for the efforts made to achieve appropriate reductions of copper in SIYB (Shelter Island Yacht Basin Dissolved Copper TMDL Implementation Plan, May, 2011).

- **MONITORING PLAN-** The Monitoring plan, which includes a quality assurance plan described below, and a Conceptual Model, details the annual water quality testing conducted by the Port.

- **QAPP-** The Quality Assurance Project Plan (QAPP), which is part of the Implementation Plan, provides details for the methods used to assess reductions of dissolved copper by tracking the number of hulls converted from copper to non-copper paint. In addition, this document details the project’s objectives and quality assurance (QAPP, 2017).

- **DISCHARGERS-** The 2005 Technical Report within Resolution R9-2005-19 named the Port of San Diego (Port) a Discharger. Due to the Port’s role in managing the tidelands around San Diego Bay, the Water Board recognized their ability to regulate the environmental impact of copper. The Board points to the Port to manage the TMDL in SIYB, and reiterates their authority to hold MO’s, owners, divers, and boat owners accountable for reducing copper loading.

- **REGULATIONS-** According to the Port’s 2007 presentation of a plan to reduce copper in Shelter Island Yacht Basin (SIYB), regulatory mechanisms may be put in place to ensure compliance of the aforementioned benchmark. It is our intention to avoid such measures by voluntarily complying; and creating, following, and submitting BMP’s is necessary to comply.

- **GRANT-** In an effort to increase the number of hulls converted to non-copper, the Port applied for and won grant monies ($600,000) to offset the cost of such conversion for boaters. With the help of the grant, 41 hulls were converted from 2012 through 2015.

- **DIVER ORDINANCE-** Port Ordinance 2681 originated in July, 2011, and became enforceable following a 90-day grace period that ended in November of the same year. This ordinance mandates Divers obtain a permit from the Port in order to clean hulls. In order to obtain a permit, Divers must display working knowledge of BMP's related to cleaning hulls in the SIYB. One example of these BMP's is Divers are supposed to use the least abrasive cleaning method possible to accomplish the job of cleaning the hull. The Port sends a list of Divers who are permitted to each MO in the SIYB. It is incumbent upon the MO's to disallow any Diver without a valid permit to work in their marina. Once permitted, a Diver will receive from the Port a card, which has green trim and a photo of the Diver. This card shall be displayed in a place where it can be observed by an MO or the Port.

BMP 3-Staff: Training Staff on Basic TMDL Fundamentals, Essential Information, and BMP’s

- **OVERVIEW-** In general, compliance efforts have proven to be demanding. And if your office has the ability to dedicate a staff person(s) to assist with the efforts, it is suggested that they undergo thorough and ongoing training, and receive updates regarding the TMDL and BMP’s.Marina staff should be made available and become familiarized with this BMP document, Port deadlines, and have input on expanding BMP’s.

- **DISSEMINATING GENERAL INFORMATION-** Having a staff that is informed about the TMDL can be very helpful. A MO may or may not be the first person a boater reaches out to about their questions regarding the TMDL and their bottom paint. And it is important that the correct information is disseminated, whether a tenant or member reaches the MO or someone else on their staff.

- **DISSEMINATING PORT INFORMATION-** Staff should be encouraged to assist, whenever possible, efforts made by the Port to educate boaters on the TMDL. From “literature and print media” to “booths at local events,” and “internal education” to an “Eco-friendly hull paint expo,” the Port has made a concerted effort to inform and assist boaters who are moored in the SIYB switch to non-copper paint (Shelter Island Yacht Basin Hull Paint Conversion Project, 2015). These efforts, which began in 2011, should be clearly, routinely and effectively communicated to boaters in our marinas. Staff in a marina office should remain current with knowledge related to such efforts, so they can refer boaters to the appropriate materials.

BMP 4- Divers: Check-In/Check-Out Procedures, Permits, and Monitoring

- **WARNING-** It is ultimately the job of the MO to ensure no work takes place in our marinas by unpermitted Divers. If work is taking place by an unpermitted Diver, and said Diver is noticed by the Port during an inspection, adverse action against your marina by the Port could take place. If a MO or their staff knew that the Diver did not have their permit, you can count on action being taken against your marina.

- **DIVER BMP'S:** The BMP's that each diver uses should be known. Each MO must ensure that every diver is performing cleanings in line with the California Professional Divers Association (CPDA), or using BMP's that are more stringent.

- **SIGNAGE-** It is helpful to convey messages to divers in English and Spanish. And signage can help facilitate the exchange with a Diver. This is especially true if you are unable to allow a Diver to work on a particular day because they do not have their card from the Port, discussed in BMP 2 above. You may be able to curtail any above occurrences by placing signage at the desk where Divers sign in. There are at least three reasons for having signs notifying Divers of the fact that they cannot work without a permit. First, signs offer a clear statement to Divers about your office's policy. Second, if anyone on your staff is uncomfortable disallowing a Diver to work, they can more easily adhere to your office's policy if it is in writing, in front of both them and the Diver. Finally, if the Port were to reach an unpermitted Diver working, having a sign that the Diver must've passed when signing in could go a long way in convincing the Port that your office genuinely tries to manage this practice.

- **SIGN IN SHEETS-**Sign in sheets should be used in order to track Diver activity. For reasons beyond the TMDL, MO's should know who is in their marina working on boats or conducting business. Regarding the TMDL, the sign-in process is a great time to verify the Diver has their valid permit with them.

- **SIGN IN WHEN ARRIVE BY WATER-** All divers, whether arriving by water or land, must check in with the marina office. Each MO must determine and make known to divers the process by which sign in occurs when they arrive by boat.

- **DOCK WALKS-** While on dock walks it is important to check for permits. We recognize that the sign-in process can be skirted when vendors walk through our entrance gates behind boaters, etc. And this is especially true of Divers who arrive by water. Just because a Diver arrives by water does not mean they are skirting the sign-in process; they may not know a policy is in place. By walking the docks, you can inspect permits for yourself, and direct any Diver arriving by water to visit your office.

BMP 5- Boaters: Communicating TMDL Basics to Boaters and Slip Holders.

- **OVERVIEW-** One BMP that is imperative to accomplish is communicating the latest news and information concerning the TMDL to your marina tenants or yacht club members. Choosing the medium for accomplishing this rests on the individual MO's, however it is very important that communication occurs. It is important to remember that, while MO's and long-time tenants/members may be familiar with this topic, it is likely to be a foreign topic to new boaters. And new boaters may be just as likely to convert their paint to non-copper; painting their bottom is sometimes one of the first moderately large maintenance tasks taken on.

- **NEWSLETTERS-** In general, newsletters are a great way to communicate with your boaters. Most marinas send them via email on a monthly basis. The SIMLG suggests mentioning the latest news concerning TMDL monthly. It can also be done via emails, events aimed at boater education, wharfage agreements, personal conversations, etc.

- **EMAILS-** Dedicated emails are effective because sending an email blast to tenants/members is usually a relatively easy task nowadays. News and updates are easily conveyed in emails dedicated to the TMDL.

- **EVENTS-** Hosting tenant events, such as potlucks, tenant appreciation parties, and picnics is a good idea. You may benefit from grabbing some of your tenants' attention at such events to discuss the TMDL.

- **SIGNAGE-** Wharfage contracts or Slip agreements set forth the arrangement you have with your tenants or members. As such, they may be an effective source for requiring bottom paint that is non-copper or low-copper. Or incentives, such as wait list priority or discounts, can be outlined in the slip agreement. At a minimum, each tenant should sign an agreement, whether it is in their contract or a supplemental contract, stating they will supply the TMDL Survey prior to November 1st each year.

DATE	TOPIC/SUBJECT	EMPLOYEE NAME	SIGNATURE

RECORD KEEPING

BMP 1- Sign-In Sheets

- **DIVER INFO-** All divers must sign in with their business name, diver name, date, time, slip locations. They should also sign out when done. The sign in sheet should include basic diver BMP info, such as no hard scrapers, no abrasives, no plumes, etc. Some marinas and yacht clubs will also require independent contractors, such as divers, to sign other documents and waivers, as needed. A copy of a sign in sheet can be found in the appendix. A web link to the Port of San Diego's In Water Hull Cleaning Permit program can be found in the Appendix on page 18.
    - It is suggested that divers either sign in using a different sign-in sheet, or are highlighted or noted upon signing in. This will assist your office when the Port of SD inspects for Diver Permits and/or conducts an audit at another time (updated for 2019 Manual).

- **PAPERWORK-** All paperwork such as sign in sheets and other paperwork should be kept in file for a minimum of 7 years.

- **SIGN IN SHEET-** Sign in sheets and other paperwork will help the Port of San Diego track divers permitted by the Port in addition to ensure they are following Port and diver established BMPs.

- **SIGN IN SHEETS FOR TRAINING-** Sign in sheets should be used in staff training, to help the employee understand the impact of diver activity at their marina/yacht club. Understanding which divers are on property, for which company they are working and if they have a Port issued diver ID card.

- **SIGN IN SHEETS FOR TMDL COMPLIANCE-** Sign in sheets help individual marinas and yacht clubs establish TMDL compliance as it relates to tracking the divers, who they work for, which boats they are working on and how often. This info should be used with dock walks and other interactions with divers and tenants.

BMP 2- Staff Training

- **DOCUMENT BMP TRAINING-** All marinas and yacht clubs should be documenting BMP training of their staff. This can be done by using this document as a guideline for individual training records as well as TMDL compliance. At the bottom of each page of this document, as an example, is a place for each employee to sign off they have reviewed the page and understand the contents. A copy of training records can be found in the appendix.

- **DOCUMENT DIVER POLICY/INTERACTIONS-** It is also important to document diver policy education and interactions. This includes the sign in sheets, independent contractor rules and policies, property waivers, other documentation given to divers. Other training can involve dock walks, diver interactions at the slips, other handouts and brochures given to divers, etc. Dates, times, locations and the diver info should all be kept in written form and on file in the marina manager/dockmaster office.

- **VESSEL TRACKING SURVEYS-** Another source of staff training can include boater/tenant vessel hull paint tracking surveys (used to collect hull paint data and diver information). Surveys can include items like type of bottom paint used, last date applied, boatyard who applied paint, dive company used and many other sources of data. The annual vessel tracking survey should be used as a training tool as well, as it can give a great overview of how the bottom paint and diver activity at your location is impacting the water. A copy of the vessel tracking survey is in the appendix.

BMP 3- Boater Education

- **EMAIL-** There are many ways to document how you educate and inform your tenants of the ever changing hull paint choices and their impacts on the water and your marina/yacht club. All emails sent to your tenants/members should be kept on file in their individual folders. Emails may contain info about the various hull paint options, current strategies to minimize copper loading of our waterways, upcoming events in the area focusing on hull paint applications and diver information, such as BMPs and your marina's/yacht club's approach to tracking and educating divers.

- **MARINA/YC EVENTS-** Another great option is to document tenant events at your location. These can be during other events, such as seasonal parties, clean up days, national marina day or other events. You can have local yard representatives on hand to help answer boater questions re bottom paint choices and cost estimates. If you have never had a tenant event , reach out to your marina/YC manager/dockmaster as many have done them in the past and may be able to give some ideas. Dates, times, who spoke at the event and who attended needs to be recorded.

- **HANDOUTS-** Tenant handouts can provide simple, relevant information about hull paint options and costs as well as who to contact for more information. Handouts are available from the Port of SD, hull paint manufacturers and boatyards. Keeping track of what is being handed out and how often can help show you are educating boaters on a regular basis.

- **MARKETING-** Keeping records of marketing done by the marina to your tenants/members helps to show a continual effort to educate. Keeping copies of the marketing materials and who received them is a good idea. Marketing could include discounts at local boatyards, slip fee reductions, wait list priorities for slip applicants, etc.

BMP 4- Meetings

- **INTERNAL/STAFF MEETINGS-** Internal organizational meetings should be documented with topics, date, time, who attended and any goals set.
- **EXTERNAL/PORT/CITY MEETINGS-** Document other meetings times, locations and items discussed. These could be local group meetings, dockmaster group meetings and other meetings with local boatyards, etc.

DATE	TOPIC/SUBJECT	EMPLOYEE NAME	SIGNATURE

STAFF TRAINING/BOATER EDUCATION

BMP 1- Staff Training

- **OVERVIEW-** Staff training should include a review of office procedures, marina/YC policies/bylaws, and policies for allowing independent contractors/divers on property and associated documents.

- **RECORDING INFORMATION-** All employees should be shown how to properly record important information and where that information is kept. Training should include reviewing past training efforts to other staff.

- **ROLES-** Part of the employee training should include their role in the TMDL process. Information should include TMDL history, impacts to local waterways, impacts to the tenants and marina/YC, efforts to comply with the TMDL as well as future regulations/fines if TMDL compliance is not met.

- **BOATERS AND DIVERS-** TMDL regulations have changed how boaters interact with their divers and the boatyards as well as the myriad of new hull paints being brought to market. This impacts the boaters not only from a time stand point (more time devoted to speaking with their hull cleaners, the boat yards and possibly local stores selling hull paints), but also the economics of annual boating costs. These additional expenses may play into where a boater decides to moor their boats, which impacts every marina. Divers are impacted as they are regulated by the Port of SD and must show they are using BMPs in their daily operations and to minimize copper loading from their in-water activities. Staff training should take this into account.

BMP 2 – Boater Education

- **EMAILS-** Email blasts are a great way to "get the word out" quickly and cheaply to your boaters. Email can be used as a marketing tool as well as an educational tool. These emails can be to the entire marina/YC, small groups of boaters or even to individual boaters. Email also allows quick interactions as well as Q&A with your boat owners.

- **MAILINGS-** Next step up from an email is a mailing. This obviously costs more and takes longer, but is also a great way to reach out. Sometimes sending a letter is taken as a more formal way to notify your tenants/members about important news or other education information. It lacks a quick way to get more immediate feedback, but may give a longer lasting impression of the information sent.

- **MEETINGS-** Sometimes face to face meetings with your boaters is the best way to communicate news and educate them on topics such as hull paints, local water quality studies and other pertinent information. It allows for immediate Q&A as well as an avenue to hand out new marketing/educational materials. Having speakers from the local boatyards and chandleries may help boat owners a more personal educational experience. Port of SD hull paint expos and marina events are great ways to gather your boaters together.

- **MARKETING-** Internal and external marketing is another way to reach out to your boaters and educate them on issues impacting the boating community. Marketing could include bottom paints, boat yard discounts, marina/YC incentives, etc.

- **ONE ON ONE-** Day to day conversations with tenants allows a more "one on one" experience. This allows the boat owner to ask specific questions and take the time needed to help them understand their bottom paint choices and maybe even make recommendations, such as category 1 hull paints (non-copper, biocide free and low leach copper bottom paints). A web link to the Port's list of alternative hull paint can be found in the Appendix on page 18. Also, a link to the Port's Alternative Hull Paint website can be found on the same page.

DATE	TOPIC/SUBJECT	EMPLOYEE NAME	SIGNATURE

APPENDIX

SIYB Master Leaseholders

TMDL Group

YC/Marina Logo

BOTTOM PAINT SURVEY FORM

The California Regional Water Quality Control Board has stipulated that the Marinas and Yacht Clubs of Shelter Island Yacht Basin are legally required to reduce copper concentrations in our basin. Please help us complete our annual report, in order to fulfill our legal obligation, for the Port of San Diego by completing this questionnaire ASAP and returning it to your Marina or Club office by (date).

Today's Date: _________________ Slip #: __________________

SECTION A

Percentage of Time Slip is occupied: ______________________

Vessel Type (circle one): Power Sail Multi-hull

Registered Vessel Length: ___________ Vessel Beam: _____________

Paint Type: (circle one) Copper Low Copper (<36%) Non-Copper

Paint Product Name ___________________Product Number: _______________Color: _____________

Bottom paint last applied: Month ______________ Year________

Boatyard name that applied paint: ____

If paint is unknown due to a recent purchase, please provide purchase date: Month_______ Year____________

SECTION B (all information below will remain confidential and is not submitted in our report)

Owner Name: ____

Vessel Doc./Reg. #: ________________Boat Name ____________________ Make _________________

Signature: ____ Date: _______________________

Thank you for your cooperation completing and returning this required survey. Please contact the marina office if you have any questions…619-999-9999 or email@yourmarina.com.

Attachment I
SIYB Dissolved Copper TMDL
Hull Tracking Template Form

Facility	Slip/Mooring Reference Number	Percent of Time Occupied	Vessel Type (Power or Sail)	Vessel Length	Vessel Beam	Paint Type Copper, Low or Non	Paint Product Name	Product Number	Boatyard Name or Purchase Date	Painting Date Month (mm)	Painting Date Year (yyyy)

All hulls with paint greater than 40% copper are counted as high-copper

All hulls equal to zero are counted as non-copper

All hulls between 1 and 39.9% copper are counted as low-copper

Non and low-copper paint types are considered "confirmed" if the paint brand and product number is listed and can be cross checked with the SIML TMDL Group and/or Port paint list

Hulls with aged-copper paint are considered low-copper

Guidelines to Port’s Vessel Tracking Template

COMPLETENESS. ACCUARACY. CONSISTENCY.

DO NOT FORMAT ANY CELLS. TO ENABLE US TO MERGE ALL DOCUMENTS SUCCESSFULLY FOR FINAL SUBMISSION, PLEASE FOLLOW THESE GUIDELINES-

1) **FACILITY** – Your marina or yacht club name or abbreviation

2) **SLIP/MOORING REFERENCE NUMBER** – Use the correct slip number according your slip assignments. We will assign reference numbers for privacy reasons before we submit merged data.

3) **PERCENTAGE OF TIME OCCUPIED** – Do not format cell. Example – For 98% occupied, use 98, if left blank, the Port will default it to 100 percent occupied. Make sure you calculate in vacant slips here.

4) **VESSEL TYPE (POWER OR SAIL)** – Use a P or S

5) **VESSEL LENGTH** – Use what you have

6) **VESSEL BEAM -** Use what you have

7) **PAINT TYPE: COPPER, LOW OR NON**
- All hulls with paint greater than 40% copper are reported as **Copper**
- All hulls equal to zero are counted as non-copper and reported as **Non**
- All hulls between 1 and 39.9% copper are counted as low-copper and reported as **Low**
- No-copper and low-copper paint types are considered "confirmed" if the paint brand and product number is listed and can be cross-checked with Port paint lists
- Aged paints are calculated by painting date Month and Year and must have the Boatyard name to qualify. Do not write LOW for aged paints. You must include the painting date with the month, year and name of boat yard or purchase date to qualify the data.

8) **PAINT PRODUCT NAME** – Please spell out the word, do not abbreviate.

9) **PRODUCT NUMBER** – To qualify for non-copper or low-copper, you must record this information.

10) **BOATYARD NAME or PURCHASE DATE** – Necessary to qualify aged paints. Use “self” if the boater self-applied the paint.

11) **PAINTING DATE MONTH MM** – Use 2 digits such as 01 for January or 02 for February, etc.

12) **PAINTING YEAR YYYY** – Use 4 digits such as 2005.

13) **PERCENTAGE OF COPPER** – Do not format cells. If you have the paint product information record the % associated with that product. If the product is unknown leave the space blank.

14) **NO RESPONSE-** If a boater does not complete a particular question, leave corresponding cell in spreadsheet blank.

Important Links

Port Alternative Hull Paint Website:

http://www.sandiegobaycopperreduction.org/

February 2005 Technical Report

https://www.portofsandiego.org/document/environment/alternative-hull-paint/3061-total-maximum-daily-load-for-dissolved-copper-in-shelter-island-yacht-basin-technical-report/file.html

March 2013 Annual Monitoring Report

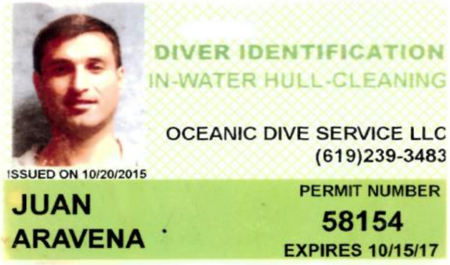
https://www.portofsandiego.org/environmental/copper-reduction-program/monitoring-and-data-assessment/shelter-island-yacht-basin-tmdl-annual-reports/7283-shelter-island-yacht-basin-tmdl-annual-report-2012/file.html

Port Alternative Hull Paint Partial List

https://www.portofsandiego.org/environment/environmental-downloads/copper-reduction-program/3530-how-to-select-an-alternative-hull-paint/file.html

Port of San Diego Issued Diver Permit Card*

Front



DIVER IDENTIFICATION
IN-WATER HULL-CLEANING

OCEANIC DIVE SERVICE LLC
(619)239-3483

ISSUED ON 10/20/2015

JUAN
ARAVENA

PERMIT NUMBER
58154
EXPIRES 10/15/17

Back

Property of
Port of San Diego
Return Postage Guara[illegible]
ATTN: Human Res[illegible]
P.O. Box 120483
San Diego, CA 92112-0486

Emergencies
Harbor Police Dispatc
(619) 223-1133
or dial 911

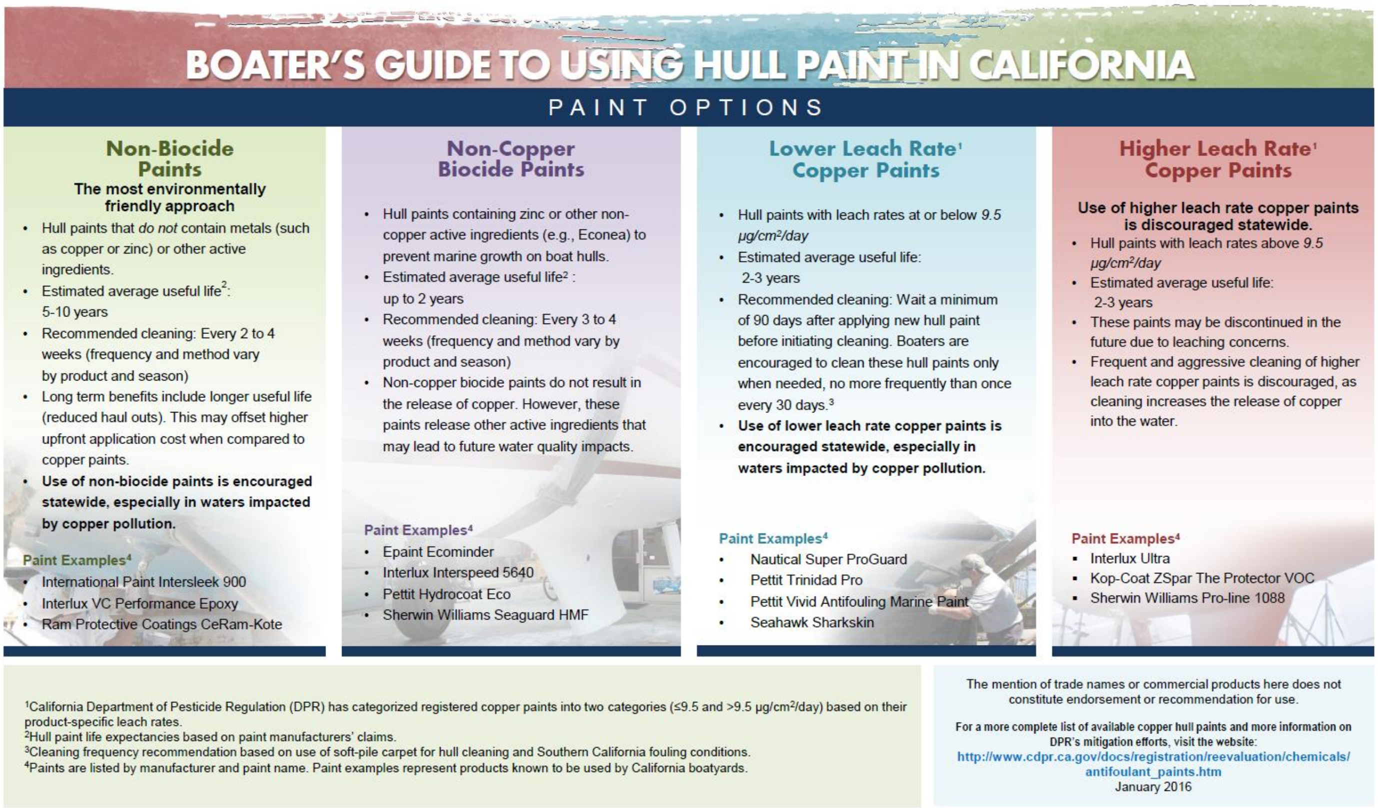
IN ACCORDANCE WITH
UPD CODE SECTION 4.14,
THIS CARD MUST REMAIN
IN THE POSSESS[illegible] OF
THE CARD HO[illegible] AND
BE PRESENTE[illegible] [illegible]ACH
FACILITY PRIO[illegible]
CONDUCTING [illegible]TER
HULL CLEANI[illegible]THIN
THE JURISD[illegible]F THE
PORT OF SAN DI[illegible].

*Note: Diver, Juan Aravena furnished Joe Ravitch, of Shelter Island Marina permission to use his Diver card as an example on Friday, January 13, 2017.

BMP Tracking and Self-Certification

BMP Type	Project Name Description	Purpose	Participant	Manager	Start Date	Assessment Mechanism	Results	Modifications	End Date
Education	communicate the availability of low leach copper paints	Reduce copper load							

Port of San Diego Alternative Hull Paint Options Brochure



BOATER'S GUIDE TO USING HULL PAINT IN CALIFORNIA

PAINT OPTIONS

Non-Biocide Paints

The most environmentally friendly approach

- Hull paints that *do not* contain metals (such as copper or zinc) or other active ingredients.
- Estimated average useful life[2]: 5-10 years
- Recommended cleaning: Every 2 to 4 weeks (frequency and method vary by product and season)
- Long term benefits include longer useful life (reduced haul outs). This may offset higher upfront application cost when compared to copper paints.
- **Use of non-biocide paints is encouraged statewide, especially in waters impacted by copper pollution.**

Paint Examples[4]

- International Paint Intersleek 900
- Interlux VC Performance Epoxy
- Ram Protective Coatings CeRam-Kote

Non-Copper Biocide Paints

- Hull paints containing zinc or other non-copper active ingredients (e.g., Econea) to prevent marine growth on boat hulls.
- Estimated average useful life[2] : up to 2 years
- Recommended cleaning: Every 3 to 4 weeks (frequency and method vary by product and season)
- Non-copper biocide paints do not result in the release of copper. However, these paints release other active ingredients that may lead to future water quality impacts.

Paint Examples[4]

- Epaint Ecominder
- Interlux Interspeed 5640
- Pettit Hydrocoat Eco
- Sherwin Williams Seaguard HMF

Lower Leach Rate[1] Copper Paints

- Hull paints with leach rates at or below *9.5 μg/cm²/day*
- Estimated average useful life: 2-3 years
- Recommended cleaning: Wait a minimum of 90 days after applying new hull paint before initiating cleaning. Boaters are encouraged to clean these hull paints only when needed, no more frequently than once every 30 days.[3]
- **Use of lower leach rate copper paints is encouraged statewide, especially in waters impacted by copper pollution.**

Paint Examples[4]

- Nautical Super ProGuard
- Pettit Trinidad Pro
- Pettit Vivid Antifouling Marine Paint
- Seahawk Sharkskin

Higher Leach Rate[1] Copper Paints

Use of higher leach rate copper paints is discouraged statewide.

- Hull paints with leach rates above *9.5 μg/cm²/day*
- Estimated average useful life: 2-3 years
- These paints may be discontinued in the future due to leaching concerns.
- Frequent and aggressive cleaning of higher leach rate copper paints is discouraged, as cleaning increases the release of copper into the water.

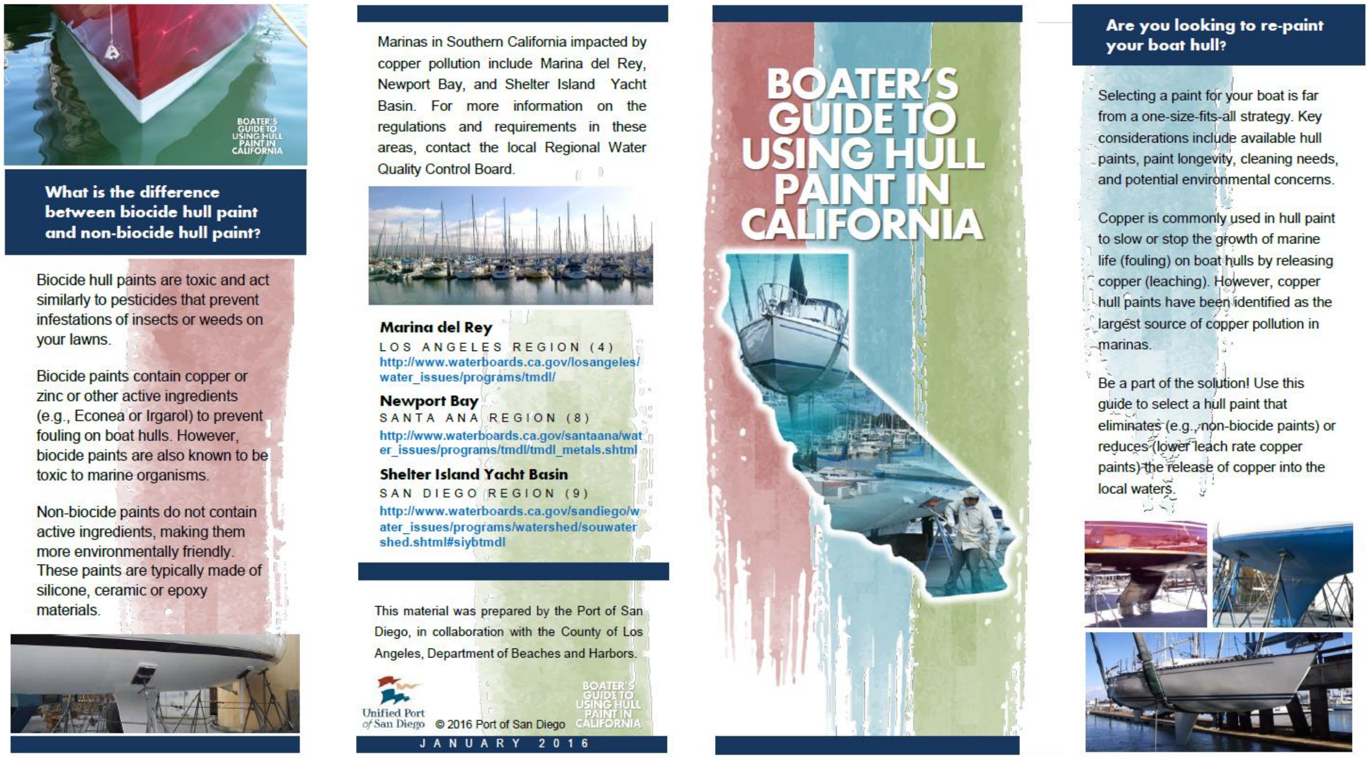
Paint Examples[4]

- Interlux Ultra
- Kop-Coat ZSpar The Protector VOC
- Sherwin Williams Pro-line 1088

[1] California Department of Pesticide Regulation (DPR) has categorized registered copper paints into two categories (≤9.5 and >9.5 μg/cm²/day) based on their product-specific leach rates.
[2] Hull paint life expectancies based on paint manufacturers' claims.
[3] Cleaning frequency recommendation based on use of soft-pile carpet for hull cleaning and Southern California fouling conditions.
[4] Paints are listed by manufacturer and paint name. Paint examples represent products known to be used by California boatyards.

The mention of trade names or commercial products here does not constitute endorsement or recommendation for use.

For a more complete list of available copper hull paints and more information on DPR's mitigation efforts, visit the website:
http://www.cdpr.ca.gov/docs/registration/reevaluation/chemicals/antifoulant_paints.htm
January 2016



What is the difference between biocide hull paint and non-biocide hull paint?

Biocide hull paints are toxic and act similarly to pesticides that prevent infestations of insects or weeds on your lawns.

Biocide paints contain copper or zinc or other active ingredients (e.g., Econea or Irgarol) to prevent fouling on boat hulls. However, biocide paints are also known to be toxic to marine organisms.

Non-biocide paints do not contain active ingredients, making them more environmentally friendly. These paints are typically made of silicone, ceramic or epoxy materials.

Marinas in Southern California impacted by copper pollution include Marina del Rey, Newport Bay, and Shelter Island Yacht Basin. For more information on the regulations and requirements in these areas, contact the local Regional Water Quality Control Board.

Marina del Rey
LOS ANGELES REGION (4)
http://www.waterboards.ca.gov/losangeles/water_issues/programs/tmdl/

Newport Bay
SANTA ANA REGION (8)
http://www.waterboards.ca.gov/santaana/water_issues/programs/tmdl/tmdl_metals.shtml

Shelter Island Yacht Basin
SAN DIEGO REGION (9)
http://www.waterboards.ca.gov/sandiego/water_issues/programs/watershed/souwatershed.shtml#siybtmdl

This material was prepared by the Port of San Diego, in collaboration with the County of Los Angeles, Department of Beaches and Harbors.

Unified Port of San Diego

BOATER'S GUIDE TO USING HULL PAINT IN CALIFORNIA
JANUARY 2016

BOATER'S GUIDE TO USING HULL PAINT IN CALIFORNIA

Are you looking to re-paint your boat hull?

Selecting a paint for your boat is far from a one-size-fits-all strategy. Key considerations include available hull paints, paint longevity, cleaning needs, and potential environmental concerns.

Copper is commonly used in hull paint to slow or stop the growth of marine life (fouling) on boat hulls by releasing copper (leaching). However, copper hull paints have been identified as the largest source of copper pollution in marinas.

Be a part of the solution! Use this guide to select a hull paint that eliminates (e.g., non-biocide paints) or reduces (lower leach rate copper paints) the release of copper into the local waters.

Port of San Diego Diver BMP Notice for Marina Offices

MARINA RECREATION ASSOCIATION

SAN DIEGO PORT TENANTS ASSOCIATION

CLEAN MARINA

ATTENTION

DIVERS & BOAT OWNERS

Please help reduce pollution from bottom paints containing copper, zinc, biocides or any other toxic substance by following these basic best management practices when cleaning bottom paint.

This marina and the other California marinas have established the following
Rules for In-Water Hull Cleaning
For Bottom Paints Containing Copper, Zinc, Biocides, or any other toxic substance:

- **All in-water hull cleaning must be done by hand only - no power equipment allowed.**
- **The Marina shall prohibit in-the-water hull scraping or any process that occurs under water which results in the removal of paint from boat hulls. This does not apply to bare metal parts.**

Remember:

- **NO Scrapers (metal/plastic/wood)**
- **NO Abrasives (sandpaper/cleanser/soft scrub)**
- **NO Scotchbrite®/3M® pads except the White pad**
- **NO Powered Rotary Brushes**
- **USE soft cloth or fleece mitt only**

According to paint manufacturers, properly functioning antifouling paint will repel all hard growth and requires only occasional light wiping with a soft cloth to remove slime. Use only soft rags or a sponge or fleece mitt when light wiping is required.

Thank you for your cooperation.

Marina Office Sign In Sheet Example

✍ **Diver Sign in Sheet**

By signing below I agree to assume all risk of working on marine property, including, but not limited to work in the water, and I agree, in the absence of gross negligence or willful misconduct by the marina, to indemnify, protect, defend, and hold the marina harmless from and against all actual or potential liability for personal injury, death or property damage, suffered by me or any other person.

DATE	PRINT NAME	SIGNATURE	COMPANY	SLIP #	TIME	
					IN	OUT

PLEASE PRINT CLEARLY

☞ Divers: You must be on file with us to work in our marina! We require:

*Valid/current Port of San Diego Diver ID Card

*Proof of Ship Repairers Legal Liability insurance with $500,000 minimum. Marina must be listed as additional insured)

*A signed copy of our vendor policy

*A copy of your current business license tax

*Proof of workman's comp insurance and a list of your employees

If you're not sure, please ask an office staff member. Thank You!

DIVER REGISTRATION

By signing below I agree to assume all risk of working on marina property, including, but not limited to work in the water, and I agree, in the absence of gross negligence or willful misconduct by the marina, to indemnify, protect, defend, and hold the marina harmless from and against all actual or potential liability for personal injury, death or property damage, suffered by me or any other person.

____ ____________________

Signature Date

DATE	TIME IN	TIME OUT	SLIP #s

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APPENDIX C

VESSEL TRACKING DATA

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DATA FOR THE HARBOR POLICE DOCK, TRANSIENT DOCK, AND WEEKEND ANCHORAGE

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Port Fleet Hull Paint Information

Date	Facility	Slip / Mooring Number	Percent of Time Occupied	Vessel Document # or Registration #	Vessel Type	Vessel Length	Vessel Beam	Paint Type	Paint Name	Product Number	Boatyard	Painting Date	% Copper
01/08/19	HPD		100	Marine 1 (# 9157)	P - Fire Boat	39.1'	13'	Org	Interspeed 5640	BZA646	Driscoll	2019	N/A
01/08/19	HPD		100	Marine 2 (#9162)	P - Fire Boat	39.1'	13'	Org	Interspeed 5640	BZA646	Driscoll	2019	N/A
01/08/19	HPD		100	Marine 3 (# 9139)	P - Fire Boat	39.1'	13'	Org	Interspeed 5640	BZA646	Driscoll	2019	N/A
01/08/19	HPD		100	Marine 4 (# 9138)	P - Fire Boat	39.1'	13'	Org	Interspeed 5640	BZA646	Driscoll	2019	N/A
01/08/19	HPD		100	Marine 5 (#9163)	P - Fire Boat	39.1'	13'	Org	Interspeed 5640	BZA646	Driscoll	2019	N/A
01/08/19	HPD		100	Marine 6 (# 7762)	P - Patrol Boat	31'	10'	Org	Interspeed 5640	BZA646	Marine Group	2019	N/A
01/08/19	HPD		100	Marine 7 (# 7763)	P - Patrol Boat	31'	10'	Org	Interspeed 5640	BZA646	Marine Group	2019	N/A
01/08/19	HPD		100	Marine 8 (# 9066)	P - Patrol Boat	36'	10'	Org	Interspeed 5640	BZA646	Marine Group	2019	N/A
01/08/19	HPD	24	100	Coral Reef (# 7708)	P - GS Work Boat	40'	14'	Org	Intersleek 900	FXA972/A	Marine Group	2019	N/A
01/08/19	HPD		on trailer	Marine 10 (9079)	P - Patrol Boat	22		Non	No bottom paint	N/A	N/A	N/A	N/A
01/08/19	GST		100	Tsunamii II (# 9144)	P - GS Boat	20'	6'	Non	Interspeed 5640	BZA646	Marine Group	2019	N/A
01/08/19	HPD		100	Marine 9 (#9229)	P - Patrol Boat	39'	11'	Org	Interspeed 5640	BZA646	Marine Group	2019	N/A
01/08/19	HPD		100	Tuff Boat (# 9274)	P - GS Work Boat	16'		Org	Interspeed 5640	BZA646	Marine Group	2019	N/A
01/08/19	HPD	23	100	Munson (# 9305)	P - GS Boat	38'	13'	Org	Intersleek 900	FXA972/A	Munson	2019	N/A

Marina	Mooring	Date Reservation Made	Made At	Status	Arrival Date	Departure Date	Boat Length	Length of Stay (Nights)
A1 La Playa Cove	A1 Anchorage	4/26/2018	WEBSITE	Confirmed	1/4/2019	1/7/2019	39'	3
A1 La Playa Cove	A1 Anchorage	11/13/2018	Moorings	Confirmed	2/8/2019	2/11/2019	43'	3
A1 La Playa Cove	A1 Anchorage	11/13/2018	Moorings	Confirmed	2/15/2019	2/18/2019	43'	3
A1 La Playa Cove	A1 Anchorage	1/1/2019	WEBSITE	Confirmed	1/4/2019	1/7/2019	55'	3
A1 La Playa Cove	A1 Anchorage	1/1/2019	WEBSITE	Confirmed	1/4/2019	1/7/2019	27'	3
A1 La Playa Cove	A1 Anchorage	1/1/2019	WEBSITE	Confirmed	1/18/2019	1/21/2019	37'	3
A1 La Playa Cove	A1 Anchorage	1/2/2019	Moorings	Confirmed	1/4/2019	1/7/2019	33'	3
A1 La Playa Cove	A1 Anchorage	1/2/2019	WEBSITE	Confirmed	1/4/2019	1/7/2019	44'	3
A1 La Playa Cove	A1 Anchorage	1/2/2019	Moorings	Confirmed	1/4/2019	1/7/2019	26'	3
A1 La Playa Cove	A1 Anchorage	1/2/2019	Moorings	Confirmed	1/4/2019	1/7/2019	35'	3
A1 La Playa Cove	A1 Anchorage	1/2/2019	Moorings	Confirmed	1/4/2019	1/7/2019	25'	3
A1 La Playa Cove	A1 Anchorage	1/2/2019	WEBSITE	Confirmed	1/4/2019	1/7/2019	38'	3
A1 La Playa Cove	A1 Anchorage	1/2/2019	WEBSITE	Confirmed	1/4/2019	1/7/2019	36'	3
A1 La Playa Cove	A1 Anchorage	1/2/2019	WEBSITE	Confirmed	2/22/2019	2/25/2019	35'	3
A1 La Playa Cove	A1 Anchorage	1/2/2019	WEBSITE	Confirmed	1/4/2019	1/7/2019	49'	3
A1 La Playa Cove	A1 Anchorage	1/3/2019	WEBSITE	Confirmed	1/4/2019	1/7/2019	28'	3
A1 La Playa Cove	A1 Anchorage	1/3/2019	WEBSITE	Confirmed	1/4/2019	1/7/2019	25'	3
A1 La Playa Cove	A1 Anchorage	1/3/2019	WEBSITE	Confirmed	1/4/2019	1/7/2019	41'	3
A1 La Playa Cove	A1 Anchorage	1/3/2019	WEBSITE	Confirmed	1/4/2019	1/7/2019	35'	3
A1 La Playa Cove	A1 Anchorage	1/3/2019	Moorings	Confirmed	1/11/2019	1/14/2019	32'	3
A1 La Playa Cove	A1 Anchorage	1/3/2019	WEBSITE	Confirmed	2/22/2019	2/25/2019	30'	3
A1 La Playa Cove	A1 Anchorage	1/3/2019	WEBSITE	Confirmed	6/21/2019	6/24/2019	50'	3
A1 La Playa Cove	A1 Anchorage	1/3/2019	Moorings	Confirmed	1/4/2019	1/7/2019	45'	3
A1 La Playa Cove	A1 Anchorage	1/3/2019	Moorings	Confirmed	1/4/2019	1/7/2019	30'	3
A1 La Playa Cove	A1 Anchorage	1/3/2019	Moorings	Confirmed	1/4/2019	1/7/2019	45'	3
A1 La Playa Cove	A1 Anchorage	1/3/2019	WEBSITE	Confirmed	1/4/2019	1/7/2019	24'	3
A1 La Playa Cove	A1 Anchorage	1/3/2019	WEBSITE	Confirmed	1/11/2019	1/14/2019	30'	3
A1 La Playa Cove	A1 Anchorage	1/4/2019	WEBSITE	Confirmed	2/22/2019	2/25/2019	36'	3
A1 La Playa Cove	A1 Anchorage	1/4/2019	WEBSITE	Confirmed	8/23/2019	8/26/2019	36'	3
A1 La Playa Cove	A1 Anchorage	1/4/2019	WEBSITE	Confirmed	2/22/2019	2/25/2019	30'	3
A1 La Playa Cove	A1 Anchorage	1/4/2019	Parks Central Reservations	Confirmed	1/4/2019	1/7/2019	34'	3
A1 La Playa Cove	A1 Anchorage	1/4/2019	Parks Central Reservations	Confirmed	1/4/2019	1/7/2019	40'	3
A1 La Playa Cove	A1 Anchorage	1/4/2019	WEBSITE	Confirmed	2/22/2019	2/25/2019	36'	3
A1 La Playa Cove	A1 Anchorage	1/4/2019	WEBSITE	Confirmed	8/23/2019	8/26/2019	36'	3
A1 La Playa Cove	A1 Anchorage	1/4/2019	Parks Central Reservations	Confirmed	1/4/2019	1/7/2019	40'	3
A1 La Playa Cove	A1 Anchorage	1/4/2019	WEBSITE	Confirmed	2/15/2019	2/18/2019	32'	3
A1 La Playa Cove	A1 Anchorage	1/4/2019	WEBSITE	Confirmed	1/11/2019	1/14/2019	42'	3
A1 La Playa Cove	A1 Anchorage	1/4/2019	WEBSITE	Confirmed	2/22/2019	2/25/2019	30'	3
A1 La Playa Cove	A1 Anchorage	1/7/2019	WEBSITE	Confirmed	1/11/2019	1/14/2019	26'	3
A1 La Playa Cove	A1 Anchorage	1/7/2019	WEBSITE	Confirmed	1/11/2019	1/14/2019	33'	3
A1 La Playa Cove	A1 Anchorage	1/7/2019	WEBSITE	Confirmed	1/11/2019	1/14/2019	44'	3
A1 La Playa Cove	A1 Anchorage	1/7/2019	WEBSITE	Confirmed	1/11/2019	1/14/2019	27'	3
A1 La Playa Cove	A1 Anchorage	1/7/2019	WEBSITE	Confirmed	1/11/2019	1/14/2019	35'	3
A1 La Playa Cove	A1 Anchorage	1/7/2019	WEBSITE	Confirmed	8/23/2019	8/26/2019	30'	3
A1 La Playa Cove	A1 Anchorage	1/7/2019	WEBSITE	Confirmed	1/11/2019	1/14/2019	32'	3
A1 La Playa Cove	A1 Anchorage	1/8/2019	WEBSITE	Confirmed	1/11/2019	1/14/2019	30'	3
A1 La Playa Cove	A1 Anchorage	1/8/2019	WEBSITE	Confirmed	1/11/2019	1/14/2019	30'	3
A1 La Playa Cove	A1 Anchorage	1/8/2019	WEBSITE	Confirmed	8/23/2019	8/26/2019	34'	3
A1 La Playa Cove	A1 Anchorage	1/8/2019	WEBSITE	Confirmed	2/22/2019	2/25/2019	34'	3
A1 La Playa Cove	A1 Anchorage	1/9/2019	WEBSITE	Confirmed	1/11/2019	1/14/2019	34'	3
A1 La Playa Cove	A1 Anchorage	1/9/2019	WEBSITE	Confirmed	1/11/2019	1/14/2019	38'	3
A1 La Playa Cove	A1 Anchorage	1/9/2019	WEBSITE	Confirmed	2/22/2019	2/25/2019	32'	3
A1 La Playa Cove	A1 Anchorage	1/9/2019	WEBSITE	Confirmed	8/23/2019	8/26/2019	32'	3
A1 La Playa Cove	A1 Anchorage	1/9/2019	WEBSITE	Confirmed	6/7/2019	6/10/2019	31'	3
A1 La Playa Cove	A1 Anchorage	1/9/2019	WEBSITE	Confirmed	7/19/2019	7/22/2019	31'	3
A1 La Playa Cove	A1 Anchorage	1/9/2019	WEBSITE	Confirmed	1/11/2019	1/14/2019	37'	3
A1 La Playa Cove	A1 Anchorage	1/9/2019	WEBSITE	Confirmed	1/11/2019	1/14/2019	26'	3
A1 La Playa Cove	A1 Anchorage	1/9/2019	WEBSITE	Confirmed	1/11/2019	1/14/2019	35'	3
A1 La Playa Cove	A1 Anchorage	1/10/2019	WEBSITE	Confirmed	1/11/2019	1/14/2019	55'	3
A1 La Playa Cove	A1 Anchorage	1/10/2019	WEBSITE	Confirmed	1/11/2019	1/14/2019	28'	3

Marina	Mooring	Date Reservation Made	Made At	Status	Arrival Date	Departure Date	Boat Length	Length of Stay (Nights)
A1 La Playa Cove	A1 Anchorage	1/10/2019	WEBSITE	Confirmed	6/7/2019	6/10/2019	34'	3
A1 La Playa Cove	A1 Anchorage	1/10/2019	Parks Central Reservations	Confirmed	1/11/2019	1/14/2019	25'	3
A1 La Playa Cove	A1 Anchorage	1/10/2019	WEBSITE	Confirmed	1/11/2019	1/14/2019	25'	3
A1 La Playa Cove	A1 Anchorage	1/10/2019	Parks Central Reservations	Confirmed	1/11/2019	1/14/2019	45'	3
A1 La Playa Cove	A1 Anchorage	1/10/2019	Parks Central Reservations	Confirmed	1/11/2019	1/14/2019	30'	3
A1 La Playa Cove	A1 Anchorage	1/10/2019	Parks Central Reservations	Confirmed	1/11/2019	1/14/2019	45'	3
A1 La Playa Cove	A1 Anchorage	1/10/2019	WEBSITE	Confirmed	1/11/2019	1/14/2019	24'	3
A1 La Playa Cove	A1 Anchorage	1/10/2019	WEBSITE	Confirmed	1/18/2019	1/21/2019	40'	3
A1 La Playa Cove	A1 Anchorage	1/10/2019	WEBSITE	Confirmed	1/11/2019	1/14/2019	32'	3
A1 La Playa Cove	A1 Anchorage	1/10/2019	WEBSITE	Confirmed	2/15/2019	2/18/2019	33'	3
A1 La Playa Cove	A1 Anchorage	1/10/2019	WEBSITE	Confirmed	2/15/2019	2/18/2019	34'	3
A1 La Playa Cove	A1 Anchorage	1/10/2019	WEBSITE	Confirmed	1/11/2019	1/14/2019	25'	3
A1 La Playa Cove	A1 Anchorage	1/10/2019	WEBSITE	Confirmed	2/15/2019	2/18/2019	14'	3
A1 La Playa Cove	A1 Anchorage	1/10/2019	WEBSITE	Confirmed	1/11/2019	1/14/2019	26'	3
A1 La Playa Cove	A1 Anchorage	1/10/2019	WEBSITE	Confirmed	1/11/2019	1/14/2019	16'	3
A1 La Playa Cove	A1 Anchorage	1/11/2019	WEBSITE	Confirmed	1/11/2019	1/14/2019	34'	3
A1 La Playa Cove	A1 Anchorage	1/12/2019	WEBSITE	Confirmed	1/18/2019	1/21/2019	39'	3
A1 La Playa Cove	A1 Anchorage	1/13/2019	WEBSITE	Confirmed	1/18/2019	1/21/2019	34'	3
A1 La Playa Cove	A1 Anchorage	1/13/2019	WEBSITE	Confirmed	1/18/2019	1/21/2019	31'	3
A1 La Playa Cove	A1 Anchorage	1/14/2019	WEBSITE	Confirmed	1/18/2019	1/21/2019	30'	3
A1 La Playa Cove	A1 Anchorage	1/14/2019	WEBSITE	Confirmed	1/18/2019	1/21/2019	16'	3
A1 La Playa Cove	A1 Anchorage	1/14/2019	WEBSITE	Confirmed	1/18/2019	1/21/2019	44'	3
A1 La Playa Cove	A1 Anchorage	1/14/2019	WEBSITE	Confirmed	1/18/2019	1/21/2019	26'	3
A1 La Playa Cove	A1 Anchorage	1/14/2019	WEBSITE	Confirmed	8/23/2019	8/26/2019	36'	3
A1 La Playa Cove	A1 Anchorage	1/14/2019	WEBSITE	Confirmed	2/22/2019	2/25/2019	36'	3
A1 La Playa Cove	A1 Anchorage	1/14/2019	Parks Central Reservations	Confirmed	1/18/2019	1/21/2019	33'	3
A1 La Playa Cove	A1 Anchorage	1/14/2019	Parks Central Reservations	Confirmed	1/25/2019	1/28/2019	33'	3
A1 La Playa Cove	A1 Anchorage	1/14/2019	WEBSITE	Confirmed	2/15/2019	2/18/2019	35'	3
A1 La Playa Cove	A1 Anchorage	1/14/2019	WEBSITE	Confirmed	6/7/2019	6/10/2019	38'	3
A1 La Playa Cove	A1 Anchorage	1/14/2019	Parks Central Reservations	Confirmed	2/15/2019	2/18/2019	41'	3
A1 La Playa Cove	A1 Anchorage	1/14/2019	WEBSITE	Confirmed	1/18/2019	1/21/2019	30'	3
A1 La Playa Cove	A1 Anchorage	1/14/2019	WEBSITE	Confirmed	1/25/2019	1/28/2019	30'	3
A1 La Playa Cove	A1 Anchorage	1/14/2019	WEBSITE	Confirmed	2/8/2019	2/11/2019	38'	3
A1 La Playa Cove	A1 Anchorage	1/16/2019	WEBSITE	Confirmed	1/18/2019	1/21/2019	47'	3
A1 La Playa Cove	A1 Anchorage	1/16/2019	Parks Central Reservations	Confirmed	1/18/2019	1/21/2019	35'	3
A1 La Playa Cove	A1 Anchorage	1/16/2019	Parks Central Reservations	Confirmed	1/25/2019	1/28/2019	25'	3
A1 La Playa Cove	A1 Anchorage	1/16/2019	WEBSITE	Confirmed	1/18/2019	1/21/2019	41'	3
A1 La Playa Cove	A1 Anchorage	1/16/2019	WEBSITE	Confirmed	1/18/2019	1/21/2019	26'	3
A1 La Playa Cove	A1 Anchorage	1/16/2019	WEBSITE	Confirmed	1/25/2019	1/28/2019	26'	3
A1 La Playa Cove	A1 Anchorage	1/16/2019	WEBSITE	Confirmed	1/18/2019	1/21/2019	30'	3
A1 La Playa Cove	A1 Anchorage	1/16/2019	WEBSITE	Confirmed	1/18/2019	1/21/2019	26'	3
A1 La Playa Cove	A1 Anchorage	1/17/2019	WEBSITE	Confirmed	1/18/2019	1/21/2019	48'	3
A1 La Playa Cove	A1 Anchorage	1/17/2019	Parks Central Reservations	Confirmed	1/18/2019	1/21/2019	32'	3
A1 La Playa Cove	A1 Anchorage	1/17/2019	Parks Central Reservations	Confirmed	2/1/2019	2/4/2019	32'	3
A1 La Playa Cove	A1 Anchorage	1/17/2019	WEBSITE	Confirmed	10/18/2019	10/21/2019	45'	3
A1 La Playa Cove	A1 Anchorage	1/17/2019	WEBSITE	Confirmed	8/23/2019	8/26/2019	30'	3
A1 La Playa Cove	A1 Anchorage	1/17/2019	WEBSITE	Confirmed	1/25/2019	1/28/2019	35'	3
A1 La Playa Cove	A1 Anchorage	1/17/2019	Parks Central Reservations	Confirmed	1/18/2019	1/21/2019	45'	3
A1 La Playa Cove	A1 Anchorage	1/17/2019	Parks Central Reservations	Confirmed	1/18/2019	1/21/2019	45'	3
A1 La Playa Cove	A1 Anchorage	1/17/2019	Parks Central Reservations	Confirmed	1/18/2019	1/21/2019	30'	3
A1 La Playa Cove	A1 Anchorage	1/17/2019	WEBSITE	Confirmed	1/18/2019	1/21/2019	25'	3
A1 La Playa Cove	A1 Anchorage	1/17/2019	WEBSITE	Confirmed	1/18/2019	1/21/2019	28'	3
A1 La Playa Cove	A1 Anchorage	1/17/2019	WEBSITE	Confirmed	1/18/2019	1/21/2019	25'	3
A1 La Playa Cove	A1 Anchorage	1/17/2019	WEBSITE	Confirmed	1/18/2019	1/21/2019	32'	3
A1 La Playa Cove	A1 Anchorage	1/18/2019	Parks Central Reservations	Confirmed	1/18/2019	1/21/2019	34'	3
A1 La Playa Cove	A1 Anchorage	1/20/2019	WEBSITE	Confirmed	2/15/2019	2/18/2019	30'	3
A1 La Playa Cove	A1 Anchorage	1/20/2019	WEBSITE	Confirmed	2/22/2019	2/25/2019	36'	3
A1 La Playa Cove	A1 Anchorage	1/20/2019	WEBSITE	Confirmed	8/23/2019	8/26/2019	36'	3
A1 La Playa Cove	A1 Anchorage	1/21/2019	WEBSITE	Confirmed	10/18/2019	10/21/2019	53'	3
A1 La Playa Cove	A1 Anchorage	1/21/2019	WEBSITE	Confirmed	1/25/2019	1/28/2019	45'	3

Marina	Mooring	Date Reservation Made	Made At	Status	Arrival Date	Departure Date	Boat Length	Length of Stay (Nights)
A1 La Playa Cove	A1 Anchorage	1/21/2019	WEBSITE	Confirmed	1/25/2019	1/28/2019	30'	3
A1 La Playa Cove	A1 Anchorage	1/22/2019	WEBSITE	Confirmed	1/25/2019	1/28/2019	41'	3
A1 La Playa Cove	A1 Anchorage	1/22/2019	Parks Central Reservations	Confirmed	1/25/2019	1/28/2019	27'	3
A1 La Playa Cove	A1 Anchorage	1/22/2019	Parks Central Reservations	Confirmed	1/25/2019	1/28/2019	35'	3
A1 La Playa Cove	A1 Anchorage	1/22/2019	Parks Central Reservations	Confirmed	1/25/2019	1/28/2019	26'	3
A1 La Playa Cove	A1 Anchorage	1/22/2019	Parks Central Reservations	Confirmed	1/25/2019	1/28/2019	44'	3
A1 La Playa Cove	A1 Anchorage	1/23/2019	WEBSITE	Confirmed	1/25/2019	1/28/2019	43'	3
A1 La Playa Cove	A1 Anchorage	1/23/2019	WEBSITE	Confirmed	1/25/2019	1/28/2019	30'	3
A1 La Playa Cove	A1 Anchorage	1/23/2019	WEBSITE	Confirmed	2/22/2019	2/25/2019	42'	3
A1 La Playa Cove	A1 Anchorage	1/23/2019	WEBSITE	Confirmed	3/22/2019	3/25/2019	42'	3
A1 La Playa Cove	A1 Anchorage	1/23/2019	WEBSITE	Confirmed	1/25/2019	1/28/2019	42'	3
A1 La Playa Cove	A1 Anchorage	1/23/2019	WEBSITE	Confirmed	1/25/2019	1/28/2019	34'	3
A1 La Playa Cove	A1 Anchorage	1/23/2019	WEBSITE	Confirmed	1/25/2019	1/28/2019	26'	3
A1 La Playa Cove	A1 Anchorage	1/23/2019	WEBSITE	Confirmed	2/1/2019	2/4/2019	34'	3
A1 La Playa Cove	A1 Anchorage	1/24/2019	WEBSITE	Confirmed	1/25/2019	1/28/2019	55'	3
A1 La Playa Cove	A1 Anchorage	1/24/2019	WEBSITE	Confirmed	1/25/2019	1/28/2019	26'	3
A1 La Playa Cove	A1 Anchorage	1/24/2019	WEBSITE	Confirmed	1/25/2019	1/28/2019	39'	3
A1 La Playa Cove	A1 Anchorage	1/24/2019	WEBSITE	Confirmed	1/25/2019	1/28/2019	24'	3
A1 La Playa Cove	A1 Anchorage	1/24/2019	WEBSITE	Confirmed	1/25/2019	1/28/2019	30'	3
A1 La Playa Cove	A1 Anchorage	1/24/2019	WEBSITE	Confirmed	1/25/2019	1/28/2019	38'	3
A1 La Playa Cove	A1 Anchorage	1/24/2019	WEBSITE	Confirmed	1/25/2019	1/28/2019	45'	3
A1 La Playa Cove	A1 Anchorage	1/25/2019	WEBSITE	Confirmed	2/1/2019	2/4/2019	32'	3
A1 La Playa Cove	A1 Anchorage	1/25/2019	WEBSITE	Confirmed	2/15/2019	2/18/2019	30'	3
A1 La Playa Cove	A1 Anchorage	1/25/2019	WEBSITE	Confirmed	2/1/2019	2/4/2019	30'	3
A1 La Playa Cove	A1 Anchorage	1/26/2019	WEBSITE	Confirmed	2/1/2019	2/4/2019	38'	3
A1 La Playa Cove	A1 Anchorage	1/27/2019	WEBSITE	Confirmed	2/1/2019	2/4/2019	16'	3
A1 La Playa Cove	A1 Anchorage	1/28/2019	Parks Central Reservations	Confirmed	2/1/2019	2/4/2019	44'	3
A1 La Playa Cove	A1 Anchorage	1/28/2019	Parks Central Reservations	Confirmed	2/1/2019	2/4/2019	26'	3
A1 La Playa Cove	A1 Anchorage	1/28/2019	WEBSITE	Confirmed	2/1/2019	2/4/2019	26'	3
A1 La Playa Cove	A1 Anchorage	1/28/2019	WEBSITE	Confirmed	2/8/2019	2/11/2019	26'	3
A1 La Playa Cove	A1 Anchorage	1/28/2019	WEBSITE	Confirmed	2/15/2019	2/18/2019	26'	3
A1 La Playa Cove	A1 Anchorage	1/29/2019	WEBSITE	Confirmed	10/18/2019	10/21/2019	53'	3
A1 La Playa Cove	A1 Anchorage	1/29/2019	Parks Central Reservations	Confirmed	2/1/2019	2/4/2019	40'	3
A1 La Playa Cove	A1 Anchorage	1/29/2019	WEBSITE	Confirmed	3/1/2019	3/4/2019	36'	3
A1 La Playa Cove	A1 Anchorage	1/29/2019	WEBSITE	Confirmed	8/2/2019	8/5/2019	36'	3
A1 La Playa Cove	A1 Anchorage	1/30/2019	WEBSITE	Confirmed	2/1/2019	2/4/2019	30'	3
A1 La Playa Cove	A1 Anchorage	1/30/2019	WEBSITE	Confirmed	2/1/2019	2/4/2019	24'	3
A1 La Playa Cove	A1 Anchorage	1/30/2019	WEBSITE	Confirmed	2/1/2019	2/4/2019	45'	3
A1 La Playa Cove	A1 Anchorage	1/30/2019	WEBSITE	Confirmed	2/1/2019	2/4/2019	32'	3
A1 La Playa Cove	A1 Anchorage	1/30/2019	Parks Central Reservations	Confirmed	2/1/2019	2/4/2019	25'	3
A1 La Playa Cove	A1 Anchorage	1/30/2019	Parks Central Reservations	Confirmed	2/8/2019	2/11/2019	30'	3
A1 La Playa Cove	A1 Anchorage	1/30/2019	WEBSITE	Confirmed	2/1/2019	2/4/2019	26'	3
A1 La Playa Cove	A1 Anchorage	1/30/2019	WEBSITE	Confirmed	2/1/2019	2/4/2019	41'	3
A1 La Playa Cove	A1 Anchorage	1/31/2019	Parks Central Reservations	Confirmed	2/1/2019	2/4/2019	16'	3
A1 La Playa Cove	A1 Anchorage	1/31/2019	WEBSITE	Confirmed	2/1/2019	2/4/2019	25'	3
A1 La Playa Cove	A1 Anchorage	1/31/2019	WEBSITE	Confirmed	2/1/2019	2/4/2019	35'	3
A1 La Playa Cove	A1 Anchorage	1/31/2019	WEBSITE	Confirmed	2/1/2019	2/4/2019	25'	3
A1 La Playa Cove	A1 Anchorage	1/31/2019	WEBSITE	Confirmed	2/1/2019	2/4/2019	55'	3
A1 La Playa Cove	A1 Anchorage	1/31/2019	WEBSITE	Confirmed	2/1/2019	2/4/2019	33'	3
A1 La Playa Cove	A1 Anchorage	2/1/2019	Parks Central Reservations	Confirmed	2/1/2019	2/4/2019	27'	3
A1 La Playa Cove	A1 Anchorage	2/2/2019	WEBSITE	Confirmed	5/3/2019	5/6/2019	41'	3
A1 La Playa Cove	A1 Anchorage	2/2/2019	WEBSITE	Confirmed	2/22/2019	2/25/2019	40'	3
A1 La Playa Cove	A1 Anchorage	2/2/2019	WEBSITE	Confirmed	2/15/2019	2/18/2019	42'	3
A1 La Playa Cove	A1 Anchorage	2/3/2019	WEBSITE	Confirmed	10/18/2019	10/21/2019	48'	3
A1 La Playa Cove	A1 Anchorage	2/4/2019	Parks Central Reservations	Confirmed	2/8/2019	2/11/2019	33'	3
A1 La Playa Cove	A1 Anchorage	2/4/2019	Parks Central Reservations	Confirmed	2/8/2019	2/11/2019	44'	3
A1 La Playa Cove	A1 Anchorage	2/4/2019	WEBSITE	Confirmed	6/7/2019	6/10/2019	36'	3
A1 La Playa Cove	A1 Anchorage	2/5/2019	WEBSITE	Confirmed	2/15/2019	2/18/2019	34'	3
A1 La Playa Cove	A1 Anchorage	2/5/2019	WEBSITE	Confirmed	2/15/2019	2/18/2019	30'	3
A1 La Playa Cove	A1 Anchorage	2/5/2019	WEBSITE	Confirmed	2/8/2019	2/11/2019	41'	3

Marina	Mooring	Date Reservation Made	Made At	Status	Arrival Date	Departure Date	Boat Length	Length of Stay (Nights)
A1 La Playa Cove	A1 Anchorage	2/5/2019	WEBSITE	Confirmed	2/8/2019	2/11/2019	25'	3
A1 La Playa Cove	A1 Anchorage	2/5/2019	WEBSITE	Confirmed	2/8/2019	2/11/2019		3
A1 La Playa Cove	A1 Anchorage	2/5/2019	WEBSITE	Confirmed	3/1/2019	3/4/2019	40'	3
A1 La Playa Cove	A1 Anchorage	2/5/2019	WEBSITE	Confirmed	2/15/2019	2/18/2019	47'	3
A1 La Playa Cove	A1 Anchorage	2/5/2019	WEBSITE	Confirmed	2/8/2019	2/11/2019	37'	3
A1 La Playa Cove	A1 Anchorage	2/6/2019	WEBSITE	Confirmed	2/8/2019	2/11/2019	30'	3
A1 La Playa Cove	A1 Anchorage	2/6/2019	WEBSITE	Confirmed	2/8/2019	2/11/2019	50'	3
A1 La Playa Cove	A1 Anchorage	2/6/2019	Parks Central Reservations	Confirmed	2/8/2019	2/11/2019	26'	3
A1 La Playa Cove	A1 Anchorage	2/6/2019	WEBSITE	Confirmed	3/15/2019	3/18/2019	23'	3
A1 La Playa Cove	A1 Anchorage	2/6/2019	WEBSITE	Confirmed	2/8/2019	2/11/2019	30'	3
A1 La Playa Cove	A1 Anchorage	2/6/2019	WEBSITE	Confirmed	2/8/2019	2/11/2019	24'	3
A1 La Playa Cove	A1 Anchorage	2/6/2019	WEBSITE	Confirmed	2/8/2019	2/11/2019	30'	3
A1 La Playa Cove	A1 Anchorage	2/6/2019	WEBSITE	Confirmed	2/8/2019	2/11/2019	47'	3
A1 La Playa Cove	A1 Anchorage	2/7/2019	WEBSITE	Confirmed	2/8/2019	2/11/2019	28'	3
A1 La Playa Cove	A1 Anchorage	2/7/2019	WEBSITE	Confirmed	2/8/2019	2/11/2019	36'	3
A1 La Playa Cove	A1 Anchorage	2/7/2019	WEBSITE	Confirmed	2/8/2019	2/11/2019	32'	3
A1 La Playa Cove	A1 Anchorage	2/7/2019	WEBSITE	Confirmed	6/7/2019	6/10/2019	35'	3
A1 La Playa Cove	A1 Anchorage	2/7/2019	Parks Central Reservations	Confirmed	2/8/2019	2/11/2019	28'	3
A1 La Playa Cove	A1 Anchorage	2/7/2019	WEBSITE	Confirmed	2/8/2019	2/11/2019	45'	3
A1 La Playa Cove	A1 Anchorage	2/7/2019	WEBSITE	Confirmed	2/8/2019	2/11/2019	36'	3
A1 La Playa Cove	A1 Anchorage	2/7/2019	WEBSITE	Confirmed	2/8/2019	2/11/2019	34'	3
A1 La Playa Cove	A1 Anchorage	2/7/2019	WEBSITE	Confirmed	2/8/2019	2/11/2019	32'	3
A1 La Playa Cove	A1 Anchorage	2/7/2019	WEBSITE	Confirmed	2/8/2019	2/11/2019	27'	3
A1 La Playa Cove	A1 Anchorage	2/7/2019	WEBSITE	Confirmed	2/8/2019	2/11/2019	26'	3
A1 La Playa Cove	A1 Anchorage	2/7/2019	WEBSITE	Confirmed	2/8/2019	2/11/2019	43'	3
A1 La Playa Cove	A1 Anchorage	2/7/2019	WEBSITE	Confirmed	2/8/2019	2/11/2019	16'	3
A1 La Playa Cove	A1 Anchorage	2/7/2019	WEBSITE	Confirmed	2/8/2019	2/11/2019	30'	3
A1 La Playa Cove	A1 Anchorage	2/9/2019	WEBSITE	Confirmed	2/15/2019	2/18/2019	28'	3
A1 La Playa Cove	A1 Anchorage	2/9/2019	WEBSITE	Confirmed	5/24/2019	5/27/2019	64'	3
A1 La Playa Cove	A1 Anchorage	2/9/2019	WEBSITE	Confirmed	7/5/2019	7/8/2019	64'	3
A1 La Playa Cove	A1 Anchorage	2/9/2019	WEBSITE	Confirmed	8/30/2019	9/2/2019	64'	3
A1 La Playa Cove	A1 Anchorage	2/9/2019	WEBSITE	Confirmed	6/21/2019	6/24/2019	40'	3
A1 La Playa Cove	A1 Anchorage	2/9/2019	WEBSITE	Confirmed	8/9/2019	8/12/2019	38'	3
A1 La Playa Cove	A1 Anchorage	2/11/2019	WEBSITE	Confirmed	2/15/2019	2/18/2019	44'	3
A1 La Playa Cove	A1 Anchorage	2/11/2019	WEBSITE	Confirmed	5/24/2019	5/27/2019	49'	3
A1 La Playa Cove	A1 Anchorage	2/11/2019	WEBSITE	Confirmed	5/31/2019	6/3/2019	30'	3
A1 La Playa Cove	A1 Anchorage	2/13/2019	WEBSITE	Confirmed	3/1/2019	3/4/2019	26'	3
A1 La Playa Cove	A1 Anchorage	2/14/2019	WEBSITE	Confirmed	3/15/2019	3/18/2019	30'	3
A1 La Playa Cove	A1 Anchorage	2/14/2019	WEBSITE	Confirmed	3/29/2019	4/1/2019	30'	3
A1 La Playa Cove	A1 Anchorage	2/14/2019	Parks Central Reservations	Confirmed	2/15/2019	2/18/2019	32'	3
A1 La Playa Cove	A1 Anchorage	2/14/2019	Parks Central Reservations	Confirmed	2/15/2019	2/18/2019	26'	3
A1 La Playa Cove	A1 Anchorage	2/14/2019	Parks Central Reservations	Confirmed	2/15/2019	2/18/2019	40'	3
A1 La Playa Cove	A1 Anchorage	2/14/2019	Parks Central Reservations	Confirmed	2/15/2019	2/18/2019	28'	3
A1 La Playa Cove	A1 Anchorage	2/14/2019	Parks Central Reservations	Confirmed	2/15/2019	2/18/2019	25'	3
A1 La Playa Cove	A1 Anchorage	2/14/2019	Parks Central Reservations	Confirmed	2/15/2019	2/18/2019	27'	3
A1 La Playa Cove	A1 Anchorage	2/14/2019	Parks Central Reservations	Confirmed	2/15/2019	2/18/2019	34'	3
A1 La Playa Cove	A1 Anchorage	2/14/2019	Parks Central Reservations	Confirmed	2/15/2019	2/18/2019	30'	3
A1 La Playa Cove	A1 Anchorage	2/14/2019	Parks Central Reservations	Confirmed	2/15/2019	2/18/2019	45'	3
A1 La Playa Cove	A1 Anchorage	2/15/2019	Parks Central Reservations	Confirmed	2/15/2019	2/18/2019	33'	3
A1 La Playa Cove	A1 Anchorage	2/15/2019	Parks Central Reservations	Confirmed	2/15/2019	2/18/2019	36'	3
A1 La Playa Cove	A1 Anchorage	2/15/2019	WEBSITE	Confirmed	2/22/2019	2/25/2019	34'	3
A1 La Playa Cove	A1 Anchorage	2/17/2019	WEBSITE	Confirmed	5/24/2019	5/27/2019	28'	3
A1 La Playa Cove	A1 Anchorage	2/17/2019	WEBSITE	Confirmed	2/22/2019	2/25/2019	36'	3
A1 La Playa Cove	A1 Anchorage	2/18/2019	WEBSITE	Confirmed	2/22/2019	2/25/2019	34'	3
A1 La Playa Cove	A1 Anchorage	2/18/2019	WEBSITE	Confirmed	2/22/2019	2/25/2019	34'	3
A1 La Playa Cove	A1 Anchorage	2/19/2019	WEBSITE	Confirmed	2/22/2019	2/25/2019	30'	3
A1 La Playa Cove	A1 Anchorage	2/19/2019	WEBSITE	Confirmed	2/22/2019	2/25/2019	27'	3
A1 La Playa Cove	A1 Anchorage	2/19/2019	WEBSITE	Confirmed	2/22/2019	2/25/2019	38'	3
A1 La Playa Cove	A1 Anchorage	2/19/2019	WEBSITE	Confirmed	2/22/2019	2/25/2019	38'	3
A1 La Playa Cove	A1 Anchorage	2/19/2019	WEBSITE	Confirmed	2/22/2019	2/25/2019	30'	3

Marina	Mooring	Date Reservation Made	Made At	Status	Arrival Date	Departure Date	Boat Length	Length of Stay (Nights)
A1 La Playa Cove	A1 Anchorage	2/19/2019	WEBSITE	Confirmed	2/22/2019	2/25/2019	24'	3
A1 La Playa Cove	A1 Anchorage	2/20/2019	Parks Central Reservations	Confirmed	2/22/2019	2/25/2019	45'	3
A1 La Playa Cove	A1 Anchorage	2/20/2019	WEBSITE	Confirmed	2/22/2019	2/25/2019	41'	3
A1 La Playa Cove	A1 Anchorage	2/20/2019	WEBSITE	Confirmed	2/22/2019	2/25/2019		3
A1 La Playa Cove	A1 Anchorage	2/20/2019	WEBSITE	Confirmed	3/8/2019	3/11/2019	36'	3
A1 La Playa Cove	A1 Anchorage	2/20/2019	WEBSITE	Confirmed	2/22/2019	2/25/2019	26'	3
A1 La Playa Cove	A1 Anchorage	2/21/2019	WEBSITE	Confirmed	2/22/2019	2/25/2019	32'	3
A1 La Playa Cove	A1 Anchorage	2/21/2019	Parks Central Reservations	Confirmed	2/22/2019	2/25/2019	26'	3
A1 La Playa Cove	A1 Anchorage	2/21/2019	Parks Central Reservations	Confirmed	2/22/2019	2/25/2019	44'	3
A1 La Playa Cove	A1 Anchorage	2/21/2019	Parks Central Reservations	Confirmed	2/22/2019	2/25/2019	33'	3
A1 La Playa Cove	A1 Anchorage	2/21/2019	Parks Central Reservations	Confirmed	2/22/2019	2/25/2019	30'	3
A1 La Playa Cove	A1 Anchorage	2/21/2019	Parks Central Reservations	Confirmed	2/22/2019	2/25/2019	25'	3
A1 La Playa Cove	A1 Anchorage	2/21/2019	Parks Central Reservations	Confirmed	2/22/2019	2/25/2019	28'	3
A1 La Playa Cove	A1 Anchorage	2/21/2019	Parks Central Reservations	Confirmed	2/22/2019	2/25/2019		3
A1 La Playa Cove	A1 Anchorage	2/21/2019	WEBSITE	Confirmed	2/22/2019	2/25/2019	32'	3
A1 La Playa Cove	A1 Anchorage	2/21/2019	WEBSITE	Confirmed	2/22/2019	2/25/2019	38'	3
A1 La Playa Cove	A1 Anchorage	2/23/2019	WEBSITE	Confirmed	3/1/2019	3/4/2019	33'	3
A1 La Playa Cove	A1 Anchorage	2/23/2019	WEBSITE	Confirmed	3/1/2019	3/4/2019	37'	3
A1 La Playa Cove	A1 Anchorage	2/24/2019	WEBSITE	Confirmed	3/8/2019	3/11/2019	42'	3
A1 La Playa Cove	A1 Anchorage	2/24/2019	WEBSITE	Confirmed	5/24/2019	5/27/2019	36'	3
A1 La Playa Cove	A1 Anchorage	2/25/2019	WEBSITE	Confirmed	3/8/2019	3/11/2019	30'	3
A1 La Playa Cove	A1 Anchorage	2/25/2019	Parks Central Reservations	Confirmed	3/8/2019	3/11/2019	30'	3
A1 La Playa Cove	A1 Anchorage	2/25/2019	Parks Central Reservations	Confirmed	3/22/2019	3/25/2019	30'	3
A1 La Playa Cove	A1 Anchorage	2/26/2019	WEBSITE	Confirmed	3/1/2019	3/4/2019	32'	3
A1 La Playa Cove	A1 Anchorage	2/26/2019	Parks Central Reservations	Confirmed	3/1/2019	3/4/2019	26'	3
A1 La Playa Cove	A1 Anchorage	2/26/2019	WEBSITE	Confirmed	3/1/2019	3/4/2019	41'	3
A1 La Playa Cove	A1 Anchorage	2/26/2019	WEBSITE	Confirmed	3/1/2019	3/4/2019	26'	3
A1 La Playa Cove	A1 Anchorage	2/26/2019	WEBSITE	Confirmed	3/15/2019	3/18/2019	26'	3
A1 La Playa Cove	A1 Anchorage	2/26/2019	WEBSITE	Confirmed	3/1/2019	3/4/2019	26'	3
A1 La Playa Cove	A1 Anchorage	2/26/2019	WEBSITE	Confirmed	3/8/2019	3/11/2019	38'	3
A1 La Playa Cove	A1 Anchorage	2/28/2019	WEBSITE	Confirmed	6/7/2019	6/10/2019	34'	3
A1 La Playa Cove	A1 Anchorage	2/28/2019	WEBSITE	Confirmed	3/1/2019	3/4/2019	30'	3
A1 La Playa Cove	A1 Anchorage	2/28/2019	WEBSITE	Confirmed	3/1/2019	3/4/2019	47'	3
A1 La Playa Cove	A1 Anchorage	2/28/2019	WEBSITE	Confirmed	3/1/2019	3/4/2019	49'	3
A1 La Playa Cove	A1 Anchorage	2/28/2019	Parks Central Reservations	Confirmed	3/1/2019	3/4/2019	40'	3
A1 La Playa Cove	A1 Anchorage	2/28/2019	Parks Central Reservations	Confirmed	3/1/2019	3/4/2019	34'	3
A1 La Playa Cove	A1 Anchorage	2/28/2019	WEBSITE	Confirmed	3/1/2019	3/4/2019	35'	3
A1 La Playa Cove	A1 Anchorage	2/28/2019	WEBSITE	Confirmed	3/1/2019	3/4/2019	30'	3
A1 La Playa Cove	A1 Anchorage	2/28/2019	WEBSITE	Confirmed	3/1/2019	3/4/2019	47'	3
A1 La Playa Cove	A1 Anchorage	2/28/2019	WEBSITE	Confirmed	3/1/2019	3/4/2019	30'	3
A1 La Playa Cove	A1 Anchorage	3/1/2019	Parks Central Reservations	Confirmed	3/8/2019	3/11/2019	25'	3
A1 La Playa Cove	A1 Anchorage	3/1/2019	WEBSITE	Confirmed	3/8/2019	3/11/2019	16'	3
A1 La Playa Cove	A1 Anchorage	3/1/2019	WEBSITE	Confirmed	6/7/2019	6/10/2019	42'	3
A1 La Playa Cove	A1 Anchorage	3/1/2019	WEBSITE	Confirmed	3/8/2019	3/11/2019	32'	3
A1 La Playa Cove	A1 Anchorage	3/1/2019	WEBSITE	Confirmed	3/15/2019	3/18/2019	32'	3
A1 La Playa Cove	A1 Anchorage	3/1/2019	WEBSITE	Confirmed	3/22/2019	3/25/2019	32'	3
A1 La Playa Cove	A1 Anchorage	3/2/2019	WEBSITE	Confirmed	6/7/2019	6/10/2019	17'	3
A1 La Playa Cove	A1 Anchorage	3/2/2019	WEBSITE	Confirmed	3/8/2019	3/11/2019	42'	3
A1 La Playa Cove	A1 Anchorage	3/2/2019	WEBSITE	Confirmed	6/7/2019	6/10/2019	32'	3
A1 La Playa Cove	A1 Anchorage	3/2/2019	WEBSITE	Confirmed	5/24/2019	5/27/2019	32'	3
A1 La Playa Cove	A1 Anchorage	3/2/2019	WEBSITE	Confirmed	6/21/2019	6/24/2019	36'	3
A1 La Playa Cove	A1 Anchorage	3/3/2019	WEBSITE	Confirmed	3/22/2019	3/25/2019	50'	3
A1 La Playa Cove	A1 Anchorage	3/4/2019	Parks Central Reservations	Confirmed	4/26/2019	4/29/2019	42'	3
A1 La Playa Cove	A1 Anchorage	3/5/2019	WEBSITE	Confirmed	3/22/2019	3/25/2019	47'	3
A1 La Playa Cove	A1 Anchorage	3/5/2019	WEBSITE	Confirmed	3/15/2019	3/18/2019	48'	3
A1 La Playa Cove	A1 Anchorage	3/6/2019	WEBSITE	Confirmed	3/8/2019	3/11/2019	26'	3
A1 La Playa Cove	A1 Anchorage	3/6/2019	WEBSITE	Confirmed	3/8/2019	3/11/2019	28'	3
A1 La Playa Cove	A1 Anchorage	3/6/2019	WEBSITE	Confirmed	3/8/2019	3/11/2019	42'	3
A1 La Playa Cove	A1 Anchorage	3/6/2019	WEBSITE	Confirmed	3/8/2019	3/11/2019	32'	3
A1 La Playa Cove	A1 Anchorage	3/6/2019	Parks Central Reservations	Confirmed	3/8/2019	3/11/2019	40'	3

Marina	Mooring	Date Reservation Made	Made At	Status	Arrival Date	Departure Date	Boat Length	Length of Stay (Nights)
A1 La Playa Cove	A1 Anchorage	3/7/2019	WEBSITE	Confirmed	3/8/2019	3/11/2019	30'	3
A1 La Playa Cove	A1 Anchorage	3/7/2019	Parks Central Reservations	Confirmed	3/8/2019	3/11/2019	33'	3
A1 La Playa Cove	A1 Anchorage	3/7/2019	Parks Central Reservations	Confirmed	3/15/2019	3/18/2019	33'	3
A1 La Playa Cove	A1 Anchorage	3/7/2019	Parks Central Reservations	Confirmed	3/22/2019	3/25/2019	33'	3
A1 La Playa Cove	A1 Anchorage	3/7/2019	Parks Central Reservations	Confirmed	3/8/2019	3/11/2019	27'	3
A1 La Playa Cove	A1 Anchorage	3/7/2019	Parks Central Reservations	Confirmed	3/8/2019	3/11/2019	38'	3
A1 La Playa Cove	A1 Anchorage	3/7/2019	WEBSITE	Confirmed	3/8/2019	3/11/2019	47'	3
A1 La Playa Cove	A1 Anchorage	3/7/2019	WEBSITE	Confirmed	3/8/2019	3/11/2019	26'	3
A1 La Playa Cove	A1 Anchorage	3/7/2019	Parks Central Reservations	Confirmed	3/8/2019	3/11/2019	30'	3
A1 La Playa Cove	A1 Anchorage	3/7/2019	WEBSITE	Confirmed	3/8/2019	3/11/2019	25'	3
A1 La Playa Cove	A1 Anchorage	3/7/2019	WEBSITE	Confirmed	3/8/2019	3/11/2019	35'	3
A1 La Playa Cove	A1 Anchorage	3/7/2019	WEBSITE	Confirmed	3/15/2019	3/18/2019	30'	3
A1 La Playa Cove	A1 Anchorage	3/7/2019	WEBSITE	Confirmed	3/8/2019	3/11/2019	35'	3
A1 La Playa Cove	A1 Anchorage	3/7/2019	WEBSITE	Confirmed	3/8/2019	3/11/2019	24'	3
A1 La Playa Cove	A1 Anchorage	3/7/2019	WEBSITE	Confirmed	3/8/2019	3/11/2019	30'	3
A1 La Playa Cove	A1 Anchorage	3/7/2019	WEBSITE	Confirmed	3/22/2019	3/25/2019	30'	3
A1 La Playa Cove	A1 Anchorage	3/7/2019	WEBSITE	Confirmed	3/22/2019	3/25/2019	24'	3
A1 La Playa Cove	A1 Anchorage	3/8/2019	WEBSITE	Confirmed	3/22/2019	3/25/2019	35'	3
A1 La Playa Cove	A1 Anchorage	3/8/2019	WEBSITE	Confirmed	3/29/2019	4/1/2019	30'	3
A1 La Playa Cove	A1 Anchorage	3/9/2019	WEBSITE	Confirmed	5/3/2019	5/6/2019	40'	3
A1 La Playa Cove	A1 Anchorage	3/10/2019	WEBSITE	Confirmed	3/29/2019	4/1/2019	34'	3
A1 La Playa Cove	A1 Anchorage	3/10/2019	WEBSITE	Confirmed	3/15/2019	3/18/2019	63'	3
A1 La Playa Cove	A1 Anchorage	3/10/2019	WEBSITE	Confirmed	3/22/2019	3/25/2019	63'	3
A1 La Playa Cove	A1 Anchorage	3/10/2019	WEBSITE	Confirmed	3/15/2019	3/18/2019	37'	3
A1 La Playa Cove	A1 Anchorage	3/11/2019	Parks Central Reservations	Confirmed	3/15/2019	3/18/2019	38'	3
A1 La Playa Cove	A1 Anchorage	3/11/2019	WEBSITE	Confirmed	3/15/2019	3/18/2019	52'	3
A1 La Playa Cove	A1 Anchorage	3/11/2019	WEBSITE	Confirmed	3/15/2019	3/18/2019	28'	3
A1 La Playa Cove	A1 Anchorage	3/12/2019	WEBSITE	Confirmed	3/15/2019	3/18/2019	44'	3
A1 La Playa Cove	A1 Anchorage	3/12/2019	WEBSITE	Confirmed	3/15/2019	3/18/2019	26'	3
A1 La Playa Cove	A1 Anchorage	3/12/2019	WEBSITE	Confirmed	3/15/2019	3/18/2019	53'	3
A1 La Playa Cove	A1 Anchorage	3/12/2019	WEBSITE	Confirmed	3/15/2019	3/18/2019	37'	3
A1 La Playa Cove	A1 Anchorage	3/12/2019	WEBSITE	Confirmed	3/15/2019	3/18/2019	40'	3
A1 La Playa Cove	A1 Anchorage	3/13/2019	WEBSITE	Confirmed	3/15/2019	3/18/2019	32'	3
A1 La Playa Cove	A1 Anchorage	3/13/2019	WEBSITE	Confirmed	5/24/2019	5/27/2019	46'	3
A1 La Playa Cove	A1 Anchorage	3/13/2019	WEBSITE	Confirmed	8/30/2019	9/2/2019	46'	3
A1 La Playa Cove	A1 Anchorage	3/13/2019	WEBSITE	Confirmed	4/5/2019	4/8/2019	31'	3
A1 La Playa Cove	A1 Anchorage	3/13/2019	WEBSITE	Confirmed	3/22/2019	3/25/2019	15'	3
A1 La Playa Cove	A1 Anchorage	3/13/2019	WEBSITE	Confirmed	3/29/2019	4/1/2019	15'	3
A1 La Playa Cove	A1 Anchorage	3/13/2019	Parks Central Reservations	Confirmed	3/15/2019	3/18/2019	27'	3
A1 La Playa Cove	A1 Anchorage	3/13/2019	WEBSITE	Confirmed	3/15/2019	3/18/2019	48'	3
A1 La Playa Cove	A1 Anchorage	3/13/2019	WEBSITE	Confirmed	3/15/2019	3/18/2019	38'	3
A1 La Playa Cove	A1 Anchorage	3/13/2019	Parks Central Reservations	Confirmed	3/15/2019	3/18/2019	36'	3
A1 La Playa Cove	A1 Anchorage	3/13/2019	WEBSITE	Confirmed	3/15/2019	3/18/2019	32'	3
A1 La Playa Cove	A1 Anchorage	3/13/2019	WEBSITE	Confirmed	3/15/2019	3/18/2019	30'	3
A1 La Playa Cove	A1 Anchorage	3/13/2019	WEBSITE	Confirmed	3/15/2019	3/18/2019	22'	3
A1 La Playa Cove	A1 Anchorage	3/14/2019	Parks Central Reservations	Confirmed	3/15/2019	3/18/2019	25'	3
A1 La Playa Cove	A1 Anchorage	3/14/2019	WEBSITE	Confirmed	3/15/2019	3/18/2019	45'	3
A1 La Playa Cove	A1 Anchorage	3/14/2019	WEBSITE	Confirmed	3/15/2019	3/18/2019	35'	3
A1 La Playa Cove	A1 Anchorage	3/14/2019	WEBSITE	Confirmed	3/15/2019	3/18/2019	30'	3
A1 La Playa Cove	A1 Anchorage	3/14/2019	WEBSITE	Confirmed	3/15/2019	3/18/2019	26'	3
A1 La Playa Cove	A1 Anchorage	3/14/2019	WEBSITE	Confirmed	3/15/2019	3/18/2019	42'	3
A1 La Playa Cove	A1 Anchorage	3/14/2019	WEBSITE	Confirmed	3/15/2019	3/18/2019	34'	3
A1 La Playa Cove	A1 Anchorage	3/14/2019	WEBSITE	Confirmed	3/15/2019	3/18/2019	42'	3
A1 La Playa Cove	A1 Anchorage	3/14/2019	WEBSITE	Confirmed	3/15/2019	3/18/2019	41'	3
A1 La Playa Cove	A1 Anchorage	3/14/2019	WEBSITE	Confirmed	3/15/2019	3/18/2019	41'	3
A1 La Playa Cove	A1 Anchorage	3/14/2019	WEBSITE	Confirmed	3/15/2019	3/18/2019	30'	3
A1 La Playa Cove	A1 Anchorage	3/14/2019	WEBSITE	Confirmed	3/15/2019	3/18/2019	42'	3
A1 La Playa Cove	A1 Anchorage	3/14/2019	WEBSITE	Confirmed	3/15/2019	3/18/2019	35'	3
A1 La Playa Cove	A1 Anchorage	3/14/2019	WEBSITE	Confirmed	5/24/2019	5/27/2019	48'	3
A1 La Playa Cove	A1 Anchorage	3/15/2019	Parks Central Reservations	Confirmed	3/15/2019	3/18/2019	42'	3

Marina	Mooring	Date Reservation Made	Made At	Status	Arrival Date	Departure Date	Boat Length	Length of Stay (Nights)
A1 La Playa Cove	A1 Anchorage	3/16/2019	WEBSITE	Confirmed	3/22/2019	3/25/2019	44'	3
A1 La Playa Cove	A1 Anchorage	3/16/2019	WEBSITE	Confirmed	3/29/2019	4/1/2019	44'	3
A1 La Playa Cove	A1 Anchorage	3/17/2019	WEBSITE	Confirmed	6/14/2019	6/17/2019	46'	3
A1 La Playa Cove	A1 Anchorage	3/17/2019	WEBSITE	Confirmed	6/21/2019	6/24/2019	46'	3
A1 La Playa Cove	A1 Anchorage	3/17/2019	WEBSITE	Confirmed	8/30/2019	9/2/2019	46'	3
A1 La Playa Cove	A1 Anchorage	3/17/2019	WEBSITE	Confirmed	3/22/2019	3/25/2019	53'	3
A1 La Playa Cove	A1 Anchorage	3/18/2019	Parks Central Reservations	Confirmed	3/22/2019	3/25/2019	44'	3
A1 La Playa Cove	A1 Anchorage	3/18/2019	Parks Central Reservations	Confirmed	3/22/2019	3/25/2019	26'	3
A1 La Playa Cove	A1 Anchorage	3/18/2019	Parks Central Reservations	Confirmed	3/22/2019	3/25/2019	27'	3
A1 La Playa Cove	A1 Anchorage	3/18/2019	WEBSITE	Confirmed	3/22/2019	3/25/2019	34'	3
A1 La Playa Cove	A1 Anchorage	3/18/2019	WEBSITE	Confirmed	3/22/2019	3/25/2019	36'	3
A1 La Playa Cove	A1 Anchorage	3/18/2019	WEBSITE	Confirmed	3/22/2019	3/25/2019	60'	3
A1 La Playa Cove	A1 Anchorage	3/18/2019	WEBSITE	Confirmed	5/24/2019	5/27/2019	30'	3
A1 La Playa Cove	A1 Anchorage	3/18/2019	WEBSITE	Confirmed	8/30/2019	9/2/2019	30'	3
A1 La Playa Cove	A1 Anchorage	3/19/2019	WEBSITE	Confirmed	3/22/2019	3/25/2019	30'	3
A1 La Playa Cove	A1 Anchorage	3/19/2019	WEBSITE	Confirmed	3/22/2019	3/25/2019	44'	3
A1 La Playa Cove	A1 Anchorage	3/19/2019	WEBSITE	Confirmed	4/26/2019	4/29/2019	30'	3
A1 La Playa Cove	A1 Anchorage	3/19/2019	WEBSITE	Confirmed	4/19/2019	4/22/2019	30'	3
A1 La Playa Cove	A1 Anchorage	3/19/2019	WEBSITE	Confirmed	4/19/2019	4/22/2019	48'	3
A1 La Playa Cove	A1 Anchorage	3/19/2019	WEBSITE	Confirmed	4/12/2019	4/15/2019	48'	3
A1 La Playa Cove	A1 Anchorage	3/19/2019	WEBSITE	Confirmed	10/18/2019	10/21/2019	38'	3
A1 La Playa Cove	A1 Anchorage	3/20/2019	WEBSITE	Confirmed	3/22/2019	3/25/2019	30'	3
A1 La Playa Cove	A1 Anchorage	3/20/2019	WEBSITE	Confirmed	3/22/2019	3/25/2019	38'	3
A1 La Playa Cove	A1 Anchorage	3/20/2019	WEBSITE	Confirmed	3/29/2019	4/1/2019	50'	3
A1 La Playa Cove	A1 Anchorage	3/20/2019	WEBSITE	Confirmed	3/22/2019	3/25/2019	38'	3
A1 La Playa Cove	A1 Anchorage	3/20/2019	WEBSITE	Confirmed	3/22/2019	3/25/2019	40'	3
A1 La Playa Cove	A1 Anchorage	3/20/2019	WEBSITE	Confirmed	4/19/2019	4/22/2019	32'	3
A1 La Playa Cove	A1 Anchorage	3/20/2019	WEBSITE	Confirmed	5/24/2019	5/27/2019	32'	3
A1 La Playa Cove	A1 Anchorage	3/20/2019	WEBSITE	Confirmed	3/22/2019	3/25/2019	30'	3
A1 La Playa Cove	A1 Anchorage	3/20/2019	WEBSITE	Confirmed	10/18/2019	10/21/2019	42'	3
A1 La Playa Cove	A1 Anchorage	3/21/2019	WEBSITE	Confirmed	3/22/2019	3/25/2019	37'	3
A1 La Playa Cove	A1 Anchorage	3/21/2019	WEBSITE	Confirmed	3/22/2019	3/25/2019	26'	3
A1 La Playa Cove	A1 Anchorage	3/21/2019	WEBSITE	Confirmed	3/22/2019	3/25/2019	38'	3
A1 La Playa Cove	A1 Anchorage	3/21/2019	WEBSITE	Confirmed	3/22/2019	3/25/2019	42'	3
A1 La Playa Cove	A1 Anchorage	3/21/2019	WEBSITE	Confirmed	3/22/2019	3/25/2019	65'	3
A1 La Playa Cove	A1 Anchorage	3/21/2019	WEBSITE	Confirmed	3/29/2019	4/1/2019	65'	3
A1 La Playa Cove	A1 Anchorage	3/21/2019	WEBSITE	Confirmed	3/22/2019	3/25/2019	2'	3
A1 La Playa Cove	A1 Anchorage	3/21/2019	WEBSITE	Confirmed	3/22/2019	3/25/2019	35'	3
A1 La Playa Cove	A1 Anchorage	3/21/2019	WEBSITE	Confirmed	3/29/2019	4/1/2019	35'	3
A1 La Playa Cove	A1 Anchorage	3/21/2019	WEBSITE	Confirmed	3/22/2019	3/25/2019	32'	3
A1 La Playa Cove	A1 Anchorage	3/21/2019	WEBSITE	Confirmed	3/29/2019	4/1/2019	63'	3
A1 La Playa Cove	A1 Anchorage	3/21/2019	WEBSITE	Confirmed	3/22/2019	3/25/2019	27'	3
A1 La Playa Cove	A1 Anchorage	3/21/2019	WEBSITE	Confirmed	3/22/2019	3/25/2019	39'	3
A1 La Playa Cove	A1 Anchorage	3/21/2019	WEBSITE	Confirmed	3/22/2019	3/25/2019	27'	3
A1 La Playa Cove	A1 Anchorage	3/21/2019	WEBSITE	Confirmed	3/22/2019	3/25/2019	25'	3
A1 La Playa Cove	A1 Anchorage	3/21/2019	WEBSITE	Confirmed	3/22/2019	3/25/2019	41'	3
A1 La Playa Cove	A1 Anchorage	3/22/2019	WEBSITE	Confirmed	4/19/2019	4/22/2019	35'	3
A1 La Playa Cove	A1 Anchorage	3/23/2019	WEBSITE	Confirmed	3/29/2019	4/1/2019	41'	3
A1 La Playa Cove	A1 Anchorage	3/24/2019	WEBSITE	Confirmed	3/29/2019	4/1/2019	32'	3
A1 La Playa Cove	A1 Anchorage	3/24/2019	WEBSITE	Confirmed	4/5/2019	4/8/2019	40'	3
A1 La Playa Cove	A1 Anchorage	3/24/2019	WEBSITE	Confirmed	3/29/2019	4/1/2019	30'	3
A1 La Playa Cove	A1 Anchorage	3/25/2019	WEBSITE	Confirmed	3/29/2019	4/1/2019	44'	3
A1 La Playa Cove	A1 Anchorage	3/25/2019	WEBSITE	Confirmed	3/29/2019	4/1/2019	26'	3
A1 La Playa Cove	A1 Anchorage	3/25/2019	WEBSITE	Confirmed	4/26/2019	4/29/2019	39'	3
A1 La Playa Cove	A1 Anchorage	3/26/2019	WEBSITE	Confirmed	3/29/2019	4/1/2019	38'	3
A1 La Playa Cove	A1 Anchorage	3/26/2019	WEBSITE	Confirmed	3/29/2019	4/1/2019	36'	3
A1 La Playa Cove	A1 Anchorage	3/26/2019	WEBSITE	Confirmed	3/29/2019	4/1/2019	26'	3
A1 La Playa Cove	A1 Anchorage	3/26/2019	WEBSITE	Confirmed	3/29/2019	4/1/2019	38'	3
A1 La Playa Cove	A1 Anchorage	3/27/2019	WEBSITE	Confirmed	3/29/2019	4/1/2019	36'	3
A1 La Playa Cove	A1 Anchorage	3/27/2019	WEBSITE	Confirmed	4/5/2019	4/8/2019	25'	3

Marina	Mooring	Date Reservation Made	Made At	Status	Arrival Date	Departure Date	Boat Length	Length of Stay (Nights)
A1 La Playa Cove	A1 Anchorage	3/27/2019	WEBSITE	Confirmed	3/29/2019	4/1/2019	27'	3
A1 La Playa Cove	A1 Anchorage	3/27/2019	WEBSITE	Confirmed	3/29/2019	4/1/2019	28'	3
A1 La Playa Cove	A1 Anchorage	3/27/2019	WEBSITE	Confirmed	3/29/2019	4/1/2019	25'	3
A1 La Playa Cove	A1 Anchorage	3/27/2019	WEBSITE	Confirmed	7/26/2019	7/29/2019	44'	3
A1 La Playa Cove	A1 Anchorage	3/27/2019	WEBSITE	Confirmed	3/29/2019	4/1/2019	34'	3
A1 La Playa Cove	A1 Anchorage	3/27/2019	WEBSITE	Confirmed	3/29/2019	4/1/2019	30'	3
A1 La Playa Cove	A1 Anchorage	3/27/2019	WEBSITE	Confirmed	3/29/2019	4/1/2019		3
A1 La Playa Cove	A1 Anchorage	3/27/2019	WEBSITE	Confirmed	7/5/2019	7/8/2019	37'	3
A1 La Playa Cove	A1 Anchorage	3/27/2019	WEBSITE	Confirmed	4/5/2019	4/8/2019	32'	3
A1 La Playa Cove	A1 Anchorage	3/27/2019	WEBSITE	Confirmed	4/12/2019	4/15/2019	32'	3
A1 La Playa Cove	A1 Anchorage	3/27/2019	WEBSITE	Confirmed	4/19/2019	4/22/2019	32'	3
A1 La Playa Cove	A1 Anchorage	3/27/2019	WEBSITE	Confirmed	3/29/2019	4/1/2019	30'	3
A1 La Playa Cove	A1 Anchorage	3/27/2019	WEBSITE	Confirmed	3/29/2019	4/1/2019	24'	3
A1 La Playa Cove	A1 Anchorage	3/28/2019	WEBSITE	Confirmed	3/29/2019	4/1/2019	22'	3
A1 La Playa Cove	A1 Anchorage	3/28/2019	WEBSITE	Confirmed	3/29/2019	4/1/2019	30'	3
A1 La Playa Cove	A1 Anchorage	3/28/2019	WEBSITE	Confirmed	3/29/2019	4/1/2019	30'	3
A1 La Playa Cove	A1 Anchorage	3/28/2019	WEBSITE	Confirmed	3/29/2019	4/1/2019	36'	3
A1 La Playa Cove	A1 Anchorage	3/28/2019	WEBSITE	Confirmed	3/29/2019	4/1/2019	27'	3
A1 La Playa Cove	A1 Anchorage	3/28/2019	WEBSITE	Confirmed	3/29/2019	4/1/2019	34'	3
A1 La Playa Cove	A1 Anchorage	3/28/2019	WEBSITE	Confirmed	3/29/2019	4/1/2019	42'	3
A1 La Playa Cove	A1 Anchorage	3/28/2019	WEBSITE	Confirmed	3/29/2019	4/1/2019	35'	3
A1 La Playa Cove	A1 Anchorage	3/28/2019	WEBSITE	Confirmed	3/29/2019	4/1/2019	32'	3
A1 La Playa Cove	A1 Anchorage	3/28/2019	WEBSITE	Confirmed	3/29/2019	4/1/2019	25'	3
A1 La Playa Cove	A1 Anchorage	3/28/2019	WEBSITE	Confirmed	3/29/2019	4/1/2019	48'	3
A1 La Playa Cove	A1 Anchorage	3/29/2019	WEBSITE	Confirmed	4/5/2019	4/8/2019	36'	3
A1 La Playa Cove	A1 Anchorage	3/29/2019	Parks Central Reservations	Confirmed	3/29/2019	4/1/2019	25'	3
A1 La Playa Cove	A1 Anchorage	3/30/2019	WEBSITE	Confirmed	4/5/2019	4/8/2019	65'	3
A1 La Playa Cove	A1 Anchorage	3/31/2019	WEBSITE	Confirmed	4/5/2019	4/8/2019	32'	3
A1 La Playa Cove	A1 Anchorage	3/31/2019	WEBSITE	Confirmed	4/5/2019	4/8/2019	47'	3
A1 La Playa Cove	A1 Anchorage	3/31/2019	WEBSITE	Confirmed	4/5/2019	4/8/2019	30'	3
A1 La Playa Cove	A1 Anchorage	4/1/2019	WEBSITE	Confirmed	4/5/2019	4/8/2019	26'	3
A1 La Playa Cove	A1 Anchorage	4/1/2019	WEBSITE	Confirmed	4/5/2019	4/8/2019	48'	3
A1 La Playa Cove	A1 Anchorage	4/1/2019	WEBSITE	Confirmed	10/18/2019	10/21/2019	37'	3
A1 La Playa Cove	A1 Anchorage	4/1/2019	WEBSITE	Confirmed	4/5/2019	4/8/2019	30'	3
A1 La Playa Cove	A1 Anchorage	4/1/2019	WEBSITE	Confirmed	4/19/2019	4/22/2019	30'	3
A1 La Playa Cove	A1 Anchorage	4/1/2019	WEBSITE	Confirmed	5/3/2019	5/6/2019	30'	3
A1 La Playa Cove	A1 Anchorage	4/2/2019	Parks Central Reservations	Confirmed	4/5/2019	4/8/2019	26'	3
A1 La Playa Cove	A1 Anchorage	4/2/2019	Parks Central Reservations	Confirmed	4/5/2019	4/8/2019	25'	3
A1 La Playa Cove	A1 Anchorage	4/2/2019	Parks Central Reservations	Confirmed	4/5/2019	4/8/2019	30'	3
A1 La Playa Cove	A1 Anchorage	4/2/2019	WEBSITE	Confirmed	4/5/2019	4/8/2019	36'	3
A1 La Playa Cove	A1 Anchorage	4/3/2019	WEBSITE	Confirmed	7/12/2019	7/15/2019	42'	3
A1 La Playa Cove	A1 Anchorage	4/3/2019	WEBSITE	Confirmed	4/5/2019	4/8/2019	63'	3
A1 La Playa Cove	A1 Anchorage	4/3/2019	WEBSITE	Confirmed	4/5/2019	4/8/2019	34'	3
A1 La Playa Cove	A1 Anchorage	4/3/2019	WEBSITE	Confirmed	4/5/2019	4/8/2019	40'	3
A1 La Playa Cove	A1 Anchorage	4/3/2019	WEBSITE	Confirmed	4/5/2019	4/8/2019	29'	3
A1 La Playa Cove	A1 Anchorage	4/3/2019	WEBSITE	Confirmed	8/9/2019	8/12/2019	32'	3
A1 La Playa Cove	A1 Anchorage	4/4/2019	WEBSITE	Confirmed	4/5/2019	4/8/2019	34'	3
A1 La Playa Cove	A1 Anchorage	4/4/2019	Parks Central Reservations	Confirmed	4/5/2019	4/8/2019	27'	3
A1 La Playa Cove	A1 Anchorage	4/4/2019	WEBSITE	Confirmed	4/5/2019	4/8/2019	42'	3
A1 La Playa Cove	A1 Anchorage	4/4/2019	WEBSITE	Confirmed	4/5/2019	4/8/2019	39'	3
A1 La Playa Cove	A1 Anchorage	4/4/2019	WEBSITE	Confirmed	4/19/2019	4/22/2019	65'	3
A1 La Playa Cove	A1 Anchorage	4/4/2019	WEBSITE	Confirmed	4/5/2019	4/8/2019	41'	3
A1 La Playa Cove	A1 Anchorage	4/4/2019	Parks Central Reservations	Confirmed	4/5/2019	4/8/2019	35'	3
A1 La Playa Cove	A1 Anchorage	4/4/2019	Parks Central Reservations	Confirmed	4/19/2019	4/22/2019	26'	3
A1 La Playa Cove	A1 Anchorage	4/4/2019	WEBSITE	Confirmed	6/21/2019	6/24/2019	20'	3
A1 La Playa Cove	A1 Anchorage	4/4/2019	WEBSITE	Confirmed	4/5/2019	4/8/2019	47'	3
A1 La Playa Cove	A1 Anchorage	4/4/2019	WEBSITE	Confirmed	4/5/2019	4/8/2019	30'	3
A1 La Playa Cove	A1 Anchorage	4/5/2019	WEBSITE	Confirmed	4/5/2019	4/8/2019	46'	3
A1 La Playa Cove	A1 Anchorage	4/6/2019	WEBSITE	Confirmed	8/9/2019	8/12/2019	32'	3
A1 La Playa Cove	A1 Anchorage	4/7/2019	WEBSITE	Confirmed	4/12/2019	4/15/2019	38'	3

Marina	Mooring	Date Reservation Made	Made At	Status	Arrival Date	Departure Date	Boat Length	Length of Stay (Nights)
A1 La Playa Cove	A1 Anchorage	4/7/2019	WEBSITE	Confirmed	10/18/2019	10/21/2019	42'	3
A1 La Playa Cove	A1 Anchorage	4/7/2019	WEBSITE	Confirmed	10/18/2019	10/21/2019	45'	3
A1 La Playa Cove	A1 Anchorage	4/7/2019	WEBSITE	Confirmed	10/18/2019	10/21/2019	36'	3
A1 La Playa Cove	A1 Anchorage	4/7/2019	WEBSITE	Confirmed	4/12/2019	4/15/2019	43'	3
A1 La Playa Cove	A1 Anchorage	4/7/2019	WEBSITE	Confirmed	4/12/2019	4/15/2019	34'	3
A1 La Playa Cove	A1 Anchorage	4/7/2019	WEBSITE	Confirmed	4/12/2019	4/15/2019	30'	3
A1 La Playa Cove	A1 Anchorage	4/7/2019	WEBSITE	Confirmed	4/12/2019	4/15/2019	24'	3
A1 La Playa Cove	A1 Anchorage	4/8/2019	Parks Central Reservations	Confirmed	4/12/2019	4/15/2019	36'	3
A1 La Playa Cove	A1 Anchorage	4/8/2019	Parks Central Reservations	Confirmed	10/4/2019	10/7/2019	50'	3
A1 La Playa Cove	A1 Anchorage	4/8/2019	WEBSITE	Confirmed	4/12/2019	4/15/2019	41'	3
A1 La Playa Cove	A1 Anchorage	4/8/2019	Parks Central Reservations	Confirmed	4/12/2019	4/15/2019	27'	3
A1 La Playa Cove	A1 Anchorage	4/8/2019	Parks Central Reservations	Confirmed	4/19/2019	4/22/2019	27'	3
A1 La Playa Cove	A1 Anchorage	4/8/2019	WEBSITE	Confirmed	4/26/2019	4/29/2019	43'	3
A1 La Playa Cove	A1 Anchorage	4/8/2019	WEBSITE	Confirmed	4/12/2019	4/15/2019	32'	3
A1 La Playa Cove	A1 Anchorage	4/8/2019	WEBSITE	Confirmed	4/12/2019	4/15/2019	30'	3
A1 La Playa Cove	A1 Anchorage	4/9/2019	WEBSITE	Confirmed	4/12/2019	4/15/2019	60'	3
A1 La Playa Cove	A1 Anchorage	4/9/2019	Parks Central Reservations	Confirmed	4/12/2019	4/15/2019	33'	3
A1 La Playa Cove	A1 Anchorage	4/9/2019	Parks Central Reservations	Confirmed	4/19/2019	4/22/2019	33'	3
A1 La Playa Cove	A1 Anchorage	4/9/2019	WEBSITE	Confirmed	4/12/2019	4/15/2019	42'	3
A1 La Playa Cove	A1 Anchorage	4/10/2019	WEBSITE	Confirmed	4/12/2019	4/15/2019	34'	3
A1 La Playa Cove	A1 Anchorage	4/10/2019	WEBSITE	Confirmed	4/12/2019	4/15/2019	26'	3
A1 La Playa Cove	A1 Anchorage	4/10/2019	WEBSITE	Confirmed	4/19/2019	4/22/2019	37'	3
A1 La Playa Cove	A1 Anchorage	4/10/2019	WEBSITE	Confirmed	4/12/2019	4/15/2019	35'	3
A1 La Playa Cove	A1 Anchorage	4/10/2019	WEBSITE	Confirmed	4/12/2019	4/15/2019	30'	3
A1 La Playa Cove	A1 Anchorage	4/11/2019	WEBSITE	Confirmed	4/12/2019	4/15/2019	27'	3
A1 La Playa Cove	A1 Anchorage	4/11/2019	WEBSITE	Confirmed	4/12/2019	4/15/2019	35'	3
A1 La Playa Cove	A1 Anchorage	4/11/2019	WEBSITE	Confirmed	4/12/2019	4/15/2019	47'	3
A1 La Playa Cove	A1 Anchorage	4/11/2019	WEBSITE	Confirmed	5/3/2019	5/6/2019	42'	3
A1 La Playa Cove	A1 Anchorage	4/11/2019	WEBSITE	Confirmed	4/12/2019	4/15/2019	28'	3
A1 La Playa Cove	A1 Anchorage	4/11/2019	WEBSITE	Confirmed	4/12/2019	4/15/2019	27'	3
A1 La Playa Cove	A1 Anchorage	4/11/2019	WEBSITE	Confirmed	4/12/2019	4/15/2019	34'	3
A1 La Playa Cove	A1 Anchorage	4/11/2019	WEBSITE	Confirmed	4/19/2019	4/22/2019	60'	3
A1 La Playa Cove	A1 Anchorage	4/11/2019	WEBSITE	Confirmed	4/26/2019	4/29/2019	60'	3
A1 La Playa Cove	A1 Anchorage	4/11/2019	Moorings	Confirmed	4/12/2019	4/15/2019	36'	3
A1 La Playa Cove	A1 Anchorage	4/11/2019	WEBSITE	Confirmed	4/12/2019	4/15/2019	30'	3
A1 La Playa Cove	A1 Anchorage	4/11/2019	WEBSITE	Confirmed	4/12/2019	4/15/2019	25'	3
A1 La Playa Cove	A1 Anchorage	4/11/2019	WEBSITE	Confirmed	5/24/2019	5/27/2019	36'	3
A1 La Playa Cove	A1 Anchorage	4/12/2019	Moorings	Confirmed	4/12/2019	4/15/2019	32'	3
A1 La Playa Cove	A1 Anchorage	4/12/2019	WEBSITE	Confirmed	5/24/2019	5/27/2019	30'	3
A1 La Playa Cove	A1 Anchorage	4/13/2019	WEBSITE	Confirmed	4/19/2019	4/22/2019	37'	3
A1 La Playa Cove	A1 Anchorage	4/13/2019	WEBSITE	Confirmed	4/19/2019	4/22/2019	47'	3
A1 La Playa Cove	A1 Anchorage	4/15/2019	Parks Central Reservations	Confirmed	4/19/2019	4/22/2019	38'	3
A1 La Playa Cove	A1 Anchorage	4/15/2019	WEBSITE	Confirmed	7/5/2019	7/8/2019	63'	3
A1 La Playa Cove	A1 Anchorage	4/15/2019	WEBSITE	Confirmed	5/24/2019	5/27/2019	63'	3
A1 La Playa Cove	A1 Anchorage	4/15/2019	WEBSITE	Confirmed	4/19/2019	4/22/2019	31'	3
A1 La Playa Cove	A1 Anchorage	4/15/2019	WEBSITE	Confirmed	6/28/2019	7/1/2019	42'	3
A1 La Playa Cove	A1 Anchorage	4/16/2019	Parks Central Reservations	Confirmed	4/19/2019	4/22/2019		3
A1 La Playa Cove	A1 Anchorage	4/16/2019	Parks Central Reservations	Confirmed	4/19/2019	4/22/2019	47'	3
A1 La Playa Cove	A1 Anchorage	4/16/2019	Parks Central Reservations	Confirmed	4/19/2019	4/22/2019	34'	3
A1 La Playa Cove	A1 Anchorage	4/16/2019	WEBSITE	Confirmed	4/19/2019	4/22/2019	30'	3
A1 La Playa Cove	A1 Anchorage	4/16/2019	WEBSITE	Confirmed	4/19/2019	4/22/2019	30'	3
A1 La Playa Cove	A1 Anchorage	4/16/2019	WEBSITE	Confirmed	4/19/2019	4/22/2019	24'	3
A1 La Playa Cove	A1 Anchorage	4/16/2019	WEBSITE	Confirmed	4/19/2019	4/22/2019	35'	3
A1 La Playa Cove	A1 Anchorage	4/17/2019	WEBSITE	Confirmed	4/26/2019	4/29/2019	31'	3
A1 La Playa Cove	A1 Anchorage	4/17/2019	Parks Central Reservations	Confirmed	4/19/2019	4/22/2019	30'	3
A1 La Playa Cove	A1 Anchorage	4/17/2019	WEBSITE	Confirmed	4/19/2019	4/22/2019	34'	3
A1 La Playa Cove	A1 Anchorage	4/17/2019	WEBSITE	Confirmed	10/18/2019	10/21/2019	41'	3
A1 La Playa Cove	A1 Anchorage	4/17/2019	Moorings	Confirmed	4/19/2019	4/22/2019	30'	3
A1 La Playa Cove	A1 Anchorage	4/17/2019	WEBSITE	Confirmed	4/19/2019	4/22/2019	37'	3
A1 La Playa Cove	A1 Anchorage	4/17/2019	WEBSITE	Confirmed	4/19/2019	4/22/2019	50'	3

Marina	Mooring	Date Reservation Made	Made At	Status	Arrival Date	Departure Date	Boat Length	Length of Stay (Nights)
A1 La Playa Cove	A1 Anchorage	4/17/2019	WEBSITE	Confirmed	4/19/2019	4/22/2019	25'	3
A1 La Playa Cove	A1 Anchorage	4/17/2019	WEBSITE	Confirmed	4/19/2019	4/22/2019	34'	3
A1 La Playa Cove	A1 Anchorage	4/18/2019	WEBSITE	Confirmed	4/19/2019	4/22/2019	26'	3
A1 La Playa Cove	A1 Anchorage	4/18/2019	WEBSITE	Confirmed	4/19/2019	4/22/2019	32'	3
A1 La Playa Cove	A1 Anchorage	4/18/2019	Parks Central Reservations	Confirmed	4/19/2019	4/22/2019	28'	3
A1 La Playa Cove	A1 Anchorage	4/18/2019	Parks Central Reservations	Confirmed	4/19/2019	4/22/2019	27'	3
A1 La Playa Cove	A1 Anchorage	4/18/2019	Parks Central Reservations	Confirmed	4/19/2019	4/22/2019	35'	3
A1 La Playa Cove	A1 Anchorage	4/18/2019	Parks Central Reservations	Confirmed	4/19/2019	4/22/2019	36'	3
A1 La Playa Cove	A1 Anchorage	4/18/2019	WEBSITE	Confirmed	4/19/2019	4/22/2019	32'	3
A1 La Playa Cove	A1 Anchorage	4/18/2019	Parks Central Reservations	Confirmed	4/19/2019	4/22/2019	34'	3
A1 La Playa Cove	A1 Anchorage	4/18/2019	WEBSITE	Confirmed	4/19/2019	4/22/2019	42'	3
A1 La Playa Cove	A1 Anchorage	4/18/2019	WEBSITE	Confirmed	4/26/2019	4/29/2019	30'	3
A1 La Playa Cove	A1 Anchorage	4/18/2019	WEBSITE	Confirmed	4/26/2019	4/29/2019	41'	3
A1 La Playa Cove	A1 Anchorage	4/18/2019	WEBSITE	Confirmed	5/3/2019	5/6/2019	34'	3
A1 La Playa Cove	A1 Anchorage	4/18/2019	WEBSITE	Confirmed	8/16/2019	8/19/2019	45'	3
A1 La Playa Cove	A1 Anchorage	4/19/2019	WEBSITE	Confirmed	4/26/2019	4/29/2019	41'	3
A1 La Playa Cove	A1 Anchorage	4/19/2019	WEBSITE	Confirmed	5/3/2019	5/6/2019	34'	3
A1 La Playa Cove	A1 Anchorage	4/19/2019	WEBSITE	Confirmed	4/26/2019	4/29/2019	37'	3
A1 La Playa Cove	A1 Anchorage	4/20/2019	WEBSITE	Confirmed	4/26/2019	4/29/2019	36'	3
A1 La Playa Cove	A1 Anchorage	4/21/2019	WEBSITE	Confirmed	4/26/2019	4/29/2019	33'	3
A1 La Playa Cove	A1 Anchorage	4/21/2019	WEBSITE	Confirmed	4/26/2019	4/29/2019	30'	3
A1 La Playa Cove	A1 Anchorage	4/22/2019	Parks Central Reservations	Confirmed	4/26/2019	4/29/2019	38'	3
A1 La Playa Cove	A1 Anchorage	4/22/2019	WEBSITE	Confirmed	7/5/2019	7/8/2019	36'	3
A1 La Playa Cove	A1 Anchorage	4/22/2019	WEBSITE	Confirmed	7/26/2019	7/29/2019	64'	3
A1 La Playa Cove	A1 Anchorage	4/22/2019	WEBSITE	Confirmed	4/26/2019	4/29/2019	25'	3
A1 La Playa Cove	A1 Anchorage	4/22/2019	WEBSITE	Confirmed	5/24/2019	5/27/2019	30'	3
A1 La Playa Cove	A1 Anchorage	4/23/2019	WEBSITE	Confirmed	4/26/2019	4/29/2019	24'	3
A1 La Playa Cove	A1 Anchorage	4/23/2019	WEBSITE	Confirmed	4/26/2019	4/29/2019	30'	3
A1 La Playa Cove	A1 Anchorage	4/23/2019	WEBSITE	Confirmed	4/26/2019	4/29/2019	63'	3
A1 La Playa Cove	A1 Anchorage	4/23/2019	WEBSITE	Confirmed	5/3/2019	5/6/2019	45'	3
A1 La Playa Cove	A1 Anchorage	4/23/2019	WEBSITE	Confirmed	4/26/2019	4/29/2019	26'	3
A1 La Playa Cove	A1 Anchorage	4/24/2019	Parks Central Reservations	Confirmed	7/26/2019	7/29/2019	44'	3
A1 La Playa Cove	A1 Anchorage	4/24/2019	WEBSITE	Confirmed	4/26/2019	4/29/2019	42'	3
A1 La Playa Cove	A1 Anchorage	4/24/2019	WEBSITE	Confirmed	4/26/2019	4/29/2019	26'	3
A1 La Playa Cove	A1 Anchorage	4/24/2019	Moorings	Confirmed	4/26/2019	4/29/2019	25'	3
A1 La Playa Cove	A1 Anchorage	4/24/2019	WEBSITE	Confirmed	4/26/2019	4/29/2019	50'	3
A1 La Playa Cove	A1 Anchorage	4/24/2019	WEBSITE	Confirmed	5/3/2019	5/6/2019	65'	3
A1 La Playa Cove	A1 Anchorage	4/24/2019	WEBSITE	Confirmed	4/26/2019	4/29/2019	38'	3
A1 La Playa Cove	A1 Anchorage	4/24/2019	WEBSITE	Confirmed	4/26/2019	4/29/2019	27'	3
A1 La Playa Cove	A1 Anchorage	4/24/2019	WEBSITE	Confirmed	4/26/2019	4/29/2019	30'	3
A1 La Playa Cove	A1 Anchorage	4/25/2019	Moorings	Confirmed	4/26/2019	4/29/2019	44'	3
A1 La Playa Cove	A1 Anchorage	4/25/2019	WEBSITE	Confirmed	4/26/2019	4/29/2019	65'	3
A1 La Playa Cove	A1 Anchorage	4/25/2019	WEBSITE	Confirmed	4/26/2019	4/29/2019	37'	3
A1 La Playa Cove	A1 Anchorage	4/25/2019	WEBSITE	Confirmed	4/26/2019	4/29/2019	25'	3
A1 La Playa Cove	A1 Anchorage	4/25/2019	WEBSITE	Confirmed	4/26/2019	4/29/2019	32'	3
A1 La Playa Cove	A1 Anchorage	4/25/2019	Parks Central Reservations	Confirmed	4/26/2019	4/29/2019	36'	3
A1 La Playa Cove	A1 Anchorage	4/25/2019	WEBSITE	Confirmed	4/26/2019	4/29/2019	34'	3
A1 La Playa Cove	A1 Anchorage	4/25/2019	WEBSITE	Confirmed	4/26/2019	4/29/2019	32'	3
A1 La Playa Cove	A1 Anchorage	4/25/2019	WEBSITE	Confirmed	4/26/2019	4/29/2019	32'	3
A1 La Playa Cove	A1 Anchorage	4/25/2019	WEBSITE	Confirmed	4/26/2019	4/29/2019	27'	3
A1 La Playa Cove	A1 Anchorage	4/26/2019	Parks Central Reservations	Confirmed	4/26/2019	4/29/2019	28'	3
A1 La Playa Cove	A1 Anchorage	4/26/2019	WEBSITE	Confirmed	4/26/2019	4/29/2019	33'	3
A1 La Playa Cove	A1 Anchorage	4/27/2019	WEBSITE	Confirmed	5/24/2019	5/27/2019	50'	3
A1 La Playa Cove	A1 Anchorage	4/28/2019	WEBSITE	Confirmed	5/24/2019	5/27/2019	38'	3
A1 La Playa Cove	A1 Anchorage	4/28/2019	WEBSITE	Confirmed	5/24/2019	5/27/2019	30'	3
A1 La Playa Cove	A1 Anchorage	4/28/2019	WEBSITE	Confirmed	5/10/2019	5/13/2019	42'	3
A1 La Playa Cove	A1 Anchorage	4/28/2019	WEBSITE	Confirmed	5/3/2019	5/6/2019	27'	3
A1 La Playa Cove	A1 Anchorage	4/28/2019	WEBSITE	Confirmed	7/12/2019	7/15/2019	50'	3
A1 La Playa Cove	A1 Anchorage	4/29/2019	Parks Central Reservations	Confirmed	5/3/2019	5/6/2019	27'	3
A1 La Playa Cove	A1 Anchorage	4/29/2019	Parks Central Reservations	Confirmed	5/3/2019	5/6/2019	28'	3

Marina	Mooring	Date Reservation Made	Made At	Status	Arrival Date	Departure Date	Boat Length	Length of Stay (Nights)
A1 La Playa Cove	A1 Anchorage	4/29/2019	Parks Central Reservations	Confirmed	5/31/2019	6/3/2019	38'	3
A1 La Playa Cove	A1 Anchorage	4/29/2019	Parks Central Reservations	Confirmed	5/3/2019	5/6/2019	38'	3
A1 La Playa Cove	A1 Anchorage	4/30/2019	WEBSITE	Confirmed	5/3/2019	5/6/2019	26'	3
A1 La Playa Cove	A1 Anchorage	4/30/2019	WEBSITE	Confirmed	5/10/2019	5/13/2019	26'	3
A1 La Playa Cove	A1 Anchorage	4/30/2019	WEBSITE	Confirmed	5/3/2019	5/6/2019	25'	3
A1 La Playa Cove	A1 Anchorage	4/30/2019	Parks Central Reservations	Confirmed	5/3/2019	5/6/2019	25'	3
A1 La Playa Cove	A1 Anchorage	4/30/2019	Parks Central Reservations	Confirmed	5/24/2019	5/27/2019	36'	3
A1 La Playa Cove	A1 Anchorage	4/30/2019	Parks Central Reservations	Confirmed	5/24/2019	5/27/2019	25'	3
A1 La Playa Cove	A1 Anchorage	4/30/2019	Parks Central Reservations	Confirmed	7/5/2019	7/8/2019	36'	3
A1 La Playa Cove	A1 Anchorage	4/30/2019	Parks Central Reservations	Confirmed	8/30/2019	9/2/2019	36'	3
A1 La Playa Cove	A1 Anchorage	4/30/2019	WEBSITE	Confirmed	5/24/2019	5/27/2019	63'	3
A1 La Playa Cove	A1 Anchorage	4/30/2019	Parks Central Reservations	Confirmed	5/3/2019	5/6/2019	33'	3
A1 La Playa Cove	A1 Anchorage	4/30/2019	WEBSITE	Confirmed	5/3/2019	5/6/2019	40'	3
A1 La Playa Cove	A1 Anchorage	5/1/2019	WEBSITE	Confirmed	5/3/2019	5/6/2019	30'	3
A1 La Playa Cove	A1 Anchorage	5/1/2019	WEBSITE	Confirmed	5/3/2019	5/6/2019	40'	3
A1 La Playa Cove	A1 Anchorage	5/1/2019	Moorings	Confirmed	5/3/2019	5/6/2019	26'	3
A1 La Playa Cove	A1 Anchorage	5/1/2019	Moorings	Confirmed	5/10/2019	5/13/2019	26'	3
A1 La Playa Cove	A1 Anchorage	5/1/2019	WEBSITE	Confirmed	5/24/2019	5/27/2019	45'	3
A1 La Playa Cove	A1 Anchorage	5/1/2019	WEBSITE	Confirmed	5/3/2019	5/6/2019	30'	3
A1 La Playa Cove	A1 Anchorage	5/1/2019	WEBSITE	Confirmed	5/3/2019	5/6/2019	24'	3
A1 La Playa Cove	A1 Anchorage	5/1/2019	WEBSITE	Confirmed	5/3/2019	5/6/2019	37'	3
A1 La Playa Cove	A1 Anchorage	5/1/2019	WEBSITE	Confirmed	5/3/2019	5/6/2019	30'	3
A1 La Playa Cove	A1 Anchorage	5/1/2019	WEBSITE	Confirmed	5/3/2019	5/6/2019	26'	3
A1 La Playa Cove	A1 Anchorage	5/2/2019	WEBSITE	Confirmed	5/3/2019	5/6/2019	30'	3
A1 La Playa Cove	A1 Anchorage	5/2/2019	WEBSITE	Confirmed	5/3/2019	5/6/2019	32'	3
A1 La Playa Cove	A1 Anchorage	5/2/2019	Moorings	Confirmed	5/3/2019	5/6/2019	35'	3
A1 La Playa Cove	A1 Anchorage	5/2/2019	WEBSITE	Confirmed	5/3/2019	5/6/2019	30'	3
A1 La Playa Cove	A1 Anchorage	5/2/2019	WEBSITE	Confirmed	5/3/2019	5/6/2019	30'	3
A1 La Playa Cove	A1 Anchorage	5/2/2019	WEBSITE	Confirmed	5/3/2019	5/6/2019	65'	3
A1 La Playa Cove	A1 Anchorage	5/2/2019	WEBSITE	Confirmed	5/17/2019	5/20/2019	60'	3
A1 La Playa Cove	A1 Anchorage	5/2/2019	WEBSITE	Confirmed	5/31/2019	6/3/2019	60'	3
A1 La Playa Cove	A1 Anchorage	5/2/2019	WEBSITE	Confirmed	5/3/2019	5/6/2019	39'	3
A1 La Playa Cove	A1 Anchorage	5/2/2019	WEBSITE	Confirmed	5/3/2019	5/6/2019	32'	3
A1 La Playa Cove	A1 Anchorage	5/2/2019	WEBSITE	Confirmed	5/3/2019	5/6/2019	25'	3
A1 La Playa Cove	A1 Anchorage	5/2/2019	WEBSITE	Confirmed	6/7/2019	6/10/2019	40'	3
A1 La Playa Cove	A1 Anchorage	5/3/2019	WEBSITE	Confirmed	5/3/2019	5/6/2019	25'	3
A1 La Playa Cove	A1 Anchorage	5/3/2019	WEBSITE	Confirmed	5/24/2019	5/27/2019	46'	3
A1 La Playa Cove	A1 Anchorage	5/3/2019	WEBSITE	Confirmed	5/24/2019	5/27/2019	51'	3
A1 La Playa Cove	A1 Anchorage	5/4/2019	WEBSITE	Confirmed	5/24/2019	5/27/2019	42'	3
A1 La Playa Cove	A1 Anchorage	5/4/2019	WEBSITE	Confirmed	5/10/2019	5/13/2019	32'	3
A1 La Playa Cove	A1 Anchorage	5/4/2019	WEBSITE	Confirmed	5/24/2019	5/27/2019	28'	3
A1 La Playa Cove	A1 Anchorage	5/4/2019	WEBSITE	Confirmed	5/24/2019	5/27/2019	59'	3
A1 La Playa Cove	A1 Anchorage	5/5/2019	WEBSITE	Confirmed	5/24/2019	5/27/2019	34'	3
A1 La Playa Cove	A1 Anchorage	5/6/2019	Parks Central Reservations	Confirmed	5/10/2019	5/13/2019	27'	3
A1 La Playa Cove	A1 Anchorage	5/6/2019	WEBSITE	Confirmed	5/10/2019	5/13/2019	38'	3
A1 La Playa Cove	A1 Anchorage	5/6/2019	WEBSITE	Confirmed	5/10/2019	5/13/2019	50'	3
A1 La Playa Cove	A1 Anchorage	5/7/2019	Parks Central Reservations	Confirmed	5/10/2019	5/13/2019	48'	3
A1 La Playa Cove	A1 Anchorage	5/7/2019	WEBSITE	Confirmed	5/10/2019	5/13/2019	50'	3
A1 La Playa Cove	A1 Anchorage	5/7/2019	WEBSITE	Confirmed	5/10/2019	5/13/2019	39'	3
A1 La Playa Cove	A1 Anchorage	5/7/2019	WEBSITE	Confirmed	5/10/2019	5/13/2019	30'	3
A1 La Playa Cove	A1 Anchorage	5/7/2019	WEBSITE	Confirmed	5/10/2019	5/13/2019	32'	3
A1 La Playa Cove	A1 Anchorage	5/8/2019	Parks Central Reservations	Confirmed	5/10/2019	5/13/2019	28'	3
A1 La Playa Cove	A1 Anchorage	5/8/2019	WEBSITE	Confirmed	6/14/2019	6/17/2019	36'	3
A1 La Playa Cove	A1 Anchorage	5/8/2019	Parks Central Reservations	Confirmed	5/10/2019	5/13/2019	44'	3
A1 La Playa Cove	A1 Anchorage	5/8/2019	WEBSITE	Confirmed	5/10/2019	5/13/2019	63'	3
A1 La Playa Cove	A1 Anchorage	5/8/2019	WEBSITE	Confirmed	5/10/2019	5/13/2019	32'	3
A1 La Playa Cove	A1 Anchorage	5/8/2019	WEBSITE	Confirmed	5/17/2019	5/20/2019	32'	3
A1 La Playa Cove	A1 Anchorage	5/8/2019	Parks Central Reservations	Confirmed	5/10/2019	5/13/2019	27'	3
A1 La Playa Cove	A1 Anchorage	5/8/2019	WEBSITE	Confirmed	5/10/2019	5/13/2019	32'	3
A1 La Playa Cove	A1 Anchorage	5/8/2019	WEBSITE	Confirmed	5/10/2019	5/13/2019	65'	3

Marina	Mooring	Date Reservation Made	Made At	Status	Arrival Date	Departure Date	Boat Length	Length of Stay (Nights)
A1 La Playa Cove	A1 Anchorage	5/8/2019	WEBSITE	Confirmed	5/10/2019	5/13/2019	48'	3
A1 La Playa Cove	A1 Anchorage	5/9/2019	Parks Central Reservations	Confirmed	5/10/2019	5/13/2019	45'	3
A1 La Playa Cove	A1 Anchorage	5/9/2019	Parks Central Reservations	Confirmed	5/10/2019	5/13/2019	32'	3
A1 La Playa Cove	A1 Anchorage	5/9/2019	WEBSITE	Confirmed	5/10/2019	5/13/2019	36'	3
A1 La Playa Cove	A1 Anchorage	5/9/2019	WEBSITE	Confirmed	5/24/2019	5/27/2019	28'	3
A1 La Playa Cove	A1 Anchorage	5/9/2019	Parks Central Reservations	Confirmed	5/10/2019	5/13/2019	42'	3
A1 La Playa Cove	A1 Anchorage	5/9/2019	Parks Central Reservations	Confirmed	5/24/2019	5/27/2019	27'	3
A1 La Playa Cove	A1 Anchorage	5/9/2019	Moorings	Confirmed	5/24/2019	5/27/2019	30'	3
A1 La Playa Cove	A1 Anchorage	5/9/2019	Moorings	Confirmed	5/10/2019	5/13/2019	30'	3
A1 La Playa Cove	A1 Anchorage	5/9/2019	WEBSITE	Confirmed	5/10/2019	5/13/2019	55'	3
A1 La Playa Cove	A1 Anchorage	5/9/2019	WEBSITE	Confirmed	5/10/2019	5/13/2019	50'	3
A1 La Playa Cove	A1 Anchorage	5/9/2019	WEBSITE	Confirmed	5/24/2019	5/27/2019	50'	3
A1 La Playa Cove	A1 Anchorage	5/9/2019	WEBSITE	Confirmed	5/10/2019	5/13/2019	34'	3
A1 La Playa Cove	A1 Anchorage	5/9/2019	Parks Central Reservations	Confirmed	5/10/2019	5/13/2019	35'	3
A1 La Playa Cove	A1 Anchorage	5/9/2019	WEBSITE	Confirmed	5/17/2019	5/20/2019	25'	3
A1 La Playa Cove	A1 Anchorage	5/9/2019	WEBSITE	Confirmed	5/10/2019	5/13/2019	26'	3
A1 La Playa Cove	A1 Anchorage	5/9/2019	WEBSITE	Confirmed	5/10/2019	5/13/2019	26'	3
A1 La Playa Cove	A1 Anchorage	5/9/2019	WEBSITE	Confirmed	5/24/2019	5/27/2019	30'	3
A1 La Playa Cove	A1 Anchorage	5/9/2019	WEBSITE	Confirmed	5/17/2019	5/20/2019	26'	3
A1 La Playa Cove	A1 Anchorage	5/9/2019	WEBSITE	Confirmed	5/31/2019	6/3/2019	30'	3
A1 La Playa Cove	A1 Anchorage	5/9/2019	WEBSITE	Confirmed	7/5/2019	7/8/2019	30'	3
A1 La Playa Cove	A1 Anchorage	5/10/2019	WEBSITE	Confirmed	7/5/2019	7/8/2019	48'	3
A1 La Playa Cove	A1 Anchorage	5/10/2019	Parks Central Reservations	Confirmed	5/10/2019	5/13/2019	34'	3
A1 La Playa Cove	A1 Anchorage	5/10/2019	WEBSITE	Confirmed	6/7/2019	6/10/2019	36'	3
A1 La Playa Cove	A1 Anchorage	5/11/2019	WEBSITE	Confirmed	6/7/2019	6/10/2019	26'	3
A1 La Playa Cove	A1 Anchorage	5/12/2019	WEBSITE	Confirmed	7/5/2019	7/8/2019	39'	3
A1 La Playa Cove	A1 Anchorage	5/12/2019	WEBSITE	Confirmed	10/18/2019	10/21/2019	50'	3
A1 La Playa Cove	A1 Anchorage	5/13/2019	WEBSITE	Confirmed	5/31/2019	6/3/2019	30'	3
A1 La Playa Cove	A1 Anchorage	5/13/2019	WEBSITE	Confirmed	6/21/2019	6/24/2019	34'	3
A1 La Playa Cove	A1 Anchorage	5/14/2019	WEBSITE	Confirmed	5/17/2019	5/20/2019	30'	3
A1 La Playa Cove	A1 Anchorage	5/14/2019	WEBSITE	Confirmed	7/5/2019	7/8/2019	30'	3
A1 La Playa Cove	A1 Anchorage	5/14/2019	WEBSITE	Confirmed	7/5/2019	7/8/2019	50'	3
A1 La Playa Cove	A1 Anchorage	5/14/2019	WEBSITE	Confirmed	5/24/2019	5/27/2019	32'	3
A1 La Playa Cove	A1 Anchorage	5/14/2019	WEBSITE	Confirmed	7/5/2019	7/8/2019	30'	3
A1 La Playa Cove	A1 Anchorage	5/14/2019	WEBSITE	Confirmed	7/5/2019	7/8/2019	62'	3
A1 La Playa Cove	A1 Anchorage	5/14/2019	WEBSITE	Confirmed	5/17/2019	5/20/2019	63'	3
A1 La Playa Cove	A1 Anchorage	5/15/2019	WEBSITE	Confirmed	7/5/2019	7/8/2019	42'	3
A1 La Playa Cove	A1 Anchorage	5/15/2019	Moorings	Confirmed	5/17/2019	5/20/2019	27'	3
A1 La Playa Cove	A1 Anchorage	5/15/2019	WEBSITE	Confirmed	5/17/2019	5/20/2019	42'	3
A1 La Playa Cove	A1 Anchorage	5/15/2019	WEBSITE	Confirmed	8/30/2019	9/2/2019	40'	3
A1 La Playa Cove	A1 Anchorage	5/15/2019	WEBSITE	Confirmed	5/17/2019	5/20/2019	34'	3
A1 La Playa Cove	A1 Anchorage	5/15/2019	WEBSITE	Confirmed	5/17/2019	5/20/2019	27'	3
A1 La Playa Cove	A1 Anchorage	5/15/2019	WEBSITE	Confirmed	6/14/2019	6/17/2019	44'	3
A1 La Playa Cove	A1 Anchorage	5/15/2019	WEBSITE	Confirmed	5/17/2019	5/20/2019	42'	3
A1 La Playa Cove	A1 Anchorage	5/16/2019	WEBSITE	Confirmed	5/17/2019	5/20/2019	30'	3
A1 La Playa Cove	A1 Anchorage	5/16/2019	WEBSITE	Confirmed	5/17/2019	5/20/2019	24'	3
A1 La Playa Cove	A1 Anchorage	5/16/2019	WEBSITE	Confirmed	5/17/2019	5/20/2019	15'	3
A1 La Playa Cove	A1 Anchorage	5/16/2019	WEBSITE	Confirmed	5/17/2019	5/20/2019	38'	3
A1 La Playa Cove	A1 Anchorage	5/16/2019	WEBSITE	Confirmed	5/17/2019	5/20/2019	39'	3
A1 La Playa Cove	A1 Anchorage	5/16/2019	WEBSITE	Confirmed	5/17/2019	5/20/2019	48'	3
A1 La Playa Cove	A1 Anchorage	5/16/2019	WEBSITE	Confirmed	5/17/2019	5/20/2019	50'	3
A1 La Playa Cove	A1 Anchorage	5/16/2019	WEBSITE	Confirmed	5/17/2019	5/20/2019	33'	3
A1 La Playa Cove	A1 Anchorage	5/16/2019	Moorings	Confirmed	5/17/2019	5/20/2019	34'	3
A1 La Playa Cove	A1 Anchorage	5/16/2019	Moorings	Confirmed	5/17/2019	5/20/2019	36'	3
A1 La Playa Cove	A1 Anchorage	5/16/2019	Moorings	Confirmed	5/17/2019	5/20/2019	25'	3
A1 La Playa Cove	A1 Anchorage	5/16/2019	WEBSITE	Confirmed	7/12/2019	7/15/2019	38'	3
A1 La Playa Cove	A1 Anchorage	5/16/2019	WEBSITE	Confirmed	5/17/2019	5/20/2019	30'	3
A1 La Playa Cove	A1 Anchorage	5/16/2019	WEBSITE	Confirmed	5/24/2019	5/27/2019	42'	3
A1 La Playa Cove	A1 Anchorage	5/16/2019	WEBSITE	Confirmed	7/5/2019	7/8/2019	42'	3
A1 La Playa Cove	A1 Anchorage	5/16/2019	WEBSITE	Confirmed	5/17/2019	5/20/2019	32'	3

Marina	Mooring	Date Reservation Made	Made At	Status	Arrival Date	Departure Date	Boat Length	Length of Stay (Nights)
A1 La Playa Cove	A1 Anchorage	5/16/2019	Moorings	Confirmed	5/17/2019	5/20/2019	27'	3
A1 La Playa Cove	A1 Anchorage	5/16/2019	Moorings	Confirmed	5/17/2019	5/20/2019	28'	3
A1 La Playa Cove	A1 Anchorage	5/16/2019	WEBSITE	Confirmed	5/17/2019	5/20/2019	30'	3
A1 La Playa Cove	A1 Anchorage	5/16/2019	WEBSITE	Confirmed	5/17/2019	5/20/2019	37'	3
A1 La Playa Cove	A1 Anchorage	5/16/2019	WEBSITE	Confirmed	5/17/2019	5/20/2019	53'	3
A1 La Playa Cove	A1 Anchorage	5/16/2019	WEBSITE	Confirmed	5/17/2019	5/20/2019	26'	3
A1 La Playa Cove	A1 Anchorage	5/20/2019	Parks Central Reservations	Confirmed	5/31/2019	6/3/2019	30'	3
A1 La Playa Cove	A1 Anchorage	5/20/2019	WEBSITE	Confirmed	5/24/2019	5/27/2019	34'	3
A1 La Playa Cove	A1 Anchorage	5/20/2019	WEBSITE	Confirmed	5/31/2019	6/3/2019	34'	3
A1 La Playa Cove	A1 Anchorage	5/20/2019	WEBSITE	Confirmed	6/7/2019	6/10/2019	34'	3
A1 La Playa Cove	A1 Anchorage	5/20/2019	WEBSITE	Confirmed	5/24/2019	5/27/2019	43'	3
A1 La Playa Cove	A1 Anchorage	5/20/2019	WEBSITE	Confirmed	5/24/2019	5/27/2019	44'	3
A1 La Playa Cove	A1 Anchorage	5/21/2019	WEBSITE	Confirmed	5/24/2019	5/27/2019	34'	3
A1 La Playa Cove	A1 Anchorage	5/21/2019	WEBSITE	Confirmed	7/5/2019	7/8/2019	48'	3
A1 La Playa Cove	A1 Anchorage	5/21/2019	WEBSITE	Confirmed	5/24/2019	5/27/2019	49'	3
A1 La Playa Cove	A1 Anchorage	5/22/2019	WEBSITE	Confirmed	6/7/2019	6/10/2019	55'	3
A1 La Playa Cove	A1 Anchorage	5/22/2019	WEBSITE	Confirmed	6/7/2019	6/10/2019	34'	3
A1 La Playa Cove	A1 Anchorage	5/22/2019	WEBSITE	Confirmed	6/7/2019	6/10/2019	38'	3
A1 La Playa Cove	A1 Anchorage	5/22/2019	WEBSITE	Confirmed	6/7/2019	6/10/2019	30'	3
A1 La Playa Cove	A1 Anchorage	5/22/2019	WEBSITE	Confirmed	6/7/2019	6/10/2019	35'	3
A1 La Playa Cove	A1 Anchorage	5/22/2019	WEBSITE	Confirmed	6/7/2019	6/10/2019	48'	3
A1 La Playa Cove	A1 Anchorage	5/22/2019	WEBSITE	Confirmed	7/5/2019	7/8/2019	39'	3
A1 La Playa Cove	A1 Anchorage	5/22/2019	WEBSITE	Confirmed	6/7/2019	6/10/2019	59'	3
A1 La Playa Cove	A1 Anchorage	5/22/2019	WEBSITE	Confirmed	6/7/2019	6/10/2019	52'	3
A1 La Playa Cove	A1 Anchorage	5/22/2019	WEBSITE	Confirmed	6/7/2019	6/10/2019	56'	3
A1 La Playa Cove	A1 Anchorage	5/23/2019	WEBSITE	Confirmed	5/24/2019	5/27/2019	26'	3
A1 La Playa Cove	A1 Anchorage	5/23/2019	WEBSITE	Confirmed	5/24/2019	5/27/2019	30'	3
A1 La Playa Cove	A1 Anchorage	5/23/2019	WEBSITE	Confirmed	5/31/2019	6/3/2019	36'	3
A1 La Playa Cove	A1 Anchorage	5/23/2019	WEBSITE	Confirmed	6/7/2019	6/10/2019	53'	3
A1 La Playa Cove	A1 Anchorage	5/24/2019	WEBSITE	Confirmed	7/5/2019	7/8/2019	28'	3
A1 La Playa Cove	A1 Anchorage	5/24/2019	WEBSITE	Confirmed	5/31/2019	6/3/2019	48'	3
A1 La Playa Cove	A1 Anchorage	5/25/2019	WEBSITE	Confirmed	6/7/2019	6/10/2019	37'	3
A1 La Playa Cove	A1 Anchorage	5/26/2019	WEBSITE	Confirmed	5/31/2019	6/3/2019	26'	3
A1 La Playa Cove	A1 Anchorage	5/26/2019	WEBSITE	Confirmed	10/18/2019	10/21/2019	65'	3
A1 La Playa Cove	A1 Anchorage	5/26/2019	WEBSITE	Confirmed	7/5/2019	7/8/2019	46'	3
A1 La Playa Cove	A1 Anchorage	5/27/2019	WEBSITE	Confirmed	10/18/2019	10/21/2019	48'	3
A1 La Playa Cove	A1 Anchorage	5/27/2019	WEBSITE	Confirmed	6/21/2019	6/24/2019	39'	3
A1 La Playa Cove	A1 Anchorage	5/27/2019	WEBSITE	Confirmed	6/7/2019	6/10/2019	41'	3
A1 La Playa Cove	A1 Anchorage	5/28/2019	Moorings	Confirmed	5/31/2019	6/3/2019	27'	3
A1 La Playa Cove	A1 Anchorage	5/28/2019	WEBSITE	Confirmed	7/5/2019	7/8/2019	39'	3
A1 La Playa Cove	A1 Anchorage	5/28/2019	WEBSITE	Confirmed	6/7/2019	6/10/2019	50'	3
A1 La Playa Cove	A1 Anchorage	5/28/2019	Moorings	Confirmed	6/14/2019	6/17/2019	40'	3
A1 La Playa Cove	A1 Anchorage	5/29/2019	WEBSITE	Confirmed	5/31/2019	6/3/2019	43'	3
A1 La Playa Cove	A1 Anchorage	5/29/2019	WEBSITE	Confirmed	5/31/2019	6/3/2019	44'	3
A1 La Playa Cove	A1 Anchorage	5/30/2019	WEBSITE	Confirmed	5/31/2019	6/3/2019	34'	3
A1 La Playa Cove	A1 Anchorage	5/30/2019	WEBSITE	Confirmed	5/31/2019	6/3/2019	30'	3
A1 La Playa Cove	A1 Anchorage	5/30/2019	WEBSITE	Confirmed	5/31/2019	6/3/2019	24'	3
A1 La Playa Cove	A1 Anchorage	5/30/2019	WEBSITE	Confirmed	5/31/2019	6/3/2019	15'	3
A1 La Playa Cove	A1 Anchorage	5/30/2019	Parks Central Reservations	Confirmed	5/31/2019	6/3/2019	33'	3
A1 La Playa Cove	A1 Anchorage	5/30/2019	WEBSITE	Confirmed	5/31/2019	6/3/2019	50'	3
A1 La Playa Cove	A1 Anchorage	5/30/2019	Moorings	Confirmed	5/31/2019	6/3/2019	45'	3
A1 La Playa Cove	A1 Anchorage	5/30/2019	WEBSITE	Confirmed	5/31/2019	6/3/2019	47'	3
A1 La Playa Cove	A1 Anchorage	5/30/2019	WEBSITE	Confirmed	5/31/2019	6/3/2019	30'	3
A1 La Playa Cove	A1 Anchorage	5/30/2019	WEBSITE	Confirmed	6/7/2019	6/10/2019	32'	3
A1 La Playa Cove	A1 Anchorage	5/30/2019	WEBSITE	Confirmed	5/31/2019	6/3/2019	36'	3
A1 La Playa Cove	A1 Anchorage	5/30/2019	WEBSITE	Confirmed	5/31/2019	6/3/2019	30'	3
A1 La Playa Cove	A1 Anchorage	5/30/2019	WEBSITE	Confirmed	5/31/2019	6/3/2019	42'	3
A1 La Playa Cove	A1 Anchorage	5/30/2019	WEBSITE	Confirmed	5/31/2019	6/3/2019	37'	3
A1 La Playa Cove	A1 Anchorage	5/30/2019	WEBSITE	Confirmed	5/31/2019	6/3/2019	32'	3
A1 La Playa Cove	A1 Anchorage	5/30/2019	WEBSITE	Confirmed	5/31/2019	6/3/2019	32'	3

Marina	Mooring	Date Reservation Made	Made At	Status	Arrival Date	Departure Date	Boat Length	Length of Stay (Nights)
A1 La Playa Cove	A1 Anchorage	5/31/2019	WEBSITE	Confirmed	6/21/2019	6/24/2019	35'	3
A1 La Playa Cove	A1 Anchorage	6/1/2019	WEBSITE	Confirmed	7/5/2019	7/8/2019	35'	3
A1 La Playa Cove	A1 Anchorage	6/1/2019	WEBSITE	Confirmed	6/7/2019	6/10/2019	47'	3
A1 La Playa Cove	A1 Anchorage	6/1/2019	WEBSITE	Confirmed	6/7/2019	6/10/2019	26'	3
A1 La Playa Cove	A1 Anchorage	6/1/2019	WEBSITE	Confirmed	6/7/2019	6/10/2019	42'	3
A1 La Playa Cove	A1 Anchorage	6/2/2019	WEBSITE	Confirmed	6/7/2019	6/10/2019	63'	3
A1 La Playa Cove	A1 Anchorage	6/2/2019	WEBSITE	Confirmed	7/5/2019	7/8/2019	63'	3
A1 La Playa Cove	A1 Anchorage	6/2/2019	WEBSITE	Confirmed	6/7/2019	6/10/2019	30'	3
A1 La Playa Cove	A1 Anchorage	6/2/2019	WEBSITE	Confirmed	6/14/2019	6/17/2019	34'	3
A1 La Playa Cove	A1 Anchorage	6/3/2019	WEBSITE	Confirmed	6/7/2019	6/10/2019	47'	3
A1 La Playa Cove	A1 Anchorage	6/3/2019	WEBSITE	Confirmed	6/7/2019	6/10/2019	44'	3
A1 La Playa Cove	A1 Anchorage	6/3/2019	WEBSITE	Confirmed	6/21/2019	6/24/2019	65'	3
A1 La Playa Cove	A1 Anchorage	6/3/2019	WEBSITE	Confirmed	6/14/2019	6/17/2019	38'	3
A1 La Playa Cove	A1 Anchorage	6/3/2019	WEBSITE	Confirmed	6/7/2019	6/10/2019	32'	3
A1 La Playa Cove	A1 Anchorage	6/3/2019	WEBSITE	Confirmed	7/5/2019	7/8/2019	63'	3
A1 La Playa Cove	A1 Anchorage	6/3/2019	WEBSITE	Confirmed	6/7/2019	6/10/2019	22'	3
A1 La Playa Cove	A1 Anchorage	6/4/2019	WEBSITE	Confirmed	6/14/2019	6/17/2019	33'	3
A1 La Playa Cove	A1 Anchorage	6/4/2019	WEBSITE	Confirmed	6/7/2019	6/10/2019	35'	3
A1 La Playa Cove	A1 Anchorage	6/4/2019	WEBSITE	Confirmed	6/7/2019	6/10/2019	22'	3
A1 La Playa Cove	A1 Anchorage	6/4/2019	WEBSITE	Confirmed	7/5/2019	7/8/2019	36'	3
A1 La Playa Cove	A1 Anchorage	6/5/2019	Moorings	Confirmed	6/9/2019	6/10/2019	27'	1
A1 La Playa Cove	A1 Anchorage	6/5/2019	Moorings	Confirmed	6/7/2019	6/9/2019	27'	2
A1 La Playa Cove	A1 Anchorage	6/5/2019	WEBSITE	Confirmed	6/7/2019	6/10/2019	26'	3
A1 La Playa Cove	A1 Anchorage	6/5/2019	WEBSITE	Confirmed	6/21/2019	6/24/2019	28'	3
A1 La Playa Cove	A1 Anchorage	6/5/2019	Moorings	Confirmed	6/14/2019	6/17/2019	27'	3
A1 La Playa Cove	A1 Anchorage	6/5/2019	Moorings	Confirmed	6/14/2019	6/17/2019	28'	3
A1 La Playa Cove	A1 Overflow	6/6/2019	Parks Central Reservations	Confirmed	6/7/2019	6/10/2019	34'	3
A1 La Playa Cove	A1 Anchorage	6/6/2019	WEBSITE	Confirmed	7/12/2019	7/15/2019	30'	3
A1 La Playa Cove	A1 Anchorage	6/6/2019	WEBSITE	Confirmed	7/19/2019	7/22/2019	30'	3
A1 La Playa Cove	A1 Anchorage	6/6/2019	WEBSITE	Confirmed	7/26/2019	7/29/2019	30'	3
A1 La Playa Cove	A1 Anchorage	6/6/2019	WEBSITE	Confirmed	10/18/2019	10/21/2019	32'	3
A1 La Playa Cove	A1 Anchorage	6/9/2019	WEBSITE	Confirmed	6/14/2019	6/17/2019	37'	3
A1 La Playa Cove	A1 Anchorage	6/9/2019	WEBSITE	Confirmed	6/21/2019	6/24/2019	37'	3
A1 La Playa Cove	A1 Anchorage	6/9/2019	WEBSITE	Confirmed	6/28/2019	7/1/2019	37'	3
A1 La Playa Cove	A1 Anchorage	6/9/2019	WEBSITE	Confirmed	7/5/2019	7/8/2019	46'	3
A1 La Playa Cove	A1 Anchorage	6/9/2019	WEBSITE	Confirmed	6/21/2019	6/24/2019	30'	3
A1 La Playa Cove	A1 Anchorage	6/9/2019	WEBSITE	Confirmed	6/28/2019	7/1/2019	30'	3
A1 La Playa Cove	A1 Anchorage	6/9/2019	WEBSITE	Confirmed	6/14/2019	6/17/2019	32'	3
A1 La Playa Cove	A1 Anchorage	6/10/2019	WEBSITE	Confirmed	7/5/2019	7/8/2019	36'	3
A1 La Playa Cove	A1 Anchorage	6/10/2019	WEBSITE	Confirmed	6/14/2019	6/17/2019	42'	3
A1 La Playa Cove	A1 Anchorage	6/10/2019	WEBSITE	Confirmed	6/14/2019	6/17/2019	43'	3
A1 La Playa Cove	A1 Anchorage	6/10/2019	WEBSITE	Confirmed	9/13/2019	9/16/2019	65'	3
A1 La Playa Cove	A1 Anchorage	6/10/2019	WEBSITE	Confirmed	6/14/2019	6/17/2019	37'	3
A1 La Playa Cove	A1 Anchorage	6/10/2019	WEBSITE	Confirmed	6/14/2019	6/17/2019	30'	3
A1 La Playa Cove	A1 Anchorage	6/11/2019	WEBSITE	Confirmed	7/5/2019	7/8/2019	28'	3
A1 La Playa Cove	A1 Anchorage	6/11/2019	WEBSITE	Confirmed	6/14/2019	6/17/2019	28'	3
A1 La Playa Cove	A1 Anchorage	6/11/2019	WEBSITE	Confirmed	6/21/2019	6/24/2019	28'	3
A1 La Playa Cove	A1 Anchorage	6/11/2019	WEBSITE	Confirmed	6/28/2019	7/1/2019	28'	3
A1 La Playa Cove	A1 Anchorage	6/11/2019	WEBSITE	Confirmed	6/14/2019	6/17/2019	35'	3
A1 La Playa Cove	A1 Anchorage	6/11/2019	Moorings	Confirmed	6/14/2019	6/17/2019	27'	3
A1 La Playa Cove	A1 Anchorage	6/11/2019	WEBSITE	Confirmed	6/28/2019	7/1/2019	35'	3
A1 La Playa Cove	A1 Anchorage	6/11/2019	WEBSITE	Confirmed	6/14/2019	6/17/2019	34'	3
A1 La Playa Cove	A1 Anchorage	6/11/2019	WEBSITE	Confirmed	6/14/2019	6/17/2019	22'	3
A1 La Playa Cove	A1 Anchorage	6/11/2019	WEBSITE	Confirmed	6/14/2019	6/17/2019	30'	3
A1 La Playa Cove	A1 Anchorage	6/11/2019	WEBSITE	Confirmed	6/14/2019	6/17/2019	50'	3
A1 La Playa Cove	A1 Anchorage	6/11/2019	WEBSITE	Confirmed	6/14/2019	6/17/2019	38'	3
A1 La Playa Cove	A1 Anchorage	6/12/2019	Parks Central Reservations	Confirmed	6/14/2019	6/17/2019	30'	3
A1 La Playa Cove	A1 Anchorage	6/12/2019	WEBSITE	Confirmed	6/14/2019	6/17/2019	30'	3
A1 La Playa Cove	A1 Anchorage	6/12/2019	WEBSITE	Confirmed	6/14/2019	6/17/2019	40'	3
A1 La Playa Cove	A1 Anchorage	6/12/2019	WEBSITE	Confirmed	6/28/2019	7/1/2019	46'	3

Marina	Mooring	Date Reservation Made	Made At	Status	Arrival Date	Departure Date	Boat Length	Length of Stay (Nights)
A1 La Playa Cove	A1 Anchorage	6/12/2019	WEBSITE	Confirmed	6/14/2019	6/17/2019	52'	3
A1 La Playa Cove	A1 Anchorage	6/12/2019	WEBSITE	Confirmed	6/14/2019	6/17/2019	32'	3
A1 La Playa Cove	A1 Anchorage	6/12/2019	WEBSITE	Confirmed	6/14/2019	6/17/2019	30'	3
A1 La Playa Cove	A1 Anchorage	6/13/2019	Parks Central Reservations	Confirmed	6/14/2019	6/17/2019	26'	3
A1 La Playa Cove	A1 Anchorage	6/13/2019	WEBSITE	Confirmed	6/21/2019	6/24/2019	30'	3
A1 La Playa Cove	A1 Anchorage	6/13/2019	WEBSITE	Confirmed	6/28/2019	7/1/2019	30'	3
A1 La Playa Cove	A1 Anchorage	6/13/2019	Moorings	Confirmed	6/14/2019	6/17/2019	35'	3
A1 La Playa Cove	A1 Anchorage	6/13/2019	WEBSITE	Confirmed	6/14/2019	6/17/2019	30'	3
A1 La Playa Cove	A1 Anchorage	6/13/2019	WEBSITE	Confirmed	6/14/2019	6/17/2019	38'	3
A1 La Playa Cove	A1 Anchorage	6/13/2019	WEBSITE	Confirmed	6/14/2019	6/17/2019	46'	3
A1 La Playa Cove	A1 Anchorage	6/13/2019	Parks Central Reservations	Confirmed	6/14/2019	6/17/2019	37'	3
A1 La Playa Cove	A1 Anchorage	6/13/2019	WEBSITE	Confirmed	6/14/2019	6/17/2019	37'	3
A1 La Playa Cove	A1 Anchorage	6/13/2019	WEBSITE	Confirmed	6/14/2019	6/17/2019	32'	3
A1 La Playa Cove	A1 Anchorage	6/13/2019	WEBSITE	Confirmed	6/21/2019	6/24/2019	37'	3
A1 La Playa Cove	A1 Anchorage	6/14/2019	WEBSITE	Confirmed	8/2/2019	8/5/2019	42'	3
A1 La Playa Cove	A1 Anchorage	6/14/2019	WEBSITE	Confirmed	8/9/2019	8/12/2019	42'	3
A1 La Playa Cove	A1 Anchorage	6/14/2019	WEBSITE	Confirmed	6/21/2019	6/24/2019	33'	3
A1 La Playa Cove	A1 Anchorage	6/14/2019	WEBSITE	Confirmed	7/12/2019	7/15/2019	33'	3
A1 La Playa Cove	A1 Anchorage	6/14/2019	WEBSITE	Confirmed	8/2/2019	8/5/2019	38'	3
A1 La Playa Cove	A1 Anchorage	6/14/2019	WEBSITE	Confirmed	8/9/2019	8/12/2019	38'	3
A1 La Playa Cove	A1 Anchorage	6/14/2019	WEBSITE	Confirmed	8/9/2019	8/12/2019	48'	3
A1 La Playa Cove	A1 Anchorage	6/14/2019	WEBSITE	Confirmed	7/26/2019	7/29/2019	42'	3
A1 La Playa Cove	A1 Anchorage	6/14/2019	WEBSITE	Confirmed	6/14/2019	6/17/2019	48'	3
A1 La Playa Cove	A1 Anchorage	6/14/2019	WEBSITE	Confirmed	6/14/2019	6/17/2019	33'	3
A1 La Playa Cove	A1 Anchorage	6/15/2019	WEBSITE	Confirmed	6/21/2019	6/24/2019	36'	3
A1 La Playa Cove	A1 Anchorage	6/15/2019	WEBSITE	Confirmed	6/21/2019	6/24/2019	45'	3
A1 La Playa Cove	A1 Anchorage	6/16/2019	WEBSITE	Confirmed	6/21/2019	6/24/2019	30'	3
A1 La Playa Cove	A1 Anchorage	6/17/2019	Parks Central Reservations	Confirmed	6/21/2019	6/24/2019	38'	3
A1 La Playa Cove	A1 Anchorage	6/17/2019	WEBSITE	Confirmed	6/21/2019	6/24/2019	63'	3
A1 La Playa Cove	A1 Anchorage	6/17/2019	Moorings	Confirmed	7/5/2019	7/8/2019	42'	3
A1 La Playa Cove	A1 Anchorage	6/17/2019	Moorings	Confirmed	6/28/2019	7/1/2019	42'	3
A1 La Playa Cove	A1 Anchorage	6/17/2019	WEBSITE	Confirmed	6/21/2019	6/24/2019	44'	3
A1 La Playa Cove	A1 Anchorage	6/17/2019	WEBSITE	Confirmed	6/21/2019	6/24/2019	44'	3
A1 La Playa Cove	A1 Anchorage	6/18/2019	WEBSITE	Confirmed	6/21/2019	6/24/2019	31'	3
A1 La Playa Cove	A1 Anchorage	6/18/2019	WEBSITE	Confirmed	8/30/2019	9/2/2019	44'	3
A1 La Playa Cove	A1 Anchorage	6/18/2019	WEBSITE	Confirmed	7/5/2019	7/8/2019	40'	3
A1 La Playa Cove	A1 Anchorage	6/18/2019	WEBSITE	Confirmed	6/21/2019	6/24/2019	30'	3
A1 La Playa Cove	A1 Anchorage	6/18/2019	WEBSITE	Confirmed	7/5/2019	7/8/2019	45'	3
A1 La Playa Cove	A1 Anchorage	6/18/2019	WEBSITE	Confirmed	6/21/2019	6/24/2019	60'	3
A1 La Playa Cove	A1 Anchorage	6/19/2019	WEBSITE	Confirmed	7/5/2019	7/8/2019	20'	3
A1 La Playa Cove	A1 Anchorage	6/19/2019	WEBSITE	Confirmed	6/21/2019	6/24/2019	45'	3
A1 La Playa Cove	A1 Anchorage	6/19/2019	WEBSITE	Confirmed	7/5/2019	7/8/2019	48'	3
A1 La Playa Cove	A1 Anchorage	6/19/2019	WEBSITE	Confirmed	6/21/2019	6/24/2019	32'	3
A1 La Playa Cove	A1 Anchorage	6/19/2019	WEBSITE	Confirmed	6/21/2019	6/24/2019	31'	3
A1 La Playa Cove	A1 Anchorage	6/19/2019	WEBSITE	Confirmed	6/21/2019	6/24/2019	30'	3
A1 La Playa Cove	A1 Anchorage	6/19/2019	WEBSITE	Confirmed	6/28/2019	7/1/2019	30'	3
A1 La Playa Cove	A1 Anchorage	6/19/2019	WEBSITE	Confirmed	7/12/2019	7/15/2019	30'	3
A1 La Playa Cove	A1 Anchorage	6/19/2019	WEBSITE	Confirmed	7/19/2019	7/22/2019	30'	3
A1 La Playa Cove	A1 Anchorage	6/19/2019	WEBSITE	Confirmed	8/9/2019	8/12/2019	30'	3
A1 La Playa Cove	A1 Anchorage	6/19/2019	WEBSITE	Confirmed	6/21/2019	6/24/2019	42'	3
A1 La Playa Cove	A1 Anchorage	6/20/2019	Parks Central Reservations	Confirmed	6/21/2019	6/24/2019	26'	3
A1 La Playa Cove	A1 Anchorage	6/20/2019	Parks Central Reservations	Confirmed	6/21/2019	6/24/2019	26'	3
A1 La Playa Cove	A1 Anchorage	6/20/2019	Moorings	Confirmed	6/21/2019	6/24/2019	45'	3
A1 La Playa Cove	A1 Anchorage	6/20/2019	WEBSITE	Confirmed	6/21/2019	6/24/2019	32'	3
A1 La Playa Cove	A1 Anchorage	6/20/2019	Parks Central Reservations	Confirmed	6/21/2019	6/24/2019	27'	3
A1 La Playa Cove	A1 Anchorage	6/20/2019	WEBSITE	Confirmed	6/21/2019	6/24/2019	29'	3
A1 La Playa Cove	A1 Anchorage	6/20/2019	WEBSITE	Confirmed	6/21/2019	6/24/2019	42'	3
A1 La Playa Cove	A1 Anchorage	6/20/2019	WEBSITE	Confirmed	8/16/2019	8/19/2019	44'	3
A1 La Playa Cove	A1 Anchorage	6/20/2019	WEBSITE	Confirmed	8/23/2019	8/26/2019	44'	3
A1 La Playa Cove	A1 Anchorage	6/20/2019	Parks Central Reservations	Confirmed	6/21/2019	6/24/2019	28'	3

Marina	Mooring	Date Reservation Made	Made At	Status	Arrival Date	Departure Date	Boat Length	Length of Stay (Nights)
A1 La Playa Cove	A1 Anchorage	6/20/2019	Parks Central Reservations	Confirmed	6/21/2019	6/24/2019	28'	3
A1 La Playa Cove	A1 Anchorage	6/20/2019	Parks Central Reservations	Confirmed	6/28/2019	7/1/2019	28'	3
A1 La Playa Cove	A1 Anchorage	6/20/2019	Parks Central Reservations	Confirmed	6/28/2019	7/1/2019	28'	3
A1 La Playa Cove	A1 Overflow	6/20/2019	Parks Central Reservations	Confirmed	6/21/2019	6/24/2019	38'	3
A1 La Playa Cove	A1 Anchorage	6/20/2019	WEBSITE	Confirmed	8/16/2019	8/19/2019	30'	3
A1 La Playa Cove	A1 Anchorage	6/21/2019	WEBSITE	Confirmed	7/5/2019	7/8/2019	32'	3
A1 La Playa Cove	A1 Anchorage	6/21/2019	WEBSITE	Confirmed	7/5/2019	7/8/2019	53'	3
A1 La Playa Cove	A1 Anchorage	6/23/2019	WEBSITE	Confirmed	6/28/2019	7/1/2019	63'	3
A1 La Playa Cove	A1 Anchorage	6/23/2019	WEBSITE	Confirmed	6/28/2019	7/1/2019	47'	3
A1 La Playa Cove	A1 Anchorage	6/24/2019	Parks Central Reservations	Confirmed	6/28/2019	7/1/2019	27'	3
A1 La Playa Cove	A1 Anchorage	6/24/2019	WEBSITE	Confirmed	6/28/2019	7/1/2019	33'	3
A1 La Playa Cove	A1 Anchorage	6/24/2019	WEBSITE	Confirmed	6/28/2019	7/1/2019	32'	3
A1 La Playa Cove	A1 Anchorage	6/24/2019	WEBSITE	Confirmed	7/5/2019	7/8/2019	32'	3
A1 La Playa Cove	A1 Anchorage	6/24/2019	WEBSITE	Confirmed	6/28/2019	7/1/2019	27'	3
A1 La Playa Cove	A1 Anchorage	6/24/2019	WEBSITE	Confirmed	7/5/2019	7/8/2019	27'	3
A1 La Playa Cove	A1 Anchorage	6/24/2019	WEBSITE	Confirmed	7/5/2019	7/8/2019	38'	3
A1 La Playa Cove	A1 Anchorage	6/24/2019	WEBSITE	Confirmed	6/28/2019	7/1/2019	30'	3
A1 La Playa Cove	A1 Anchorage	6/25/2019	WEBSITE	Confirmed	7/5/2019	7/8/2019	32'	3
A1 La Playa Cove	A1 Anchorage	6/25/2019	WEBSITE	Confirmed	6/28/2019	7/1/2019	42'	3
A1 La Playa Cove	A1 Anchorage	6/25/2019	WEBSITE	Confirmed	7/5/2019	7/8/2019	23'	3
A1 La Playa Cove	A1 Anchorage	6/25/2019	WEBSITE	Confirmed	6/28/2019	7/1/2019	36'	3
A1 La Playa Cove	A1 Anchorage	6/26/2019	Parks Central Reservations	Confirmed	6/28/2019	7/1/2019	38'	3
A1 La Playa Cove	A1 Anchorage	6/26/2019	WEBSITE	Confirmed	6/28/2019	7/1/2019	38'	3
A1 La Playa Cove	A1 Anchorage	6/27/2019	Moorings	Confirmed	6/28/2019	7/1/2019	26'	3
A1 La Playa Cove	A1 Anchorage	6/27/2019	WEBSITE	Confirmed	6/28/2019	7/1/2019	42'	3
A1 La Playa Cove	A1 Anchorage	6/27/2019	WEBSITE	Confirmed	6/28/2019	7/1/2019	42'	3
A1 La Playa Cove	A1 Anchorage	6/27/2019	WEBSITE	Confirmed	6/28/2019	7/1/2019	36'	3
A1 La Playa Cove	A1 Anchorage	6/27/2019	WEBSITE	Confirmed	7/12/2019	7/15/2019	38'	3
A1 La Playa Cove	A1 Anchorage	6/27/2019	WEBSITE	Confirmed	6/28/2019	7/1/2019	58'	3
A1 La Playa Cove	A1 Anchorage	6/27/2019	WEBSITE	Confirmed	6/28/2019	7/1/2019	28'	3
A1 La Playa Cove	A1 Anchorage	6/27/2019	WEBSITE	Confirmed	6/28/2019	7/1/2019	32'	3
A1 La Playa Cove	A1 Anchorage	6/27/2019	WEBSITE	Confirmed	6/28/2019	7/1/2019	42'	3
A1 La Playa Cove	A1 Anchorage	6/28/2019	WEBSITE	Confirmed	7/26/2019	7/29/2019	32'	3
A1 La Playa Cove	A1 Anchorage	6/28/2019	WEBSITE	Confirmed	6/28/2019	7/1/2019	26'	3
A1 La Playa Cove	A1 Anchorage	6/28/2019	WEBSITE	Confirmed	7/12/2019	7/15/2019	30'	3
A1 La Playa Cove	A1 Anchorage	6/28/2019	WEBSITE	Confirmed	7/26/2019	7/29/2019	30'	3
A1 La Playa Cove	A1 Anchorage	6/28/2019	WEBSITE	Confirmed	8/16/2019	8/19/2019	43'	3
A1 La Playa Cove	A1 Anchorage	6/29/2019	WEBSITE	Confirmed	7/12/2019	7/15/2019	43'	3
A1 La Playa Cove	A1 Anchorage	6/30/2019	WEBSITE	Confirmed	7/12/2019	7/15/2019	50'	3
A1 La Playa Cove	A1 Anchorage	7/1/2019	WEBSITE	Confirmed	8/30/2019	9/2/2019	47'	3
A1 La Playa Cove	A1 Anchorage	7/1/2019	WEBSITE	Confirmed	7/12/2019	7/15/2019	25'	3
A1 La Playa Cove	A1 Anchorage	7/1/2019	WEBSITE	Confirmed	7/12/2019	7/15/2019	49'	3
A1 La Playa Cove	A1 Anchorage	7/2/2019	WEBSITE	Confirmed	7/12/2019	7/15/2019	48'	3
A1 La Playa Cove	A1 Anchorage	7/3/2019	WEBSITE	Confirmed	7/12/2019	7/15/2019	30'	3
A1 La Playa Cove	A1 Anchorage	7/3/2019	WEBSITE	Confirmed	7/5/2019	7/8/2019	16'	3
A1 La Playa Cove	A1 Anchorage	7/5/2019	WEBSITE	Confirmed	7/12/2019	7/15/2019	28'	3
A1 La Playa Cove	A1 Anchorage	7/6/2019	WEBSITE	Confirmed	7/12/2019	7/15/2019	40'	3
A1 La Playa Cove	A1 Anchorage	7/6/2019	WEBSITE	Confirmed	9/13/2019	9/16/2019	44'	3
A1 La Playa Cove	A1 Anchorage	7/6/2019	WEBSITE	Confirmed	9/20/2019	9/23/2019	44'	3
A1 La Playa Cove	A1 Anchorage	7/6/2019	WEBSITE	Confirmed	9/27/2019	9/30/2019	44'	3
A1 La Playa Cove	A1 Anchorage	7/6/2019	WEBSITE	Confirmed	10/25/2019	10/28/2019	44'	3
A1 La Playa Cove	A1 Anchorage	7/6/2019	WEBSITE	Confirmed	7/12/2019	7/15/2019	50'	3
A1 La Playa Cove	A1 Anchorage	7/6/2019	WEBSITE	Confirmed	7/12/2019	7/15/2019	46'	3
A1 La Playa Cove	A1 Anchorage	7/6/2019	WEBSITE	Confirmed	7/12/2019	7/15/2019	38'	3
A1 La Playa Cove	A1 Anchorage	7/7/2019	WEBSITE	Confirmed	7/12/2019	7/15/2019	37'	3
A1 La Playa Cove	A1 Anchorage	7/7/2019	WEBSITE	Confirmed	7/12/2019	7/15/2019	34'	3
A1 La Playa Cove	A1 Anchorage	7/7/2019	WEBSITE	Confirmed	7/12/2019	7/15/2019	40'	3
A1 La Playa Cove	A1 Anchorage	7/7/2019	WEBSITE	Confirmed	7/12/2019	7/15/2019	41'	3
A1 La Playa Cove	A1 Anchorage	7/7/2019	WEBSITE	Confirmed	7/12/2019	7/15/2019	32'	3
A1 La Playa Cove	A1 Anchorage	7/7/2019	WEBSITE	Confirmed	7/12/2019	7/15/2019	36'	3

Marina	Mooring	Date Reservation Made	Made At	Status	Arrival Date	Departure Date	Boat Length	Length of Stay (Nights)
A1 La Playa Cove	A1 Anchorage	7/8/2019	Parks Central Reservations	Confirmed	7/12/2019	7/15/2019	38'	3
A1 La Playa Cove	A1 Anchorage	7/8/2019	Parks Central Reservations	Confirmed	7/12/2019	7/15/2019	42'	3
A1 La Playa Cove	A1 Anchorage	7/8/2019	WEBSITE	Confirmed	7/12/2019	7/15/2019	49'	3
A1 La Playa Cove	A1 Anchorage	7/8/2019	WEBSITE	Confirmed	7/19/2019	7/22/2019	64'	3
A1 La Playa Cove	A1 Anchorage	7/8/2019	WEBSITE	Confirmed	7/12/2019	7/15/2019	36'	3
A1 La Playa Cove	A1 Anchorage	7/8/2019	WEBSITE	Confirmed	7/12/2019	7/15/2019	50'	3
A1 La Playa Cove	A1 Anchorage	7/8/2019	WEBSITE	Confirmed	7/12/2019	7/15/2019	38'	3
A1 La Playa Cove	A1 Anchorage	7/8/2019	WEBSITE	Confirmed	7/12/2019	7/15/2019	36'	3
A1 La Playa Cove	A1 Anchorage	7/8/2019	WEBSITE	Confirmed	7/12/2019	7/15/2019	33'	3
A1 La Playa Cove	A1 Anchorage	7/8/2019	WEBSITE	Confirmed	7/12/2019	7/15/2019	47'	3
A1 La Playa Cove	A1 Anchorage	7/9/2019	WEBSITE	Confirmed	7/26/2019	7/29/2019	30'	3
A1 La Playa Cove	A1 Anchorage	7/9/2019	WEBSITE	Confirmed	7/12/2019	7/15/2019	31'	3
A1 La Playa Cove	A1 Anchorage	7/9/2019	WEBSITE	Confirmed	7/12/2019	7/15/2019	34'	3
A1 La Playa Cove	A1 Anchorage	7/9/2019	WEBSITE	Confirmed	7/12/2019	7/15/2019	55'	3
A1 La Playa Cove	A1 Anchorage	7/9/2019	WEBSITE	Confirmed	7/12/2019	7/15/2019	44'	3
A1 La Playa Cove	A1 Anchorage	7/10/2019	WEBSITE	Confirmed	7/19/2019	7/22/2019	34'	3
A1 La Playa Cove	A1 Anchorage	7/10/2019	WEBSITE	Confirmed	7/26/2019	7/29/2019	34'	3
A1 La Playa Cove	A1 Anchorage	7/10/2019	WEBSITE	Confirmed	8/2/2019	8/5/2019	34'	3
A1 La Playa Cove	A1 Anchorage	7/10/2019	WEBSITE	Confirmed	7/19/2019	7/22/2019	38'	3
A1 La Playa Cove	A1 Anchorage	7/10/2019	WEBSITE	Confirmed	7/19/2019	7/22/2019	60'	3
A1 La Playa Cove	A1 Anchorage	7/10/2019	Parks Central Reservations	Confirmed	7/12/2019	7/15/2019	26'	3
A1 La Playa Cove	A1 Anchorage	7/11/2019	WEBSITE	Confirmed	8/2/2019	8/5/2019	47'	3
A1 La Playa Cove	A1 Anchorage	7/11/2019	WEBSITE	Confirmed	7/19/2019	7/22/2019	30'	3
A1 La Playa Cove	A1 Anchorage	7/11/2019	WEBSITE	Confirmed	8/23/2019	8/26/2019	41'	3
A1 La Playa Cove	A1 Anchorage	7/11/2019	Moorings	Confirmed	7/12/2019	7/15/2019	38'	3
A1 La Playa Cove	A1 Anchorage	7/11/2019	WEBSITE	Confirmed	7/26/2019	7/29/2019	30'	3
A1 La Playa Cove	A1 Anchorage	7/11/2019	WEBSITE	Confirmed	7/19/2019	7/22/2019	41'	3
A1 La Playa Cove	A1 Anchorage	7/11/2019	Parks Central Reservations	Confirmed	7/19/2019	7/22/2019	65'	3
A1 La Playa Cove	A1 Anchorage	7/11/2019	WEBSITE	Confirmed	11/1/2019	11/4/2019	30'	3
A1 La Playa Cove	A1 Anchorage	7/11/2019	WEBSITE	Confirmed	11/8/2019	11/11/2019	30'	3
A1 La Playa Cove	A1 Anchorage	7/11/2019	WEBSITE	Confirmed	7/19/2019	7/22/2019	26'	3
A1 La Playa Cove	A1 Anchorage	7/11/2019	WEBSITE	Confirmed	7/19/2019	7/22/2019	50'	3
A1 La Playa Cove	A1 Anchorage	7/12/2019	WEBSITE	Confirmed	7/19/2019	7/22/2019	28'	3
A1 La Playa Cove	A1 Anchorage	7/12/2019	WEBSITE	Confirmed	7/26/2019	7/29/2019	28'	3
A1 La Playa Cove	A1 Anchorage	7/13/2019	WEBSITE	Confirmed	8/16/2019	8/19/2019	28'	3
A1 La Playa Cove	A1 Anchorage	7/14/2019	WEBSITE	Confirmed	7/19/2019	7/22/2019	53'	3
A1 La Playa Cove	A1 Anchorage	7/14/2019	WEBSITE	Confirmed	7/19/2019	7/22/2019	45'	3
A1 La Playa Cove	A1 Anchorage	7/14/2019	WEBSITE	Confirmed	7/26/2019	7/29/2019	45'	3
A1 La Playa Cove	A1 Anchorage	7/14/2019	WEBSITE	Confirmed	7/19/2019	7/22/2019	50'	3
A1 La Playa Cove	A1 Anchorage	7/15/2019	Parks Central Reservations	Confirmed	7/19/2019	7/22/2019	42'	3
A1 La Playa Cove	A1 Anchorage	7/15/2019	WEBSITE	Confirmed	9/27/2019	9/30/2019	31'	3
A1 La Playa Cove	A1 Anchorage	7/15/2019	WEBSITE	Confirmed	7/19/2019	7/22/2019	46'	3
A1 La Playa Cove	A1 Anchorage	7/15/2019	WEBSITE	Confirmed	7/19/2019	7/22/2019	40'	3
A1 La Playa Cove	A1 Anchorage	7/15/2019	WEBSITE	Confirmed	8/2/2019	8/5/2019	37'	3
A1 La Playa Cove	A1 Anchorage	7/15/2019	Parks Central Reservations	Confirmed	7/19/2019	7/22/2019	30'	3
A1 La Playa Cove	A1 Anchorage	7/15/2019	WEBSITE	Confirmed	7/19/2019	7/22/2019	40'	3
A1 La Playa Cove	A1 Anchorage	7/15/2019	WEBSITE	Confirmed	7/19/2019	7/22/2019	28'	3
A1 La Playa Cove	A1 Anchorage	7/15/2019	WEBSITE	Confirmed	7/19/2019	7/22/2019	42'	3
A1 La Playa Cove	A1 Anchorage	7/15/2019	WEBSITE	Confirmed	7/19/2019	7/22/2019	40'	3
A1 La Playa Cove	A1 Anchorage	7/15/2019	WEBSITE	Confirmed	7/19/2019	7/22/2019	30'	3
A1 La Playa Cove	A1 Anchorage	7/16/2019	Moorings	Confirmed	7/19/2019	7/22/2019	60'	3
A1 La Playa Cove	A1 Anchorage	7/16/2019	WEBSITE	Confirmed	7/26/2019	7/29/2019	38'	3
A1 La Playa Cove	A1 Anchorage	7/16/2019	Moorings	Confirmed	7/19/2019	7/22/2019	38'	3
A1 La Playa Cove	A1 Anchorage	7/16/2019	Parks Central Reservations	Confirmed	7/19/2019	7/22/2019	26'	3
A1 La Playa Cove	A1 Anchorage	7/16/2019	WEBSITE	Confirmed	7/19/2019	7/22/2019	37'	3
A1 La Playa Cove	A1 Anchorage	7/16/2019	Parks Central Reservations	Confirmed	7/26/2019	7/29/2019	50'	3
A1 La Playa Cove	A1 Anchorage	7/16/2019	Parks Central Reservations	Confirmed	7/26/2019	7/29/2019	43'	3
A1 La Playa Cove	A1 Anchorage	7/16/2019	Parks Central Reservations	Confirmed	7/26/2019	7/29/2019	50'	3
A1 La Playa Cove	A1 Anchorage	7/16/2019	WEBSITE	Confirmed	7/19/2019	7/22/2019	32'	3
A1 La Playa Cove	A1 Anchorage	7/17/2019	WEBSITE	Confirmed	7/19/2019	7/22/2019	63'	3

Marina	Mooring	Date Reservation Made	Made At	Status	Arrival Date	Departure Date	Boat Length	Length of Stay (Nights)
A1 La Playa Cove	A1 Anchorage	7/17/2019	WEBSITE	Confirmed	8/30/2019	9/2/2019	63'	3
A1 La Playa Cove	A1 Anchorage	7/17/2019	Parks Central Reservations	Confirmed	7/19/2019	7/22/2019	27'	3
A1 La Playa Cove	A1 Anchorage	7/17/2019	Parks Central Reservations	Confirmed	7/19/2019	7/22/2019	30'	3
A1 La Playa Cove	A1 Anchorage	7/17/2019	WEBSITE	Confirmed	7/19/2019	7/22/2019	40'	3
A1 La Playa Cove	A1 Anchorage	7/18/2019	WEBSITE	Confirmed	7/19/2019	7/22/2019	42'	3
A1 La Playa Cove	A1 Anchorage	7/18/2019	Parks Central Reservations	Confirmed	7/19/2019	7/22/2019	26'	3
A1 La Playa Cove	A1 Anchorage	7/18/2019	WEBSITE	Confirmed	7/19/2019	7/22/2019	32'	3
A1 La Playa Cove	A1 Anchorage	7/18/2019	WEBSITE	Confirmed	7/19/2019	7/22/2019	41'	3
A1 La Playa Cove	A1 Anchorage	7/18/2019	Parks Central Reservations	Confirmed	7/19/2019	7/22/2019	39'	3
A1 La Playa Cove	A1 Anchorage	7/18/2019	WEBSITE	Confirmed	7/19/2019	7/22/2019	39'	3
A1 La Playa Cove	A1 Anchorage	7/18/2019	WEBSITE	Confirmed	7/26/2019	7/29/2019	36'	3
A1 La Playa Cove	A1 Anchorage	7/19/2019	WEBSITE	Confirmed	8/30/2019	9/2/2019	43'	3
A1 La Playa Cove	A1 Anchorage	7/19/2019	WEBSITE	Confirmed	7/26/2019	7/29/2019	38'	3
A1 La Playa Cove	A1 Anchorage	7/19/2019	WEBSITE	Confirmed	7/26/2019	7/29/2019	38'	3
A1 La Playa Cove	A1 Anchorage	7/19/2019	WEBSITE	Confirmed	7/26/2019	7/29/2019	36'	3
A1 La Playa Cove	A1 Anchorage	7/19/2019	WEBSITE	Confirmed	8/16/2019	8/19/2019	34'	3
A1 La Playa Cove	A1 Anchorage	7/19/2019	WEBSITE	Confirmed	7/26/2019	7/29/2019	30'	3
A1 La Playa Cove	A1 Anchorage	7/21/2019	WEBSITE	Confirmed	7/26/2019	7/29/2019	47'	3
A1 La Playa Cove	A1 Anchorage	7/21/2019	WEBSITE	Confirmed	8/23/2019	8/26/2019	34'	3
A1 La Playa Cove	A1 Anchorage	7/21/2019	WEBSITE	Confirmed	7/26/2019	7/29/2019	38'	3
A1 La Playa Cove	A1 Anchorage	7/22/2019	WEBSITE	Confirmed	7/26/2019	7/29/2019	44'	3
A1 La Playa Cove	A1 Anchorage	7/22/2019	WEBSITE	Confirmed	7/26/2019	7/29/2019	31'	3
A1 La Playa Cove	A1 Anchorage	7/22/2019	WEBSITE	Confirmed	8/16/2019	8/19/2019	42'	3
A1 La Playa Cove	A1 Anchorage	7/22/2019	Parks Central Reservations	Confirmed	7/26/2019	7/29/2019	30'	3
A1 La Playa Cove	A1 Anchorage	7/22/2019	WEBSITE	Confirmed	7/26/2019	7/29/2019	32'	3
A1 La Playa Cove	A1 Anchorage	7/22/2019	WEBSITE	Confirmed	7/26/2019	7/29/2019	26'	3
A1 La Playa Cove	A1 Anchorage	7/22/2019	WEBSITE	Confirmed	8/16/2019	8/19/2019	40'	3
A1 La Playa Cove	A1 Anchorage	7/22/2019	WEBSITE	Confirmed	7/26/2019	7/29/2019	52'	3
A1 La Playa Cove	A1 Anchorage	7/22/2019	WEBSITE	Confirmed	10/18/2019	10/21/2019	48'	3
A1 La Playa Cove	A1 Anchorage	7/22/2019	WEBSITE	Confirmed	8/2/2019	8/5/2019	50'	3
A1 La Playa Cove	A1 Anchorage	7/23/2019	WEBSITE	Confirmed	9/6/2019	9/9/2019	40'	3
A1 La Playa Cove	A1 Anchorage	7/23/2019	WEBSITE	Confirmed	7/26/2019	7/29/2019	37'	3
A1 La Playa Cove	A1 Anchorage	7/23/2019	WEBSITE	Confirmed	8/30/2019	9/2/2019	59'	3
A1 La Playa Cove	A1 Anchorage	7/23/2019	WEBSITE	Confirmed	7/26/2019	7/29/2019	28'	3
A1 La Playa Cove	A1 Anchorage	7/23/2019	WEBSITE	Confirmed	8/2/2019	8/5/2019	28'	3
A1 La Playa Cove	A1 Anchorage	7/23/2019	Moorings	Confirmed	7/26/2019	7/29/2019	27'	3
A1 La Playa Cove	A1 Anchorage	7/23/2019	WEBSITE	Confirmed	8/16/2019	8/19/2019	28'	3
A1 La Playa Cove	A1 Anchorage	7/23/2019	WEBSITE	Confirmed	7/26/2019	7/29/2019	27'	3
A1 La Playa Cove	A1 Anchorage	7/24/2019	WEBSITE	Confirmed	7/26/2019	7/29/2019	24'	3
A1 La Playa Cove	A1 Anchorage	7/24/2019	Parks Central Reservations	Confirmed	7/26/2019	7/29/2019	26'	3
A1 La Playa Cove	A1 Anchorage	7/24/2019	Parks Central Reservations	Confirmed	7/26/2019	7/29/2019	65'	3
A1 La Playa Cove	A1 Anchorage	7/24/2019	WEBSITE	Confirmed	7/26/2019	7/29/2019	48'	3
A1 La Playa Cove	A1 Anchorage	7/24/2019	Moorings	Confirmed	7/26/2019	7/29/2019	58'	3
A1 La Playa Cove	A1 Anchorage	7/24/2019	WEBSITE	Confirmed	7/26/2019	7/29/2019	42'	3
A1 La Playa Cove	A1 Anchorage	7/24/2019	WEBSITE	Confirmed	7/26/2019	7/29/2019	36'	3
A1 La Playa Cove	A1 Anchorage	7/25/2019	WEBSITE	Confirmed	8/2/2019	8/5/2019	42'	3
A1 La Playa Cove	A1 Overflow	7/25/2019	Parks Central Reservations	Confirmed	7/26/2019	7/29/2019	27'	3
A1 La Playa Cove	A1 Anchorage	7/25/2019	WEBSITE	Confirmed	8/2/2019	8/5/2019	39'	3
A1 La Playa Cove	A1 Anchorage	7/25/2019	WEBSITE	Confirmed	8/2/2019	8/5/2019	26'	3
A1 La Playa Cove	A1 Anchorage	7/26/2019	WEBSITE	Confirmed	8/2/2019	8/5/2019	32'	3
A1 La Playa Cove	A1 Anchorage	7/26/2019	WEBSITE	Confirmed	8/30/2019	9/2/2019	36'	3
A1 La Playa Cove	A1 Anchorage	7/26/2019	WEBSITE	Confirmed	8/30/2019	9/2/2019	28'	3
A1 La Playa Cove	A1 Anchorage	7/26/2019	WEBSITE	Confirmed	8/30/2019	9/2/2019	40'	3
A1 La Playa Cove	A1 Anchorage	7/26/2019	WEBSITE	Confirmed	8/30/2019	9/2/2019	42'	3
A1 La Playa Cove	A1 Anchorage	7/27/2019	WEBSITE	Confirmed	8/30/2019	9/2/2019	33'	3
A1 La Playa Cove	A1 Anchorage	7/27/2019	WEBSITE	Confirmed	8/2/2019	8/5/2019	32'	3
A1 La Playa Cove	A1 Anchorage	7/27/2019	WEBSITE	Confirmed	8/9/2019	8/12/2019	32'	3
A1 La Playa Cove	A1 Anchorage	7/28/2019	WEBSITE	Confirmed	8/2/2019	8/5/2019	40'	3
A1 La Playa Cove	A1 Anchorage	7/28/2019	WEBSITE	Confirmed	8/2/2019	8/5/2019	46'	3
A1 La Playa Cove	A1 Anchorage	7/28/2019	WEBSITE	Confirmed	8/30/2019	9/2/2019	39'	3

Marina	Mooring	Date Reservation Made	Made At	Status	Arrival Date	Departure Date	Boat Length	Length of Stay (Nights)
A1 La Playa Cove	A1 Anchorage	7/28/2019	WEBSITE	Confirmed	8/2/2019	8/5/2019	37'	3
A1 La Playa Cove	A1 Anchorage	7/28/2019	WEBSITE	Confirmed	8/2/2019	8/5/2019	42'	3
A1 La Playa Cove	A1 Anchorage	7/28/2019	WEBSITE	Confirmed	8/30/2019	9/2/2019	42'	3
A1 La Playa Cove	A1 Anchorage	7/28/2019	WEBSITE	Confirmed	8/2/2019	8/5/2019	38'	3
A1 La Playa Cove	A1 Anchorage	7/28/2019	WEBSITE	Confirmed	8/2/2019	8/5/2019	48'	3
A1 La Playa Cove	A1 Anchorage	7/28/2019	WEBSITE	Confirmed	10/18/2019	10/21/2019	42'	3
A1 La Playa Cove	A1 Anchorage	7/28/2019	WEBSITE	Confirmed	8/2/2019	8/5/2019	34'	3
A1 La Playa Cove	A1 Anchorage	7/29/2019	WEBSITE	Confirmed	8/2/2019	8/5/2019	42'	3
A1 La Playa Cove	A1 Anchorage	7/29/2019	WEBSITE	Confirmed	8/2/2019	8/5/2019	32'	3
A1 La Playa Cove	A1 Anchorage	7/29/2019	WEBSITE	Confirmed	8/2/2019	8/5/2019	35'	3
A1 La Playa Cove	A1 Anchorage	7/29/2019	WEBSITE	Confirmed	9/13/2019	9/16/2019	36'	3
A1 La Playa Cove	A1 Anchorage	7/29/2019	WEBSITE	Confirmed	8/2/2019	8/5/2019	30'	3
A1 La Playa Cove	A1 Anchorage	7/29/2019	WEBSITE	Confirmed	8/30/2019	9/2/2019	42'	3
A1 La Playa Cove	A1 Anchorage	7/29/2019	WEBSITE	Confirmed	8/2/2019	8/5/2019	36'	3
A1 La Playa Cove	A1 Anchorage	7/30/2019	Parks Central Reservations	Confirmed	8/2/2019	8/5/2019	26'	3
A1 La Playa Cove	A1 Anchorage	7/30/2019	WEBSITE	Confirmed	8/2/2019	8/5/2019	50'	3
A1 La Playa Cove	A1 Anchorage	7/30/2019	Parks Central Reservations	Confirmed	8/2/2019	8/5/2019	32'	3
A1 La Playa Cove	A1 Anchorage	7/30/2019	WEBSITE	Confirmed	8/2/2019	8/5/2019	35'	3
A1 La Playa Cove	A1 Anchorage	7/30/2019	Parks Central Reservations	Confirmed	8/2/2019	8/5/2019	26'	3
A1 La Playa Cove	A1 Anchorage	7/30/2019	WEBSITE	Confirmed	8/2/2019	8/5/2019	38'	3
A1 La Playa Cove	A1 Anchorage	7/30/2019	WEBSITE	Confirmed	8/9/2019	8/12/2019	50'	3
A1 La Playa Cove	A1 Anchorage	7/30/2019	WEBSITE	Confirmed	8/2/2019	8/5/2019	40'	3
A1 La Playa Cove	A1 Anchorage	7/30/2019	WEBSITE	Confirmed	8/2/2019	8/5/2019	43'	3
A1 La Playa Cove	A1 Anchorage	7/30/2019	WEBSITE	Confirmed	8/2/2019	8/5/2019	40'	3
A1 La Playa Cove	A1 Anchorage	7/31/2019	WEBSITE	Confirmed	8/2/2019	8/5/2019	30'	3
A1 La Playa Cove	A1 Anchorage	7/31/2019	WEBSITE	Confirmed	8/2/2019	8/5/2019	47'	3
A1 La Playa Cove	A1 Anchorage	7/31/2019	WEBSITE	Confirmed	8/9/2019	8/12/2019	32'	3
A1 La Playa Cove	A1 Overflow	7/31/2019	Moorings	Confirmed	8/2/2019	8/5/2019	38'	3
A1 La Playa Cove	A1 Anchorage	7/31/2019	Moorings	Confirmed	8/9/2019	8/12/2019	38'	3
A1 La Playa Cove	A1 Anchorage	7/31/2019	Moorings	Confirmed	8/16/2019	8/19/2019	38'	3
A1 La Playa Cove	A1 Anchorage	7/31/2019	WEBSITE	Confirmed	10/11/2019	10/14/2019	40'	3
A1 La Playa Cove	A1 Anchorage	8/1/2019	WEBSITE	Confirmed	8/9/2019	8/12/2019	30'	3
A1 La Playa Cove	A1 Anchorage	8/1/2019	WEBSITE	Confirmed	8/9/2019	8/12/2019	28'	3
A1 La Playa Cove	A1 Anchorage	8/1/2019	Parks Central Reservations	Confirmed	8/9/2019	8/12/2019	30'	3
A1 La Playa Cove	A1 Anchorage	8/1/2019	WEBSITE	Confirmed	8/2/2019	8/5/2019	33'	3
A1 La Playa Cove	A1 Anchorage	8/1/2019	Parks Central Reservations	Confirmed	8/9/2019	8/12/2019	27'	3
A1 La Playa Cove	A1 Anchorage	8/1/2019	WEBSITE	Confirmed	8/9/2019	8/12/2019	63'	3
A1 La Playa Cove	A1 Anchorage	8/1/2019	WEBSITE	Confirmed	8/2/2019	8/5/2019	32'	3
A1 La Playa Cove	A1 Anchorage	8/2/2019	WEBSITE	Confirmed	8/2/2019	8/5/2019	59'	3
A1 La Playa Cove	A1 Anchorage	8/2/2019	WEBSITE	Confirmed	8/9/2019	8/12/2019	38'	3
A1 La Playa Cove	A1 Anchorage	8/2/2019	WEBSITE	Confirmed	8/9/2019	8/12/2019	55'	3
A1 La Playa Cove	A1 Anchorage	8/3/2019	WEBSITE	Confirmed	8/30/2019	9/2/2019		3
A1 La Playa Cove	A1 Anchorage	8/3/2019	WEBSITE	Confirmed	8/9/2019	8/12/2019	30'	3
A1 La Playa Cove	A1 Anchorage	8/4/2019	WEBSITE	Confirmed	8/9/2019	8/12/2019	37'	3
A1 La Playa Cove	A1 Anchorage	8/4/2019	WEBSITE	Confirmed	8/9/2019	8/12/2019	26'	3
A1 La Playa Cove	A1 Anchorage	8/4/2019	WEBSITE	Confirmed	8/9/2019	8/12/2019	37'	3
A1 La Playa Cove	A1 Anchorage	8/4/2019	WEBSITE	Confirmed	8/16/2019	8/19/2019	26'	3
A1 La Playa Cove	A1 Anchorage	8/4/2019	WEBSITE	Confirmed	8/9/2019	8/12/2019	38'	3
A1 La Playa Cove	A1 Anchorage	8/4/2019	WEBSITE	Confirmed	8/23/2019	8/26/2019	30'	3
A1 La Playa Cove	A1 Anchorage	8/5/2019	WEBSITE	Confirmed	8/16/2019	8/19/2019	30'	3
A1 La Playa Cove	A1 Anchorage	8/5/2019	WEBSITE	Confirmed	8/9/2019	8/12/2019	40'	3
A1 La Playa Cove	A1 Anchorage	8/5/2019	WEBSITE	Confirmed	8/9/2019	8/12/2019	36'	3
A1 La Playa Cove	A1 Anchorage	8/6/2019	WEBSITE	Confirmed	8/9/2019	8/12/2019	24'	3
A1 La Playa Cove	A1 Anchorage	8/7/2019	Parks Central Reservations	Confirmed	8/9/2019	8/12/2019	26'	3
A1 La Playa Cove	A1 Anchorage	8/7/2019	WEBSITE	Confirmed	8/9/2019	8/12/2019	35'	3
A1 La Playa Cove	A1 Anchorage	8/7/2019	WEBSITE	Confirmed	8/9/2019	8/12/2019	50'	3
A1 La Playa Cove	A1 Anchorage	8/7/2019	WEBSITE	Confirmed	8/9/2019	8/12/2019	52'	3
A1 La Playa Cove	A1 Anchorage	8/7/2019	WEBSITE	Confirmed	8/9/2019	8/12/2019	22'	3
A1 La Playa Cove	A1 Anchorage	8/7/2019	WEBSITE	Confirmed	8/9/2019	8/12/2019	38'	3
A1 La Playa Cove	A1 Anchorage	8/7/2019	WEBSITE	Confirmed	8/9/2019	8/12/2019	32'	3

Marina	Mooring	Date Reservation Made	Made At	Status	Arrival Date	Departure Date	Boat Length	Length of Stay (Nights)
A1 La Playa Cove	A1 Anchorage	8/7/2019	WEBSITE	Confirmed	9/6/2019	9/9/2019	30'	3
A1 La Playa Cove	A1 Anchorage	8/7/2019	WEBSITE	Confirmed	8/9/2019	8/12/2019	42'	3
A1 La Playa Cove	A1 Anchorage	8/7/2019	Parks Central Reservations	Confirmed	8/9/2019	8/12/2019	32'	3
A1 La Playa Cove	A1 Anchorage	8/7/2019	WEBSITE	Confirmed	8/9/2019	8/12/2019	33'	3
A1 La Playa Cove	A1 Anchorage	8/7/2019	WEBSITE	Confirmed	8/16/2019	8/19/2019	33'	3
A1 La Playa Cove	A1 Anchorage	8/7/2019	WEBSITE	Confirmed	8/9/2019	8/12/2019	33'	3
A1 La Playa Cove	A1 Anchorage	8/7/2019	WEBSITE	Confirmed	8/9/2019	8/12/2019	40'	3
A1 La Playa Cove	A1 Anchorage	8/7/2019	WEBSITE	Confirmed	8/23/2019	8/26/2019	42'	3
A1 La Playa Cove	A1 Anchorage	8/7/2019	WEBSITE	Confirmed	8/9/2019	8/12/2019	47'	3
A1 La Playa Cove	A1 Anchorage	8/7/2019	WEBSITE	Confirmed	8/9/2019	8/12/2019	45'	3
A1 La Playa Cove	A1 Anchorage	8/7/2019	WEBSITE	Confirmed	8/23/2019	8/26/2019	34'	3
A1 La Playa Cove	A1 Anchorage	8/7/2019	WEBSITE	Confirmed	8/16/2019	8/19/2019	34'	3
A1 La Playa Cove	A1 Anchorage	8/8/2019	Moorings	Confirmed	8/16/2019	8/19/2019	26'	3
A1 La Playa Cove	A1 Anchorage	8/8/2019	WEBSITE	Confirmed	8/16/2019	8/19/2019	42'	3
A1 La Playa Cove	A1 Anchorage	8/8/2019	WEBSITE	Confirmed	8/16/2019	8/19/2019	30'	3
A1 La Playa Cove	A1 Anchorage	8/9/2019	WEBSITE	Confirmed	8/16/2019	8/19/2019	30'	3
A1 La Playa Cove	A1 Anchorage	8/9/2019	WEBSITE	Confirmed	8/30/2019	9/2/2019	34'	3
A1 La Playa Cove	A1 Anchorage	8/9/2019	WEBSITE	Confirmed	8/23/2019	8/26/2019	30'	3
A1 La Playa Cove	A1 Anchorage	8/9/2019	WEBSITE	Confirmed	8/30/2019	9/2/2019	30'	3
A1 La Playa Cove	A1 Anchorage	8/10/2019	WEBSITE	Confirmed	8/30/2019	9/2/2019	35'	3
A1 La Playa Cove	A1 Anchorage	8/10/2019	WEBSITE	Confirmed	8/30/2019	9/2/2019	25'	3
A1 La Playa Cove	A1 Anchorage	8/10/2019	WEBSITE	Confirmed	8/16/2019	8/19/2019	36'	3
A1 La Playa Cove	A1 Anchorage	8/10/2019	WEBSITE	Confirmed	8/30/2019	9/2/2019	46'	3
A1 La Playa Cove	A1 Anchorage	8/10/2019	WEBSITE	Confirmed	8/30/2019	9/2/2019	32'	3
A1 La Playa Cove	A1 Anchorage	8/10/2019	WEBSITE	Confirmed	8/23/2019	8/26/2019	34'	3
A1 La Playa Cove	A1 Anchorage	8/11/2019	WEBSITE	Confirmed	8/23/2019	8/26/2019	36'	3
A1 La Playa Cove	A1 Anchorage	8/11/2019	WEBSITE	Confirmed	8/16/2019	8/19/2019	40'	3
A1 La Playa Cove	A1 Anchorage	8/11/2019	WEBSITE	Confirmed	8/16/2019	8/19/2019	32'	3
A1 La Playa Cove	A1 Anchorage	8/12/2019	WEBSITE	Confirmed	8/30/2019	9/2/2019	48'	3
A1 La Playa Cove	A1 Anchorage	8/12/2019	WEBSITE	Confirmed	8/16/2019	8/19/2019	41'	3
A1 La Playa Cove	A1 Anchorage	8/12/2019	WEBSITE	Confirmed	8/30/2019	9/2/2019	41'	3
A1 La Playa Cove	A1 Anchorage	8/12/2019	WEBSITE	Confirmed	8/23/2019	8/26/2019	42'	3
A1 La Playa Cove	A1 Anchorage	8/12/2019	WEBSITE	Confirmed	8/16/2019	8/19/2019	22'	3
A1 La Playa Cove	A1 Anchorage	8/13/2019	WEBSITE	Confirmed	8/16/2019	8/19/2019	30'	3
A1 La Playa Cove	A1 Anchorage	8/13/2019	WEBSITE	Confirmed	8/30/2019	9/2/2019	33'	3
A1 La Playa Cove	A1 Anchorage	8/13/2019	WEBSITE	Confirmed	8/30/2019	9/2/2019	46'	3
A1 La Playa Cove	A1 Anchorage	8/13/2019	WEBSITE	Confirmed	8/30/2019	9/2/2019	28'	3
A1 La Playa Cove	A1 Anchorage	8/13/2019	WEBSITE	Confirmed	8/16/2019	8/19/2019	32'	3
A1 La Playa Cove	A1 Anchorage	8/13/2019	WEBSITE	Confirmed	8/16/2019	8/19/2019	38'	3
A1 La Playa Cove	A1 Anchorage	8/13/2019	WEBSITE	Confirmed	8/16/2019	8/19/2019	28'	3
A1 La Playa Cove	A1 Anchorage	8/13/2019	Moorings	Confirmed	8/16/2019	8/19/2019	27'	3
A1 La Playa Cove	A1 Anchorage	8/13/2019	WEBSITE	Confirmed	8/16/2019	8/19/2019	37'	3
A1 La Playa Cove	A1 Anchorage	8/13/2019	Moorings	Confirmed	8/16/2019	8/19/2019	65'	3
A1 La Playa Cove	A1 Anchorage	8/13/2019	WEBSITE	Confirmed	8/16/2019	8/19/2019	32'	3
A1 La Playa Cove	A1 Anchorage	8/13/2019	WEBSITE	Confirmed	8/30/2019	9/2/2019	39'	3
A1 La Playa Cove	A1 Anchorage	8/13/2019	WEBSITE	Confirmed	8/30/2019	9/2/2019	36'	3
A1 La Playa Cove	A1 Anchorage	8/13/2019	WEBSITE	Confirmed	8/30/2019	9/2/2019	39'	3
A1 La Playa Cove	A1 Anchorage	8/13/2019	WEBSITE	Confirmed	8/16/2019	8/19/2019	50'	3
A1 La Playa Cove	A1 Anchorage	8/14/2019	WEBSITE	Confirmed	8/16/2019	8/19/2019	47'	3
A1 La Playa Cove	A1 Anchorage	8/14/2019	Parks Central Reservations	Confirmed	8/16/2019	8/19/2019	30'	3
A1 La Playa Cove	A1 Anchorage	8/14/2019	Parks Central Reservations	Confirmed	8/16/2019	8/19/2019	26'	3
A1 La Playa Cove	A1 Anchorage	8/14/2019	WEBSITE	Confirmed	8/16/2019	8/19/2019	40'	3
A1 La Playa Cove	A1 Anchorage	8/14/2019	WEBSITE	Confirmed	8/16/2019	8/19/2019	27'	3
A1 La Playa Cove	A1 Anchorage	8/14/2019	WEBSITE	Confirmed	9/6/2019	9/9/2019	58'	3
A1 La Playa Cove	A1 Anchorage	8/15/2019	WEBSITE	Confirmed	9/13/2019	9/16/2019	38'	3
A1 La Playa Cove	A1 Anchorage	8/15/2019	WEBSITE	Confirmed	8/30/2019	9/2/2019	48'	3
A1 La Playa Cove	A1 Anchorage	8/15/2019	WEBSITE	Confirmed	8/23/2019	8/26/2019	63'	3
A1 La Playa Cove	A1 Anchorage	8/15/2019	Parks Central Reservations	Confirmed	8/23/2019	8/26/2019	26'	3
A1 La Playa Cove	A1 Anchorage	8/15/2019	Parks Central Reservations	Confirmed	8/23/2019	8/26/2019	30'	3
A1 La Playa Cove	A1 Anchorage	8/15/2019	WEBSITE	Confirmed	8/16/2019	8/19/2019	38'	3

Marina	Mooring	Date Reservation Made	Made At	Status	Arrival Date	Departure Date	Boat Length	Length of Stay (Nights)
A1 La Playa Cove	A1 Anchorage	8/15/2019	WEBSITE	Confirmed	8/16/2019	8/19/2019	36'	3
A1 La Playa Cove	A1 Anchorage	8/15/2019	WEBSITE	Confirmed	8/30/2019	9/2/2019	36'	3
A1 La Playa Cove	A1 Anchorage	8/17/2019	WEBSITE	Confirmed	9/6/2019	9/9/2019	36'	3
A1 La Playa Cove	A1 Anchorage	8/17/2019	WEBSITE	Confirmed	8/23/2019	8/26/2019	53'	3
A1 La Playa Cove	A1 Anchorage	8/17/2019	WEBSITE	Confirmed	8/23/2019	8/26/2019	27'	3
A1 La Playa Cove	A1 Anchorage	8/17/2019	WEBSITE	Confirmed	9/13/2019	9/16/2019	49'	3
A1 La Playa Cove	A1 Anchorage	8/18/2019	WEBSITE	Confirmed	8/23/2019	8/26/2019	38'	3
A1 La Playa Cove	A1 Anchorage	8/18/2019	WEBSITE	Confirmed	8/23/2019	8/26/2019	38'	3
A1 La Playa Cove	A1 Anchorage	8/18/2019	WEBSITE	Confirmed	8/23/2019	8/26/2019	34'	3
A1 La Playa Cove	A1 Anchorage	8/18/2019	WEBSITE	Confirmed	8/23/2019	8/26/2019	36'	3
A1 La Playa Cove	A1 Anchorage	8/18/2019	WEBSITE	Confirmed	8/23/2019	8/26/2019	32'	3
A1 La Playa Cove	A1 Anchorage	8/18/2019	WEBSITE	Confirmed	8/23/2019	8/26/2019	32'	3
A1 La Playa Cove	A1 Anchorage	8/18/2019	WEBSITE	Confirmed	9/6/2019	9/9/2019	32'	3
A1 La Playa Cove	A1 Anchorage	8/19/2019	Parks Central Reservations	Confirmed	8/23/2019	8/26/2019	32'	3
A1 La Playa Cove	A1 Anchorage	8/19/2019	WEBSITE	Confirmed	8/30/2019	9/2/2019	31'	3
A1 La Playa Cove	A1 Anchorage	8/19/2019	WEBSITE	Confirmed	8/23/2019	8/26/2019	40'	3
A1 La Playa Cove	A1 Anchorage	8/19/2019	WEBSITE	Confirmed	8/23/2019	8/26/2019	36'	3
A1 La Playa Cove	A1 Anchorage	8/19/2019	Moorings	Confirmed	8/23/2019	8/26/2019	65'	3
A1 La Playa Cove	A1 Anchorage	8/19/2019	Parks Central Reservations	Confirmed	8/23/2019	8/26/2019	32'	3
A1 La Playa Cove	A1 Anchorage	8/19/2019	WEBSITE	Confirmed	8/23/2019	8/26/2019	58'	3
A1 La Playa Cove	A1 Anchorage	8/19/2019	WEBSITE	Confirmed	8/23/2019	8/26/2019	48'	3
A1 La Playa Cove	A1 Anchorage	8/20/2019	WEBSITE	Confirmed	8/23/2019	8/26/2019	37'	3
A1 La Playa Cove	A1 Anchorage	8/20/2019	WEBSITE	Confirmed	8/23/2019	8/26/2019	38'	3
A1 La Playa Cove	A1 Anchorage	8/20/2019	WEBSITE	Confirmed	8/23/2019	8/26/2019	36'	3
A1 La Playa Cove	A1 Anchorage	8/20/2019	WEBSITE	Confirmed	8/30/2019	9/2/2019	38'	3
A1 La Playa Cove	A1 Overflow	8/21/2019	Parks Central Reservations	Confirmed	8/23/2019	8/26/2019	33'	3
A1 La Playa Cove	A1 Anchorage	8/22/2019	WEBSITE	Confirmed	9/27/2019	9/30/2019	38'	3
A1 La Playa Cove	A1 Anchorage	8/25/2019	WEBSITE	Confirmed	9/6/2019	9/9/2019	30'	3
A1 La Playa Cove	A1 Anchorage	8/26/2019	Parks Central Reservations	Confirmed	9/6/2019	9/9/2019	27'	3
A1 La Playa Cove	A1 Anchorage	8/26/2019	Parks Central Reservations	Confirmed	9/13/2019	9/16/2019	27'	3
A1 La Playa Cove	A1 Anchorage	8/26/2019	Parks Central Reservations	Confirmed	8/30/2019	9/2/2019	26'	3
A1 La Playa Cove	A1 Anchorage	8/26/2019	WEBSITE	Confirmed	9/6/2019	9/9/2019	39'	3
A1 La Playa Cove	A1 Anchorage	8/26/2019	WEBSITE	Confirmed	9/13/2019	9/16/2019	39'	3
A1 La Playa Cove	A1 Anchorage	8/26/2019	WEBSITE	Confirmed	9/27/2019	9/30/2019	39'	3
A1 La Playa Cove	A1 Anchorage	8/26/2019	WEBSITE	Confirmed	10/4/2019	10/7/2019	39'	3
A1 La Playa Cove	A1 Anchorage	8/26/2019	WEBSITE	Confirmed	11/8/2019	11/11/2019	39'	3
A1 La Playa Cove	A1 Anchorage	8/26/2019	WEBSITE	Confirmed	12/6/2019	12/9/2019	39'	3
A1 La Playa Cove	A1 Anchorage	8/26/2019	WEBSITE	Confirmed	12/13/2019	12/16/2019	39'	3
A1 La Playa Cove	A1 Anchorage	8/26/2019	WEBSITE	Confirmed	12/20/2019	12/23/2019	39'	3
A1 La Playa Cove	A1 Anchorage	8/29/2019	Parks Central Reservations	Confirmed	9/13/2019	9/16/2019	30'	3
A1 La Playa Cove	A1 Anchorage	8/29/2019	Parks Central Reservations	Confirmed	9/27/2019	9/30/2019	30'	3
A1 La Playa Cove	A1 Anchorage	8/29/2019	WEBSITE	Confirmed	11/1/2019	11/4/2019	49'	3
A1 La Playa Cove	A1 Anchorage	8/30/2019	WEBSITE	Confirmed	9/6/2019	9/9/2019	22'	3
A1 La Playa Cove	A1 Anchorage	8/30/2019	WEBSITE	Confirmed	9/6/2019	9/9/2019	27'	3
A1 La Playa Cove	A1 Anchorage	9/1/2019	WEBSITE	Confirmed	9/27/2019	9/30/2019	30'	3
A1 La Playa Cove	A1 Anchorage	9/1/2019	WEBSITE	Confirmed	9/6/2019	9/9/2019	38'	3
A1 La Playa Cove	A1 Anchorage	9/1/2019	WEBSITE	Confirmed	11/1/2019	11/4/2019	50'	3
A1 La Playa Cove	A1 Anchorage	9/1/2019	WEBSITE	Confirmed	9/20/2019	9/23/2019	35'	3
A1 La Playa Cove	A1 Anchorage	9/2/2019	WEBSITE	Confirmed	9/6/2019	9/9/2019	32'	3
A1 La Playa Cove	A1 Anchorage	9/2/2019	WEBSITE	Confirmed	9/6/2019	9/9/2019	38'	3
A1 La Playa Cove	A1 Anchorage	9/3/2019	Parks Central Reservations	Confirmed	9/6/2019	9/9/2019	26'	3
A1 La Playa Cove	A1 Anchorage	9/3/2019	Parks Central Reservations	Confirmed	9/6/2019	9/9/2019	65'	3
A1 La Playa Cove	A1 Anchorage	9/3/2019	WEBSITE	Confirmed	9/6/2019	9/9/2019	38'	3
A1 La Playa Cove	A1 Anchorage	9/3/2019	Parks Central Reservations	Confirmed	9/6/2019	9/9/2019	32'	3
A1 La Playa Cove	A1 Anchorage	9/3/2019	Parks Central Reservations	Confirmed	9/20/2019	9/23/2019	40'	3
A1 La Playa Cove	A1 Anchorage	9/3/2019	Parks Central Reservations	Confirmed	9/27/2019	9/30/2019	40'	3
A1 La Playa Cove	A1 Anchorage	9/3/2019	WEBSITE	Confirmed	9/6/2019	9/9/2019	27'	3
A1 La Playa Cove	A1 Anchorage	9/4/2019	WEBSITE	Confirmed	9/6/2019	9/9/2019	37'	3
A1 La Playa Cove	A1 Anchorage	9/4/2019	Parks Central Reservations	Confirmed	9/6/2019	9/9/2019	26'	3
A1 La Playa Cove	A1 Anchorage	9/4/2019	WEBSITE	Confirmed	9/6/2019	9/9/2019	30'	3

Marina	Mooring	Date Reservation Made	Made At	Status	Arrival Date	Departure Date	Boat Length	Length of Stay (Nights)
A1 La Playa Cove	A1 Anchorage	9/4/2019	Parks Central Reservations	Confirmed	9/6/2019	9/9/2019	30'	3
A1 La Playa Cove	A1 Anchorage	9/4/2019	WEBSITE	Confirmed	9/13/2019	9/16/2019	36'	3
A1 La Playa Cove	A1 Anchorage	9/4/2019	WEBSITE	Confirmed	9/6/2019	9/9/2019	30'	3
A1 La Playa Cove	A1 Anchorage	9/4/2019	WEBSITE	Confirmed	9/6/2019	9/9/2019	58'	3
A1 La Playa Cove	A1 Anchorage	9/4/2019	WEBSITE	Confirmed	9/6/2019	9/9/2019	47'	3
A1 La Playa Cove	A1 Anchorage	9/4/2019	WEBSITE	Confirmed	9/6/2019	9/9/2019	40'	3
A1 La Playa Cove	A1 Anchorage	9/4/2019	WEBSITE	Confirmed	9/20/2019	9/23/2019	36'	3
A1 La Playa Cove	A1 Anchorage	9/4/2019	WEBSITE	Confirmed	9/6/2019	9/9/2019	30'	3
A1 La Playa Cove	A1 Anchorage	9/5/2019	WEBSITE	Confirmed	9/6/2019	9/9/2019	46'	3
A1 La Playa Cove	A1 Anchorage	9/5/2019	Moorings	Confirmed	9/6/2019	9/9/2019	28'	3
A1 La Playa Cove	A1 Anchorage	9/5/2019	WEBSITE	Confirmed	9/6/2019	9/9/2019	50'	3
A1 La Playa Cove	A1 Anchorage	9/5/2019	Moorings	Confirmed	9/6/2019	9/9/2019	30'	3
A1 La Playa Cove	A1 Anchorage	9/5/2019	Moorings	Confirmed	9/27/2019	9/30/2019	30'	3
A1 La Playa Cove	A1 Anchorage	9/5/2019	WEBSITE	Confirmed	9/6/2019	9/9/2019	48'	3
A1 La Playa Cove	A1 Anchorage	9/5/2019	WEBSITE	Confirmed	9/13/2019	9/16/2019	28'	3
A1 La Playa Cove	A1 Anchorage	9/5/2019	WEBSITE	Confirmed	9/20/2019	9/23/2019	28'	3
A1 La Playa Cove	A1 Anchorage	9/5/2019	WEBSITE	Confirmed	9/27/2019	9/30/2019	28'	3
A1 La Playa Cove	A1 Anchorage	9/5/2019	WEBSITE	Confirmed	9/20/2019	9/23/2019	38'	3
A1 La Playa Cove	A1 Anchorage	9/5/2019	WEBSITE	Confirmed	9/6/2019	9/9/2019	43'	3
A1 La Playa Cove	A1 Anchorage	9/5/2019	WEBSITE	Confirmed	9/6/2019	9/9/2019	33'	3
A1 La Playa Cove	A1 Anchorage	9/6/2019	WEBSITE	Confirmed	9/13/2019	9/16/2019	50'	3
A1 La Playa Cove	A1 Anchorage	9/6/2019	WEBSITE	Confirmed	9/20/2019	9/23/2019	49'	3
A1 La Playa Cove	A1 Anchorage	9/6/2019	WEBSITE	Confirmed	9/13/2019	9/16/2019	30'	3
A1 La Playa Cove	A1 Anchorage	9/7/2019	WEBSITE	Confirmed	9/13/2019	9/16/2019	36'	3
A1 La Playa Cove	A1 Anchorage	9/7/2019	WEBSITE	Confirmed	9/13/2019	9/16/2019	25'	3
A1 La Playa Cove	A1 Anchorage	9/7/2019	WEBSITE	Confirmed	9/13/2019	9/16/2019	38'	3
A1 La Playa Cove	A1 Anchorage	9/8/2019	WEBSITE	Confirmed	9/13/2019	9/16/2019	50'	3
A1 La Playa Cove	A1 Anchorage	9/8/2019	WEBSITE	Confirmed	9/13/2019	9/16/2019	32'	3
A1 La Playa Cove	A1 Anchorage	9/8/2019	WEBSITE	Confirmed	9/13/2019	9/16/2019	24'	3
A1 La Playa Cove	A1 Anchorage	9/8/2019	WEBSITE	Confirmed	9/13/2019	9/16/2019	38'	3
A1 La Playa Cove	A1 Anchorage	9/9/2019	Parks Central Reservations	Confirmed	9/13/2019	9/16/2019	53'	3
A1 La Playa Cove	A1 Anchorage	9/9/2019	WEBSITE	Confirmed	9/13/2019	9/16/2019	44'	3
A1 La Playa Cove	A1 Anchorage	9/10/2019	WEBSITE	Confirmed	9/13/2019	9/16/2019	37'	3
A1 La Playa Cove	A1 Anchorage	9/10/2019	WEBSITE	Confirmed	9/13/2019	9/16/2019	37'	3
A1 La Playa Cove	A1 Anchorage	9/10/2019	Parks Central Reservations	Confirmed	9/13/2019	9/16/2019	26'	3
A1 La Playa Cove	A1 Anchorage	9/10/2019	WEBSITE	Confirmed	9/13/2019	9/16/2019	63'	3
A1 La Playa Cove	A1 Anchorage	9/10/2019	Moorings	Confirmed	9/13/2019	9/16/2019	26'	3
A1 La Playa Cove	A1 Anchorage	9/10/2019	Parks Central Reservations	Confirmed	9/13/2019	9/16/2019	33'	3
A1 La Playa Cove	A1 Anchorage	9/10/2019	WEBSITE	Confirmed	9/13/2019	9/16/2019	36'	3
A1 La Playa Cove	A1 Anchorage	9/10/2019	WEBSITE	Confirmed	9/13/2019	9/16/2019	27'	3
A1 La Playa Cove	A1 Anchorage	9/11/2019	WEBSITE	Confirmed	9/13/2019	9/16/2019	32'	3
A1 La Playa Cove	A1 Anchorage	9/11/2019	WEBSITE	Confirmed	9/13/2019	9/16/2019	27'	3
A1 La Playa Cove	A1 Anchorage	9/11/2019	WEBSITE	Confirmed	9/13/2019	9/16/2019	50'	3
A1 La Playa Cove	A1 Anchorage	9/11/2019	WEBSITE	Confirmed	10/18/2019	10/21/2019	40'	3
A1 La Playa Cove	A1 Anchorage	9/11/2019	WEBSITE	Confirmed	9/13/2019	9/16/2019	32'	3
A1 La Playa Cove	A1 Anchorage	9/11/2019	WEBSITE	Confirmed	9/13/2019	9/16/2019	41'	3
A1 La Playa Cove	A1 Anchorage	9/12/2019	WEBSITE	Confirmed	9/13/2019	9/16/2019	30'	3
A1 La Playa Cove	A1 Anchorage	9/12/2019	WEBSITE	Confirmed	9/20/2019	9/23/2019	20'	3
A1 La Playa Cove	A1 Anchorage	9/12/2019	Moorings	Confirmed	9/13/2019	9/16/2019	50'	3
A1 La Playa Cove	A1 Anchorage	9/12/2019	Parks Central Reservations	Confirmed	9/13/2019	9/16/2019	25'	3
A1 La Playa Cove	A1 Anchorage	9/12/2019	WEBSITE	Confirmed	9/13/2019	9/16/2019	49'	3
A1 La Playa Cove	A1 Anchorage	9/12/2019	WEBSITE	Confirmed	9/13/2019	9/16/2019	32'	3
A1 La Playa Cove	A1 Anchorage	9/12/2019	WEBSITE	Confirmed	9/13/2019	9/16/2019	33'	3
A1 La Playa Cove	A1 Anchorage	9/12/2019	WEBSITE	Confirmed	9/20/2019	9/23/2019	28'	3
A1 La Playa Cove	A1 Anchorage	9/13/2019	WEBSITE	Confirmed	10/25/2019	10/28/2019	44'	3
A1 La Playa Cove	A1 Anchorage	9/13/2019	WEBSITE	Confirmed	11/1/2019	11/4/2019	44'	3
A1 La Playa Cove	A1 Anchorage	9/13/2019	Parks Central Reservations	Confirmed	9/20/2019	9/23/2019	26'	3
A1 La Playa Cove	A1 Anchorage	9/13/2019	WEBSITE	Confirmed	9/20/2019	9/23/2019	47'	3
A1 La Playa Cove	A1 Anchorage	9/14/2019	WEBSITE	Confirmed	9/20/2019	9/23/2019	38'	3
A1 La Playa Cove	A1 Anchorage	9/15/2019	WEBSITE	Confirmed	10/25/2019	10/28/2019	38'	3

Marina	Mooring	Date Reservation Made	Made At	Status	Arrival Date	Departure Date	Boat Length	Length of Stay (Nights)
A1 La Playa Cove	A1 Anchorage	9/15/2019	WEBSITE	Confirmed	9/20/2019	9/23/2019	63'	3
A1 La Playa Cove	A1 Anchorage	9/15/2019	WEBSITE	Confirmed	9/20/2019	9/23/2019	49'	3
A1 La Playa Cove	A1 Anchorage	9/15/2019	WEBSITE	Confirmed	9/20/2019	9/23/2019	33'	3
A1 La Playa Cove	A1 Anchorage	9/15/2019	WEBSITE	Confirmed	9/20/2019	9/23/2019	34'	3
A1 La Playa Cove	A1 Anchorage	9/15/2019	WEBSITE	Confirmed	9/27/2019	9/30/2019	34'	3
A1 La Playa Cove	A1 Anchorage	9/16/2019	WEBSITE	Confirmed	9/20/2019	9/23/2019	38'	3
A1 La Playa Cove	A1 Anchorage	9/16/2019	Parks Central Reservations	Confirmed	9/20/2019	9/23/2019	26'	3
A1 La Playa Cove	A1 Anchorage	9/16/2019	Moorings	Confirmed	9/20/2019	9/23/2019	65'	3
A1 La Playa Cove	A1 Anchorage	9/16/2019	Parks Central Reservations	Confirmed	9/20/2019	9/23/2019	27'	3
A1 La Playa Cove	A1 Anchorage	9/16/2019	Parks Central Reservations	Confirmed	9/20/2019	9/23/2019	25'	3
A1 La Playa Cove	A1 Anchorage	9/16/2019	WEBSITE	Confirmed	9/20/2019	9/23/2019	32'	3
A1 La Playa Cove	A1 Anchorage	9/17/2019	WEBSITE	Confirmed	9/20/2019	9/23/2019	37'	3
A1 La Playa Cove	A1 Anchorage	9/17/2019	WEBSITE	Confirmed	9/20/2019	9/23/2019	38'	3
A1 La Playa Cove	A1 Anchorage	9/17/2019	WEBSITE	Confirmed	9/20/2019	9/23/2019	41'	3
A1 La Playa Cove	A1 Anchorage	9/17/2019	WEBSITE	Confirmed	11/1/2019	11/4/2019	44'	3
A1 La Playa Cove	A1 Anchorage	9/17/2019	WEBSITE	Confirmed	9/20/2019	9/23/2019	46'	3
A1 La Playa Cove	A1 Anchorage	9/18/2019	Parks Central Reservations	Confirmed	9/20/2019	9/23/2019	27'	3
A1 La Playa Cove	A1 Anchorage	9/18/2019	Parks Central Reservations	Confirmed	9/20/2019	9/23/2019	30'	3
A1 La Playa Cove	A1 Anchorage	9/18/2019	WEBSITE	Confirmed	11/1/2019	11/4/2019	30'	3
A1 La Playa Cove	A1 Anchorage	9/18/2019	Parks Central Reservations	Confirmed	9/20/2019	9/23/2019	30'	3
A1 La Playa Cove	A1 Anchorage	9/18/2019	WEBSITE	Confirmed	9/27/2019	9/30/2019	45'	3
A1 La Playa Cove	A1 Anchorage	9/18/2019	WEBSITE	Confirmed	9/27/2019	9/30/2019	22'	3
A1 La Playa Cove	A1 Anchorage	9/19/2019	WEBSITE	Confirmed	11/1/2019	11/4/2019	44'	3
A1 La Playa Cove	A1 Anchorage	9/19/2019	WEBSITE	Confirmed	9/20/2019	9/23/2019	50'	3
A1 La Playa Cove	A1 Anchorage	9/19/2019	WEBSITE	Confirmed	9/20/2019	9/23/2019	65'	3
A1 La Playa Cove	A1 Anchorage	9/19/2019	WEBSITE	Confirmed	9/20/2019	9/23/2019	36'	3
A1 La Playa Cove	A1 Anchorage	9/19/2019	Parks Central Reservations	Confirmed	9/27/2019	9/30/2019	26'	3
A1 La Playa Cove	A1 Anchorage	9/19/2019	WEBSITE	Confirmed	10/11/2019	10/14/2019	37'	3
A1 La Playa Cove	A1 Anchorage	9/19/2019	WEBSITE	Confirmed	9/20/2019	9/23/2019	27'	3
A1 La Playa Cove	A1 Anchorage	9/19/2019	WEBSITE	Confirmed	9/27/2019	9/30/2019	26'	3
A1 La Playa Cove	A1 Anchorage	9/19/2019	WEBSITE	Confirmed	9/20/2019	9/23/2019	32'	3
A1 La Playa Cove	A1 Anchorage	9/19/2019	WEBSITE	Confirmed	9/20/2019	9/23/2019	45'	3
A1 La Playa Cove	A1 Anchorage	9/19/2019	WEBSITE	Confirmed	10/25/2019	10/28/2019	45'	3
A1 La Playa Cove	A1 Anchorage	9/20/2019	WEBSITE	Confirmed	9/27/2019	9/30/2019	38'	3
A1 La Playa Cove	A1 Anchorage	9/20/2019	WEBSITE	Confirmed	10/11/2019	10/14/2019	36'	3
A1 La Playa Cove	A1 Anchorage	9/20/2019	WEBSITE	Confirmed	10/18/2019	10/21/2019	44'	3
A1 La Playa Cove	A1 Anchorage	9/20/2019	WEBSITE	Confirmed	10/11/2019	10/14/2019	44'	3
A1 La Playa Cove	A1 Anchorage	9/20/2019	WEBSITE	Confirmed	10/11/2019	10/14/2019	26'	3
A1 La Playa Cove	A1 Anchorage	9/21/2019	WEBSITE	Confirmed	10/4/2019	10/7/2019	38'	3
A1 La Playa Cove	A1 Anchorage	9/21/2019	WEBSITE	Confirmed	10/11/2019	10/14/2019	38'	3
A1 La Playa Cove	A1 Anchorage	9/21/2019	WEBSITE	Confirmed	10/18/2019	10/21/2019	38'	3
A1 La Playa Cove	A1 Anchorage	9/21/2019	WEBSITE	Confirmed	10/25/2019	10/28/2019	38'	3
A1 La Playa Cove	A1 Anchorage	9/21/2019	WEBSITE	Confirmed	11/1/2019	11/4/2019	38'	3
A1 La Playa Cove	A1 Anchorage	9/21/2019	WEBSITE	Confirmed	11/8/2019	11/11/2019	38'	3
A1 La Playa Cove	A1 Anchorage	9/21/2019	WEBSITE	Confirmed	11/15/2019	11/18/2019	38'	3
A1 La Playa Cove	A1 Anchorage	9/21/2019	WEBSITE	Confirmed	11/22/2019	11/25/2019	38'	3
A1 La Playa Cove	A1 Anchorage	9/21/2019	WEBSITE	Confirmed	11/29/2019	12/2/2019	38'	3
A1 La Playa Cove	A1 Anchorage	9/21/2019	WEBSITE	Confirmed	12/6/2019	12/9/2019	38'	3
A1 La Playa Cove	A1 Anchorage	9/21/2019	WEBSITE	Confirmed	12/13/2019	12/16/2019	38'	3
A1 La Playa Cove	A1 Anchorage	9/21/2019	WEBSITE	Confirmed	10/18/2019	10/21/2019	44'	3
A1 La Playa Cove	A1 Anchorage	9/21/2019	WEBSITE	Confirmed	10/18/2019	10/21/2019	42'	3
A1 La Playa Cove	A1 Anchorage	9/21/2019	WEBSITE	Confirmed	9/27/2019	9/30/2019	60'	3
A1 La Playa Cove	A1 Anchorage	9/22/2019	WEBSITE	Confirmed	9/27/2019	9/30/2019	63'	3
A1 La Playa Cove	A1 Anchorage	9/22/2019	WEBSITE	Confirmed	10/18/2019	10/21/2019	35'	3
A1 La Playa Cove	A1 Anchorage	9/22/2019	WEBSITE	Confirmed	9/27/2019	9/30/2019	33'	3
A1 La Playa Cove	A1 Anchorage	9/22/2019	WEBSITE	Confirmed	9/27/2019	9/30/2019	32'	3
A1 La Playa Cove	A1 Anchorage	9/22/2019	WEBSITE	Confirmed	9/27/2019	9/30/2019	38'	3
A1 La Playa Cove	A1 Anchorage	9/22/2019	WEBSITE	Confirmed	9/27/2019	9/30/2019	50'	3
A1 La Playa Cove	A1 Anchorage	9/22/2019	WEBSITE	Confirmed	10/4/2019	10/7/2019	50'	3
A1 La Playa Cove	A1 Anchorage	9/22/2019	WEBSITE	Confirmed	10/11/2019	10/14/2019	50'	3

Marina	Mooring	Date Reservation Made	Made At	Status	Arrival Date	Departure Date	Boat Length	Length of Stay (Nights)
A1 La Playa Cove	A1 Anchorage	9/23/2019	WEBSITE	Confirmed	9/27/2019	9/30/2019	38'	3
A1 La Playa Cove	A1 Anchorage	9/23/2019	Parks Central Reservations	Confirmed	9/27/2019	9/30/2019	30'	3
A1 La Playa Cove	A1 Anchorage	9/23/2019	Parks Central Reservations	Confirmed	9/27/2019	9/30/2019	27'	3
A1 La Playa Cove	A1 Anchorage	9/23/2019	WEBSITE	Confirmed	11/8/2019	11/11/2019	33'	3
A1 La Playa Cove	A1 Anchorage	9/23/2019	WEBSITE	Confirmed	9/27/2019	9/30/2019	33'	3
A1 La Playa Cove	A1 Anchorage	9/24/2019	Moorings	Confirmed	9/27/2019	9/30/2019	26'	3
A1 La Playa Cove	A1 Anchorage	9/24/2019	Moorings	Confirmed	10/4/2019	10/7/2019	26'	3
A1 La Playa Cove	A1 Anchorage	9/24/2019	Moorings	Confirmed	10/11/2019	10/14/2019	26'	3
A1 La Playa Cove	A1 Anchorage	9/24/2019	Moorings	Confirmed	10/18/2019	10/21/2019	26'	3
A1 La Playa Cove	A1 Anchorage	9/24/2019	Moorings	Confirmed	10/25/2019	10/28/2019	26'	3
A1 La Playa Cove	A1 Anchorage	9/24/2019	WEBSITE	Confirmed	10/4/2019	10/7/2019	42'	3
A1 La Playa Cove	A1 Anchorage	9/24/2019	WEBSITE	Confirmed	10/11/2019	10/14/2019	50'	3
A1 La Playa Cove	A1 Anchorage	9/24/2019	Parks Central Reservations	Confirmed	9/27/2019	9/30/2019	30'	3
A1 La Playa Cove	A1 Anchorage	9/24/2019	Parks Central Reservations	Confirmed	10/4/2019	10/7/2019	30'	3
A1 La Playa Cove	A1 Anchorage	9/24/2019	WEBSITE	Confirmed	10/11/2019	10/14/2019	52'	3
A1 La Playa Cove	A1 Anchorage	9/24/2019	Parks Central Reservations	Confirmed	9/27/2019	9/30/2019	50'	3
A1 La Playa Cove	A1 Anchorage	9/24/2019	WEBSITE	Confirmed	9/27/2019	9/30/2019	32'	3
A1 La Playa Cove	A1 Anchorage	9/25/2019	WEBSITE	Confirmed	9/27/2019	9/30/2019	65'	3
A1 La Playa Cove	A1 Anchorage	9/25/2019	Parks Central Reservations	Confirmed	9/27/2019	9/30/2019		3
A1 La Playa Cove	A1 Anchorage	9/25/2019	Parks Central Reservations	Confirmed	9/27/2019	9/30/2019	28'	3
A1 La Playa Cove	A1 Anchorage	9/25/2019	Moorings	Confirmed	9/27/2019	9/30/2019	27'	3
A1 La Playa Cove	A1 Anchorage	9/25/2019	WEBSITE	Confirmed	10/18/2019	10/21/2019	50'	3
A1 La Playa Cove	A1 Anchorage	9/25/2019	WEBSITE	Confirmed	10/25/2019	10/28/2019	50'	3
A1 La Playa Cove	A1 Anchorage	9/25/2019	Parks Central Reservations	Confirmed	10/4/2019	10/7/2019	50'	3
A1 La Playa Cove	A1 Anchorage	9/25/2019	WEBSITE	Confirmed	10/18/2019	10/21/2019	61'	3
A1 La Playa Cove	A1 Anchorage	9/25/2019	WEBSITE	Confirmed	9/27/2019	9/30/2019	34'	3
A1 La Playa Cove	A1 Anchorage	9/25/2019	WEBSITE	Confirmed	11/8/2019	11/11/2019	49'	3
A1 La Playa Cove	A1 Anchorage	9/25/2019	WEBSITE	Confirmed	11/22/2019	11/25/2019	49'	3
A1 La Playa Cove	A1 Anchorage	9/25/2019	WEBSITE	Confirmed	12/6/2019	12/9/2019	49'	3
A1 La Playa Cove	A1 Anchorage	9/25/2019	Parks Central Reservations	Confirmed	9/27/2019	9/30/2019	52'	3
A1 La Playa Cove	A1 Anchorage	9/25/2019	WEBSITE	Confirmed	10/11/2019	10/14/2019	50'	3
A1 La Playa Cove	A1 Anchorage	9/26/2019	WEBSITE	Confirmed	9/27/2019	9/30/2019	30'	3
A1 La Playa Cove	A1 Anchorage	9/26/2019	WEBSITE	Confirmed	9/27/2019	9/30/2019	36'	3
A1 La Playa Cove	A1 Anchorage	9/26/2019	Parks Central Reservations	Confirmed	9/27/2019	9/30/2019	25'	3
A1 La Playa Cove	A1 Anchorage	9/26/2019	WEBSITE	Confirmed	9/27/2019	9/30/2019	30'	3
A1 La Playa Cove	A1 Anchorage	9/26/2019	WEBSITE	Confirmed	9/27/2019	9/30/2019	48'	3
A1 La Playa Cove	A1 Anchorage	9/26/2019	WEBSITE	Confirmed	9/27/2019	9/30/2019	26'	3
A1 La Playa Cove	A1 Anchorage	9/27/2019	WEBSITE	Confirmed	10/18/2019	10/21/2019	59'	3
A1 La Playa Cove	A1 Anchorage	9/27/2019	WEBSITE	Confirmed	10/18/2019	10/21/2019	37'	3
A1 La Playa Cove	A1 Anchorage	9/27/2019	WEBSITE	Confirmed	10/4/2019	10/7/2019	37'	3
A1 La Playa Cove	A1 Anchorage	9/28/2019	WEBSITE	Confirmed	11/1/2019	11/4/2019	27'	3
A1 La Playa Cove	A1 Anchorage	9/28/2019	WEBSITE	Confirmed	10/4/2019	10/7/2019	40'	3
A1 La Playa Cove	A1 Anchorage	9/29/2019	WEBSITE	Confirmed	10/4/2019	10/7/2019	30'	3
A1 La Playa Cove	A1 Anchorage	9/29/2019	WEBSITE	Confirmed	10/4/2019	10/7/2019	27'	3
A1 La Playa Cove	A1 Anchorage	9/29/2019	WEBSITE	Confirmed	10/4/2019	10/7/2019	22'	3
A1 La Playa Cove	A1 Anchorage	9/29/2019	WEBSITE	Confirmed	10/25/2019	10/28/2019	43'	3
A1 La Playa Cove	A1 Anchorage	9/29/2019	WEBSITE	Confirmed	10/4/2019	10/7/2019	38'	3
A1 La Playa Cove	A1 Anchorage	9/29/2019	WEBSITE	Confirmed	10/11/2019	10/14/2019	38'	3
A1 La Playa Cove	A1 Anchorage	9/29/2019	WEBSITE	Confirmed	10/18/2019	10/21/2019	38'	3
A1 La Playa Cove	A1 Anchorage	9/29/2019	WEBSITE	Confirmed	10/25/2019	10/28/2019	38'	3
A1 La Playa Cove	A1 Anchorage	9/29/2019	WEBSITE	Confirmed	11/29/2019	12/2/2019	38'	3
A1 La Playa Cove	A1 Anchorage	9/29/2019	WEBSITE	Confirmed	11/22/2019	11/25/2019	38'	3
A1 La Playa Cove	A1 Anchorage	9/29/2019	WEBSITE	Confirmed	11/15/2019	11/18/2019	38'	3
A1 La Playa Cove	A1 Anchorage	9/29/2019	WEBSITE	Confirmed	10/11/2019	10/14/2019	33'	3
A1 La Playa Cove	A1 Anchorage	9/29/2019	WEBSITE	Confirmed	10/18/2019	10/21/2019	33'	3
A1 La Playa Cove	A1 Anchorage	9/29/2019	WEBSITE	Confirmed	10/25/2019	10/28/2019	33'	3
A1 La Playa Cove	A1 Anchorage	9/29/2019	WEBSITE	Confirmed	11/1/2019	11/4/2019	33'	3
A1 La Playa Cove	A1 Anchorage	9/29/2019	WEBSITE	Confirmed	11/8/2019	11/11/2019	33'	3
A1 La Playa Cove	A1 Anchorage	9/29/2019	WEBSITE	Confirmed	11/15/2019	11/18/2019	33'	3
A1 La Playa Cove	A1 Anchorage	9/29/2019	WEBSITE	Confirmed	10/4/2019	10/7/2019	24'	3

Marina	Mooring	Date Reservation Made	Made At	Status	Arrival Date	Departure Date	Boat Length	Length of Stay (Nights)
A1 La Playa Cove	A1 Anchorage	9/30/2019	Parks Central Reservations	Confirmed	10/4/2019	10/7/2019	27'	3
A1 La Playa Cove	A1 Anchorage	9/30/2019	Parks Central Reservations	Confirmed	10/11/2019	10/14/2019	30'	3
A1 La Playa Cove	A1 Anchorage	9/30/2019	WEBSITE	Confirmed	10/11/2019	10/14/2019	32'	3
A1 La Playa Cove	A1 Anchorage	9/30/2019	WEBSITE	Confirmed	10/11/2019	10/14/2019	24'	3
A1 La Playa Cove	A1 Anchorage	9/30/2019	WEBSITE	Confirmed	10/4/2019	10/7/2019	37'	3
A1 La Playa Cove	A1 Anchorage	9/30/2019	WEBSITE	Confirmed	10/11/2019	10/14/2019	32'	3
A1 La Playa Cove	A1 Anchorage	9/30/2019	Parks Central Reservations	Confirmed	10/4/2019	10/7/2019	36'	3
A1 La Playa Cove	A1 Anchorage	9/30/2019	WEBSITE	Confirmed	10/4/2019	10/7/2019	27'	3
A1 La Playa Cove	A1 Anchorage	10/1/2019	WEBSITE	Confirmed	10/4/2019	10/7/2019	38'	3
A1 La Playa Cove	A1 Anchorage	10/1/2019	WEBSITE	Confirmed	10/4/2019	10/7/2019	37'	3
A1 La Playa Cove	A1 Anchorage	10/1/2019	WEBSITE	Confirmed	10/11/2019	10/14/2019	36'	3
A1 La Playa Cove	A1 Anchorage	10/1/2019	WEBSITE	Confirmed	10/18/2019	10/21/2019	36'	3
A1 La Playa Cove	A1 Anchorage	10/1/2019	WEBSITE	Confirmed	10/25/2019	10/28/2019	41'	3
A1 La Playa Cove	A1 Anchorage	10/1/2019	Parks Central Reservations	Confirmed	10/4/2019	10/7/2019	65'	3
A1 La Playa Cove	A1 Anchorage	10/1/2019	WEBSITE	Confirmed	10/4/2019	10/7/2019	26'	3
A1 La Playa Cove	A1 Anchorage	10/1/2019	WEBSITE	Confirmed	10/11/2019	10/14/2019	26'	3
A1 La Playa Cove	A1 Anchorage	10/1/2019	Parks Central Reservations	Confirmed	10/4/2019	10/7/2019	28'	3
A1 La Playa Cove	A1 Anchorage	10/1/2019	Parks Central Reservations	Confirmed	10/11/2019	10/14/2019	28'	3
A1 La Playa Cove	A1 Anchorage	10/1/2019	Parks Central Reservations	Confirmed	10/18/2019	10/21/2019	28'	3
A1 La Playa Cove	A1 Anchorage	10/1/2019	Parks Central Reservations	Confirmed	10/4/2019	10/7/2019	26'	3
A1 La Playa Cove	A1 Anchorage	10/1/2019	Parks Central Reservations	Confirmed	10/11/2019	10/14/2019	26'	3
A1 La Playa Cove	A1 Anchorage	10/1/2019	Parks Central Reservations	Confirmed	10/4/2019	10/7/2019	30'	3
A1 La Playa Cove	A1 Anchorage	10/1/2019	Parks Central Reservations	Confirmed	10/11/2019	10/14/2019	30'	3
A1 La Playa Cove	A1 Anchorage	10/1/2019	Parks Central Reservations	Confirmed	10/18/2019	10/21/2019	30'	3
A1 La Playa Cove	A1 Anchorage	10/1/2019	WEBSITE	Confirmed	10/11/2019	10/14/2019	42'	3
A1 La Playa Cove	A1 Anchorage	10/1/2019	WEBSITE	Confirmed	11/1/2019	11/4/2019	42'	3
A1 La Playa Cove	A1 Anchorage	10/1/2019	WEBSITE	Confirmed	10/4/2019	10/7/2019	36'	3
A1 La Playa Cove	A1 Anchorage	10/1/2019	WEBSITE	Confirmed	10/4/2019	10/7/2019	25'	3
A1 La Playa Cove	A1 Anchorage	10/2/2019	WEBSITE	Confirmed	10/25/2019	10/28/2019	42'	3
A1 La Playa Cove	A1 Anchorage	10/2/2019	WEBSITE	Confirmed	10/4/2019	10/7/2019	42'	3
A1 La Playa Cove	A1 Anchorage	10/2/2019	WEBSITE	Confirmed	10/4/2019	10/7/2019	30'	3
A1 La Playa Cove	A1 Anchorage	10/2/2019	WEBSITE	Confirmed	10/4/2019	10/7/2019	30'	3
A1 La Playa Cove	A1 Anchorage	10/3/2019	WEBSITE	Confirmed	10/4/2019	10/7/2019	30'	3
A1 La Playa Cove	A1 Anchorage	10/3/2019	WEBSITE	Confirmed	10/4/2019	10/7/2019	15'	3
A1 La Playa Cove	A1 Anchorage	10/3/2019	WEBSITE	Confirmed	10/4/2019	10/7/2019	24'	3
A1 La Playa Cove	A1 Anchorage	10/3/2019	WEBSITE	Confirmed	10/4/2019	10/7/2019	45'	3
A1 La Playa Cove	A1 Anchorage	10/3/2019	WEBSITE	Confirmed	10/4/2019	10/7/2019	30'	3
A1 La Playa Cove	A1 Anchorage	10/3/2019	WEBSITE	Confirmed	10/4/2019	10/7/2019	40'	3
A1 La Playa Cove	A1 Anchorage	10/3/2019	Parks Central Reservations	Confirmed	10/4/2019	10/7/2019	33'	3
A1 La Playa Cove	A1 Anchorage	10/3/2019	WEBSITE	Confirmed	10/4/2019	10/7/2019	32'	3
A1 La Playa Cove	A1 Anchorage	10/3/2019	Moorings	Confirmed	10/4/2019	10/7/2019	30'	3
A1 La Playa Cove	A1 Anchorage	10/4/2019	WEBSITE	Confirmed	10/11/2019	10/14/2019	45'	3
A1 La Playa Cove	A1 Anchorage	10/4/2019	WEBSITE	Confirmed	10/18/2019	10/21/2019	45'	3
A1 La Playa Cove	A1 Anchorage	10/4/2019	WEBSITE	Confirmed	10/25/2019	10/28/2019	45'	3
A1 La Playa Cove	A1 Anchorage	10/4/2019	WEBSITE	Confirmed	10/11/2019	10/14/2019	47'	3
A1 La Playa Cove	A1 Anchorage	10/5/2019	WEBSITE	Confirmed	10/11/2019	10/14/2019	36'	3
A1 La Playa Cove	A1 Anchorage	10/5/2019	WEBSITE	Confirmed	10/18/2019	10/21/2019	41'	3
A1 La Playa Cove	A1 Anchorage	10/5/2019	WEBSITE	Confirmed	11/1/2019	11/4/2019	53'	3
A1 La Playa Cove	A1 Anchorage	10/5/2019	WEBSITE	Confirmed	10/18/2019	10/21/2019	39'	3
A1 La Playa Cove	A1 Anchorage	10/5/2019	WEBSITE	Confirmed	10/11/2019	10/14/2019	30'	3
A1 La Playa Cove	A1 Anchorage	10/5/2019	WEBSITE	Confirmed	10/18/2019	10/21/2019	30'	3
A1 La Playa Cove	A1 Anchorage	10/5/2019	WEBSITE	Confirmed	10/25/2019	10/28/2019	30'	3
A1 La Playa Cove	A1 Anchorage	10/5/2019	WEBSITE	Confirmed	10/25/2019	10/28/2019	35'	3
A1 La Playa Cove	A1 Anchorage	10/6/2019	WEBSITE	Confirmed	10/11/2019	10/14/2019	26'	3
A1 La Playa Cove	A1 Anchorage	10/6/2019	WEBSITE	Confirmed	10/11/2019	10/14/2019	50'	3
A1 La Playa Cove	A1 Anchorage	10/7/2019	WEBSITE	Confirmed	10/11/2019	10/14/2019	63'	3
A1 La Playa Cove	A1 Anchorage	10/7/2019	WEBSITE	Confirmed	10/18/2019	10/21/2019	63'	3
A1 La Playa Cove	A1 Anchorage	10/7/2019	WEBSITE	Confirmed	10/25/2019	10/28/2019	63'	3
A1 La Playa Cove	A1 Anchorage	10/7/2019	WEBSITE	Confirmed	11/1/2019	11/4/2019	49'	3
A1 La Playa Cove	A1 Anchorage	10/7/2019	WEBSITE	Confirmed	10/11/2019	10/14/2019	38'	3

Marina	Mooring	Date Reservation Made	Made At	Status	Arrival Date	Departure Date	Boat Length	Length of Stay (Nights)
A1 La Playa Cove	A1 Anchorage	10/7/2019	WEBSITE	Confirmed	10/11/2019	10/14/2019	37'	3
A1 La Playa Cove	A1 Anchorage	10/8/2019	WEBSITE	Confirmed	11/1/2019	11/4/2019	42'	3
A1 La Playa Cove	A1 Anchorage	10/8/2019	WEBSITE	Confirmed	10/11/2019	10/14/2019	50'	3
A1 La Playa Cove	A1 Anchorage	10/8/2019	WEBSITE	Confirmed	10/11/2019	10/14/2019	34'	3
A1 La Playa Cove	A1 Anchorage	10/8/2019	WEBSITE	Confirmed	10/11/2019	10/14/2019	38'	3
A1 La Playa Cove	A1 Anchorage	10/9/2019	WEBSITE	Confirmed	11/1/2019	11/4/2019	39'	3
A1 La Playa Cove	A1 Anchorage	10/9/2019	WEBSITE	Confirmed	10/11/2019	10/14/2019	40'	3
A1 La Playa Cove	A1 Anchorage	10/9/2019	WEBSITE	Confirmed	10/11/2019	10/14/2019	41'	3
A1 La Playa Cove	A1 Anchorage	10/9/2019	WEBSITE	Confirmed	10/11/2019	10/14/2019	38'	3
A1 La Playa Cove	A1 Anchorage	10/9/2019	WEBSITE	Confirmed	10/25/2019	10/28/2019	30'	3
A1 La Playa Cove	A1 Anchorage	10/10/2019	WEBSITE	Confirmed	11/22/2019	11/25/2019	38'	3
A1 La Playa Cove	A1 Anchorage	10/10/2019	Moorings	Confirmed	10/25/2019	10/28/2019	30'	3
A1 La Playa Cove	A1 Anchorage	10/10/2019	WEBSITE	Confirmed	10/11/2019	10/14/2019	32'	3
A1 La Playa Cove	A1 Anchorage	10/10/2019	WEBSITE	Confirmed	10/25/2019	10/28/2019	30'	3
A1 La Playa Cove	A1 Anchorage	10/10/2019	WEBSITE	Confirmed	10/25/2019	10/28/2019	30'	3
A1 La Playa Cove	A1 Anchorage	10/10/2019	WEBSITE	Confirmed	11/1/2019	11/4/2019	30'	3
A1 La Playa Cove	A1 Anchorage	10/10/2019	WEBSITE	Confirmed	11/8/2019	11/11/2019	30'	3
A1 La Playa Cove	A1 Anchorage	10/10/2019	WEBSITE	Confirmed	11/15/2019	11/18/2019	30'	3
A1 La Playa Cove	A1 Anchorage	10/10/2019	WEBSITE	Confirmed	11/22/2019	11/25/2019	30'	3
A1 La Playa Cove	A1 Anchorage	10/10/2019	WEBSITE	Confirmed	11/22/2019	11/25/2019	30'	3
A1 La Playa Cove	A1 Anchorage	10/10/2019	WEBSITE	Confirmed	11/29/2019	12/2/2019	30'	3
A1 La Playa Cove	A1 Anchorage	10/10/2019	WEBSITE	Confirmed	12/13/2019	12/16/2019	30'	3
A1 La Playa Cove	A1 Anchorage	10/10/2019	WEBSITE	Confirmed	12/20/2019	12/23/2019	30'	3
A1 La Playa Cove	A1 Anchorage	10/10/2019	WEBSITE	Confirmed	12/27/2019	12/30/2019	30'	3
A1 La Playa Cove	A1 Anchorage	10/10/2019	WEBSITE	Confirmed	10/11/2019	10/14/2019	50'	3
A1 La Playa Cove	A1 Anchorage	10/10/2019	WEBSITE	Confirmed	10/25/2019	10/28/2019	45'	3
A1 La Playa Cove	A1 Anchorage	10/11/2019	WEBSITE	Confirmed	10/25/2019	10/28/2019	42'	3
A1 La Playa Cove	A1 Anchorage	10/11/2019	WEBSITE	Confirmed	10/18/2019	10/21/2019	50'	3
A1 La Playa Cove	A1 Anchorage	10/14/2019	Parks Central Reservations	Confirmed	10/25/2019	10/28/2019	26'	3
A1 La Playa Cove	A1 Anchorage	10/14/2019	Parks Central Reservations	Confirmed	11/1/2019	11/4/2019	26'	3
A1 La Playa Cove	A1 Anchorage	10/14/2019	Parks Central Reservations	Confirmed	11/1/2019	11/4/2019	30'	3
A1 La Playa Cove	A1 Anchorage	10/14/2019	Parks Central Reservations	Confirmed	11/8/2019	11/11/2019	30'	3
A1 La Playa Cove	A1 Anchorage	10/14/2019	Parks Central Reservations	Confirmed	11/29/2019	12/2/2019	30'	3
A1 La Playa Cove	A1 Overflow	10/14/2019	Parks Central Reservations	Confirmed	10/18/2019	10/21/2019	32'	3
A1 La Playa Cove	A1 Anchorage	10/14/2019	WEBSITE	Confirmed	10/25/2019	10/28/2019	37'	3
A1 La Playa Cove	A1 Anchorage	10/14/2019	WEBSITE	Confirmed	11/1/2019	11/4/2019	37'	3
A1 La Playa Cove	A1 Anchorage	10/15/2019	WEBSITE	Confirmed	10/25/2019	10/28/2019	30'	3
A1 La Playa Cove	A1 Overflow	10/15/2019	WEBSITE	Confirmed	10/25/2019	10/28/2019	32'	3
A1 La Playa Cove	A1 Anchorage	10/16/2019	WEBSITE	Confirmed	10/25/2019	10/28/2019	32'	3
A1 La Playa Cove	A1 Anchorage	10/16/2019	WEBSITE	Confirmed	11/1/2019	11/4/2019	32'	3
A1 La Playa Cove	A1 Anchorage	10/16/2019	WEBSITE	Confirmed	10/25/2019	10/28/2019	25'	3
A1 La Playa Cove	A1 Anchorage	10/16/2019	WEBSITE	Confirmed	11/1/2019	11/4/2019	25'	3
A1 La Playa Cove	A1 Anchorage	10/16/2019	WEBSITE	Confirmed	10/25/2019	10/28/2019	44'	3
A1 La Playa Cove	A1 Anchorage	10/17/2019	WEBSITE	Confirmed	10/25/2019	10/28/2019	34'	3
A1 La Playa Cove	A1 Anchorage	10/17/2019	WEBSITE	Confirmed	11/8/2019	11/11/2019	34'	3
A1 La Playa Cove	A1 Overflow	10/17/2019	Parks Central Reservations	Confirmed	10/18/2019	10/21/2019	44'	3
A1 La Playa Cove	A1 Anchorage	10/17/2019	WEBSITE	Confirmed	10/25/2019	10/28/2019	60'	3
A1 La Playa Cove	A1 Anchorage	10/17/2019	WEBSITE	Confirmed	10/25/2019	10/28/2019	48'	3
A1 La Playa Cove	A1 Anchorage	10/17/2019	WEBSITE	Confirmed	11/1/2019	11/4/2019	63'	3
A1 La Playa Cove	A1 Anchorage	10/17/2019	Parks Central Reservations	Confirmed	10/18/2019	10/21/2019	58'	3
A1 La Playa Cove	A1 Anchorage	10/17/2019	WEBSITE	Confirmed	11/8/2019	11/11/2019	32'	3
A1 La Playa Cove	A1 Overflow	10/17/2019	WEBSITE	Confirmed	11/1/2019	11/4/2019	32'	3
A1 La Playa Cove	A1 Anchorage	10/17/2019	Parks Central Reservations	Confirmed	10/25/2019	10/28/2019	50'	3
A1 La Playa Cove	A1 Anchorage	10/18/2019	WEBSITE	Confirmed	10/25/2019	10/28/2019	37'	3
A1 La Playa Cove	A1 Anchorage	10/18/2019	WEBSITE	Confirmed	10/25/2019	10/28/2019	27'	3
A1 La Playa Cove	A1 Anchorage	10/18/2019	WEBSITE	Confirmed	12/27/2019	12/30/2019	42'	3
A1 La Playa Cove	A1 Anchorage	10/18/2019	WEBSITE	Confirmed	10/25/2019	10/28/2019	38'	3
A1 La Playa Cove	A1 Anchorage	10/19/2019	WEBSITE	Confirmed	10/25/2019	10/28/2019	37'	3
A1 La Playa Cove	A1 Anchorage	10/19/2019	WEBSITE	Confirmed	11/1/2019	11/4/2019	50'	3
A1 La Playa Cove	A1 Anchorage	10/20/2019	WEBSITE	Confirmed	10/25/2019	10/28/2019	32'	3

Marina	Mooring	Date Reservation Made	Made At	Status	Arrival Date	Departure Date	Boat Length	Length of Stay (Nights)
A1 La Playa Cove	A1 Anchorage	10/20/2019	WEBSITE	Confirmed	11/1/2019	11/4/2019	32'	3
A1 La Playa Cove	A1 Anchorage	10/20/2019	WEBSITE	Confirmed	10/25/2019	10/28/2019	33'	3
A1 La Playa Cove	A1 Anchorage	10/20/2019	WEBSITE	Confirmed	11/1/2019	11/4/2019	45'	3
A1 La Playa Cove	A1 Anchorage	10/20/2019	WEBSITE	Confirmed	10/25/2019	10/28/2019	40'	3
A1 La Playa Cove	A1 Anchorage	10/21/2019	WEBSITE	Confirmed	11/22/2019	11/25/2019	30'	3
A1 La Playa Cove	A1 Anchorage	10/21/2019	WEBSITE	Confirmed	11/1/2019	11/4/2019	63'	3
A1 La Playa Cove	A1 Overflow	10/21/2019	Moorings	Confirmed	10/25/2019	10/28/2019	30'	3
A1 La Playa Cove	A1 Anchorage	10/22/2019	WEBSITE	Confirmed	11/1/2019	11/4/2019	32'	3
A1 La Playa Cove	A1 Anchorage	10/22/2019	WEBSITE	Confirmed	11/1/2019	11/4/2019	50'	3
A1 La Playa Cove	A1 Anchorage	10/22/2019	WEBSITE	Confirmed	11/1/2019	11/4/2019	33'	3
A1 La Playa Cove	A1 Anchorage	10/23/2019	Parks Central Reservations	Confirmed	11/1/2019	11/4/2019	38'	3
A1 La Playa Cove	A1 Anchorage	10/23/2019	Parks Central Reservations	Confirmed	11/8/2019	11/11/2019	38'	3
A1 La Playa Cove	A1 Anchorage	10/23/2019	WEBSITE	Confirmed	11/1/2019	11/4/2019	27'	3
A1 La Playa Cove	A1 Anchorage	10/23/2019	WEBSITE	Confirmed	10/25/2019	10/28/2019	42'	3
A1 La Playa Cove	A1 Overflow	10/24/2019	WEBSITE	Confirmed	11/1/2019	11/4/2019	40'	3
A1 La Playa Cove	A1 Anchorage	10/24/2019	WEBSITE	Confirmed	11/1/2019	11/4/2019	50'	3
A1 La Playa Cove	A1 Anchorage	10/24/2019	WEBSITE	Confirmed	11/8/2019	11/11/2019	42'	3
A1 La Playa Cove	A1 Anchorage	10/25/2019	Moorings	Confirmed	11/1/2019	11/4/2019	42'	3
A1 La Playa Cove	A1 Overflow	10/25/2019	Moorings	Confirmed	11/8/2019	11/11/2019	44'	3
A1 La Playa Cove	A1 Anchorage	10/25/2019	WEBSITE	Confirmed	11/1/2019	11/4/2019	38'	3
A1 La Playa Cove	A1 Anchorage	10/25/2019	WEBSITE	Confirmed	11/29/2019	12/2/2019	30'	3
A1 La Playa Cove	A1 Anchorage	10/25/2019	WEBSITE	Confirmed	11/1/2019	11/4/2019	50'	3
A1 La Playa Cove	A1 Anchorage	10/25/2019	WEBSITE	Confirmed	11/8/2019	11/11/2019	30'	3
A1 La Playa Cove	A1 Anchorage	10/27/2019	WEBSITE	Confirmed	11/8/2019	11/11/2019	40'	3
A1 La Playa Cove	A1 Anchorage	10/27/2019	WEBSITE	Confirmed	12/20/2019	12/23/2019	30'	3
A1 La Playa Cove	A1 Anchorage	10/27/2019	WEBSITE	Confirmed	12/27/2019	12/30/2019	30'	3
A1 La Playa Cove	A1 Anchorage	10/27/2019	WEBSITE	Confirmed	11/8/2019	11/11/2019	30'	3
A1 La Playa Cove	A1 Anchorage	10/28/2019	WEBSITE	Confirmed	11/8/2019	11/11/2019	39'	3
A1 La Playa Cove	A1 Anchorage	10/28/2019	Moorings	Confirmed	11/1/2019	11/4/2019	48'	3
A1 La Playa Cove	A1 Anchorage	10/29/2019	WEBSITE	Confirmed	11/15/2019	11/18/2019	35'	3
A1 La Playa Cove	A1 Anchorage	10/29/2019	WEBSITE	Confirmed	11/8/2019	11/11/2019	37'	3
A1 La Playa Cove	A1 Anchorage	10/29/2019	WEBSITE	Confirmed	12/20/2019	12/23/2019	30'	3
A1 La Playa Cove	A1 Anchorage	10/29/2019	WEBSITE	Confirmed	12/27/2019	12/30/2019	30'	3
A1 La Playa Cove	A1 Anchorage	10/30/2019	Moorings	Confirmed	11/1/2019	11/4/2019	47'	3
A1 La Playa Cove	A1 Anchorage	10/30/2019	WEBSITE	Confirmed	11/8/2019	11/11/2019	28'	3
A1 La Playa Cove	A1 Anchorage	10/30/2019	WEBSITE	Confirmed	11/15/2019	11/18/2019	28'	3
A1 La Playa Cove	A1 Anchorage	10/30/2019	WEBSITE	Confirmed	11/22/2019	11/25/2019	28'	3
A1 La Playa Cove	A1 Anchorage	10/30/2019	WEBSITE	Confirmed	11/29/2019	12/2/2019	28'	3
A1 La Playa Cove	A1 Anchorage	10/30/2019	WEBSITE	Confirmed	11/1/2019	11/4/2019	37'	3
A1 La Playa Cove	A1 Anchorage	10/30/2019	WEBSITE	Confirmed	11/8/2019	11/11/2019	32'	3
A1 La Playa Cove	A1 Anchorage	10/31/2019	Parks Central Reservations	Confirmed	11/1/2019	11/4/2019	26'	3
A1 La Playa Cove	A1 Anchorage	10/31/2019	WEBSITE	Confirmed	11/8/2019	11/11/2019	45'	3
A1 La Playa Cove	A1 Anchorage	11/1/2019	WEBSITE	Confirmed	11/8/2019	11/11/2019	24'	3
A1 La Playa Cove	A1 Anchorage	11/1/2019	WEBSITE	Confirmed	11/8/2019	11/11/2019	40'	3
A1 La Playa Cove	A1 Anchorage	11/2/2019	WEBSITE	Confirmed	11/8/2019	11/11/2019	48'	3
A1 La Playa Cove	A1 Anchorage	11/3/2019	WEBSITE	Confirmed	11/8/2019	11/11/2019	50'	3
A1 La Playa Cove	A1 Anchorage	11/3/2019	WEBSITE	Confirmed	11/8/2019	11/11/2019	30'	3
A1 La Playa Cove	A1 Anchorage	11/3/2019	WEBSITE	Confirmed	11/29/2019	12/2/2019	33'	3
A1 La Playa Cove	A1 Anchorage	11/3/2019	WEBSITE	Confirmed	11/8/2019	11/11/2019	42'	3
A1 La Playa Cove	A1 Anchorage	11/4/2019	WEBSITE	Confirmed	11/8/2019	11/11/2019	50'	3
A1 La Playa Cove	A1 Anchorage	11/4/2019	Parks Central Reservations	Confirmed	11/8/2019	11/11/2019	30'	3
A1 La Playa Cove	A1 Anchorage	11/4/2019	WEBSITE	Confirmed	11/15/2019	11/18/2019	26'	3
A1 La Playa Cove	A1 Anchorage	11/4/2019	WEBSITE	Confirmed	11/8/2019	11/11/2019	37'	3
A1 La Playa Cove	A1 Anchorage	11/4/2019	Parks Central Reservations	Confirmed	11/8/2019	11/11/2019	26'	3
A1 La Playa Cove	A1 Anchorage	11/4/2019	WEBSITE	Confirmed	11/8/2019	11/11/2019	28'	3
A1 La Playa Cove	A1 Anchorage	11/4/2019	WEBSITE	Confirmed	11/8/2019	11/11/2019	37'	3
A1 La Playa Cove	A1 Anchorage	11/4/2019	WEBSITE	Confirmed	11/8/2019	11/11/2019	22'	3
A1 La Playa Cove	A1 Anchorage	11/5/2019	WEBSITE	Confirmed	11/8/2019	11/11/2019	50'	3
A1 La Playa Cove	A1 Anchorage	11/5/2019	WEBSITE	Confirmed	11/8/2019	11/11/2019	53'	3
A1 La Playa Cove	A1 Anchorage	11/5/2019	WEBSITE	Confirmed	11/8/2019	11/11/2019	27'	3

Marina	Mooring	Date Reservation Made	Made At	Status	Arrival Date	Departure Date	Boat Length	Length of Stay (Nights)
A1 La Playa Cove	A1 Anchorage	11/5/2019	WEBSITE	Confirmed	11/15/2019	11/18/2019	32'	3
A1 La Playa Cove	A1 Anchorage	11/5/2019	WEBSITE	Confirmed	11/8/2019	11/11/2019	50'	3
A1 La Playa Cove	A1 Anchorage	11/5/2019	Parks Central Reservations	Confirmed	11/8/2019	11/11/2019	26'	3
A1 La Playa Cove	A1 Anchorage	11/5/2019	WEBSITE	Confirmed	11/8/2019	11/11/2019	26'	3
A1 La Playa Cove	A1 Anchorage	11/6/2019	WEBSITE	Confirmed	11/15/2019	11/18/2019	33'	3
A1 La Playa Cove	A1 Overflow	11/6/2019	Parks Central Reservations	Confirmed	11/8/2019	11/11/2019	26'	3
A1 La Playa Cove	A1 Anchorage	11/6/2019	WEBSITE	Confirmed	11/15/2019	11/18/2019	30'	3
A1 La Playa Cove	A1 Anchorage	11/6/2019	Parks Central Reservations	Confirmed	11/22/2019	11/25/2019	30'	3
A1 La Playa Cove	A1 Anchorage	11/6/2019	WEBSITE	Confirmed	11/15/2019	11/18/2019	38'	3
A1 La Playa Cove	A1 Anchorage	11/6/2019	WEBSITE	Confirmed	11/22/2019	11/25/2019	38'	3
A1 La Playa Cove	A1 Anchorage	11/6/2019	WEBSITE	Confirmed	11/29/2019	12/2/2019	38'	3
A1 La Playa Cove	A1 Anchorage	11/6/2019	WEBSITE	Confirmed	12/13/2019	12/16/2019	38'	3
A1 La Playa Cove	A1 Anchorage	11/7/2019	WEBSITE	Confirmed	11/15/2019	11/18/2019	54'	3
A1 La Playa Cove	A1 Anchorage	11/7/2019	WEBSITE	Confirmed	11/15/2019	11/18/2019	32'	3
A1 La Playa Cove	A1 Anchorage	11/7/2019	Parks Central Reservations	Confirmed	11/15/2019	11/18/2019	32'	3
A1 La Playa Cove	A1 Anchorage	11/7/2019	WEBSITE	Confirmed	11/8/2019	11/11/2019	36'	3
A1 La Playa Cove	A1 Anchorage	11/8/2019	WEBSITE	Confirmed	11/22/2019	11/25/2019	32'	3
A1 La Playa Cove	A1 Anchorage	11/8/2019	WEBSITE	Confirmed	11/29/2019	12/2/2019	32'	3
A1 La Playa Cove	A1 Anchorage	11/8/2019	WEBSITE	Confirmed	12/6/2019	12/9/2019	32'	3
A1 La Playa Cove	A1 Overflow	11/8/2019	Parks Central Reservations	Confirmed	11/8/2019	11/11/2019	44'	3
A1 La Playa Cove	A1 Anchorage	11/8/2019	Parks Central Reservations	Confirmed	11/15/2019	11/18/2019	44'	3
A1 La Playa Cove	A1 Anchorage	11/8/2019	WEBSITE	Confirmed	12/13/2019	12/16/2019	32'	3
A1 La Playa Cove	A1 Anchorage	11/8/2019	WEBSITE	Confirmed	12/20/2019	12/23/2019	32'	3
A1 La Playa Cove	A1 Anchorage	11/8/2019	WEBSITE	Confirmed	11/15/2019	11/18/2019	32'	3
A1 La Playa Cove	A1 Anchorage	11/10/2019	WEBSITE	Confirmed	11/29/2019	12/2/2019	60'	3
A1 La Playa Cove	A1 Anchorage	11/10/2019	WEBSITE	Confirmed	11/15/2019	11/18/2019	42'	3
A1 La Playa Cove	A1 Anchorage	11/10/2019	WEBSITE	Confirmed	11/22/2019	11/25/2019	32'	3
A1 La Playa Cove	A1 Anchorage	11/10/2019	WEBSITE	Confirmed	11/22/2019	11/25/2019	25'	3
A1 La Playa Cove	A1 Anchorage	11/11/2019	WEBSITE	Confirmed	11/15/2019	11/18/2019	56'	3
A1 La Playa Cove	A1 Anchorage	11/11/2019	WEBSITE	Confirmed	11/22/2019	11/25/2019	63'	3
A1 La Playa Cove	A1 Anchorage	11/11/2019	WEBSITE	Confirmed	11/29/2019	12/2/2019	63'	3
A1 La Playa Cove	A1 Anchorage	11/11/2019	WEBSITE	Confirmed	11/15/2019	11/18/2019	60'	3
A1 La Playa Cove	A1 Anchorage	11/11/2019	WEBSITE	Confirmed	11/15/2019	11/18/2019	32'	3
A1 La Playa Cove	A1 Anchorage	11/11/2019	WEBSITE	Confirmed	11/29/2019	12/2/2019	32'	3
A1 La Playa Cove	A1 Anchorage	11/11/2019	WEBSITE	Confirmed	11/15/2019	11/18/2019	25'	3
A1 La Playa Cove	A1 Anchorage	11/11/2019	WEBSITE	Confirmed	11/22/2019	11/25/2019	25'	3
A1 La Playa Cove	A1 Anchorage	11/11/2019	WEBSITE	Confirmed	11/15/2019	11/18/2019	32'	3
A1 La Playa Cove	A1 Anchorage	11/11/2019	WEBSITE	Confirmed	11/15/2019	11/18/2019	27'	3
A1 La Playa Cove	A1 Anchorage	11/12/2019	Parks Central Reservations	Confirmed	11/15/2019	11/18/2019	32'	3
A1 La Playa Cove	A1 Anchorage	11/12/2019	WEBSITE	Confirmed	11/29/2019	12/2/2019	28'	3
A1 La Playa Cove	A1 Anchorage	11/12/2019	WEBSITE	Confirmed	11/22/2019	11/25/2019	28'	3
A1 La Playa Cove	A1 Anchorage	11/12/2019	Moorings	Confirmed	11/15/2019	11/18/2019	26'	3
A1 La Playa Cove	A1 Anchorage	11/12/2019	Moorings	Confirmed	11/22/2019	11/25/2019	26'	3
A1 La Playa Cove	A1 Anchorage	11/12/2019	Moorings	Confirmed	11/29/2019	12/2/2019	26'	3
A1 La Playa Cove	A1 Anchorage	11/12/2019	Moorings	Confirmed	11/22/2019	11/25/2019	44'	3
A1 La Playa Cove	A1 Anchorage	11/12/2019	WEBSITE	Confirmed	11/15/2019	11/18/2019	50'	3
A1 La Playa Cove	A1 Anchorage	11/12/2019	WEBSITE	Confirmed	11/29/2019	12/2/2019	28'	3
A1 La Playa Cove	A1 Anchorage	11/13/2019	Parks Central Reservations	Confirmed	11/15/2019	11/18/2019	30'	3
A1 La Playa Cove	A1 Anchorage	11/13/2019	Parks Central Reservations	Confirmed	12/6/2019	12/9/2019	26'	3
A1 La Playa Cove	A1 Anchorage	11/13/2019	Parks Central Reservations	Confirmed	11/29/2019	12/2/2019	26'	3
A1 La Playa Cove	A1 Anchorage	11/13/2019	Moorings	Confirmed	11/15/2019	11/18/2019	38'	3
A1 La Playa Cove	A1 Anchorage	11/13/2019	Parks Central Reservations	Confirmed	12/13/2019	12/16/2019	24'	3
A1 La Playa Cove	A1 Anchorage	11/13/2019	WEBSITE	Confirmed	11/15/2019	11/18/2019	32'	3
A1 La Playa Cove	A1 Anchorage	11/13/2019	WEBSITE	Confirmed	11/15/2019	11/18/2019	30'	3
A1 La Playa Cove	A1 Anchorage	11/13/2019	WEBSITE	Confirmed	11/15/2019	11/18/2019	30'	3
A1 La Playa Cove	A1 Anchorage	11/14/2019	Parks Central Reservations	Confirmed	11/15/2019	11/18/2019	36'	3
A1 La Playa Cove	A1 Anchorage	11/14/2019	WEBSITE	Confirmed	11/22/2019	11/25/2019	32'	3
A1 La Playa Cove	A1 Anchorage	11/14/2019	Parks Central Reservations	Confirmed	11/15/2019	11/18/2019	25'	3
A1 La Playa Cove	A1 Anchorage	11/14/2019	WEBSITE	Confirmed	11/15/2019	11/18/2019	50'	3
A1 La Playa Cove	A1 Anchorage	11/14/2019	WEBSITE	Confirmed	11/15/2019	11/18/2019	27'	3

Marina	Mooring	Date Reservation Made	Made At	Status	Arrival Date	Departure Date	Boat Length	Length of Stay (Nights)
A1 La Playa Cove	A1 Anchorage	11/14/2019	WEBSITE	Confirmed	11/29/2019	12/2/2019	30'	3
A1 La Playa Cove	A1 Anchorage	11/15/2019	WEBSITE	Confirmed	11/15/2019	11/18/2019	27'	3
A1 La Playa Cove	A1 Anchorage	11/15/2019	WEBSITE	Confirmed	11/15/2019	11/18/2019	28'	3
A1 La Playa Cove	A1 Anchorage	11/15/2019	WEBSITE	Confirmed	11/22/2019	11/25/2019	30'	3
A1 La Playa Cove	A1 Anchorage	11/15/2019	WEBSITE	Confirmed	11/22/2019	11/25/2019	26'	3
A1 La Playa Cove	A1 Anchorage	11/17/2019	WEBSITE	Confirmed	11/22/2019	11/25/2019	28'	3
A1 La Playa Cove	A1 Anchorage	11/17/2019	WEBSITE	Confirmed	11/22/2019	11/25/2019	44'	3
A1 La Playa Cove	A1 Anchorage	11/17/2019	WEBSITE	Confirmed	12/6/2019	12/9/2019	34'	3
A1 La Playa Cove	A1 Anchorage	11/17/2019	WEBSITE	Confirmed	11/29/2019	12/2/2019	28'	3
A1 La Playa Cove	A1 Anchorage	11/17/2019	WEBSITE	Confirmed	11/22/2019	11/25/2019	28'	3
A1 La Playa Cove	A1 Anchorage	11/18/2019	Parks Central Reservations	Confirmed	11/22/2019	11/25/2019	36'	3
A1 La Playa Cove	A1 Anchorage	11/18/2019	WEBSITE	Confirmed	11/22/2019	11/25/2019	48'	3
A1 La Playa Cove	A1 Anchorage	11/18/2019	WEBSITE	Confirmed	11/29/2019	12/2/2019	37'	3
A1 La Playa Cove	A1 Anchorage	11/18/2019	WEBSITE	Confirmed	11/22/2019	11/25/2019	32'	3
A1 La Playa Cove	A1 Anchorage	11/19/2019	Parks Central Reservations	Confirmed	11/29/2019	12/2/2019	44'	3
A1 La Playa Cove	A1 Anchorage	11/19/2019	Parks Central Reservations	Confirmed	11/29/2019	12/2/2019	36'	3
A1 La Playa Cove	A1 Anchorage	11/19/2019	WEBSITE	Confirmed	11/22/2019	11/25/2019	60'	3
A1 La Playa Cove	A1 Anchorage	11/19/2019	WEBSITE	Confirmed	11/22/2019	11/25/2019		3
A1 La Playa Cove	A1 Anchorage	11/19/2019	WEBSITE	Confirmed	11/22/2019	11/25/2019	32'	3
A1 La Playa Cove	A1 Anchorage	11/19/2019	WEBSITE	Confirmed	11/22/2019	11/25/2019	24'	3
A1 La Playa Cove	A1 Anchorage	11/19/2019	WEBSITE	Confirmed	11/22/2019	11/25/2019	32'	3
A1 La Playa Cove	A1 Anchorage	11/20/2019	WEBSITE	Confirmed	11/29/2019	12/2/2019	32'	3
A1 La Playa Cove	A1 Anchorage	11/20/2019	Parks Central Reservations	Confirmed	11/22/2019	11/25/2019	30'	3
A1 La Playa Cove	A1 Anchorage	11/20/2019	WEBSITE	Confirmed	11/22/2019	11/25/2019	30'	3
A1 La Playa Cove	A1 Anchorage	11/20/2019	Parks Central Reservations	Confirmed	11/22/2019	11/25/2019	33'	3
A1 La Playa Cove	A1 Anchorage	11/21/2019	Parks Central Reservations	Confirmed	11/22/2019	11/25/2019	25'	3
A1 La Playa Cove	A1 Anchorage	11/21/2019	Parks Central Reservations	Confirmed	11/29/2019	12/2/2019	25'	3
A1 La Playa Cove	A1 Anchorage	11/21/2019	Parks Central Reservations	Confirmed	11/29/2019	12/2/2019	25'	3
A1 La Playa Cove	A1 Anchorage	11/21/2019	Moorings	Confirmed	11/22/2019	11/25/2019	50'	3
A1 La Playa Cove	A1 Anchorage	11/21/2019	WEBSITE	Confirmed	11/29/2019	12/2/2019	27'	3
A1 La Playa Cove	A1 Anchorage	11/22/2019	Moorings	Confirmed	11/22/2019	11/25/2019	30'	3
A1 La Playa Cove	A1 Anchorage	11/22/2019	Moorings	Confirmed	11/29/2019	12/2/2019	30'	3
A1 La Playa Cove	A1 Anchorage	11/22/2019	Parks Central Reservations	Confirmed	11/22/2019	11/25/2019	41'	3
A1 La Playa Cove	A1 Anchorage	11/22/2019	Parks Central Reservations	Confirmed	11/22/2019	11/25/2019	43'	3
A1 La Playa Cove	A1 Anchorage	11/25/2019	Parks Central Reservations	Confirmed	11/29/2019	12/2/2019	32'	3
A1 La Playa Cove	A1 Anchorage	11/25/2019	Parks Central Reservations	Confirmed	11/29/2019	12/2/2019	32'	3
A1 La Playa Cove	A1 Anchorage	11/25/2019	Parks Central Reservations	Confirmed	11/29/2019	12/2/2019	43'	3
A1 La Playa Cove	A1 Anchorage	11/26/2019	WEBSITE	Confirmed	11/29/2019	12/2/2019	38'	3
A1 La Playa Cove	A1 Anchorage	11/26/2019	Parks Central Reservations	Confirmed	11/29/2019	12/2/2019	24'	3
A1 La Playa Cove	A1 Anchorage	11/26/2019	WEBSITE	Confirmed	11/29/2019	12/2/2019	45'	3
A1 La Playa Cove	A1 Anchorage	11/26/2019	WEBSITE	Confirmed	11/29/2019	12/2/2019	30'	3
A1 La Playa Cove	A1 Anchorage	11/26/2019	WEBSITE	Confirmed	11/29/2019	12/2/2019	38'	3
A1 La Playa Cove	A1 Anchorage	11/26/2019	WEBSITE	Confirmed	11/29/2019	12/2/2019	40'	3
A1 La Playa Cove	A1 Anchorage	11/27/2019	WEBSITE	Confirmed	12/6/2019	12/9/2019	63'	3
A1 La Playa Cove	A1 Anchorage	11/27/2019	WEBSITE	Confirmed	12/27/2019	12/30/2019	63'	3
A1 La Playa Cove	A1 Anchorage	11/28/2019	WEBSITE	Confirmed	11/29/2019	12/2/2019	50'	3
A1 La Playa Cove	A1 Anchorage	11/29/2019	WEBSITE	Confirmed	12/6/2019	12/9/2019	50'	3
A1 La Playa Cove	A1 Anchorage	12/1/2019	WEBSITE	Confirmed	12/6/2019	12/9/2019	26'	3
A1 La Playa Cove	A1 Anchorage	12/1/2019	WEBSITE	Confirmed	12/6/2019	12/9/2019	32'	3
A1 La Playa Cove	A1 Anchorage	12/1/2019	WEBSITE	Confirmed	12/13/2019	12/16/2019	32'	3
A1 La Playa Cove	A1 Anchorage	12/1/2019	WEBSITE	Confirmed	12/20/2019	12/23/2019	32'	3
A1 La Playa Cove	A1 Anchorage	12/2/2019	Parks Central Reservations	Confirmed	12/6/2019	12/9/2019	26'	3
A1 La Playa Cove	A1 Anchorage	12/2/2019	Parks Central Reservations	Confirmed	12/13/2019	12/16/2019	26'	3
A1 La Playa Cove	A1 Anchorage	12/2/2019	Parks Central Reservations	Confirmed	12/20/2019	12/23/2019	26'	3
A1 La Playa Cove	A1 Anchorage	12/2/2019	Parks Central Reservations	Confirmed	12/27/2019	12/30/2019	26'	3
A1 La Playa Cove	A1 Anchorage	12/2/2019	Parks Central Reservations	Confirmed	12/6/2019	12/9/2019	44'	3
A1 La Playa Cove	A1 Anchorage	12/2/2019	Parks Central Reservations	Confirmed	12/13/2019	12/16/2019	44'	3
A1 La Playa Cove	A1 Anchorage	12/2/2019	Parks Central Reservations	Confirmed	12/20/2019	12/23/2019	44'	3
A1 La Playa Cove	A1 Anchorage	12/2/2019	Parks Central Reservations	Confirmed	12/27/2019	12/30/2019	44'	3
A1 La Playa Cove	A1 Anchorage	12/2/2019	Parks Central Reservations	Confirmed	12/6/2019	12/9/2019	32'	3

Marina	Mooring	Date Reservation Made	Made At	Status	Arrival Date	Departure Date	Boat Length	Length of Stay (Nights)
A1 La Playa Cove	A1 Anchorage	12/2/2019	Parks Central Reservations	Confirmed	12/6/2019	12/9/2019	33'	3
A1 La Playa Cove	A1 Anchorage	12/2/2019	WEBSITE	Confirmed	12/13/2019	12/16/2019	40'	3
A1 La Playa Cove	A1 Anchorage	12/2/2019	Parks Central Reservations	Confirmed	12/27/2019	12/30/2019	36'	3
A1 La Playa Cove	A1 Anchorage	12/2/2019	Parks Central Reservations	Confirmed	12/6/2019	12/9/2019	36'	3
A1 La Playa Cove	A1 Anchorage	12/2/2019	WEBSITE	Confirmed	12/6/2019	12/9/2019	32'	3
A1 La Playa Cove	A1 Anchorage	12/2/2019	WEBSITE	Confirmed	12/6/2019	12/9/2019	25'	3
A1 La Playa Cove	A1 Anchorage	12/2/2019	Parks Central Reservations	Confirmed	12/6/2019	12/9/2019	34'	3
A1 La Playa Cove	A1 Anchorage	12/2/2019	WEBSITE	Confirmed	12/6/2019	12/9/2019	28'	3
A1 La Playa Cove	A1 Anchorage	12/3/2019	WEBSITE	Confirmed	12/6/2019	12/9/2019	30'	3
A1 La Playa Cove	A1 Anchorage	12/3/2019	WEBSITE	Confirmed	12/13/2019	12/16/2019	30'	3
A1 La Playa Cove	A1 Anchorage	12/3/2019	WEBSITE	Confirmed	12/27/2019	12/30/2019	60'	3
A1 La Playa Cove	A1 Anchorage	12/3/2019	Parks Central Reservations	Confirmed	12/27/2019	12/30/2019	25'	3
A1 La Playa Cove	A1 Anchorage	12/3/2019	Parks Central Reservations	Confirmed	12/6/2019	12/9/2019	25'	3
A1 La Playa Cove	A1 Anchorage	12/3/2019	WEBSITE	Confirmed	12/6/2019	12/9/2019	38'	3
A1 La Playa Cove	A1 Anchorage	12/3/2019	Parks Central Reservations	Confirmed	12/6/2019	12/9/2019	30'	3
A1 La Playa Cove	A1 Anchorage	12/3/2019	WEBSITE	Confirmed	12/6/2019	12/9/2019	33'	3
A1 La Playa Cove	A1 Anchorage	12/3/2019	WEBSITE	Confirmed	12/6/2019	12/9/2019	32'	3
A1 La Playa Cove	A1 Anchorage	12/4/2019	WEBSITE	Confirmed	12/6/2019	12/9/2019	42'	3
A1 La Playa Cove	A1 Anchorage	12/4/2019	WEBSITE	Confirmed	12/20/2019	12/23/2019	42'	3
A1 La Playa Cove	A1 Anchorage	12/4/2019	WEBSITE	Confirmed	12/20/2019	12/23/2019	32'	3
A1 La Playa Cove	A1 Anchorage	12/4/2019	Parks Central Reservations	Confirmed	12/13/2019	12/16/2019	30'	3
A1 La Playa Cove	A1 Anchorage	12/4/2019	WEBSITE	Confirmed	12/27/2019	12/30/2019	28'	3
A1 La Playa Cove	A1 Anchorage	12/4/2019	Parks Central Reservations	Confirmed	12/27/2019	12/30/2019	26'	3
A1 La Playa Cove	A1 Anchorage	12/4/2019	WEBSITE	Confirmed	12/6/2019	12/9/2019	30'	3
A1 La Playa Cove	A1 Anchorage	12/4/2019	WEBSITE	Confirmed	12/6/2019	12/9/2019	30'	3
A1 La Playa Cove	A1 Anchorage	12/5/2019	WEBSITE	Confirmed	12/6/2019	12/9/2019	30'	3
A1 La Playa Cove	A1 Anchorage	12/5/2019	Parks Central Reservations	Confirmed	12/6/2019	12/9/2019	30'	3
A1 La Playa Cove	A1 Anchorage	12/5/2019	WEBSITE	Confirmed	12/6/2019	12/9/2019	50'	3
A1 La Playa Cove	A1 Anchorage	12/5/2019	WEBSITE	Confirmed	12/6/2019	12/9/2019	34'	3
A1 La Playa Cove	A1 Anchorage	12/5/2019	Parks Central Reservations	Confirmed	12/27/2019	12/30/2019	38'	3
A1 La Playa Cove	A1 Anchorage	12/5/2019	WEBSITE	Confirmed	12/6/2019	12/9/2019	27'	3
A1 La Playa Cove	A1 Anchorage	12/5/2019	WEBSITE	Confirmed	12/6/2019	12/9/2019	40'	3
A1 La Playa Cove	A1 Anchorage	12/6/2019	WEBSITE	Confirmed	12/13/2019	12/16/2019	43'	3
A1 La Playa Cove	A1 Anchorage	12/6/2019	Parks Central Reservations	Confirmed	12/6/2019	12/9/2019	34'	3
A1 La Playa Cove	A1 Anchorage	12/6/2019	WEBSITE	Confirmed	12/13/2019	12/16/2019	30'	3
A1 La Playa Cove	A1 Anchorage	12/6/2019	Parks Central Reservations	Confirmed	12/13/2019	12/16/2019	38'	3
A1 La Playa Cove	A1 Anchorage	12/7/2019	WEBSITE	Confirmed	12/27/2019	12/30/2019	26'	3
A1 La Playa Cove	A1 Anchorage	12/8/2019	WEBSITE	Confirmed	12/27/2019	12/30/2019	32'	3
A1 La Playa Cove	A1 Anchorage	12/9/2019	Moorings	Confirmed	12/27/2019	12/30/2019	26'	3
A1 La Playa Cove	A1 Anchorage	12/9/2019	Moorings	Confirmed	12/27/2019	12/30/2019	44'	3
A1 La Playa Cove	A1 Anchorage	12/9/2019	Moorings	Confirmed	12/13/2019	12/16/2019	34'	3
A1 La Playa Cove	A1 Anchorage	12/9/2019	Moorings	Confirmed	12/13/2019	12/16/2019	30'	3
A1 La Playa Cove	A1 Anchorage	12/10/2019	WEBSITE	Confirmed	12/13/2019	12/16/2019	32'	3
A1 La Playa Cove	A1 Anchorage	12/10/2019	WEBSITE	Confirmed	12/27/2019	12/30/2019	37'	3
A1 La Playa Cove	A1 Anchorage	12/11/2019	WEBSITE	Confirmed	12/27/2019	12/30/2019	32'	3
A1 La Playa Cove	A1 Anchorage	12/11/2019	WEBSITE	Confirmed	12/13/2019	12/16/2019	47'	3
A1 La Playa Cove	A1 Anchorage	12/11/2019	WEBSITE	Confirmed	12/20/2019	12/23/2019	63'	3
A1 La Playa Cove	A1 Anchorage	12/12/2019	WEBSITE	Confirmed	12/27/2019	12/30/2019	42'	3
A1 La Playa Cove	A1 Anchorage	12/12/2019	WEBSITE	Confirmed	12/27/2019	12/30/2019	50'	3
A1 La Playa Cove	A1 Anchorage	12/12/2019	WEBSITE	Confirmed	12/20/2019	12/23/2019	37'	3
A1 La Playa Cove	A1 Anchorage	12/12/2019	WEBSITE	Confirmed	12/13/2019	12/16/2019	50'	3
A1 La Playa Cove	A1 Anchorage	12/12/2019	WEBSITE	Confirmed	12/13/2019	12/16/2019	32'	3
A1 La Playa Cove	A1 Anchorage	12/12/2019	WEBSITE	Confirmed	12/13/2019	12/16/2019	32'	3
A1 La Playa Cove	A1 Anchorage	12/12/2019	WEBSITE	Confirmed	12/13/2019	12/16/2019	25'	3
A1 La Playa Cove	A1 Anchorage	12/12/2019	WEBSITE	Confirmed	12/13/2019	12/16/2019	36'	3
A1 La Playa Cove	A1 Anchorage	12/12/2019	WEBSITE	Confirmed	12/13/2019	12/16/2019	36'	3
A1 La Playa Cove	A1 Anchorage	12/12/2019	WEBSITE	Confirmed	12/13/2019	12/16/2019	27'	3
A1 La Playa Cove	A1 Anchorage	12/12/2019	WEBSITE	Confirmed	12/13/2019	12/16/2019	33'	3
A1 La Playa Cove	A1 Anchorage	12/14/2019	WEBSITE	Confirmed	12/27/2019	12/30/2019	42'	3
A1 La Playa Cove	A1 Anchorage	12/14/2019	WEBSITE	Confirmed	12/27/2019	12/30/2019	27'	3

Marina	Mooring	Date Reservation Made	Made At	Status	Arrival Date	Departure Date	Boat Length	Length of Stay (Nights)
A1 La Playa Cove	A1 Anchorage	12/14/2019	WEBSITE	Confirmed	12/27/2019	12/30/2019	39'	3
A1 La Playa Cove	A1 Anchorage	12/15/2019	WEBSITE	Confirmed	12/27/2019	12/30/2019	30'	3
A1 La Playa Cove	A1 Anchorage	12/16/2019	Parks Central Reservations	Confirmed	12/20/2019	12/23/2019	33'	3
A1 La Playa Cove	A1 Anchorage	12/16/2019	Parks Central Reservations	Confirmed	12/27/2019	12/30/2019	33'	3
A1 La Playa Cove	A1 Anchorage	12/16/2019	Parks Central Reservations	Confirmed	12/27/2019	12/30/2019	32'	3
A1 La Playa Cove	A1 Anchorage	12/16/2019	Moorings	Confirmed	12/20/2019	12/23/2019	34'	3
A1 La Playa Cove	A1 Anchorage	12/16/2019	Parks Central Reservations	Confirmed	12/20/2019	12/23/2019	36'	3
A1 La Playa Cove	A1 Anchorage	12/16/2019	Parks Central Reservations	Confirmed	12/20/2019	12/23/2019	26'	3
A1 La Playa Cove	A1 Anchorage	12/16/2019	Moorings	Confirmed	12/20/2019	12/23/2019	36'	3
A1 La Playa Cove	A1 Anchorage	12/16/2019	WEBSITE	Confirmed	12/20/2019	12/23/2019	27'	3
A1 La Playa Cove	A1 Anchorage	12/16/2019	Parks Central Reservations	Confirmed	12/20/2019	12/23/2019	30'	3
A1 La Playa Cove	A1 Anchorage	12/16/2019	Parks Central Reservations	Confirmed	12/27/2019	12/30/2019	30'	3
A1 La Playa Cove	A1 Anchorage	12/17/2019	Parks Central Reservations	Confirmed	12/27/2019	12/30/2019	27'	3
A1 La Playa Cove	A1 Anchorage	12/19/2019	Parks Central Reservations	Confirmed	12/20/2019	12/23/2019	50'	3
A1 La Playa Cove	A1 Anchorage	12/19/2019	Parks Central Reservations	Confirmed	12/27/2019	12/30/2019	50'	3
A1 La Playa Cove	A1 Anchorage	12/19/2019	Parks Central Reservations	Confirmed	12/20/2019	12/23/2019	26'	3
A1 La Playa Cove	A1 Anchorage	12/19/2019	Parks Central Reservations	Confirmed	12/27/2019	12/30/2019	26'	3
A1 La Playa Cove	A1 Anchorage	12/19/2019	Parks Central Reservations	Confirmed	12/20/2019	12/23/2019	43'	3
A1 La Playa Cove	A1 Anchorage	12/19/2019	Parks Central Reservations	Confirmed	12/27/2019	12/30/2019	43'	3
A1 La Playa Cove	A1 Anchorage	12/19/2019	Parks Central Reservations	Confirmed	12/27/2019	12/30/2019	34'	3
A1 La Playa Cove	A1 Anchorage	12/19/2019	WEBSITE	Confirmed	12/27/2019	12/30/2019	34'	3
A1 La Playa Cove	A1 Anchorage	12/19/2019	WEBSITE	Confirmed	12/20/2019	12/23/2019	34'	3
A1 La Playa Cove	A1 Anchorage	12/19/2019	WEBSITE	Confirmed	12/20/2019	12/23/2019	34'	3
A1 La Playa Cove	A1 Anchorage	12/19/2019	WEBSITE	Confirmed	12/27/2019	12/30/2019	34'	3
A1 La Playa Cove	A1 Anchorage	12/19/2019	WEBSITE	Confirmed	12/20/2019	12/23/2019	28'	3
A1 La Playa Cove	A1 Anchorage	12/20/2019	Moorings	Confirmed	12/20/2019	12/23/2019		3
A1 La Playa Cove	A1 Anchorage	12/20/2019	Moorings	Confirmed	12/20/2019	12/23/2019	32'	3
A1 La Playa Cove	A1 Anchorage	12/20/2019	Moorings	Confirmed	12/20/2019	12/23/2019	30'	3
A1 La Playa Cove	A1 Anchorage	12/22/2019	WEBSITE	Confirmed	12/27/2019	12/30/2019	38'	3
A1 La Playa Cove	A1 Anchorage	12/22/2019	WEBSITE	Confirmed	12/27/2019	12/30/2019	33'	3
A1 La Playa Cove	A1 Anchorage	12/23/2019	WEBSITE	Confirmed	12/27/2019	12/30/2019	42'	3
A1 La Playa Cove	A1 Anchorage	12/24/2019	WEBSITE	Confirmed	12/27/2019	12/30/2019	45'	3
A1 La Playa Cove	A1 Anchorage	12/26/2019	WEBSITE	Confirmed	12/27/2019	12/30/2019	24'	3

Marina	Mooring	Date Reservation Made	Made At	Status	Arrival Date	Departure Date	Boat Length	Length of Stay (Nights)
Guest Dock	12	12/19/2018	Moorings	Confirmed	1/3/2019	1/4/2019	38'	1
Guest Dock	7	12/26/2018	WEBSITE	Confirmed	1/4/2019	1/5/2019	44'	1
Guest Dock	7	12/26/2018	WEBSITE	Confirmed	1/3/2019	1/4/2019	44'	1
Guest Dock	26	12/27/2018	Moorings	Confirmed	1/8/2019	1/10/2019	40'	2
Guest Dock	28	1/1/2019	WEBSITE	Confirmed	1/2/2019	1/4/2019	32'	2
Guest Dock	8	1/1/2019	WEBSITE	Confirmed	1/1/2019	1/4/2019	27'	3
Guest Dock	12	1/1/2019	WEBSITE	Confirmed	1/1/2019	1/2/2019	50'	1
Guest Dock	20	1/1/2019	WEBSITE	Confirmed	1/3/2019	1/5/2019	50'	2
Guest Dock	3	1/1/2019	WEBSITE	Confirmed	1/3/2019	1/5/2019	46'	2
Guest Dock	26	1/1/2019	WEBSITE	Confirmed	1/2/2019	1/3/2019	40'	1
Guest Dock	7	1/2/2019	WEBSITE	Confirmed	1/2/2019	1/3/2019	34'	1
Guest Dock	22	1/2/2019	Moorings	Confirmed	1/2/2019	1/4/2019	33'	2
Guest Dock	6	1/2/2019	WEBSITE	Confirmed	1/2/2019	1/4/2019	44'	2
Guest Dock	9	1/2/2019	Moorings	Confirmed	1/2/2019	1/4/2019	26'	2
Guest Dock	11	1/2/2019	Moorings	Confirmed	1/2/2019	1/3/2019	35'	1
Guest Dock	13	1/2/2019	Moorings	Confirmed	1/3/2019	1/4/2019	35'	1
Guest Dock	5	1/2/2019	WEBSITE	Confirmed	1/6/2019	1/9/2019	39'	3
Guest Dock	14	1/2/2019	WEBSITE	Confirmed	1/3/2019	1/6/2019	36'	3
Guest Dock	15	1/2/2019	Moorings	Confirmed	1/2/2019	1/4/2019	25'	2
Guest Dock	15	1/2/2019	Moorings	Confirmed	1/4/2019	1/5/2019	25'	1
Guest Dock	2	1/2/2019	WEBSITE	Confirmed	1/2/2019	1/9/2019	30'	7
Guest Dock	11	1/2/2019	WEBSITE	Confirmed	1/3/2019	1/4/2019	55'	1
Guest Dock	10	1/3/2019	WEBSITE	Confirmed	1/3/2019	1/5/2019	16'	2
Guest Dock	29	1/3/2019	Moorings	Confirmed	1/8/2019	1/9/2019	32'	1
Guest Dock	29	1/3/2019	Moorings	Confirmed	1/3/2019	1/8/2019	32'	5
Guest Dock	26	1/3/2019	Moorings	Confirmed	1/3/2019	1/4/2019	28'	1
Guest Dock	21	1/3/2019	Moorings	Confirmed	1/7/2019	1/8/2019	30'	1
Guest Dock	5	1/3/2019	WEBSITE	Confirmed	1/9/2019	1/10/2019	39'	1
Guest Dock	14	1/3/2019	WEBSITE	Confirmed	1/6/2019	1/18/2019	36'	12
Guest Dock	16	1/4/2019	WEBSITE	Confirmed	1/16/2019	1/18/2019	37'	2
Guest Dock	28	1/4/2019	WEBSITE	Confirmed	1/4/2019	1/5/2019	34'	1
Guest Dock	3	1/4/2019	WEBSITE	Confirmed	1/7/2019	1/8/2019	42'	1
Guest Dock	10	1/5/2019	WEBSITE	Confirmed	1/5/2019	1/6/2019	16'	1
Guest Dock	4	1/5/2019	WEBSITE	Confirmed	1/7/2019	1/11/2019	55'	4
Guest Dock	16	1/5/2019	WEBSITE	Confirmed	1/5/2019	1/7/2019	35'	2
Guest Dock	3	1/5/2019	WEBSITE	Confirmed	1/5/2019	1/7/2019	31'	2
Guest Dock	9	1/5/2019	WEBSITE	Confirmed	1/6/2019	1/9/2019	27'	3
Guest Dock	21	1/5/2019	WEBSITE	Confirmed	1/5/2019	1/7/2019	65'	2
Guest Dock	7	1/5/2019	WEBSITE	Confirmed	1/7/2019	1/9/2019	39'	2
Guest Dock	7	1/5/2019	WEBSITE	Confirmed	1/9/2019	1/10/2019	39'	1
Guest Dock	7	1/5/2019	WEBSITE	Confirmed	1/15/2019	1/17/2019	39'	2
Guest Dock	8	1/5/2019	WEBSITE	Confirmed	1/18/2019	1/21/2019	39'	3
Guest Dock	8	1/5/2019	WEBSITE	Confirmed	1/17/2019	1/18/2019	39'	1
Guest Dock	13	1/6/2019	WEBSITE	Confirmed	1/7/2019	1/11/2019	40'	4
Guest Dock	10	1/7/2019	WEBSITE	Confirmed	1/7/2019	1/9/2019	16'	2
Guest Dock	2	1/7/2019	WEBSITE	Confirmed	1/10/2019	1/11/2019	26'	1
Guest Dock	18	1/7/2019	WEBSITE	Confirmed	1/7/2019	1/8/2019	38'	1
Guest Dock	22	1/7/2019	WEBSITE	Confirmed	1/7/2019	1/8/2019	33'	1
Guest Dock	22	1/7/2019	WEBSITE	Confirmed	1/8/2019	1/9/2019	33'	1
Guest Dock	27	1/7/2019	WEBSITE	Confirmed	1/7/2019	1/9/2019	32'	2
Guest Dock	11	1/7/2019	WEBSITE	Confirmed	1/10/2019	1/11/2019	44'	1
Guest Dock	12	1/7/2019	WEBSITE	Confirmed	1/7/2019	1/11/2019	27'	4
Guest Dock	19	1/7/2019	WEBSITE	Confirmed	1/7/2019	1/8/2019	65'	1
Guest Dock	6	1/7/2019	WEBSITE	Confirmed	1/7/2019	1/8/2019	34'	1
Guest Dock	15	1/7/2019	WEBSITE	Confirmed	1/7/2019	1/8/2019	35'	1
Guest Dock	11	1/7/2019	WEBSITE	Confirmed	1/8/2019	1/9/2019	35'	1
Guest Dock	11	1/7/2019	WEBSITE	Confirmed	1/7/2019	1/8/2019	35'	1
Guest Dock	21	1/8/2019	WEBSITE	Confirmed	1/8/2019	1/10/2019	65'	2

Marina	Mooring	Date Reservation Made	Made At	Status	Arrival Date	Departure Date	Boat Length	Length of Stay (Nights)
Guest Dock	9	1/8/2019	WEBSITE	Confirmed	1/9/2019	1/11/2019	27'	2
Guest Dock	15	1/8/2019	WEBSITE	Confirmed	1/8/2019	1/9/2019	35'	1
Guest Dock	6	1/8/2019	WEBSITE	Confirmed	1/8/2019	1/9/2019	34'	1
Guest Dock	5	1/9/2019	WEBSITE	Confirmed	1/10/2019	1/11/2019	39'	1
Guest Dock	3	1/9/2019	WEBSITE	Confirmed	1/9/2019	1/16/2019	30'	7
Guest Dock	5	1/10/2019	WEBSITE	Confirmed	1/11/2019	1/12/2019	39'	1
Guest Dock	15	1/10/2019	Parks Central Reservations	Confirmed	1/10/2019	1/11/2019	25'	1
Guest Dock	2	1/10/2019	WEBSITE	Confirmed	1/11/2019	1/13/2019	28'	2
Guest Dock	16	1/10/2019	WEBSITE	Confirmed	1/11/2019	1/12/2019	44'	1
Guest Dock	9	1/11/2019	WEBSITE	Confirmed	1/11/2019	1/14/2019	27'	3
Guest Dock	21	1/11/2019	WEBSITE	Confirmed	1/11/2019	1/12/2019	47'	1
Guest Dock	8	1/12/2019	WEBSITE	Confirmed	1/12/2019	1/17/2019	30'	5
Guest Dock	2	1/12/2019	WEBSITE	Confirmed	1/13/2019	1/14/2019	28'	1
Guest Dock	4	1/13/2019	WEBSITE	Confirmed	1/14/2019	1/18/2019	42'	4
Guest Dock	21	1/13/2019	WEBSITE	Confirmed	1/13/2019	1/16/2019	65'	3
Guest Dock	6	1/13/2019	WEBSITE	Confirmed	1/14/2019	1/15/2019	37'	1
Guest Dock	6	1/13/2019	WEBSITE	Confirmed	1/15/2019	1/18/2019	37'	3
Guest Dock	18	1/13/2019	WEBSITE	Confirmed	1/23/2019	1/26/2019	36'	3
Guest Dock	11	1/14/2019	WEBSITE	Confirmed	1/16/2019	1/18/2019	30'	2
Guest Dock	11	1/14/2019	WEBSITE	Confirmed	1/15/2019	1/16/2019	30'	1
Guest Dock	2	1/14/2019	WEBSITE	Confirmed	1/14/2019	1/15/2019	28'	1
Guest Dock	22	1/14/2019	Parks Central Reservations	Confirmed	1/16/2019	1/17/2019	33'	1
Guest Dock	22	1/14/2019	Parks Central Reservations	Confirmed	1/22/2019	1/25/2019	33'	3
Guest Dock	18	1/14/2019	WEBSITE	Confirmed	1/14/2019	1/16/2019	45'	2
Guest Dock	27	1/15/2019	Parks Central Reservations	Confirmed	1/15/2019	1/18/2019	44'	3
Guest Dock	4	1/15/2019	WEBSITE	Confirmed	4/28/2019	4/29/2019	42'	1
Guest Dock	9	1/15/2019	WEBSITE	Confirmed	1/15/2019	1/16/2019	27'	1
Guest Dock	21	1/15/2019	WEBSITE	Confirmed	1/17/2019	1/20/2019	65'	3
Guest Dock	20	1/15/2019	Parks Central Reservations	Confirmed	1/16/2019	1/17/2019	38'	1
Guest Dock	3	1/15/2019	WEBSITE	Confirmed	1/16/2019	1/17/2019	30'	1
Guest Dock	15	1/16/2019	Parks Central Reservations	Confirmed	1/16/2019	1/18/2019	25'	2
Guest Dock	5	1/16/2019	Parks Central Reservations	Confirmed	1/16/2019	1/17/2019	30'	1
Guest Dock	12	1/16/2019	Parks Central Reservations	Confirmed	1/16/2019	1/17/2019	28'	1
Guest Dock	13	1/16/2019	Parks Central Reservations	Confirmed	1/16/2019	1/18/2019	27'	2
Guest Dock	9	1/16/2019	Parks Central Reservations	Confirmed	1/16/2019	1/18/2019	35'	2
Guest Dock	18	1/16/2019	Parks Central Reservations	Confirmed	1/16/2019	1/19/2019	37'	3
Guest Dock	21	1/16/2019	WEBSITE	Confirmed	1/16/2019	1/17/2019	65'	1
Guest Dock	3	1/17/2019	WEBSITE	Confirmed	1/17/2019	1/20/2019	30'	3
Guest Dock	12	1/17/2019	Parks Central Reservations	Confirmed	1/23/2019	1/26/2019	40'	3
Guest Dock	12	1/17/2019	Parks Central Reservations	Confirmed	1/26/2019	1/28/2019	40'	2
Guest Dock	12	1/17/2019	Parks Central Reservations	Confirmed	1/22/2019	1/23/2019	40'	1
Guest Dock	12	1/17/2019	Parks Central Reservations	Confirmed	1/28/2019	2/1/2019	40'	4
Guest Dock	28	1/17/2019	Parks Central Reservations	Confirmed	1/20/2019	1/21/2019	32'	1
Guest Dock	16	1/17/2019	WEBSITE	Confirmed	1/19/2019	1/20/2019	43'	1
Guest Dock	20	1/17/2019	WEBSITE	Confirmed	1/18/2019	1/20/2019	50'	2
Guest Dock	13	1/17/2019	WEBSITE	Confirmed	1/24/2019	1/26/2019	42'	2
Guest Dock	5	1/18/2019	WEBSITE	Confirmed	7/4/2019	7/7/2019	24'	3
Guest Dock	4	1/18/2019	WEBSITE	Confirmed	1/18/2019	1/20/2019	42'	2
Guest Dock	15	1/19/2019	WEBSITE	Confirmed	1/19/2019	1/21/2019	37'	2
Guest Dock	21	1/19/2019	WEBSITE	Confirmed	1/20/2019	1/21/2019	65'	1
Guest Dock	26	1/19/2019	WEBSITE	Confirmed	1/19/2019	1/22/2019	40'	3
Guest Dock	9	1/19/2019	WEBSITE	Confirmed	1/24/2019	1/26/2019	25'	2
Guest Dock	4	1/20/2019	WEBSITE	Confirmed	1/20/2019	1/21/2019	42'	1
Guest Dock	5	1/20/2019	WEBSITE	Confirmed	1/20/2019	1/21/2019	36'	1
Guest Dock	11	1/20/2019	WEBSITE	Confirmed	1/22/2019	1/24/2019	30'	2
Guest Dock	3	1/20/2019	WEBSITE	Confirmed	1/22/2019	1/23/2019	47'	1
Guest Dock	4	1/21/2019	WEBSITE	Confirmed	1/21/2019	1/22/2019	42'	1
Guest Dock	10	1/22/2019	Parks Central Reservations	Confirmed	1/24/2019	1/25/2019	27'	1

Marina	Mooring	Date Reservation Made	Made At	Status	Arrival Date	Departure Date	Boat Length	Length of Stay (Nights)
Guest Dock	13	1/22/2019	Parks Central Reservations	Confirmed	1/22/2019	1/23/2019	27'	1
Guest Dock	13	1/22/2019	Parks Central Reservations	Confirmed	1/23/2019	1/24/2019	27'	1
Guest Dock	4	1/22/2019	WEBSITE	Confirmed	1/25/2019	1/27/2019	37'	2
Guest Dock	7	1/22/2019	WEBSITE	Confirmed	1/22/2019	1/25/2019	34'	3
Guest Dock	2	1/22/2019	Parks Central Reservations	Confirmed	1/23/2019	1/25/2019	26'	2
Guest Dock	4	1/22/2019	WEBSITE	Confirmed	1/22/2019	1/24/2019	35'	2
Guest Dock	20	1/22/2019	Parks Central Reservations	Confirmed	1/22/2019	1/23/2019	45'	1
Guest Dock	20	1/22/2019	Parks Central Reservations	Confirmed	1/23/2019	1/25/2019	45'	2
Guest Dock	5	1/22/2019	WEBSITE	Confirmed	1/22/2019	1/24/2019	42'	2
Guest Dock	8	1/22/2019	WEBSITE	Confirmed	1/22/2019	1/25/2019	27'	3
Guest Dock	21	1/22/2019	WEBSITE	Confirmed	1/23/2019	1/24/2019	58'	1
Guest Dock	21	1/22/2019	WEBSITE	Confirmed	1/22/2019	1/23/2019	58'	1
Guest Dock	3	1/22/2019	WEBSITE	Confirmed	1/23/2019	1/25/2019	16'	2
Guest Dock	14	1/22/2019	WEBSITE	Confirmed	1/22/2019	1/24/2019	24'	2
Guest Dock	6	1/22/2019	WEBSITE	Confirmed	1/22/2019	1/24/2019	30'	2
Guest Dock	26	1/23/2019	WEBSITE	Confirmed	1/23/2019	1/24/2019	47'	1
Guest Dock	21	1/23/2019	WEBSITE	Confirmed	1/24/2019	1/25/2019	58'	1
Guest Dock	9	1/23/2019	Parks Central Reservations	Confirmed	1/23/2019	1/24/2019	25'	1
Guest Dock	6	1/23/2019	WEBSITE	Confirmed	1/24/2019	1/27/2019	23'	3
Guest Dock	29	1/23/2019	Parks Central Reservations	Confirmed	1/23/2019	1/24/2019	42'	1
Guest Dock	11	1/23/2019	WEBSITE	Confirmed	1/24/2019	1/25/2019	30'	1
Guest Dock	21	1/23/2019	WEBSITE	Confirmed	1/25/2019	1/26/2019	58'	1
Guest Dock	26	1/24/2019	Parks Central Reservations	Confirmed	1/24/2019	1/25/2019	25'	1
Guest Dock	19	1/24/2019	WEBSITE	Confirmed	1/24/2019	1/25/2019	45'	1
Guest Dock	15	1/24/2019	WEBSITE	Confirmed	1/24/2019	1/25/2019	30'	1
Guest Dock	14	1/24/2019	WEBSITE	Confirmed	1/24/2019	1/25/2019	24'	1
Guest Dock	5	1/24/2019	Parks Central Reservations	Confirmed	1/24/2019	1/25/2019	40'	1
Guest Dock	29	1/24/2019	Parks Central Reservations	Confirmed	1/24/2019	1/25/2019	35'	1
Guest Dock	18	1/24/2019	Parks Central Reservations	Confirmed	1/27/2019	1/28/2019	29'	1
Guest Dock	5	1/24/2019	WEBSITE	Confirmed	1/25/2019	1/26/2019	24'	1
Guest Dock	8	1/25/2019	WEBSITE	Confirmed	1/25/2019	1/26/2019	27'	1
Guest Dock	28	1/25/2019	WEBSITE	Confirmed	1/25/2019	1/26/2019	40'	1
Guest Dock	15	1/25/2019	WEBSITE	Confirmed	1/25/2019	1/26/2019	45'	1
Guest Dock	2	1/25/2019	WEBSITE	Confirmed	1/26/2019	1/28/2019	19'	2
Guest Dock	16	1/25/2019	WEBSITE	Confirmed	1/25/2019	1/26/2019	30'	1
Guest Dock	14	1/25/2019	WEBSITE	Confirmed	1/25/2019	1/26/2019	24'	1
Guest Dock	27	1/25/2019	WEBSITE	Confirmed	1/25/2019	1/26/2019	16'	1
Guest Dock	14	1/25/2019	WEBSITE	Confirmed	1/26/2019	1/28/2019	28'	2
Guest Dock	26	1/26/2019	WEBSITE	Confirmed	1/26/2019	1/27/2019	40'	1
Guest Dock	7	1/26/2019	WEBSITE	Confirmed	1/26/2019	1/27/2019	16'	1
Guest Dock	15	1/26/2019	WEBSITE	Confirmed	1/26/2019	1/28/2019	45'	2
Guest Dock	9	1/26/2019	WEBSITE	Confirmed	1/26/2019	1/27/2019	42'	1
Guest Dock	8	1/26/2019	WEBSITE	Confirmed	1/26/2019	1/27/2019	30'	1
Guest Dock	6	1/27/2019	WEBSITE	Confirmed	1/27/2019	1/28/2019	23'	1
Guest Dock	26	1/27/2019	WEBSITE	Confirmed	1/28/2019	1/30/2019	32'	2
Guest Dock	26	1/27/2019	WEBSITE	Confirmed	1/27/2019	1/28/2019	40'	1
Guest Dock	4	1/27/2019	WEBSITE	Confirmed	1/31/2019	2/1/2019	30'	1
Guest Dock	4	1/27/2019	WEBSITE	Confirmed	1/28/2019	1/29/2019	55'	1
Guest Dock	15	1/27/2019	WEBSITE	Confirmed	1/28/2019	1/29/2019	45'	1
Guest Dock	14	1/27/2019	WEBSITE	Confirmed	1/28/2019	2/1/2019	41'	4
Guest Dock	3	1/28/2019	WEBSITE	Confirmed	1/28/2019	1/29/2019	27'	1
Guest Dock	6	1/28/2019	WEBSITE	Confirmed	1/28/2019	1/29/2019	25'	1
Guest Dock	11	1/28/2019	WEBSITE	Confirmed	1/28/2019	1/29/2019	30'	1
Guest Dock	27	1/28/2019	Parks Central Reservations	Confirmed	1/28/2019	2/11/2019	44'	14
Guest Dock	8	1/28/2019	WEBSITE	Confirmed	1/28/2019	1/29/2019	35'	1
Guest Dock	4	1/28/2019	WEBSITE	Confirmed	1/29/2019	1/30/2019	42'	1
Guest Dock	15	1/29/2019	WEBSITE	Confirmed	1/29/2019	1/31/2019	45'	2
Guest Dock	9	1/29/2019	WEBSITE	Confirmed	1/29/2019	1/30/2019	41'	1

Marina	Mooring	Date Reservation Made	Made At	Status	Arrival Date	Departure Date	Boat Length	Length of Stay (Nights)
Guest Dock	3	1/29/2019	WEBSITE	Confirmed	1/31/2019	2/1/2019	26'	1
Guest Dock	2	1/29/2019	WEBSITE	Confirmed	2/5/2019	2/8/2019	26'	3
Guest Dock	5	1/29/2019	Parks Central Reservations	Confirmed	1/29/2019	1/30/2019	37'	1
Guest Dock	26	1/29/2019	WEBSITE	Confirmed	1/30/2019	2/1/2019	32'	2
Guest Dock	3	1/29/2019	WEBSITE	Confirmed	1/29/2019	1/31/2019	50'	2
Guest Dock	6	1/30/2019	Parks Central Reservations	Confirmed	1/29/2019	2/1/2019	27'	3
Guest Dock	9	1/30/2019	WEBSITE	Confirmed	1/30/2019	2/1/2019	25'	2
Guest Dock	7	1/30/2019	WEBSITE	Confirmed	1/30/2019	1/31/2019	27'	1
Guest Dock	18	1/30/2019	Parks Central Reservations	Confirmed	1/31/2019	2/1/2019	38'	1
Guest Dock	3	1/31/2019	WEBSITE	Confirmed	2/14/2019	2/19/2019	60'	5
Guest Dock	9	1/31/2019	WEBSITE	Confirmed	2/7/2019	2/8/2019	38'	1
Guest Dock	6	1/31/2019	WEBSITE	Confirmed	2/1/2019	2/3/2019	27'	2
Guest Dock	19	1/31/2019	WEBSITE	Confirmed	2/1/2019	2/3/2019	46'	2
Guest Dock	15	1/31/2019	WEBSITE	Confirmed	1/31/2019	2/1/2019	45'	1
Guest Dock	3	1/31/2019	WEBSITE	Confirmed	2/7/2019	2/9/2019	40'	2
Guest Dock	8	2/1/2019	WEBSITE	Confirmed	2/14/2019	2/15/2019	10'	1
Guest Dock	16	2/1/2019	WEBSITE	Confirmed	2/2/2019	2/3/2019	40'	1
Guest Dock	2	2/1/2019	WEBSITE	Confirmed	2/1/2019	2/3/2019	32'	2
Guest Dock	3	2/1/2019	WEBSITE	Confirmed	2/5/2019	2/7/2019	42'	2
Guest Dock	3	2/1/2019	WEBSITE	Confirmed	2/1/2019	2/2/2019	35'	1
Guest Dock	5	2/1/2019	WEBSITE	Confirmed	2/1/2019	2/3/2019	39'	2
Guest Dock	8	2/2/2019	WEBSITE	Confirmed	2/2/2019	2/4/2019	34'	2
Guest Dock	19	2/2/2019	WEBSITE	Confirmed	2/3/2019	2/4/2019	46'	1
Guest Dock	4	2/3/2019	WEBSITE	Confirmed	2/15/2019	2/17/2019	25'	2
Guest Dock	18	2/3/2019	WEBSITE	Confirmed	2/7/2019	2/8/2019	30'	1
Guest Dock	18	2/4/2019	WEBSITE	Confirmed	2/4/2019	2/5/2019	55'	1
Guest Dock	22	2/4/2019	Parks Central Reservations	Confirmed	2/6/2019	2/8/2019	33'	2
Guest Dock	7	2/4/2019	Parks Central Reservations	Confirmed	2/4/2019	2/8/2019	44'	4
Guest Dock	20	2/4/2019	Parks Central Reservations	Confirmed	1/31/2019	2/1/2019	32'	1
Guest Dock	18	2/4/2019	Parks Central Reservations	Confirmed	2/8/2019	2/12/2019	32'	4
Guest Dock	19	2/4/2019	Parks Central Reservations	Confirmed	2/6/2019	2/8/2019	32'	2
Guest Dock	8	2/4/2019	WEBSITE	Confirmed	2/4/2019	2/6/2019	34'	2
Guest Dock	16	2/5/2019	WEBSITE	Confirmed	2/16/2019	2/18/2019	26'	2
Guest Dock	18	2/5/2019	WEBSITE	Confirmed	2/5/2019	2/6/2019	46'	1
Guest Dock	5	2/5/2019	WEBSITE	Confirmed	2/6/2019	2/7/2019	30'	1
Guest Dock	15	2/5/2019	WEBSITE	Confirmed	2/7/2019	2/8/2019	44'	1
Guest Dock	16	2/5/2019	WEBSITE	Confirmed	2/8/2019	2/10/2019	42'	2
Guest Dock	14	2/5/2019	WEBSITE	Confirmed	2/5/2019	2/6/2019	45'	1
Guest Dock	9	2/5/2019	WEBSITE	Confirmed	2/6/2019	2/7/2019	34'	1
Guest Dock	11	2/6/2019	WEBSITE	Confirmed	2/6/2019	2/7/2019	30'	1
Guest Dock	21	2/6/2019	Parks Central Reservations	Confirmed	2/6/2019	2/8/2019	38'	2
Guest Dock	8	2/6/2019	WEBSITE	Confirmed	2/6/2019	2/7/2019	27'	1
Guest Dock	19	2/6/2019	WEBSITE	Confirmed	2/8/2019	2/11/2019	47'	3
Guest Dock	15	2/6/2019	WEBSITE	Confirmed	2/6/2019	2/7/2019	25'	1
Guest Dock	16	2/6/2019	WEBSITE	Confirmed	2/6/2019	2/7/2019	35'	1
Guest Dock	28	2/6/2019	Parks Central Reservations	Confirmed	2/6/2019	2/8/2019	35'	2
Guest Dock	29	2/6/2019	Parks Central Reservations	Confirmed	2/6/2019	2/8/2019	36'	2
Guest Dock	12	2/6/2019	WEBSITE	Confirmed	2/7/2019	2/8/2019	24'	1
Guest Dock	2	2/6/2019	WEBSITE	Confirmed	2/8/2019	2/9/2019	25'	1
Guest Dock	4	2/6/2019	WEBSITE	Confirmed	2/19/2019	2/22/2019	22'	3
Guest Dock	8	2/6/2019	WEBSITE	Confirmed	2/7/2019	2/8/2019	27'	1
Guest Dock	20	2/7/2019	Parks Central Reservations	Confirmed	2/7/2019	2/8/2019	49'	1
Guest Dock	20	2/7/2019	Parks Central Reservations	Confirmed	2/4/2019	2/7/2019	49'	3
Guest Dock	20	2/7/2019	Parks Central Reservations	Confirmed	2/8/2019	2/14/2019	49'	6
Guest Dock	19	2/7/2019	Parks Central Reservations	Confirmed	2/14/2019	2/18/2019	49'	4
Guest Dock	9	2/7/2019	WEBSITE	Confirmed	2/8/2019	2/9/2019	23'	1
Guest Dock	5	2/7/2019	WEBSITE	Confirmed	2/11/2019	2/12/2019	30'	1
Guest Dock	4	2/8/2019	WEBSITE	Confirmed	2/22/2019	2/25/2019	22'	3

Marina	Mooring	Date Reservation Made	Made At	Status	Arrival Date	Departure Date	Boat Length	Length of Stay (Nights)
Guest Dock	28	2/8/2019	WEBSITE	Confirmed	2/8/2019	2/9/2019	35'	1
Guest Dock	7	2/8/2019	WEBSITE	Confirmed	2/8/2019	2/10/2019	30'	2
Guest Dock	3	2/8/2019	WEBSITE	Confirmed	2/9/2019	2/10/2019	46'	1
Guest Dock	9	2/9/2019	WEBSITE	Confirmed	2/9/2019	2/10/2019	23'	1
Guest Dock	3	2/9/2019	WEBSITE	Confirmed	2/12/2019	2/14/2019	60'	2
Guest Dock	22	2/9/2019	WEBSITE	Confirmed	2/9/2019	2/10/2019	47'	1
Guest Dock	3	2/9/2019	WEBSITE	Confirmed	2/10/2019	2/12/2019	55'	2
Guest Dock	15	2/10/2019	WEBSITE	Confirmed	2/10/2019	2/11/2019	43'	1
Guest Dock	6	2/10/2019	WEBSITE	Confirmed	2/16/2019	2/17/2019	40'	1
Guest Dock	26	2/10/2019	WEBSITE	Confirmed	2/11/2019	2/13/2019	32'	2
Guest Dock	14	2/10/2019	WEBSITE	Confirmed	2/11/2019	2/13/2019	30'	2
Guest Dock	9	2/11/2019	WEBSITE	Confirmed	2/11/2019	2/15/2019	26'	4
Guest Dock	2	2/11/2019	WEBSITE	Confirmed	2/18/2019	2/20/2019	26'	2
Guest Dock	11	2/11/2019	WEBSITE	Confirmed	2/11/2019	2/15/2019	44'	4
Guest Dock	12	2/11/2019	WEBSITE	Confirmed	2/12/2019	2/13/2019	38'	1
Guest Dock	4	2/11/2019	WEBSITE	Confirmed	2/11/2019	2/12/2019	35'	1
Guest Dock	20	2/11/2019	Parks Central Reservations	Confirmed	2/14/2019	2/15/2019	25'	1
Guest Dock	7	2/11/2019	Parks Central Reservations	Confirmed	2/11/2019	2/12/2019	36'	1
Guest Dock	7	2/11/2019	Parks Central Reservations	Confirmed	2/12/2019	2/13/2019	36'	1
Guest Dock	15	2/11/2019	WEBSITE	Confirmed	2/11/2019	2/12/2019	43'	1
Guest Dock	28	2/11/2019	WEBSITE	Confirmed	2/11/2019	2/25/2019	44'	14
Guest Dock	5	2/11/2019	WEBSITE	Confirmed	2/12/2019	2/15/2019	55'	3
Guest Dock	6	2/12/2019	WEBSITE	Confirmed	2/12/2019	2/13/2019	27'	1
Guest Dock	15	2/12/2019	WEBSITE	Confirmed	2/12/2019	2/14/2019	43'	2
Guest Dock	16	2/12/2019	WEBSITE	Confirmed	2/12/2019	2/15/2019	37'	3
Guest Dock	8	2/12/2019	WEBSITE	Confirmed	2/12/2019	2/13/2019	34'	1
Guest Dock	14	2/12/2019	WEBSITE	Confirmed	2/13/2019	2/15/2019	40'	2
Guest Dock	22	2/12/2019	WEBSITE	Confirmed	2/12/2019	2/13/2019	47'	1
Guest Dock	22	2/13/2019	WEBSITE	Confirmed	2/13/2019	2/14/2019	47'	1
Guest Dock	8	2/13/2019	WEBSITE	Confirmed	2/13/2019	2/14/2019	34'	1
Guest Dock	12	2/13/2019	WEBSITE	Confirmed	2/13/2019	2/18/2019	40'	5
Guest Dock	5	2/13/2019	WEBSITE	Confirmed	2/27/2019	3/3/2019	42'	4
Guest Dock	15	2/14/2019	WEBSITE	Confirmed	2/15/2019	2/18/2019	37'	3
Guest Dock	26	2/14/2019	WEBSITE	Confirmed	2/14/2019	2/23/2019	32'	9
Guest Dock	19	2/15/2019	Parks Central Reservations	Confirmed	2/25/2019	2/26/2019	38'	1
Guest Dock	19	2/15/2019	Parks Central Reservations	Confirmed	2/26/2019	2/28/2019	38'	2
Guest Dock	22	2/15/2019	WEBSITE	Confirmed	2/15/2019	2/16/2019	47'	1
Guest Dock	8	2/15/2019	WEBSITE	Confirmed	2/15/2019	2/18/2019	23'	3
Guest Dock	11	2/15/2019	WEBSITE	Confirmed	2/16/2019	2/18/2019	55'	2
Guest Dock	27	2/15/2019	WEBSITE	Confirmed	2/16/2019	2/17/2019	40'	1
Guest Dock	22	2/16/2019	WEBSITE	Confirmed	2/16/2019	2/17/2019	47'	1
Guest Dock	13	2/16/2019	WEBSITE	Confirmed	2/16/2019	2/19/2019	43'	3
Guest Dock	27	2/16/2019	WEBSITE	Confirmed	2/19/2019	2/21/2019	32'	2
Guest Dock	10	2/17/2019	WEBSITE	Confirmed	2/17/2019	2/19/2019	25'	2
Guest Dock	11	2/17/2019	WEBSITE	Confirmed	2/18/2019	2/19/2019	55'	1
Guest Dock	22	2/17/2019	WEBSITE	Confirmed	2/17/2019	2/18/2019	47'	1
Guest Dock	21	2/17/2019	WEBSITE	Confirmed	2/17/2019	2/23/2019	43'	6
Guest Dock	21	2/17/2019	WEBSITE	Confirmed	2/23/2019	2/25/2019	43'	2
Guest Dock	20	2/17/2019	WEBSITE	Confirmed	2/17/2019	2/19/2019	45'	2
Guest Dock	18	2/17/2019	WEBSITE	Confirmed	2/18/2019	2/20/2019	45'	2
Guest Dock	4	2/18/2019	WEBSITE	Confirmed	2/18/2019	2/19/2019	38'	1
Guest Dock	15	2/18/2019	WEBSITE	Confirmed	2/18/2019	2/22/2019	34'	4
Guest Dock	11	2/18/2019	WEBSITE	Confirmed	2/19/2019	2/22/2019	55'	3
Guest Dock	8	2/18/2019	WEBSITE	Confirmed	2/18/2019	2/20/2019	23'	2
Guest Dock	16	2/18/2019	WEBSITE	Confirmed	2/19/2019	2/22/2019	41'	3
Guest Dock	10	2/19/2019	WEBSITE	Confirmed	2/19/2019	2/22/2019	40'	3
Guest Dock	19	2/19/2019	WEBSITE	Confirmed	3/3/2019	3/5/2019	65'	2
Guest Dock	13	2/19/2019	WEBSITE	Confirmed	2/19/2019	2/21/2019	27'	2

Marina	Mooring	Date Reservation Made	Made At	Status	Arrival Date	Departure Date	Boat Length	Length of Stay (Nights)
Guest Dock	13	2/19/2019	WEBSITE	Confirmed	2/21/2019	2/22/2019	27'	1
Guest Dock	3	2/19/2019	Parks Central Reservations	Confirmed	2/20/2019	2/22/2019	50'	2
Guest Dock	20	2/19/2019	WEBSITE	Confirmed	2/20/2019	2/25/2019	45'	5
Guest Dock	3	2/19/2019	Parks Central Reservations	Confirmed	2/22/2019	2/23/2019	60'	1
Guest Dock	5	2/19/2019	WEBSITE	Confirmed	2/20/2019	2/22/2019	38'	2
Guest Dock	21	2/19/2019	WEBSITE	Confirmed	2/26/2019	2/27/2019	47'	1
Guest Dock	6	2/19/2019	WEBSITE	Confirmed	2/20/2019	2/25/2019	37'	5
Guest Dock	22	2/19/2019	WEBSITE	Confirmed	2/20/2019	2/21/2019	47'	1
Guest Dock	27	2/21/2019	WEBSITE	Confirmed	2/21/2019	2/22/2019	32'	1
Guest Dock	9	2/21/2019	Parks Central Reservations	Confirmed	2/24/2019	2/26/2019	44'	2
Guest Dock	2	2/21/2019	Parks Central Reservations	Confirmed	2/25/2019	2/26/2019	26'	1
Guest Dock	11	2/21/2019	WEBSITE	Confirmed	2/22/2019	2/27/2019	42'	5
Guest Dock	18	2/21/2019	WEBSITE	Confirmed	2/21/2019	2/22/2019	45'	1
Guest Dock	12	2/22/2019	WEBSITE	Confirmed	2/22/2019	2/25/2019	32'	3
Guest Dock	12	2/22/2019	WEBSITE	Confirmed	2/25/2019	2/26/2019	32'	1
Guest Dock	7	2/22/2019	WEBSITE	Confirmed	2/24/2019	2/28/2019	27'	4
Guest Dock	7	2/22/2019	WEBSITE	Confirmed	2/22/2019	2/24/2019	39'	2
Guest Dock	26	2/23/2019	WEBSITE	Confirmed	2/23/2019	2/24/2019	32'	1
Guest Dock	22	2/23/2019	WEBSITE	Confirmed	2/25/2019	2/26/2019	33'	1
Guest Dock	22	2/23/2019	WEBSITE	Confirmed	2/26/2019	3/1/2019	33'	3
Guest Dock	26	2/23/2019	WEBSITE	Confirmed	4/14/2019	4/16/2019	38'	2
Guest Dock	26	2/24/2019	WEBSITE	Confirmed	2/25/2019	2/26/2019	32'	1
Guest Dock	16	2/24/2019	WEBSITE	Confirmed	2/25/2019	3/1/2019	41'	4
Guest Dock	14	2/24/2019	WEBSITE	Confirmed	2/25/2019	2/28/2019	36'	3
Guest Dock	5	2/24/2019	WEBSITE	Confirmed	2/24/2019	2/25/2019	36'	1
Guest Dock	15	2/25/2019	WEBSITE	Confirmed	2/25/2019	2/26/2019	45'	1
Guest Dock	4	2/25/2019	Parks Central Reservations	Confirmed	2/25/2019	2/28/2019	36'	3
Guest Dock	13	2/25/2019	WEBSITE	Confirmed	2/25/2019	2/27/2019	34'	2
Guest Dock	14	2/25/2019	Parks Central Reservations	Confirmed	2/22/2019	2/23/2019	40'	1
Guest Dock	21	2/25/2019	WEBSITE	Confirmed	2/25/2019	2/26/2019	47'	1
Guest Dock	25	2/25/2019	Parks Central Reservations	Confirmed	2/25/2019	2/26/2019	25'	1
Guest Dock	11	2/25/2019	WEBSITE	Confirmed	2/27/2019	3/1/2019	42'	2
Guest Dock	12	2/26/2019	WEBSITE	Confirmed	2/26/2019	3/1/2019	45'	3
Guest Dock	26	2/26/2019	WEBSITE	Confirmed	2/26/2019	2/27/2019	32'	1
Guest Dock	12	2/26/2019	Parks Central Reservations	Confirmed	3/1/2019	3/15/2019	44'	14
Guest Dock	2	2/26/2019	Parks Central Reservations	Confirmed	3/4/2019	3/8/2019	26'	4
Guest Dock	2	2/26/2019	Parks Central Reservations	Confirmed	3/11/2019	3/15/2019	26'	4
Guest Dock	10	2/26/2019	Parks Central Reservations	Confirmed	2/27/2019	3/2/2019	30'	3
Guest Dock	8	2/26/2019	Parks Central Reservations	Confirmed	2/26/2019	2/27/2019	30'	1
Guest Dock	5	2/26/2019	Parks Central Reservations	Confirmed	2/26/2019	2/27/2019	18'	1
Guest Dock	8	2/26/2019	WEBSITE	Confirmed	2/27/2019	2/28/2019	27'	1
Guest Dock	21	2/26/2019	WEBSITE	Confirmed	2/27/2019	2/28/2019	47'	1
Guest Dock	6	2/27/2019	WEBSITE	Confirmed	2/27/2019	3/3/2019	30'	4
Guest Dock	2	2/27/2019	WEBSITE	Confirmed	2/27/2019	3/2/2019	24'	3
Guest Dock	27	2/27/2019	Parks Central Reservations	Confirmed	2/27/2019	3/11/2019	38'	12
Guest Dock	27	2/27/2019	Parks Central Reservations	Confirmed	3/11/2019	3/13/2019	38'	2
Guest Dock	9	2/27/2019	WEBSITE	Confirmed	2/27/2019	2/28/2019	27'	1
Guest Dock	18	2/27/2019	WEBSITE	Confirmed	2/27/2019	3/2/2019	45'	3
Guest Dock	14	2/27/2019	WEBSITE	Confirmed	2/28/2019	3/2/2019	36'	2
Guest Dock	8	2/27/2019	WEBSITE	Confirmed	2/28/2019	3/1/2019	27'	1
Guest Dock	4	2/28/2019	WEBSITE	Confirmed	2/28/2019	3/2/2019	36'	2
Guest Dock	19	2/28/2019	Parks Central Reservations	Confirmed	2/28/2019	3/1/2019	40'	1
Guest Dock	7	2/28/2019	WEBSITE	Confirmed	2/28/2019	3/1/2019	35'	1
Guest Dock	20	3/1/2019	WEBSITE	Confirmed	3/1/2019	3/2/2019	52'	1
Guest Dock	21	3/1/2019	Parks Central Reservations	Confirmed	3/1/2019	3/5/2019	25'	4
Guest Dock	6	3/1/2019	WEBSITE	Confirmed	3/14/2019	3/15/2019	10'	1
Guest Dock	7	3/1/2019	WEBSITE	Confirmed	3/1/2019	3/4/2019	31'	3
Guest Dock	16	3/1/2019	WEBSITE	Confirmed	3/1/2019	3/2/2019	29'	1

Marina	Mooring	Date Reservation Made	Made At	Status	Arrival Date	Departure Date	Boat Length	Length of Stay (Nights)
Guest Dock	8	3/2/2019	WEBSITE	Confirmed	3/2/2019	3/3/2019	32'	1
Guest Dock	4	3/2/2019	WEBSITE	Confirmed	3/2/2019	3/3/2019	16'	1
Guest Dock	10	3/2/2019	WEBSITE	Confirmed	3/2/2019	3/4/2019	30'	2
Guest Dock	20	3/2/2019	WEBSITE	Confirmed	3/2/2019	3/8/2019	42'	6
Guest Dock	16	3/2/2019	WEBSITE	Confirmed	3/2/2019	3/3/2019	30'	1
Guest Dock	15	3/2/2019	WEBSITE	Confirmed	3/2/2019	3/3/2019	28'	1
Guest Dock	13	3/2/2019	WEBSITE	Confirmed	3/2/2019	3/3/2019	24'	1
Guest Dock	6	3/2/2019	WEBSITE	Confirmed	3/4/2019	3/5/2019	27'	1
Guest Dock	16	3/2/2019	WEBSITE	Confirmed	3/3/2019	3/4/2019	27'	1
Guest Dock	4	3/3/2019	WEBSITE	Confirmed	3/4/2019	3/6/2019	32'	2
Guest Dock	26	3/3/2019	WEBSITE	Confirmed	3/3/2019	3/5/2019	40'	2
Guest Dock	13	3/3/2019	WEBSITE	Confirmed	3/3/2019	3/4/2019	28'	1
Guest Dock	16	3/3/2019	WEBSITE	Confirmed	3/4/2019	3/5/2019	41'	1
Guest Dock	8	3/3/2019	WEBSITE	Confirmed	3/4/2019	3/5/2019	30'	1
Guest Dock	5	3/3/2019	WEBSITE	Confirmed	3/4/2019	3/7/2019	32'	3
Guest Dock	7	3/4/2019	WEBSITE	Confirmed	3/5/2019	3/8/2019	42'	3
Guest Dock	22	3/4/2019	Parks Central Reservations	Confirmed	3/4/2019	3/7/2019	33'	3
Guest Dock	22	3/4/2019	Parks Central Reservations	Confirmed	3/7/2019	3/8/2019	33'	1
Guest Dock	22	3/4/2019	Parks Central Reservations	Confirmed	3/11/2019	3/12/2019	33'	1
Guest Dock	22	3/4/2019	Parks Central Reservations	Confirmed	3/18/2019	3/22/2019	33'	4
Guest Dock	15	3/4/2019	WEBSITE	Confirmed	3/4/2019	3/5/2019	47'	1
Guest Dock	9	3/4/2019	WEBSITE	Confirmed	3/4/2019	3/9/2019	30'	5
Guest Dock	28	3/4/2019	WEBSITE	Confirmed	3/4/2019	3/7/2019	40'	3
Guest Dock	7	3/4/2019	WEBSITE	Confirmed	3/4/2019	3/5/2019	34'	1
Guest Dock	29	3/4/2019	Parks Central Reservations	Confirmed	3/11/2019	3/15/2019	36'	4
Guest Dock	29	3/4/2019	Parks Central Reservations	Confirmed	3/5/2019	3/8/2019	36'	3
Guest Dock	18	3/4/2019	Parks Central Reservations	Confirmed	3/19/2019	3/21/2019	42'	2
Guest Dock	3	3/4/2019	WEBSITE	Confirmed	3/5/2019	3/8/2019	44'	3
Guest Dock	3	3/4/2019	WEBSITE	Confirmed	3/8/2019	3/9/2019	44'	1
Guest Dock	26	3/4/2019	WEBSITE	Confirmed	3/7/2019	3/9/2019	40'	2
Guest Dock	6	3/5/2019	WEBSITE	Confirmed	3/5/2019	3/6/2019	27'	1
Guest Dock	16	3/5/2019	WEBSITE	Confirmed	3/5/2019	3/6/2019	30'	1
Guest Dock	6	3/5/2019	WEBSITE	Confirmed	3/6/2019	3/8/2019	32'	2
Guest Dock	16	3/5/2019	WEBSITE	Confirmed	3/6/2019	3/7/2019	30'	1
Guest Dock	4	3/5/2019	WEBSITE	Confirmed	3/8/2019	3/9/2019	32'	1
Guest Dock	8	3/6/2019	WEBSITE	Confirmed	3/6/2019	3/8/2019	26'	2
Guest Dock	10	3/6/2019	WEBSITE	Confirmed	3/6/2019	3/7/2019	24'	1
Guest Dock	21	3/6/2019	WEBSITE	Confirmed	3/6/2019	3/7/2019	47'	1
Guest Dock	14	3/6/2019	WEBSITE	Confirmed	3/6/2019	3/7/2019	27'	1
Guest Dock	14	3/6/2019	Parks Central Reservations	Confirmed	3/7/2019	3/10/2019	40'	3
Guest Dock	5	3/6/2019	WEBSITE	Confirmed	3/7/2019	3/8/2019	32'	1
Guest Dock	4	3/6/2019	WEBSITE	Confirmed	3/9/2019	3/10/2019	32'	1
Guest Dock	16	3/7/2019	WEBSITE	Confirmed	3/7/2019	3/8/2019	30'	1
Guest Dock	11	3/7/2019	WEBSITE	Confirmed	3/7/2019	3/8/2019	30'	1
Guest Dock	28	3/7/2019	WEBSITE	Confirmed	3/7/2019	3/10/2019	40'	3
Guest Dock	10	3/7/2019	Parks Central Reservations	Confirmed	3/7/2019	3/8/2019	30'	1
Guest Dock	10	3/7/2019	WEBSITE	Confirmed	3/8/2019	3/9/2019	30'	1
Guest Dock	7	3/7/2019	WEBSITE	Confirmed	3/13/2019	3/16/2019	42'	3
Guest Dock	3	3/8/2019	WEBSITE	Confirmed	3/22/2019	3/31/2019	38'	9
Guest Dock	3	3/8/2019	WEBSITE	Confirmed	3/9/2019	3/10/2019	44'	1
Guest Dock	18	3/8/2019	WEBSITE	Confirmed	3/9/2019	3/16/2019	45'	7
Guest Dock	21	3/9/2019	WEBSITE	Confirmed	3/23/2019	3/24/2019	45'	1
Guest Dock	26	3/9/2019	WEBSITE	Confirmed	3/9/2019	3/10/2019	40'	1
Guest Dock	26	3/10/2019	WEBSITE	Confirmed	3/11/2019	3/12/2019	32'	1
Guest Dock	3	3/10/2019	WEBSITE	Confirmed	3/10/2019	3/12/2019	53'	2
Guest Dock	28	3/10/2019	WEBSITE	Confirmed	3/10/2019	3/13/2019	40'	3
Guest Dock	2	3/10/2019	WEBSITE	Confirmed	3/10/2019	3/11/2019	40'	1
Guest Dock	26	3/10/2019	WEBSITE	Confirmed	3/10/2019	3/11/2019	40'	1

Marina	Mooring	Date Reservation Made	Made At	Status	Arrival Date	Departure Date	Boat Length	Length of Stay (Nights)
Guest Dock	7	3/10/2019	WEBSITE	Confirmed	3/11/2019	3/12/2019	42'	1
Guest Dock	11	3/10/2019	WEBSITE	Confirmed	3/11/2019	3/12/2019	30'	1
Guest Dock	16	3/10/2019	WEBSITE	Confirmed	3/10/2019	3/15/2019	30'	5
Guest Dock	19	3/10/2019	WEBSITE	Confirmed	3/11/2019	3/15/2019	63'	4
Guest Dock	19	3/10/2019	WEBSITE	Confirmed	3/18/2019	3/22/2019	63'	4
Guest Dock	4	3/11/2019	WEBSITE	Confirmed	3/11/2019	3/12/2019	16'	1
Guest Dock	20	3/11/2019	Parks Central Reservations	Confirmed	3/11/2019	3/12/2019	38'	1
Guest Dock	14	3/11/2019	Parks Central Reservations	Confirmed	3/11/2019	3/18/2019	40'	7
Guest Dock	5	3/11/2019	Parks Central Reservations	Confirmed	3/11/2019	3/12/2019	27'	1
Guest Dock	9	3/11/2019	Parks Central Reservations	Confirmed	3/11/2019	3/12/2019	25'	1
Guest Dock	2	3/11/2019	WEBSITE	Confirmed	3/24/2019	3/26/2019	28'	2
Guest Dock	3	3/11/2019	WEBSITE	Confirmed	3/12/2019	3/15/2019	44'	3
Guest Dock	4	3/12/2019	WEBSITE	Confirmed	3/12/2019	3/13/2019	16'	1
Guest Dock	27	3/12/2019	WEBSITE	Confirmed	3/16/2019	3/24/2019	33'	8
Guest Dock	9	3/12/2019	WEBSITE	Confirmed	3/15/2019	3/18/2019	25'	3
Guest Dock	7	3/12/2019	WEBSITE	Confirmed	3/12/2019	3/13/2019	42'	1
Guest Dock	7	3/12/2019	WEBSITE	Confirmed	3/20/2019	3/22/2019	55'	2
Guest Dock	21	3/12/2019	WEBSITE	Confirmed	3/12/2019	3/14/2019	65'	2
Guest Dock	26	3/13/2019	WEBSITE	Confirmed	3/13/2019	3/14/2019	32'	1
Guest Dock	21	3/13/2019	Parks Central Reservations	Confirmed	3/18/2019	3/19/2019	30'	1
Guest Dock	20	3/13/2019	Parks Central Reservations	Confirmed	3/13/2019	3/15/2019	38'	2
Guest Dock	4	3/13/2019	Parks Central Reservations	Confirmed	3/13/2019	3/14/2019	30'	1
Guest Dock	4	3/13/2019	Parks Central Reservations	Confirmed	3/14/2019	3/15/2019	30'	1
Guest Dock	2	3/13/2019	WEBSITE	Confirmed	4/11/2019	4/12/2019	31'	1
Guest Dock	10	3/13/2019	Parks Central Reservations	Confirmed	3/13/2019	3/15/2019	27'	2
Guest Dock	5	3/13/2019	WEBSITE	Confirmed	3/13/2019	3/14/2019	36'	1
Guest Dock	28	3/13/2019	WEBSITE	Confirmed	3/13/2019	3/16/2019	40'	3
Guest Dock	11	3/13/2019	WEBSITE	Confirmed	3/13/2019	3/15/2019	32'	2
Guest Dock	26	3/14/2019	WEBSITE	Confirmed	3/14/2019	3/15/2019	32'	1
Guest Dock	9	3/14/2019	WEBSITE	Confirmed	3/14/2019	3/15/2019	25'	1
Guest Dock	13	3/14/2019	WEBSITE	Confirmed	3/14/2019	3/19/2019	28'	5
Guest Dock	27	3/14/2019	Parks Central Reservations	Confirmed	3/14/2019	3/15/2019	28'	1
Guest Dock	16	3/14/2019	WEBSITE	Confirmed	3/18/2019	3/22/2019	41'	4
Guest Dock	21	3/14/2019	WEBSITE	Confirmed	3/14/2019	3/16/2019	36'	2
Guest Dock	4	3/14/2019	WEBSITE	Confirmed	3/16/2019	3/18/2019	22'	2
Guest Dock	6	3/15/2019	WEBSITE	Confirmed	3/15/2019	3/16/2019	55'	1
Guest Dock	3	3/15/2019	WEBSITE	Confirmed	3/17/2019	3/18/2019	35'	1
Guest Dock	3	3/15/2019	WEBSITE	Confirmed	3/16/2019	3/17/2019	44'	1
Guest Dock	2	3/15/2019	WEBSITE	Confirmed	3/16/2019	3/19/2019	32'	3
Guest Dock	26	3/16/2019	WEBSITE	Confirmed	3/16/2019	3/19/2019	40'	3
Guest Dock	14	3/16/2019	WEBSITE	Confirmed	3/18/2019	3/20/2019	41'	2
Guest Dock	14	3/16/2019	WEBSITE	Confirmed	3/20/2019	3/21/2019	41'	1
Guest Dock	5	3/16/2019	WEBSITE	Confirmed	3/16/2019	3/17/2019		1
Guest Dock	11	3/16/2019	WEBSITE	Confirmed	3/16/2019	3/17/2019	34'	1
Guest Dock	5	3/17/2019	WEBSITE	Confirmed	6/3/2019	6/4/2019	35'	1
Guest Dock	28	3/17/2019	WEBSITE	Confirmed	3/31/2019	4/2/2019	40'	2
Guest Dock	11	3/17/2019	WEBSITE	Confirmed	3/17/2019	3/18/2019	34'	1
Guest Dock	4	3/17/2019	WEBSITE	Confirmed	3/18/2019	3/20/2019	32'	2
Guest Dock	2	3/17/2019	WEBSITE	Confirmed	3/19/2019	3/21/2019	33'	2
Guest Dock	11	3/18/2019	Parks Central Reservations	Confirmed	3/18/2019	3/22/2019	44'	4
Guest Dock	20	3/18/2019	Parks Central Reservations	Confirmed	3/18/2019	3/22/2019	26'	4
Guest Dock	18	3/18/2019	Parks Central Reservations	Confirmed	3/18/2019	3/19/2019	38'	1
Guest Dock	5	3/18/2019	Parks Central Reservations	Confirmed	3/18/2019	3/19/2019	27'	1
Guest Dock	5	3/18/2019	Parks Central Reservations	Confirmed	3/20/2019	3/21/2019	27'	1
Guest Dock	5	3/18/2019	Parks Central Reservations	Confirmed	3/19/2019	3/20/2019	27'	1
Guest Dock	15	3/18/2019	WEBSITE	Confirmed	3/18/2019	3/19/2019	34'	1
Guest Dock	28	3/18/2019	WEBSITE	Confirmed	3/18/2019	3/20/2019	25'	2
Guest Dock	21	3/18/2019	WEBSITE	Confirmed	3/19/2019	3/22/2019	36'	3

Marina	Mooring	Date Reservation Made	Made At	Status	Arrival Date	Departure Date	Boat Length	Length of Stay (Nights)
Guest Dock	12	3/18/2019	WEBSITE	Confirmed	3/18/2019	3/20/2019	40'	2
Guest Dock	13	3/18/2019	WEBSITE	Confirmed	3/19/2019	3/22/2019	28'	3
Guest Dock	26	3/19/2019	WEBSITE	Confirmed	3/19/2019	3/22/2019	40'	3
Guest Dock	9	3/19/2019	WEBSITE	Confirmed	3/19/2019	3/20/2019	32'	1
Guest Dock	15	3/19/2019	WEBSITE	Confirmed	3/21/2019	3/22/2019	30'	1
Guest Dock	15	3/19/2019	WEBSITE	Confirmed	3/19/2019	3/20/2019	34'	1
Guest Dock	9	3/19/2019	WEBSITE	Confirmed	3/20/2019	3/23/2019	32'	3
Guest Dock	3	3/19/2019	WEBSITE	Confirmed	3/19/2019	3/22/2019	60'	3
Guest Dock	6	3/19/2019	WEBSITE	Confirmed	3/19/2019	3/22/2019	32'	3
Guest Dock	21	3/19/2019	WEBSITE	Confirmed	3/25/2019	3/29/2019	30'	4
Guest Dock	14	3/20/2019	WEBSITE	Confirmed	3/21/2019	3/22/2019	41'	1
Guest Dock	10	3/20/2019	WEBSITE	Confirmed	3/20/2019	3/22/2019	35'	2
Guest Dock	8	3/20/2019	WEBSITE	Confirmed	3/20/2019	3/22/2019	25'	2
Guest Dock	26	3/20/2019	WEBSITE	Confirmed	3/28/2019	3/29/2019	0'	1
Guest Dock	27	3/20/2019	WEBSITE	Confirmed	3/28/2019	3/29/2019	0'	1
Guest Dock	15	3/20/2019	WEBSITE	Confirmed	3/20/2019	3/21/2019	34'	1
Guest Dock	14	3/20/2019	WEBSITE	Confirmed	3/22/2019	3/23/2019	41'	1
Guest Dock	4	3/20/2019	WEBSITE	Confirmed	3/20/2019	3/22/2019	32'	2
Guest Dock	12	3/20/2019	WEBSITE	Confirmed	3/20/2019	3/22/2019	38'	2
Guest Dock	26	3/20/2019	WEBSITE	Confirmed	3/22/2019	3/25/2019	40'	3
Guest Dock	28	3/20/2019	WEBSITE	Confirmed	3/20/2019	3/23/2019	35'	3
Guest Dock	16	3/21/2019	WEBSITE	Confirmed	3/23/2019	3/25/2019	39'	2
Guest Dock	2	3/21/2019	WEBSITE	Confirmed	3/21/2019	3/22/2019	34'	1
Guest Dock	18	3/21/2019	WEBSITE	Confirmed	3/25/2019	3/29/2019	38'	4
Guest Dock	19	3/21/2019	WEBSITE	Confirmed	3/25/2019	3/29/2019	63'	4
Guest Dock	29	3/21/2019	WEBSITE	Confirmed	3/21/2019	3/23/2019	55'	2
Guest Dock	22	3/21/2019	WEBSITE	Confirmed	3/22/2019	3/23/2019	47'	1
Guest Dock	7	3/22/2019	WEBSITE	Confirmed	3/22/2019	3/24/2019	42'	2
Guest Dock	6	3/22/2019	WEBSITE	Confirmed	3/22/2019	3/23/2019	25'	1
Guest Dock	7	3/22/2019	WEBSITE	Confirmed	3/25/2019	4/5/2019	40'	11
Guest Dock	15	3/22/2019	WEBSITE	Confirmed	3/22/2019	3/24/2019	45'	2
Guest Dock	4	3/22/2019	WEBSITE	Confirmed	3/24/2019	4/2/2019	30'	9
Guest Dock	4	3/22/2019	WEBSITE	Confirmed	3/22/2019	3/23/2019	34'	1
Guest Dock	5	3/22/2019	WEBSITE	Confirmed	3/22/2019	3/23/2019	31'	1
Guest Dock	9	3/23/2019	WEBSITE	Confirmed	3/23/2019	3/26/2019	32'	3
Guest Dock	28	3/23/2019	WEBSITE	Confirmed	3/23/2019	3/24/2019	35'	1
Guest Dock	19	3/23/2019	WEBSITE	Confirmed	3/23/2019	3/24/2019	55'	1
Guest Dock	27	3/23/2019	WEBSITE	Confirmed	3/24/2019	3/25/2019	33'	1
Guest Dock	6	3/23/2019	WEBSITE	Confirmed	3/24/2019	3/25/2019	42'	1
Guest Dock	16	3/23/2019	WEBSITE	Confirmed	3/25/2019	3/27/2019	41'	2
Guest Dock	15	3/24/2019	WEBSITE	Confirmed	3/24/2019	3/26/2019	45'	2
Guest Dock	5	3/24/2019	WEBSITE	Confirmed	3/25/2019	3/29/2019	32'	4
Guest Dock	21	3/24/2019	WEBSITE	Confirmed	3/24/2019	3/25/2019	45'	1
Guest Dock	5	3/24/2019	WEBSITE	Confirmed	3/24/2019	3/25/2019	24'	1
Guest Dock	1	3/24/2019	WEBSITE	Confirmed	3/25/2019	3/26/2019	24'	1
Guest Dock	28	3/24/2019	WEBSITE	Confirmed	3/24/2019	3/29/2019	36'	5
Guest Dock	14	3/24/2019	WEBSITE	Confirmed	3/25/2019	3/31/2019	44'	6
Guest Dock	27	3/24/2019	WEBSITE	Confirmed	3/25/2019	3/26/2019	30'	1
Guest Dock	10	3/24/2019	WEBSITE	Confirmed	3/25/2019	3/26/2019	24'	1
Guest Dock	8	3/24/2019	WEBSITE	Confirmed	3/24/2019	3/29/2019	30'	5
Guest Dock	6	3/24/2019	WEBSITE	Confirmed	3/25/2019	3/27/2019	25'	2
Guest Dock	26	3/24/2019	WEBSITE	Confirmed	3/25/2019	3/28/2019	32'	3
Guest Dock	11	3/25/2019	WEBSITE	Confirmed	3/28/2019	3/29/2019	44'	1
Guest Dock	2	3/25/2019	WEBSITE	Confirmed	3/28/2019	3/29/2019	26'	1
Guest Dock	20	3/25/2019	WEBSITE	Confirmed	3/25/2019	3/27/2019	33'	2
Guest Dock	12	3/25/2019	WEBSITE	Confirmed	3/25/2019	3/29/2019	25'	4
Guest Dock	13	3/25/2019	WEBSITE	Confirmed	3/25/2019	3/29/2019	27'	4
Guest Dock	16	3/25/2019	WEBSITE	Confirmed	3/30/2019	3/31/2019	40'	1

Marina	Mooring	Date Reservation Made	Made At	Status	Arrival Date	Departure Date	Boat Length	Length of Stay (Nights)
Guest Dock	9	3/25/2019	WEBSITE	Confirmed	3/26/2019	3/29/2019	32'	3
Guest Dock	2	3/25/2019	WEBSITE	Confirmed	3/30/2019	4/2/2019	26'	3
Guest Dock	29	3/25/2019	WEBSITE	Confirmed	3/25/2019	3/27/2019	14'	2
Guest Dock	27	3/26/2019	WEBSITE	Confirmed	3/26/2019	3/28/2019	30'	2
Guest Dock	29	3/26/2019	WEBSITE	Confirmed	3/28/2019	3/29/2019	30'	1
Guest Dock	10	3/26/2019	WEBSITE	Confirmed	3/26/2019	3/29/2019	24'	3
Guest Dock	15	3/26/2019	WEBSITE	Confirmed	3/26/2019	3/27/2019	45'	1
Guest Dock	15	3/26/2019	WEBSITE	Confirmed	3/27/2019	4/3/2019	41'	7
Guest Dock	2	3/26/2019	WEBSITE	Confirmed	3/26/2019	3/27/2019	34'	1
Guest Dock	2	3/27/2019	WEBSITE	Confirmed	3/27/2019	3/28/2019	34'	1
Guest Dock	6	3/27/2019	WEBSITE	Confirmed	3/27/2019	3/28/2019	27'	1
Guest Dock	16	3/27/2019	WEBSITE	Confirmed	3/27/2019	3/29/2019	45'	2
Guest Dock	20	3/27/2019	WEBSITE	Confirmed	3/27/2019	3/28/2019	50'	1
Guest Dock	20	3/27/2019	WEBSITE	Confirmed	3/28/2019	4/8/2019	40'	11
Guest Dock	6	3/28/2019	WEBSITE	Confirmed	3/28/2019	3/29/2019	27'	1
Guest Dock	1	3/28/2019	WEBSITE	Confirmed	3/28/2019	3/29/2019	38'	1
Guest Dock	19	3/28/2019	WEBSITE	Confirmed	4/15/2019	4/19/2019	38'	4
Guest Dock	9	3/28/2019	WEBSITE	Confirmed	3/31/2019	4/5/2019	36'	5
Guest Dock	28	3/29/2019	WEBSITE	Confirmed	4/2/2019	4/3/2019	40'	1
Guest Dock	22	3/29/2019	WEBSITE	Confirmed	3/30/2019	4/1/2019	50'	2
Guest Dock	22	3/29/2019	WEBSITE	Confirmed	3/29/2019	3/30/2019	54'	1
Guest Dock	5	3/30/2019	WEBSITE	Confirmed	3/30/2019	3/31/2019	40'	1
Guest Dock	18	3/30/2019	WEBSITE	Confirmed	3/30/2019	4/1/2019	58'	2
Guest Dock	12	3/30/2019	WEBSITE	Confirmed	3/31/2019	4/2/2019	32'	2
Guest Dock	4	3/31/2019	WEBSITE	Confirmed	4/2/2019	4/4/2019	32'	2
Guest Dock	10	3/31/2019	WEBSITE	Confirmed	4/4/2019	4/5/2019	32'	1
Guest Dock	19	3/31/2019	WEBSITE	Confirmed	4/4/2019	4/5/2019	63'	1
Guest Dock	16	3/31/2019	WEBSITE	Confirmed	3/31/2019	4/1/2019		1
Guest Dock	18	3/31/2019	WEBSITE	Confirmed	4/1/2019	4/5/2019	58'	4
Guest Dock	26	3/31/2019	WEBSITE	Confirmed	3/31/2019	4/1/2019	39'	1
Guest Dock	2	3/31/2019	WEBSITE	Confirmed	4/2/2019	4/6/2019	26'	4
Guest Dock	6	3/31/2019	WEBSITE	Confirmed	3/31/2019	4/3/2019	32'	3
Guest Dock	27	3/31/2019	WEBSITE	Confirmed	4/4/2019	4/5/2019	34'	1
Guest Dock	5	3/31/2019	WEBSITE	Confirmed	4/1/2019	4/2/2019	34'	1
Guest Dock	8	3/31/2019	WEBSITE	Confirmed	3/31/2019	4/1/2019	42'	1
Guest Dock	16	3/31/2019	WEBSITE	Confirmed	4/1/2019	4/2/2019	39'	1
Guest Dock	3	3/31/2019	WEBSITE	Confirmed	3/31/2019	4/1/2019	39'	1
Guest Dock	16	3/31/2019	WEBSITE	Confirmed	4/2/2019	4/5/2019	30'	3
Guest Dock	3	4/1/2019	WEBSITE	Confirmed	4/5/2019	4/6/2019	60'	1
Guest Dock	12	4/1/2019	WEBSITE	Confirmed	4/2/2019	4/10/2019	32'	8
Guest Dock	8	4/1/2019	WEBSITE	Confirmed	4/2/2019	4/5/2019	26'	3
Guest Dock	27	4/1/2019	WEBSITE	Confirmed	4/1/2019	4/4/2019	32'	3
Guest Dock	22	4/1/2019	WEBSITE	Confirmed	4/1/2019	4/2/2019	45'	1
Guest Dock	13	4/1/2019	WEBSITE	Confirmed	4/2/2019	4/5/2019	30'	3
Guest Dock	5	4/1/2019	WEBSITE	Confirmed	4/3/2019	4/5/2019	28'	2
Guest Dock	10	4/2/2019	Parks Central Reservations	Confirmed	4/2/2019	4/4/2019	27'	2
Guest Dock	14	4/2/2019	Parks Central Reservations	Confirmed	4/2/2019	4/5/2019	26'	3
Guest Dock	21	4/2/2019	Parks Central Reservations	Confirmed	3/31/2019	4/6/2019	50'	6
Guest Dock	19	4/2/2019	Parks Central Reservations	Confirmed	4/2/2019	4/3/2019	36'	1
Guest Dock	26	4/2/2019	Parks Central Reservations	Confirmed	4/2/2019	4/5/2019		3
Guest Dock	16	4/2/2019	Parks Central Reservations	Confirmed	4/5/2019	4/16/2019		11
Guest Dock	22	4/2/2019	Parks Central Reservations	Confirmed	4/2/2019	4/6/2019	50'	4
Guest Dock	3	4/2/2019	WEBSITE	Confirmed	4/6/2019	4/7/2019	40'	1
Guest Dock	6	4/2/2019	WEBSITE	Confirmed	4/3/2019	4/5/2019	32'	2
Guest Dock	15	4/2/2019	Parks Central Reservations	Confirmed	4/3/2019	4/8/2019	36'	5
Guest Dock	28	4/2/2019	WEBSITE	Confirmed	4/3/2019	4/4/2019	34'	1
Guest Dock	28	4/2/2019	WEBSITE	Confirmed	4/4/2019	4/9/2019	36'	5
Guest Dock	4	4/3/2019	Parks Central Reservations	Confirmed	4/4/2019	4/5/2019	43'	1

Marina	Mooring	Date Reservation Made	Made At	Status	Arrival Date	Departure Date	Boat Length	Length of Stay (Nights)
Guest Dock	6	4/3/2019	Parks Central Reservations	Confirmed	4/5/2019	4/13/2019	28'	8
Guest Dock	29	4/3/2019	Parks Central Reservations	Confirmed	4/15/2019	4/17/2019	45'	2
Guest Dock	3	4/3/2019	WEBSITE	Confirmed	4/19/2019	4/21/2019	40'	2
Guest Dock	15	4/3/2019	WEBSITE	Confirmed	4/12/2019	4/13/2019	25'	1
Guest Dock	18	4/3/2019	WEBSITE	Confirmed	4/5/2019	4/6/2019	58'	1
Guest Dock	11	4/4/2019	Parks Central Reservations	Confirmed	4/8/2019	4/9/2019	44'	1
Guest Dock	11	4/4/2019	Parks Central Reservations	Confirmed	4/9/2019	4/19/2019	44'	10
Guest Dock	2	4/4/2019	WEBSITE	Confirmed	4/14/2019	4/17/2019	30'	3
Guest Dock	26	4/4/2019	WEBSITE	Confirmed	4/5/2019	4/7/2019	32'	2
Guest Dock	2	4/4/2019	Parks Central Reservations	Confirmed	4/8/2019	4/9/2019	26'	1
Guest Dock	2	4/4/2019	Parks Central Reservations	Confirmed	4/9/2019	4/11/2019	26'	2
Guest Dock	20	4/4/2019	Parks Central Reservations	Confirmed	4/11/2019	4/19/2019	26'	8
Guest Dock	5	4/5/2019	WEBSITE	Confirmed	4/5/2019	4/6/2019	30'	1
Guest Dock	8	4/5/2019	WEBSITE	Confirmed	4/5/2019	4/7/2019	28'	2
Guest Dock	5	4/5/2019	WEBSITE	Confirmed	4/6/2019	4/8/2019	30'	2
Guest Dock	14	4/5/2019	WEBSITE	Confirmed	4/5/2019	4/6/2019		1
Guest Dock	14	4/6/2019	WEBSITE	Confirmed	4/6/2019	4/7/2019		1
Guest Dock	4	4/6/2019	WEBSITE	Confirmed	4/8/2019	4/9/2019	29'	1
Guest Dock	26	4/6/2019	WEBSITE	Confirmed	4/7/2019	4/10/2019	32'	3
Guest Dock	4	4/6/2019	WEBSITE	Confirmed	4/19/2019	4/22/2019	42'	3
Guest Dock	28	4/7/2019	WEBSITE	Confirmed	4/9/2019	4/16/2019	39'	7
Guest Dock	18	4/7/2019	WEBSITE	Confirmed	4/9/2019	4/12/2019	38'	3
Guest Dock	8	4/7/2019	WEBSITE	Confirmed	4/7/2019	4/8/2019	28'	1
Guest Dock	8	4/7/2019	WEBSITE	Confirmed	4/8/2019	4/11/2019	28'	3
Guest Dock	21	4/7/2019	WEBSITE	Confirmed	4/9/2019	4/13/2019	42'	4
Guest Dock	7	4/7/2019	WEBSITE	Confirmed	4/8/2019	4/9/2019	30'	1
Guest Dock	4	4/7/2019	WEBSITE	Confirmed	4/7/2019	4/8/2019	34'	1
Guest Dock	5	4/8/2019	WEBSITE	Confirmed	4/19/2019	4/21/2019	38'	2
Guest Dock	20	4/8/2019	Parks Central Reservations	Confirmed	4/8/2019	4/9/2019	40'	1
Guest Dock	4	4/9/2019	WEBSITE	Confirmed	4/16/2019	4/17/2019	38'	1
Guest Dock	12	4/9/2019	WEBSITE	Confirmed	4/10/2019	4/15/2019	32'	5
Guest Dock	22	4/9/2019	Parks Central Reservations	Confirmed	4/15/2019	4/16/2019	33'	1
Guest Dock	22	4/9/2019	Parks Central Reservations	Confirmed	4/16/2019	4/19/2019	33'	3
Guest Dock	13	4/9/2019	WEBSITE	Confirmed	4/10/2019	4/12/2019	41'	2
Guest Dock	19	4/9/2019	WEBSITE	Confirmed	4/9/2019	4/10/2019	45'	1
Guest Dock	10	4/10/2019	WEBSITE	Confirmed	4/10/2019	4/12/2019	36'	2
Guest Dock	5	4/10/2019	WEBSITE	Confirmed	4/10/2019	4/11/2019	24'	1
Guest Dock	26	4/10/2019	WEBSITE	Confirmed	4/12/2019	4/14/2019	39'	2
Guest Dock	4	4/10/2019	WEBSITE	Confirmed	4/13/2019	4/14/2019	25'	1
Guest Dock	5	4/11/2019	WEBSITE	Confirmed	4/12/2019	4/13/2019	36'	1
Guest Dock	22	4/11/2019	WEBSITE	Confirmed	4/11/2019	4/12/2019	47'	1
Guest Dock	19	4/11/2019	WEBSITE	Confirmed	4/11/2019	4/14/2019	40'	3
Guest Dock	14	4/11/2019	WEBSITE	Confirmed	7/3/2019	7/5/2019	26'	2
Guest Dock	2	4/11/2019	WEBSITE	Confirmed	4/12/2019	4/13/2019	31'	1
Guest Dock	15	4/11/2019	WEBSITE	Confirmed	4/13/2019	4/15/2019	41'	2
Guest Dock	13	4/11/2019	WEBSITE	Confirmed	4/12/2019	4/13/2019	30'	1
Guest Dock	18	4/11/2019	WEBSITE	Confirmed	4/15/2019	4/16/2019	45'	1
Guest Dock	14	4/12/2019	WEBSITE	Confirmed	4/12/2019	4/15/2019	18'	3
Guest Dock	3	4/12/2019	WEBSITE	Confirmed	4/26/2019	4/27/2019	31'	1
Guest Dock	5	4/12/2019	WEBSITE	Confirmed	4/13/2019	4/14/2019	30'	1
Guest Dock	21	4/12/2019	WEBSITE	Confirmed	4/13/2019	4/14/2019	55'	1
Guest Dock	4	4/12/2019	WEBSITE	Confirmed	4/14/2019	4/15/2019	30'	1
Guest Dock	3	4/12/2019	WEBSITE	Confirmed	4/13/2019	4/14/2019	40'	1
Guest Dock	2	4/13/2019	WEBSITE	Confirmed	4/27/2019	4/28/2019	28'	1
Guest Dock	28	4/13/2019	WEBSITE	Confirmed	4/16/2019	4/20/2019	39'	4
Guest Dock	11	4/13/2019	WEBSITE	Confirmed	4/26/2019	4/27/2019	40'	1
Guest Dock	8	4/13/2019	WEBSITE	Confirmed	4/13/2019	4/16/2019	30'	3
Guest Dock	18	4/13/2019	WEBSITE	Confirmed	4/13/2019	4/14/2019	50'	1

Marina	Mooring	Date Reservation Made	Made At	Status	Arrival Date	Departure Date	Boat Length	Length of Stay (Nights)
Guest Dock	13	4/13/2019	WEBSITE	Confirmed	4/13/2019	4/14/2019	33'	1
Guest Dock	10	4/13/2019	WEBSITE	Confirmed	4/13/2019	4/15/2019	28'	2
Guest Dock	2	4/13/2019	WEBSITE	Confirmed	4/13/2019	4/14/2019	32'	1
Guest Dock	27	4/13/2019	WEBSITE	Confirmed	4/14/2019	4/19/2019	40'	5
Guest Dock	16	4/13/2019	WEBSITE	Confirmed	4/26/2019	4/28/2019	46'	2
Guest Dock	3	4/13/2019	WEBSITE	Confirmed	4/14/2019	4/15/2019	32'	1
Guest Dock	21	4/13/2019	WEBSITE	Confirmed	4/14/2019	4/19/2019	55'	5
Guest Dock	21	4/14/2019	WEBSITE	Confirmed	4/26/2019	4/29/2019	49'	3
Guest Dock	7	4/14/2019	WEBSITE	Confirmed	4/14/2019	4/17/2019	37'	3
Guest Dock	13	4/14/2019	WEBSITE	Confirmed	4/14/2019	4/15/2019	31'	1
Guest Dock	3	4/15/2019	WEBSITE	Confirmed	4/15/2019	4/19/2019	32'	4
Guest Dock	10	4/15/2019	WEBSITE	Confirmed	4/15/2019	4/16/2019	28'	1
Guest Dock	5	4/15/2019	Parks Central Reservations	Confirmed	4/15/2019	4/16/2019	30'	1
Guest Dock	1	4/15/2019	Parks Central Reservations	Confirmed	4/15/2019	4/17/2019	32'	2
Guest Dock	18	4/15/2019	WEBSITE	Confirmed	4/18/2019	4/20/2019	63'	2
Guest Dock	16	4/15/2019	Parks Central Reservations	Confirmed	5/5/2019	5/6/2019	31'	1
Guest Dock	26	4/15/2019	WEBSITE	Confirmed	4/16/2019	4/17/2019	34'	1
Guest Dock	5	4/15/2019	WEBSITE	Confirmed	4/16/2019	4/17/2019	30'	1
Guest Dock	6	4/16/2019	WEBSITE	Confirmed	4/19/2019	4/22/2019	25'	3
Guest Dock	6	4/16/2019	WEBSITE	Confirmed	4/16/2019	4/19/2019	25'	3
Guest Dock	16	4/16/2019	WEBSITE	Confirmed	4/16/2019	4/18/2019	37'	2
Guest Dock	12	4/16/2019	WEBSITE	Confirmed	4/17/2019	4/19/2019	32'	2
Guest Dock	26	4/16/2019	WEBSITE	Confirmed	4/17/2019	4/18/2019	34'	1
Guest Dock	4	4/16/2019	WEBSITE	Confirmed	4/17/2019	4/18/2019	38'	1
Guest Dock	8	4/17/2019	WEBSITE	Confirmed	4/17/2019	4/19/2019	30'	2
Guest Dock	15	4/17/2019	Moorings	Confirmed	4/17/2019	4/18/2019	27'	1
Guest Dock	15	4/17/2019	Moorings	Confirmed	4/18/2019	4/19/2019	27'	1
Guest Dock	13	4/17/2019	Parks Central Reservations	Confirmed	4/17/2019	4/19/2019	30'	2
Guest Dock	10	4/17/2019	Parks Central Reservations	Confirmed	4/17/2019	4/18/2019	14'	1
Guest Dock	4	4/17/2019	Parks Central Reservations	Confirmed	4/26/2019	4/28/2019	37'	2
Guest Dock	5	4/17/2019	Moorings	Confirmed	4/17/2019	4/18/2019	35'	1
Guest Dock	7	4/17/2019	Moorings	Confirmed	4/18/2019	4/19/2019	30'	1
Guest Dock	2	4/17/2019	Moorings	Confirmed	4/17/2019	4/18/2019	30'	1
Guest Dock	18	4/17/2019	Parks Central Reservations	Confirmed	4/17/2019	4/18/2019	45'	1
Guest Dock	7	4/17/2019	WEBSITE	Confirmed	4/25/2019	4/26/2019	10'	1
Guest Dock	5	4/17/2019	WEBSITE	Confirmed	4/27/2019	4/29/2019	43'	2
Guest Dock	21	4/17/2019	WEBSITE	Confirmed	4/19/2019	4/22/2019	42'	3
Guest Dock	16	4/18/2019	WEBSITE	Confirmed	4/18/2019	4/19/2019	45'	1
Guest Dock	4	4/18/2019	Parks Central Reservations	Confirmed	4/18/2019	4/19/2019	25'	1
Guest Dock	2	4/18/2019	WEBSITE	Confirmed	4/18/2019	4/21/2019	26'	3
Guest Dock	18	4/18/2019	Parks Central Reservations	Confirmed	4/28/2019	4/29/2019	42'	1
Guest Dock	5	4/18/2019	WEBSITE	Confirmed	4/21/2019	4/22/2019	36'	1
Guest Dock	16	4/18/2019	WEBSITE	Confirmed	4/19/2019	4/20/2019	26'	1
Guest Dock	28	4/18/2019	WEBSITE	Confirmed	4/20/2019	4/21/2019	37'	1
Guest Dock	15	4/18/2019	WEBSITE	Confirmed	4/19/2019	4/20/2019	41'	1
Guest Dock	19	4/19/2019	WEBSITE	Confirmed	4/19/2019	4/20/2019	55'	1
Guest Dock	4	4/19/2019	WEBSITE	Confirmed	4/22/2019	4/24/2019	30'	2
Guest Dock	16	4/19/2019	WEBSITE	Confirmed	4/22/2019	4/26/2019	30'	4
Guest Dock	26	4/19/2019	WEBSITE	Confirmed	4/19/2019	4/21/2019	31'	2
Guest Dock	20	4/19/2019	WEBSITE	Confirmed	4/19/2019	4/21/2019	61'	2
Guest Dock	14	4/19/2019	WEBSITE	Confirmed	4/19/2019	4/20/2019	41'	1
Guest Dock	14	4/19/2019	WEBSITE	Confirmed	4/21/2019	4/22/2019	31'	1
Guest Dock	14	4/19/2019	WEBSITE	Confirmed	4/22/2019	4/24/2019	40'	2
Guest Dock	2	4/19/2019	WEBSITE	Confirmed	4/30/2019	5/1/2019	34'	1
Guest Dock	8	4/20/2019	WEBSITE	Confirmed	4/20/2019	4/21/2019	21'	1
Guest Dock	16	4/20/2019	WEBSITE	Confirmed	4/21/2019	4/22/2019	41'	1
Guest Dock	16	4/20/2019	WEBSITE	Confirmed	4/20/2019	4/21/2019	45'	1
Guest Dock	26	4/20/2019	WEBSITE	Confirmed	4/21/2019	4/22/2019	31'	1

Marina	Mooring	Date Reservation Made	Made At	Status	Arrival Date	Departure Date	Boat Length	Length of Stay (Nights)
Guest Dock	4	4/20/2019	WEBSITE	Confirmed	4/29/2019	4/30/2019	40'	1
Guest Dock	10	4/20/2019	WEBSITE	Confirmed	4/27/2019	4/28/2019	33'	1
Guest Dock	10	4/20/2019	WEBSITE	Confirmed	4/21/2019	4/22/2019	32'	1
Guest Dock	15	4/21/2019	WEBSITE	Confirmed	4/21/2019	4/22/2019	45'	1
Guest Dock	3	4/21/2019	WEBSITE	Confirmed	4/21/2019	4/22/2019	40'	1
Guest Dock	2	4/21/2019	WEBSITE	Confirmed	4/29/2019	4/30/2019	38'	1
Guest Dock	22	4/21/2019	WEBSITE	Confirmed	4/22/2019	4/26/2019	33'	4
Guest Dock	28	4/21/2019	WEBSITE	Confirmed	4/22/2019	4/24/2019	32'	2
Guest Dock	21	4/21/2019	WEBSITE	Confirmed	4/22/2019	4/24/2019	42'	2
Guest Dock	6	4/22/2019	WEBSITE	Confirmed	4/22/2019	4/24/2019	27'	2
Guest Dock	18	4/22/2019	Parks Central Reservations	Confirmed	4/22/2019	4/26/2019	38'	4
Guest Dock	20	4/22/2019	Parks Central Reservations	Confirmed	4/22/2019	5/3/2019	36'	11
Guest Dock	2	4/22/2019	WEBSITE	Confirmed	5/2/2019	5/3/2019	38'	1
Guest Dock	11	4/22/2019	Parks Central Reservations	Confirmed	4/22/2019	4/23/2019	30'	1
Guest Dock	5	4/22/2019	WEBSITE	Confirmed	4/23/2019	4/26/2019	27'	3
Guest Dock	15	4/22/2019	Moorings	Confirmed	4/22/2019	4/23/2019	41'	1
Guest Dock	8	4/22/2019	WEBSITE	Confirmed	4/22/2019	4/26/2019	25'	4
Guest Dock	10	4/22/2019	WEBSITE	Confirmed	4/22/2019	4/23/2019	35'	1
Guest Dock	12	4/23/2019	WEBSITE	Confirmed	8/10/2019	8/18/2019	22'	8
Guest Dock	21	4/23/2019	WEBSITE	Confirmed	4/24/2019	4/26/2019	63'	2
Guest Dock	27	4/23/2019	Parks Central Reservations	Confirmed	4/23/2019	4/24/2019	14'	1
Guest Dock	11	4/23/2019	WEBSITE	Confirmed	4/23/2019	4/25/2019	29'	2
Guest Dock	5	4/23/2019	WEBSITE	Confirmed	4/29/2019	4/30/2019	41'	1
Guest Dock	6	4/24/2019	WEBSITE	Confirmed	4/28/2019	5/1/2019	41'	3
Guest Dock	26	4/24/2019	WEBSITE	Confirmed	4/24/2019	4/26/2019	32'	2
Guest Dock	6	4/24/2019	WEBSITE	Confirmed	4/24/2019	4/26/2019	25'	2
Guest Dock	2	4/24/2019	Parks Central Reservations	Confirmed	4/24/2019	4/25/2019	40'	1
Guest Dock	15	4/24/2019	Parks Central Reservations	Confirmed	4/26/2019	5/1/2019	39'	5
Guest Dock	9	4/24/2019	Parks Central Reservations	Confirmed	4/28/2019	4/29/2019	34'	1
Guest Dock	9	4/24/2019	Parks Central Reservations	Confirmed	4/26/2019	4/28/2019	34'	2
Guest Dock	16	4/24/2019	WEBSITE	Confirmed	4/28/2019	5/4/2019	32'	6
Guest Dock	11	4/25/2019	Moorings	Confirmed	4/29/2019	5/8/2019	44'	9
Guest Dock	18	4/25/2019	Parks Central Reservations	Confirmed	5/4/2019	5/9/2019	60'	5
Guest Dock	12	4/25/2019	WEBSITE	Confirmed	4/25/2019	5/1/2019	29'	6
Guest Dock	28	4/25/2019	WEBSITE	Confirmed	4/25/2019	4/27/2019	40'	2
Guest Dock	8	4/25/2019	WEBSITE	Confirmed	4/27/2019	4/28/2019	26'	1
Guest Dock	14	4/26/2019	WEBSITE	Confirmed	4/27/2019	4/28/2019	38'	1
Guest Dock	4	4/26/2019	WEBSITE	Confirmed	4/30/2019	5/3/2019	30'	3
Guest Dock	7	4/26/2019	Moorings	Confirmed	4/26/2019	4/28/2019	27'	2
Guest Dock	5	4/26/2019	WEBSITE	Confirmed	4/26/2019	4/27/2019	35'	1
Guest Dock	3	4/26/2019	WEBSITE	Confirmed	4/27/2019	4/28/2019	32'	1
Guest Dock	14	4/26/2019	WEBSITE	Confirmed	4/26/2019	4/27/2019	39'	1
Guest Dock	20	4/26/2019	WEBSITE	Confirmed	5/10/2019	5/14/2019	47'	4
Guest Dock	22	4/26/2019	WEBSITE	Confirmed	4/27/2019	4/28/2019	47'	1
Guest Dock	13	4/27/2019	WEBSITE	Confirmed	4/27/2019	4/28/2019	43'	1
Guest Dock	28	4/27/2019	WEBSITE	Confirmed	4/27/2019	4/29/2019	40'	2
Guest Dock	18	4/27/2019	WEBSITE	Confirmed	4/27/2019	4/28/2019	62'	1
Guest Dock	3	4/28/2019	WEBSITE	Confirmed	4/29/2019	5/3/2019	42'	4
Guest Dock	22	4/28/2019	WEBSITE	Confirmed	4/28/2019	4/29/2019	46'	1
Guest Dock	28	4/28/2019	WEBSITE	Confirmed	4/29/2019	4/30/2019	40'	1
Guest Dock	13	4/28/2019	WEBSITE	Confirmed	4/29/2019	4/30/2019	26'	1
Guest Dock	14	4/28/2019	WEBSITE	Confirmed	4/29/2019	4/30/2019	30'	1
Guest Dock	2	4/28/2019	WEBSITE	Confirmed	5/1/2019	5/2/2019	37'	1
Guest Dock	27	4/28/2019	WEBSITE	Confirmed	4/28/2019	5/1/2019	37'	3
Guest Dock	26	4/28/2019	WEBSITE	Confirmed	4/30/2019	5/3/2019	38'	3
Guest Dock	8	4/28/2019	WEBSITE	Confirmed	4/29/2019	5/3/2019	27'	4
Guest Dock	14	4/28/2019	WEBSITE	Confirmed	4/28/2019	4/29/2019	47'	1
Guest Dock	19	4/29/2019	Parks Central Reservations	Confirmed	4/29/2019	5/3/2019	33'	4

Marina	Mooring	Date Reservation Made	Made At	Status	Arrival Date	Departure Date	Boat Length	Length of Stay (Nights)
Guest Dock	7	4/29/2019	Parks Central Reservations	Confirmed	4/29/2019	5/1/2019	27'	2
Guest Dock	6	4/29/2019	Parks Central Reservations	Confirmed	5/1/2019	5/3/2019	27'	2
Guest Dock	9	4/29/2019	Parks Central Reservations	Confirmed	4/29/2019	5/1/2019	28'	2
Guest Dock	18	4/29/2019	Parks Central Reservations	Confirmed	4/29/2019	5/3/2019	38'	4
Guest Dock	29	4/29/2019	Parks Central Reservations	Confirmed	4/29/2019	5/14/2019	46'	15
Guest Dock	10	4/29/2019	WEBSITE	Confirmed	4/29/2019	5/1/2019	25'	2
Guest Dock	26	4/29/2019	Parks Central Reservations	Confirmed	4/29/2019	4/30/2019	42'	1
Guest Dock	22	4/29/2019	Parks Central Reservations	Confirmed	4/29/2019	4/30/2019	25'	1
Guest Dock	5	4/29/2019	Moorings	Confirmed	5/5/2019	5/7/2019	44'	2
Guest Dock	7	4/29/2019	Moorings	Confirmed	5/7/2019	5/11/2019	44'	4
Guest Dock	7	4/30/2019	WEBSITE	Confirmed	5/2/2019	5/5/2019	28'	3
Guest Dock	13	4/30/2019	WEBSITE	Confirmed	4/30/2019	5/1/2019	25'	1
Guest Dock	5	4/30/2019	Moorings	Confirmed	4/30/2019	5/2/2019	39'	2
Guest Dock	28	4/30/2019	WEBSITE	Confirmed	4/30/2019	5/1/2019	30'	1
Guest Dock	14	4/30/2019	Parks Central Reservations	Confirmed	4/30/2019	5/5/2019	40'	5
Guest Dock	19	4/30/2019	Parks Central Reservations	Confirmed	5/15/2019	5/20/2019	38'	5
Guest Dock	22	4/30/2019	Parks Central Reservations	Confirmed	5/6/2019	5/8/2019	30'	2
Guest Dock	19	4/30/2019	Parks Central Reservations	Confirmed	5/8/2019	5/11/2019	30'	3
Guest Dock	22	4/30/2019	Parks Central Reservations	Confirmed	5/1/2019	5/6/2019	30'	5
Guest Dock	28	4/30/2019	WEBSITE	Confirmed	5/1/2019	5/3/2019	30'	2
Guest Dock	22	4/30/2019	Moorings	Confirmed	4/30/2019	5/1/2019	35'	1
Guest Dock	9	4/30/2019	WEBSITE	Confirmed	5/4/2019	5/6/2019	24'	2
Guest Dock	26	4/30/2019	WEBSITE	Confirmed	5/4/2019	5/5/2019	33'	1
Guest Dock	12	5/1/2019	WEBSITE	Confirmed	5/1/2019	5/4/2019	29'	3
Guest Dock	4	5/1/2019	WEBSITE	Confirmed	5/14/2019	5/19/2019	18'	5
Guest Dock	21	5/1/2019	WEBSITE	Confirmed	5/2/2019	5/3/2019	30'	1
Guest Dock	21	5/1/2019	WEBSITE	Confirmed	5/1/2019	5/2/2019	30'	1
Guest Dock	28	5/1/2019	WEBSITE	Confirmed	5/5/2019	5/7/2019	39'	2
Guest Dock	27	5/1/2019	Parks Central Reservations	Confirmed	5/1/2019	5/6/2019	38'	5
Guest Dock	27	5/1/2019	Parks Central Reservations	Confirmed	5/6/2019	5/8/2019	38'	2
Guest Dock	10	5/1/2019	WEBSITE	Confirmed	5/1/2019	5/3/2019	25'	2
Guest Dock	6	5/1/2019	WEBSITE	Confirmed	5/15/2019	5/16/2019	10'	1
Guest Dock	2	5/1/2019	Moorings	Confirmed	5/8/2019	5/9/2019	26'	1
Guest Dock	5	5/1/2019	Moorings	Confirmed	5/2/2019	5/3/2019	26'	1
Guest Dock	2	5/1/2019	Moorings	Confirmed	5/6/2019	5/8/2019	26'	2
Guest Dock	15	5/1/2019	WEBSITE	Confirmed	5/3/2019	5/5/2019	41'	2
Guest Dock	26	5/1/2019	WEBSITE	Confirmed	5/3/2019	5/4/2019	39'	1
Guest Dock	16	5/1/2019	WEBSITE	Confirmed	5/4/2019	5/5/2019	39'	1
Guest Dock	3	5/2/2019	WEBSITE	Confirmed	5/6/2019	5/7/2019	43'	1
Guest Dock	21	5/2/2019	WEBSITE	Confirmed	5/5/2019	5/9/2019	55'	4
Guest Dock	12	5/2/2019	WEBSITE	Confirmed	5/4/2019	5/5/2019	30'	1
Guest Dock	3	5/3/2019	WEBSITE	Confirmed	5/3/2019	5/6/2019	31'	3
Guest Dock	28	5/3/2019	WEBSITE	Confirmed	5/3/2019	5/5/2019	38'	2
Guest Dock	19	5/3/2019	WEBSITE	Confirmed	5/5/2019	5/8/2019	45'	3
Guest Dock	10	5/3/2019	WEBSITE	Confirmed	5/4/2019	5/6/2019	29'	2
Guest Dock	10	5/3/2019	WEBSITE	Confirmed	5/3/2019	5/4/2019	33'	1
Guest Dock	15	5/3/2019	WEBSITE	Confirmed	5/5/2019	5/6/2019	48'	1
Guest Dock	4	5/4/2019	WEBSITE	Confirmed	5/4/2019	5/5/2019	32'	1
Guest Dock	8	5/4/2019	WEBSITE	Confirmed	5/4/2019	5/7/2019	32'	3
Guest Dock	12	5/4/2019	WEBSITE	Confirmed	5/5/2019	5/6/2019	33'	1
Guest Dock	4	5/5/2019	WEBSITE	Confirmed	5/5/2019	5/6/2019	32'	1
Guest Dock	26	5/5/2019	WEBSITE	Confirmed	5/6/2019	5/8/2019	27'	2
Guest Dock	20	5/5/2019	WEBSITE	Confirmed	5/9/2019	5/10/2019	50'	1
Guest Dock	20	5/5/2019	WEBSITE	Confirmed	5/8/2019	5/9/2019	50'	1
Guest Dock	20	5/5/2019	WEBSITE	Confirmed	5/6/2019	5/8/2019	50'	2
Guest Dock	21	5/5/2019	WEBSITE	Confirmed	5/13/2019	5/15/2019	50'	2
Guest Dock	7	5/5/2019	WEBSITE	Confirmed	5/6/2019	5/7/2019	36'	1
Guest Dock	14	5/5/2019	WEBSITE	Confirmed	5/5/2019	5/12/2019	40'	7

Marina	Mooring	Date Reservation Made	Made At	Status	Arrival Date	Departure Date	Boat Length	Length of Stay (Nights)
Guest Dock	15	5/5/2019	WEBSITE	Confirmed	5/6/2019	5/9/2019	47'	3
Guest Dock	13	5/5/2019	WEBSITE	Confirmed	5/6/2019	5/9/2019	32'	3
Guest Dock	4	5/6/2019	Parks Central Reservations	Confirmed	5/6/2019	5/8/2019	27'	2
Guest Dock	4	5/6/2019	Parks Central Reservations	Confirmed	5/8/2019	5/10/2019	27'	2
Guest Dock	1	5/6/2019	WEBSITE	Confirmed	5/6/2019	5/10/2019	38'	4
Guest Dock	12	5/6/2019	Parks Central Reservations	Confirmed	5/6/2019	5/8/2019	25'	2
Guest Dock	5	5/6/2019	Parks Central Reservations	Confirmed	5/7/2019	5/17/2019	30'	10
Guest Dock	3	5/6/2019	WEBSITE	Confirmed	5/7/2019	5/9/2019	42'	2
Guest Dock	16	5/6/2019	WEBSITE	Confirmed	5/9/2019	5/10/2019	41'	1
Guest Dock	16	5/6/2019	WEBSITE	Confirmed	5/7/2019	5/9/2019	41'	2
Guest Dock	9	5/6/2019	WEBSITE	Confirmed	5/7/2019	5/8/2019	30'	1
Guest Dock	9	5/6/2019	WEBSITE	Confirmed	5/8/2019	5/10/2019	30'	2
Guest Dock	26	5/6/2019	WEBSITE	Confirmed	5/10/2019	5/13/2019	40'	3
Guest Dock	8	5/7/2019	WEBSITE	Confirmed	5/7/2019	5/8/2019	32'	1
Guest Dock	8	5/7/2019	WEBSITE	Confirmed	5/8/2019	5/10/2019	32'	2
Guest Dock	11	5/8/2019	WEBSITE	Confirmed	5/8/2019	5/9/2019	44'	1
Guest Dock	18	5/8/2019	WEBSITE	Confirmed	5/9/2019	5/10/2019	63'	1
Guest Dock	21	5/8/2019	WEBSITE	Confirmed	5/9/2019	5/12/2019	47'	3
Guest Dock	12	5/9/2019	Parks Central Reservations	Confirmed	5/9/2019	5/10/2019	45'	1
Guest Dock	3	5/9/2019	WEBSITE	Confirmed	5/9/2019	5/10/2019	55'	1
Guest Dock	27	5/9/2019	WEBSITE	Confirmed	5/11/2019	5/13/2019	38'	2
Guest Dock	16	5/9/2019	Moorings	Confirmed	5/10/2019	5/11/2019	41'	1
Guest Dock	2	5/9/2019	WEBSITE	Confirmed	5/11/2019	5/18/2019	26'	7
Guest Dock	3	5/9/2019	Parks Central Reservations	Confirmed	5/10/2019	5/21/2019	54'	11
Guest Dock	3	5/9/2019	Parks Central Reservations	Confirmed	5/21/2019	5/28/2019	54'	7
Guest Dock	2	5/9/2019	Parks Central Reservations	Confirmed	5/28/2019	6/10/2019	54'	13
Guest Dock	12	5/10/2019	WEBSITE	Confirmed	5/10/2019	5/13/2019	25'	3
Guest Dock	27	5/10/2019	WEBSITE	Confirmed	5/10/2019	5/11/2019	38'	1
Guest Dock	18	5/10/2019	WEBSITE	Confirmed	5/11/2019	5/13/2019	52'	2
Guest Dock	22	5/11/2019	WEBSITE	Confirmed	5/12/2019	5/15/2019	47'	3
Guest Dock	4	5/11/2019	WEBSITE	Confirmed	5/12/2019	5/13/2019	30'	1
Guest Dock	10	5/12/2019	WEBSITE	Confirmed	5/12/2019	5/13/2019	17'	1
Guest Dock	6	5/12/2019	WEBSITE	Confirmed	5/12/2019	5/13/2019	41'	1
Guest Dock	11	5/12/2019	WEBSITE	Confirmed	5/13/2019	5/14/2019	30'	1
Guest Dock	12	5/12/2019	WEBSITE	Confirmed	5/13/2019	5/14/2019	32'	1
Guest Dock	27	5/12/2019	WEBSITE	Confirmed	5/13/2019	5/14/2019	42'	1
Guest Dock	8	5/13/2019	Moorings	Confirmed	5/11/2019	5/16/2019	44'	5
Guest Dock	18	5/13/2019	WEBSITE	Confirmed	5/13/2019	5/15/2019	45'	2
Guest Dock	20	5/13/2019	WEBSITE	Confirmed	5/15/2019	5/17/2019	45'	2
Guest Dock	28	5/13/2019	Parks Central Reservations	Confirmed	5/13/2019	5/15/2019	34'	2
Guest Dock	13	5/13/2019	WEBSITE	Confirmed	5/13/2019	5/14/2019	40'	1
Guest Dock	14	5/13/2019	Moorings	Confirmed	5/13/2019	5/20/2019	40'	7
Guest Dock	29	5/13/2019	Moorings	Confirmed	5/23/2019	5/24/2019	40'	1
Guest Dock	14	5/13/2019	Moorings	Confirmed	5/20/2019	5/23/2019	40'	3
Guest Dock	9	5/13/2019	Moorings	Confirmed	5/13/2019	5/14/2019	26'	1
Guest Dock	10	5/13/2019	Moorings	Confirmed	5/13/2019	5/15/2019	27'	2
Guest Dock	10	5/13/2019	Moorings	Confirmed	5/15/2019	5/16/2019	27'	1
Guest Dock	12	5/13/2019	Moorings	Confirmed	5/14/2019	5/23/2019	46'	9
Guest Dock	6	5/13/2019	WEBSITE	Confirmed	5/13/2019	5/14/2019	41'	1
Guest Dock	15	5/13/2019	WEBSITE	Confirmed	5/14/2019	5/15/2019	41'	1
Guest Dock	6	5/14/2019	WEBSITE	Confirmed	5/14/2019	5/15/2019	32'	1
Guest Dock	11	5/14/2019	WEBSITE	Confirmed	5/14/2019	5/15/2019	30'	1
Guest Dock	7	5/14/2019	WEBSITE	Confirmed	5/14/2019	5/15/2019	27'	1
Guest Dock	9	5/14/2019	Moorings	Confirmed	5/14/2019	5/15/2019	26'	1
Guest Dock	13	5/14/2019	WEBSITE	Confirmed	5/14/2019	5/16/2019	25'	2
Guest Dock	19	5/14/2019	WEBSITE	Confirmed	5/14/2019	5/15/2019	40'	1
Guest Dock	11	5/14/2019	WEBSITE	Confirmed	5/15/2019	5/17/2019	30'	2
Guest Dock	27	5/14/2019	Moorings	Confirmed	5/15/2019	5/17/2019	38'	2

Marina	Mooring	Date Reservation Made	Made At	Status	Arrival Date	Departure Date	Boat Length	Length of Stay (Nights)
Guest Dock	18	5/14/2019	WEBSITE	Confirmed	5/15/2019	5/17/2019	63'	2
Guest Dock	15	5/15/2019	WEBSITE	Confirmed	5/15/2019	5/17/2019	35'	2
Guest Dock	7	5/15/2019	Moorings	Confirmed	5/15/2019	5/17/2019	27'	2
Guest Dock	9	5/15/2019	Moorings	Confirmed	5/15/2019	5/16/2019	41'	1
Guest Dock	26	5/15/2019	Moorings	Confirmed	5/15/2019	5/17/2019	26'	2
Guest Dock	8	5/15/2019	Moorings	Confirmed	5/16/2019	5/17/2019	44'	1
Guest Dock	28	5/15/2019	WEBSITE	Confirmed	5/15/2019	5/16/2019	40'	1
Guest Dock	4	5/15/2019	Moorings	Confirmed	5/28/2019	6/3/2019	37'	6
Guest Dock	28	5/15/2019	WEBSITE	Confirmed	5/16/2019	5/17/2019	32'	1
Guest Dock	21	5/15/2019	WEBSITE	Confirmed	5/15/2019	5/16/2019	32'	1
Guest Dock	11	5/15/2019	WEBSITE	Confirmed	5/17/2019	5/19/2019	40'	2
Guest Dock	22	5/15/2019	WEBSITE	Confirmed	5/15/2019	5/16/2019	50'	1
Guest Dock	26	5/15/2019	WEBSITE	Confirmed	5/24/2019	5/27/2019	39'	3
Guest Dock	26	5/15/2019	WEBSITE	Confirmed	5/18/2019	5/19/2019	39'	1
Guest Dock	26	5/15/2019	WEBSITE	Confirmed	5/27/2019	5/31/2019	40'	4
Guest Dock	6	5/16/2019	WEBSITE	Confirmed	5/17/2019	5/19/2019	23'	2
Guest Dock	9	5/16/2019	Moorings	Confirmed	5/16/2019	5/18/2019	33'	2
Guest Dock	9	5/16/2019	Moorings	Confirmed	5/21/2019	5/24/2019	33'	3
Guest Dock	8	5/16/2019	Moorings	Confirmed	5/17/2019	5/23/2019	30'	6
Guest Dock	7	5/16/2019	WEBSITE	Confirmed	5/19/2019	5/20/2019	40'	1
Guest Dock	10	5/16/2019	WEBSITE	Confirmed	5/17/2019	6/1/2019	43'	15
Guest Dock	10	5/16/2019	WEBSITE	Confirmed	6/1/2019	6/9/2019	43'	8
Guest Dock	28	5/16/2019	WEBSITE	Confirmed	5/17/2019	5/18/2019	32'	1
Guest Dock	26	5/16/2019	WEBSITE	Confirmed	5/17/2019	5/18/2019	30'	1
Guest Dock	18	5/17/2019	WEBSITE	Confirmed	5/17/2019	5/18/2019	38'	1
Guest Dock	16	5/17/2019	WEBSITE	Confirmed	5/21/2019	5/24/2019	44'	3
Guest Dock	7	5/17/2019	WEBSITE	Confirmed	5/18/2019	5/19/2019	36'	1
Guest Dock	20	5/17/2019	WEBSITE	Confirmed	5/19/2019	5/20/2019	53'	1
Guest Dock	15	5/17/2019	WEBSITE	Confirmed	5/17/2019	5/20/2019	27'	3
Guest Dock	15	5/17/2019	WEBSITE	Confirmed	5/20/2019	5/22/2019	27'	2
Guest Dock	11	5/17/2019	WEBSITE	Confirmed	5/23/2019	5/25/2019	27'	2
Guest Dock	28	5/17/2019	WEBSITE	Confirmed	5/18/2019	5/20/2019	32'	2
Guest Dock	27	5/17/2019	WEBSITE	Confirmed	5/18/2019	5/20/2019	30'	2
Guest Dock	5	5/18/2019	WEBSITE	Confirmed	5/31/2019	6/2/2019	40'	2
Guest Dock	2	5/18/2019	WEBSITE	Confirmed	5/18/2019	5/19/2019	32'	1
Guest Dock	2	5/19/2019	WEBSITE	Confirmed	5/19/2019	5/20/2019	40'	1
Guest Dock	21	5/19/2019	WEBSITE	Confirmed	5/19/2019	5/21/2019	45'	2
Guest Dock	27	5/20/2019	WEBSITE	Confirmed	5/20/2019	5/22/2019	30'	2
Guest Dock	28	5/20/2019	WEBSITE	Confirmed	5/20/2019	5/22/2019	32'	2
Guest Dock	4	5/20/2019	Parks Central Reservations	Confirmed	5/23/2019	5/24/2019	30'	1
Guest Dock	7	5/20/2019	Moorings	Confirmed	7/4/2019	7/5/2019	34'	1
Guest Dock	12	5/20/2019	WEBSITE	Confirmed	5/27/2019	6/1/2019	30'	5
Guest Dock	20	5/20/2019	WEBSITE	Confirmed	5/20/2019	5/25/2019	53'	5
Guest Dock	16	5/21/2019	WEBSITE	Confirmed	5/24/2019	5/25/2019	41'	1
Guest Dock	6	5/21/2019	WEBSITE	Confirmed	5/22/2019	5/24/2019	32'	2
Guest Dock	27	5/21/2019	WEBSITE	Confirmed	5/22/2019	5/23/2019	30'	1
Guest Dock	28	5/21/2019	WEBSITE	Confirmed	5/22/2019	5/23/2019	32'	1
Guest Dock	7	5/22/2019	Moorings	Confirmed	5/23/2019	5/24/2019	27'	1
Guest Dock	18	5/22/2019	WEBSITE	Confirmed	5/24/2019	5/25/2019	50'	1
Guest Dock	7	5/22/2019	Moorings	Confirmed	5/25/2019	5/27/2019	19'	2
Guest Dock	6	5/22/2019	WEBSITE	Confirmed	5/24/2019	5/29/2019	24'	5
Guest Dock	26	5/22/2019	Moorings	Confirmed	5/23/2019	5/24/2019	36'	1
Guest Dock	8	5/22/2019	Moorings	Confirmed	5/23/2019	5/24/2019	25'	1
Guest Dock	7	5/22/2019	WEBSITE	Confirmed	5/22/2019	5/23/2019	25'	1
Guest Dock	12	5/22/2019	WEBSITE	Confirmed	5/23/2019	5/24/2019	47'	1
Guest Dock	13	5/22/2019	WEBSITE	Confirmed	5/23/2019	5/24/2019	41'	1
Guest Dock	28	5/23/2019	WEBSITE	Confirmed	5/23/2019	5/24/2019	32'	1
Guest Dock	27	5/23/2019	WEBSITE	Confirmed	5/23/2019	5/24/2019	30'	1

Marina	Mooring	Date Reservation Made	Made At	Status	Arrival Date	Departure Date	Boat Length	Length of Stay (Nights)
Guest Dock	2	5/23/2019	Parks Central Reservations	Confirmed	5/23/2019	5/24/2019	32'	1
Guest Dock	2	5/23/2019	Parks Central Reservations	Confirmed	5/25/2019	5/26/2019	32'	1
Guest Dock	14	5/23/2019	WEBSITE	Confirmed	5/23/2019	5/25/2019	41'	2
Guest Dock	16	5/23/2019	WEBSITE	Confirmed	5/28/2019	5/29/2019	50'	1
Guest Dock	16	5/23/2019	WEBSITE	Confirmed	5/29/2019	6/6/2019	50'	8
Guest Dock	3	5/23/2019	WEBSITE	Confirmed	5/31/2019	6/3/2019	32'	3
Guest Dock	4	5/23/2019	WEBSITE	Confirmed	5/24/2019	5/25/2019	42'	1
Guest Dock	27	5/24/2019	WEBSITE	Confirmed	6/7/2019	6/12/2019	39'	5
Guest Dock	13	5/24/2019	WEBSITE	Confirmed	5/24/2019	5/31/2019	33'	7
Guest Dock	7	5/24/2019	WEBSITE	Confirmed	5/24/2019	5/25/2019	25'	1
Guest Dock	12	5/24/2019	Moorings	Confirmed	5/24/2019	5/25/2019	45'	1
Guest Dock	9	5/24/2019	WEBSITE	Confirmed	5/24/2019	5/26/2019	33'	2
Guest Dock	4	5/24/2019	WEBSITE	Confirmed	5/25/2019	5/26/2019	42'	1
Guest Dock	21	5/24/2019	WEBSITE	Confirmed	5/31/2019	6/3/2019	45'	3
Guest Dock	21	5/24/2019	WEBSITE	Confirmed	5/24/2019	5/25/2019	47'	1
Guest Dock	18	5/24/2019	WEBSITE	Confirmed	5/25/2019	5/26/2019	50'	1
Guest Dock	14	5/25/2019	WEBSITE	Confirmed	5/25/2019	5/28/2019	45'	3
Guest Dock	19	5/25/2019	WEBSITE	Confirmed	5/25/2019	5/26/2019	47'	1
Guest Dock	22	5/25/2019	WEBSITE	Confirmed	5/25/2019	5/26/2019	52'	1
Guest Dock	12	5/25/2019	WEBSITE	Confirmed	5/25/2019	5/26/2019	41'	1
Guest Dock	16	5/25/2019	WEBSITE	Confirmed	5/25/2019	5/26/2019	27'	1
Guest Dock	5	5/25/2019	WEBSITE	Confirmed	5/25/2019	5/26/2019	21'	1
Guest Dock	8	5/25/2019	WEBSITE	Confirmed	5/25/2019	5/26/2019	25'	1
Guest Dock	28	5/25/2019	WEBSITE	Confirmed	5/26/2019	5/28/2019	32'	2
Guest Dock	11	5/26/2019	WEBSITE	Confirmed	5/26/2019	5/27/2019	41'	1
Guest Dock	5	5/26/2019	WEBSITE	Confirmed	5/26/2019	5/27/2019	21'	1
Guest Dock	19	5/26/2019	WEBSITE	Confirmed	5/26/2019	5/27/2019	47'	1
Guest Dock	14	5/26/2019	WEBSITE	Confirmed	5/28/2019	5/29/2019	44'	1
Guest Dock	8	5/26/2019	WEBSITE	Confirmed	5/26/2019	5/27/2019	25'	1
Guest Dock	9	5/27/2019	WEBSITE	Confirmed	5/27/2019	5/29/2019	23'	2
Guest Dock	19	5/27/2019	WEBSITE	Confirmed	5/27/2019	5/28/2019	47'	1
Guest Dock	2	5/27/2019	WEBSITE	Confirmed	5/27/2019	5/28/2019	28'	1
Guest Dock	7	5/27/2019	WEBSITE	Confirmed	5/27/2019	5/28/2019	25'	1
Guest Dock	3	5/27/2019	WEBSITE	Confirmed	6/9/2019	6/14/2019	28'	5
Guest Dock	14	5/27/2019	WEBSITE	Confirmed	5/31/2019	6/1/2019	41'	1
Guest Dock	16	5/27/2019	WEBSITE	Confirmed	5/27/2019	5/28/2019	27'	1
Guest Dock	15	5/27/2019	WEBSITE	Confirmed	5/27/2019	5/29/2019	26'	2
Guest Dock	15	5/27/2019	WEBSITE	Confirmed	5/29/2019	5/30/2019	26'	1
Guest Dock	7	5/27/2019	WEBSITE	Confirmed	5/30/2019	6/1/2019	26'	2
Guest Dock	8	5/27/2019	WEBSITE	Confirmed	5/27/2019	5/30/2019	30'	3
Guest Dock	27	5/28/2019	WEBSITE	Confirmed	5/28/2019	5/31/2019	30'	3
Guest Dock	1	5/28/2019	Moorings	Confirmed	5/28/2019	5/29/2019	27'	1
Guest Dock	1	5/28/2019	Moorings	Confirmed	5/29/2019	5/31/2019	27'	2
Guest Dock	20	5/28/2019	Parks Central Reservations	Confirmed	5/28/2019	5/31/2019	26'	3
Guest Dock	15	5/28/2019	WEBSITE	Confirmed	5/30/2019	6/2/2019	22'	3
Guest Dock	18	5/28/2019	Parks Central Reservations	Confirmed	5/28/2019	5/29/2019	40'	1
Guest Dock	3	5/28/2019	Moorings	Confirmed	5/28/2019	5/29/2019	45'	1
Guest Dock	6	5/29/2019	WEBSITE	Confirmed	5/29/2019	5/31/2019	33'	2
Guest Dock	19	5/29/2019	Moorings	Confirmed	6/5/2019	6/8/2019	38'	3
Guest Dock	18	5/29/2019	Moorings	Confirmed	5/29/2019	5/30/2019	40'	1
Guest Dock	3	5/29/2019	WEBSITE	Confirmed	5/29/2019	5/31/2019	32'	2
Guest Dock	7	5/29/2019	Moorings	Confirmed	5/29/2019	5/30/2019	25'	1
Guest Dock	9	5/29/2019	WEBSITE	Confirmed	5/31/2019	6/1/2019	21'	1
Guest Dock	5	5/29/2019	WEBSITE	Confirmed	5/29/2019	5/30/2019	27'	1
Guest Dock	9	5/30/2019	Moorings	Confirmed	5/30/2019	5/31/2019	25'	1
Guest Dock	9	5/30/2019	Moorings	Confirmed	6/3/2019	6/4/2019	25'	1
Guest Dock	8	5/30/2019	Moorings	Confirmed	5/30/2019	5/31/2019	30'	1
Guest Dock	27	5/30/2019	WEBSITE	Confirmed	5/31/2019	6/1/2019	38'	1

Marina	Mooring	Date Reservation Made	Made At	Status	Arrival Date	Departure Date	Boat Length	Length of Stay (Nights)
Guest Dock	27	5/30/2019	WEBSITE	Confirmed	6/3/2019	6/4/2019	38'	1
Guest Dock	28	5/30/2019	WEBSITE	Confirmed	6/4/2019	6/5/2019	38'	1
Guest Dock	6	5/30/2019	WEBSITE	Confirmed	5/31/2019	6/1/2019	38'	1
Guest Dock	26	5/31/2019	WEBSITE	Confirmed	6/21/2019	6/23/2019	40'	2
Guest Dock	13	5/31/2019	WEBSITE	Confirmed	5/31/2019	6/2/2019	26'	2
Guest Dock	8	5/31/2019	WEBSITE	Confirmed	5/31/2019	6/4/2019	32'	4
Guest Dock	14	6/1/2019	WEBSITE	Confirmed	6/1/2019	6/2/2019	27'	1
Guest Dock	18	6/1/2019	WEBSITE	Confirmed	6/1/2019	6/2/2019	65'	1
Guest Dock	16	6/1/2019	WEBSITE	Confirmed	6/6/2019	6/7/2019	26'	1
Guest Dock	6	6/1/2019	WEBSITE	Confirmed	6/1/2019	6/9/2019	25'	8
Guest Dock	10	6/1/2019	WEBSITE	Confirmed	6/15/2019	6/16/2019	18'	1
Guest Dock	18	6/1/2019	WEBSITE	Confirmed	6/14/2019	6/18/2019	45'	4
Guest Dock	19	6/1/2019	WEBSITE	Confirmed	6/3/2019	6/5/2019	50'	2
Guest Dock	12	6/1/2019	WEBSITE	Confirmed	6/1/2019	6/5/2019	37'	4
Guest Dock	13	6/1/2019	WEBSITE	Confirmed	6/2/2019	6/5/2019	33'	3
Guest Dock	19	6/1/2019	WEBSITE	Confirmed	6/1/2019	6/2/2019	52'	1
Guest Dock	18	6/1/2019	WEBSITE	Confirmed	6/2/2019	6/4/2019	52'	2
Guest Dock	8	6/2/2019	WEBSITE	Confirmed	6/4/2019	6/5/2019	21'	1
Guest Dock	21	6/2/2019	WEBSITE	Confirmed	6/5/2019	6/7/2019	63'	2
Guest Dock	15	6/2/2019	WEBSITE	Confirmed	6/14/2019	6/16/2019	22'	2
Guest Dock	15	6/2/2019	WEBSITE	Confirmed	6/2/2019	6/3/2019	22'	1
Guest Dock	7	6/2/2019	WEBSITE	Confirmed	6/3/2019	6/6/2019	27'	3
Guest Dock	5	6/2/2019	WEBSITE	Confirmed	6/2/2019	6/3/2019	22'	1
Guest Dock	6	6/2/2019	WEBSITE	Confirmed	6/12/2019	6/13/2019	10'	1
Guest Dock	11	6/3/2019	WEBSITE	Confirmed	6/3/2019	6/4/2019	30'	1
Guest Dock	3	6/3/2019	Moorings	Confirmed	6/3/2019	6/5/2019	32'	2
Guest Dock	20	6/3/2019	Parks Central Reservations	Confirmed	6/3/2019	6/5/2019	26'	2
Guest Dock	15	6/3/2019	Moorings	Confirmed	6/3/2019	6/4/2019	27'	1
Guest Dock	5	6/3/2019	Parks Central Reservations	Confirmed	6/10/2019	6/13/2019	44'	3
Guest Dock	22	6/3/2019	Parks Central Reservations	Confirmed	6/3/2019	6/5/2019	38'	2
Guest Dock	2	6/3/2019	WEBSITE	Confirmed	12/31/2019	1/1/2020	44'	1
Guest Dock	28	6/3/2019	Parks Central Reservations	Confirmed	6/12/2019	6/15/2019	20'	3
Guest Dock	29	6/3/2019	Parks Central Reservations	Confirmed	6/6/2019	6/7/2019	40'	1
Guest Dock	29	6/3/2019	Parks Central Reservations	Confirmed	6/3/2019	6/6/2019	40'	3
Guest Dock	27	6/3/2019	WEBSITE	Confirmed	6/4/2019	6/7/2019	32'	3
Guest Dock	15	6/3/2019	Moorings	Confirmed	6/4/2019	6/5/2019	27'	1
Guest Dock	18	6/4/2019	WEBSITE	Confirmed	6/4/2019	6/5/2019	45'	1
Guest Dock	20	6/4/2019	WEBSITE	Confirmed	6/15/2019	6/16/2019	45'	1
Guest Dock	12	6/4/2019	WEBSITE	Confirmed	6/7/2019	6/10/2019	33'	3
Guest Dock	18	6/4/2019	WEBSITE	Confirmed	6/5/2019	6/6/2019	50'	1
Guest Dock	16	6/4/2019	Moorings	Confirmed	6/13/2019	6/17/2019	41'	4
Guest Dock	4	6/4/2019	Moorings	Confirmed	6/13/2019	6/17/2019	30'	4
Guest Dock	22	6/4/2019	WEBSITE	Confirmed	6/13/2019	6/17/2019	32'	4
Guest Dock	26	6/4/2019	Moorings	Confirmed	6/7/2019	6/10/2019	45'	3
Guest Dock	12	6/4/2019	WEBSITE	Confirmed	6/5/2019	6/7/2019	25'	2
Guest Dock	2	6/4/2019	WEBSITE	Confirmed	6/10/2019	6/13/2019	27'	3
Guest Dock	5	6/4/2019	WEBSITE	Confirmed	6/13/2019	6/16/2019	42'	3
Guest Dock	20	6/5/2019	WEBSITE	Confirmed	6/5/2019	6/6/2019	45'	1
Guest Dock	8	6/5/2019	WEBSITE	Confirmed	6/5/2019	6/6/2019	25'	1
Guest Dock	12	6/5/2019	WEBSITE	Confirmed	6/11/2019	6/13/2019	30'	2
Guest Dock	15	6/5/2019	Moorings	Confirmed	6/5/2019	6/7/2019	27'	2
Guest Dock	3	6/5/2019	WEBSITE	Confirmed	6/5/2019	6/6/2019	30'	1
Guest Dock	28	6/6/2019	WEBSITE	Confirmed	6/9/2019	6/11/2019	38'	2
Guest Dock	18	6/6/2019	WEBSITE	Confirmed	6/6/2019	6/7/2019	50'	1
Guest Dock	4	6/6/2019	WEBSITE	Confirmed	6/6/2019	6/8/2019	30'	2
Guest Dock	4	6/6/2019	Parks Central Reservations	Confirmed	6/10/2019	6/11/2019	30'	1
Guest Dock	20	6/6/2019	WEBSITE	Confirmed	6/6/2019	6/7/2019	45'	1
Guest Dock	13	6/6/2019	WEBSITE	Confirmed	6/9/2019	6/19/2019	45'	10

Marina	Mooring	Date Reservation Made	Made At	Status	Arrival Date	Departure Date	Boat Length	Length of Stay (Nights)
Guest Dock	9	6/6/2019	Parks Central Reservations	Confirmed	6/6/2019	6/14/2019	55'	8
Guest Dock	21	6/6/2019	WEBSITE	Confirmed	6/7/2019	6/9/2019	45'	2
Guest Dock	2	6/7/2019	WEBSITE	Confirmed	6/13/2019	6/17/2019	27'	4
Guest Dock	16	6/7/2019	WEBSITE	Confirmed	6/20/2019	6/23/2019	22'	3
Guest Dock	8	6/7/2019	Moorings	Confirmed	6/7/2019	6/8/2019	25'	1
Guest Dock	7	6/7/2019	Moorings	Confirmed	6/7/2019	6/8/2019	27'	1
Guest Dock	13	6/7/2019	WEBSITE	Confirmed	6/7/2019	6/8/2019	32'	1
Guest Dock	22	6/7/2019	WEBSITE	Confirmed	6/7/2019	6/8/2019	47'	1
Guest Dock	12	6/7/2019	WEBSITE	Confirmed	6/13/2019	6/14/2019	41'	1
Guest Dock	7	6/7/2019	WEBSITE	Confirmed	6/8/2019	6/9/2019	30'	1
Guest Dock	14	6/7/2019	WEBSITE	Confirmed	6/7/2019	6/8/2019	44'	1
Guest Dock	20	6/8/2019	WEBSITE	Confirmed	6/8/2019	6/9/2019	32'	1
Guest Dock	7	6/8/2019	WEBSITE	Confirmed	6/10/2019	6/12/2019	35'	2
Guest Dock	22	6/8/2019	WEBSITE	Confirmed	6/8/2019	6/9/2019	47'	1
Guest Dock	21	6/8/2019	WEBSITE	Confirmed	6/22/2019	7/3/2019	52'	11
Guest Dock	7	6/8/2019	WEBSITE	Confirmed	6/9/2019	6/10/2019	30'	1
Guest Dock	3	6/8/2019	WEBSITE	Confirmed	6/14/2019	6/16/2019	17'	2
Guest Dock	13	6/8/2019	WEBSITE	Confirmed	6/8/2019	6/9/2019	35'	1
Guest Dock	7	6/8/2019	WEBSITE	Confirmed	6/12/2019	6/13/2019	25'	1
Guest Dock	5	6/8/2019	WEBSITE	Confirmed	6/9/2019	6/10/2019	24'	1
Guest Dock	6	6/8/2019	WEBSITE	Confirmed	6/13/2019	6/14/2019	22'	1
Guest Dock	20	6/9/2019	WEBSITE	Confirmed	6/10/2019	6/11/2019	52'	1
Guest Dock	18	6/9/2019	WEBSITE	Confirmed	6/9/2019	6/10/2019	32'	1
Guest Dock	26	6/9/2019	WEBSITE	Confirmed	6/10/2019	6/11/2019	30'	1
Guest Dock	6	6/10/2019	WEBSITE	Confirmed	6/10/2019	6/12/2019	26'	2
Guest Dock	22	6/10/2019	WEBSITE	Confirmed	6/10/2019	6/11/2019	38'	1
Guest Dock	22	6/10/2019	WEBSITE	Confirmed	6/12/2019	6/13/2019	38'	1
Guest Dock	21	6/10/2019	WEBSITE	Confirmed	6/13/2019	6/14/2019	38'	1
Guest Dock	22	6/10/2019	WEBSITE	Confirmed	6/11/2019	6/12/2019	38'	1
Guest Dock	18	6/10/2019	WEBSITE	Confirmed	6/10/2019	6/13/2019	46'	3
Guest Dock	8	6/10/2019	Moorings	Confirmed	6/10/2019	6/11/2019	27'	1
Guest Dock	16	6/10/2019	WEBSITE	Confirmed	6/19/2019	6/20/2019	22'	1
Guest Dock	27	6/10/2019	WEBSITE	Confirmed	6/12/2019	6/18/2019	36'	6
Guest Dock	26	6/10/2019	WEBSITE	Confirmed	6/11/2019	6/14/2019	30'	3
Guest Dock	26	6/10/2019	WEBSITE	Confirmed	6/15/2019	6/16/2019	40'	1
Guest Dock	7	6/11/2019	WEBSITE	Confirmed	6/24/2019	6/29/2019	35'	5
Guest Dock	9	6/12/2019	Parks Central Reservations	Confirmed	6/15/2019	6/16/2019	43'	1
Guest Dock	2	6/12/2019	WEBSITE	Confirmed	6/22/2019	6/23/2019	20'	1
Guest Dock	12	6/13/2019	WEBSITE	Confirmed	6/14/2019	6/16/2019	21'	2
Guest Dock	18	6/13/2019	WEBSITE	Confirmed	6/13/2019	6/14/2019	46'	1
Guest Dock	21	6/13/2019	WEBSITE	Confirmed	6/14/2019	6/15/2019	46'	1
Guest Dock	7	6/13/2019	Moorings	Confirmed	6/13/2019	6/14/2019	35'	1
Guest Dock	10	6/13/2019	Moorings	Confirmed	6/13/2019	6/14/2019	25'	1
Guest Dock	7	6/13/2019	WEBSITE	Confirmed	6/14/2019	6/17/2019	35'	3
Guest Dock	19	6/13/2019	Parks Central Reservations	Confirmed	6/14/2019	6/19/2019	42'	5
Guest Dock	8	6/14/2019	WEBSITE	Confirmed	7/3/2019	7/5/2019	20'	2
Guest Dock	8	6/14/2019	WEBSITE	Confirmed	6/15/2019	6/17/2019	44'	2
Guest Dock	20	6/14/2019	WEBSITE	Confirmed	6/14/2019	6/15/2019	44'	1
Guest Dock	12	6/14/2019	WEBSITE	Confirmed	6/28/2019	6/29/2019	33'	1
Guest Dock	9	6/14/2019	WEBSITE	Confirmed	6/14/2019	6/15/2019	55'	1
Guest Dock	26	6/14/2019	WEBSITE	Confirmed	6/14/2019	6/15/2019	35'	1
Guest Dock	13	6/14/2019	WEBSITE	Confirmed	6/28/2019	7/6/2019	22'	8
Guest Dock	28	6/15/2019	WEBSITE	Confirmed	6/15/2019	6/18/2019	33'	3
Guest Dock	5	6/15/2019	WEBSITE	Confirmed	6/17/2019	6/21/2019	30'	4
Guest Dock	27	6/15/2019	WEBSITE	Confirmed	7/5/2019	7/7/2019	39'	2
Guest Dock	26	6/15/2019	WEBSITE	Confirmed	6/16/2019	6/17/2019	40'	1
Guest Dock	12	6/16/2019	WEBSITE	Confirmed	6/29/2019	7/1/2019	33'	2
Guest Dock	20	6/16/2019	WEBSITE	Confirmed	6/16/2019	6/18/2019	46'	2

Marina	Mooring	Date Reservation Made	Made At	Status	Arrival Date	Departure Date	Boat Length	Length of Stay (Nights)
Guest Dock	5	6/16/2019	WEBSITE	Confirmed	6/29/2019	6/30/2019	40'	1
Guest Dock	6	6/16/2019	WEBSITE	Confirmed	6/17/2019	6/19/2019	30'	2
Guest Dock	9	6/16/2019	WEBSITE	Confirmed	7/3/2019	7/7/2019	18'	4
Guest Dock	10	6/16/2019	WEBSITE	Confirmed	6/16/2019	6/18/2019	26'	2
Guest Dock	12	6/16/2019	WEBSITE	Confirmed	6/16/2019	6/17/2019	45'	1
Guest Dock	11	6/16/2019	WEBSITE	Confirmed	6/17/2019	6/18/2019	30'	1
Guest Dock	2	6/16/2019	WEBSITE	Confirmed	6/30/2019	7/6/2019	25'	6
Guest Dock	3	6/17/2019	Parks Central Reservations	Confirmed	6/17/2019	6/19/2019	38'	2
Guest Dock	2	6/17/2019	Moorings	Confirmed	6/17/2019	6/19/2019	26'	2
Guest Dock	2	6/17/2019	Moorings	Confirmed	6/19/2019	6/21/2019	26'	2
Guest Dock	14	6/17/2019	Parks Central Reservations	Confirmed	6/17/2019	6/18/2019	27'	1
Guest Dock	19	6/17/2019	Moorings	Confirmed	6/24/2019	6/28/2019	42'	4
Guest Dock	19	6/17/2019	Moorings	Confirmed	6/19/2019	6/24/2019	42'	5
Guest Dock	10	6/17/2019	Moorings	Confirmed	7/2/2019	7/6/2019	27'	4
Guest Dock	13	6/17/2019	Moorings	Confirmed	7/6/2019	7/7/2019	22'	1
Guest Dock	18	6/17/2019	Parks Central Reservations	Confirmed	7/3/2019	7/5/2019	40'	2
Guest Dock	19	6/17/2019	Parks Central Reservations	Confirmed	7/12/2019	7/13/2019	40'	1
Guest Dock	19	6/17/2019	Parks Central Reservations	Confirmed	7/5/2019	7/6/2019	40'	1
Guest Dock	27	6/17/2019	WEBSITE	Confirmed	6/18/2019	6/20/2019	36'	2
Guest Dock	16	6/17/2019	WEBSITE	Confirmed	6/29/2019	6/30/2019	40'	1
Guest Dock	19	6/17/2019	WEBSITE	Confirmed	7/3/2019	7/5/2019	45'	2
Guest Dock	26	6/17/2019	WEBSITE	Confirmed	6/18/2019	6/19/2019	32'	1
Guest Dock	4	6/17/2019	WEBSITE	Confirmed	6/20/2019	6/23/2019	38'	3
Guest Dock	4	6/17/2019	WEBSITE	Confirmed	6/18/2019	6/19/2019	42'	1
Guest Dock	10	6/17/2019	WEBSITE	Confirmed	6/19/2019	6/20/2019	43'	1
Guest Dock	8	6/17/2019	WEBSITE	Confirmed	6/17/2019	6/19/2019	43'	2
Guest Dock	28	6/18/2019	WEBSITE	Confirmed	6/18/2019	6/21/2019	33'	3
Guest Dock	7	6/18/2019	Parks Central Reservations	Confirmed	6/18/2019	6/21/2019	38'	3
Guest Dock	6	6/18/2019	WEBSITE	Confirmed	6/21/2019	6/27/2019	37'	6
Guest Dock	8	6/18/2019	WEBSITE	Confirmed	6/19/2019	6/22/2019	43'	3
Guest Dock	12	6/19/2019	WEBSITE	Confirmed	7/3/2019	7/5/2019	21'	2
Guest Dock	3	6/19/2019	WEBSITE	Confirmed	7/3/2019	7/6/2019	22'	3
Guest Dock	14	6/19/2019	WEBSITE	Confirmed	6/19/2019	6/21/2019	42'	2
Guest Dock	26	6/19/2019	WEBSITE	Confirmed	7/1/2019	7/4/2019	33'	3
Guest Dock	18	6/19/2019	Parks Central Reservations	Confirmed	6/18/2019	6/21/2019	49'	3
Guest Dock	18	6/19/2019	Parks Central Reservations	Confirmed	6/21/2019	6/28/2019	49'	7
Guest Dock	20	6/19/2019	Moorings	Confirmed	6/19/2019	6/22/2019	46'	3
Guest Dock	6	6/19/2019	WEBSITE	Confirmed	7/3/2019	7/5/2019	28'	2
Guest Dock	21	6/20/2019	WEBSITE	Confirmed	7/4/2019	7/6/2019	48'	2
Guest Dock	15	6/20/2019	WEBSITE	Confirmed	7/3/2019	7/4/2019	22'	1
Guest Dock	11	6/20/2019	Parks Central Reservations	Confirmed	6/20/2019	6/21/2019	26'	1
Guest Dock	10	6/20/2019	WEBSITE	Confirmed	6/20/2019	6/21/2019	43'	1
Guest Dock	11	6/20/2019	Moorings	Confirmed	6/24/2019	6/25/2019	45'	1
Guest Dock	12	6/20/2019	Moorings	Confirmed	6/20/2019	6/21/2019	45'	1
Guest Dock	26	6/20/2019	WEBSITE	Confirmed	6/20/2019	6/21/2019	32'	1
Guest Dock	15	6/20/2019	Parks Central Reservations	Confirmed	6/20/2019	6/22/2019	29'	2
Guest Dock	3	6/20/2019	WEBSITE	Confirmed	6/29/2019	6/30/2019	57'	1
Guest Dock	10	6/21/2019	Parks Central Reservations	Confirmed	6/24/2019	6/27/2019	30'	3
Guest Dock	28	6/21/2019	WEBSITE	Confirmed	6/21/2019	6/28/2019	33'	7
Guest Dock	10	6/21/2019	WEBSITE	Confirmed	6/21/2019	6/22/2019	43'	1
Guest Dock	7	6/21/2019	WEBSITE	Confirmed	6/22/2019	6/23/2019	28'	1
Guest Dock	28	6/21/2019	WEBSITE	Confirmed	7/3/2019	7/7/2019	38'	4
Guest Dock	3	6/22/2019	WEBSITE	Confirmed	7/6/2019	7/13/2019	55'	7
Guest Dock	5	6/22/2019	WEBSITE	Confirmed	6/22/2019	6/23/2019	28'	1
Guest Dock	3	6/22/2019	WEBSITE	Confirmed	6/23/2019	6/26/2019	57'	3
Guest Dock	7	6/22/2019	WEBSITE	Confirmed	7/5/2019	7/9/2019	24'	4
Guest Dock	27	6/22/2019	WEBSITE	Confirmed	6/22/2019	7/5/2019	39'	13
Guest Dock	8	6/22/2019	WEBSITE	Confirmed	6/22/2019	6/23/2019	25'	1

Marina	Mooring	Date Reservation Made	Made At	Status	Arrival Date	Departure Date	Boat Length	Length of Stay (Nights)
Guest Dock	26	6/23/2019	WEBSITE	Confirmed	6/23/2019	6/24/2019	40'	1
Guest Dock	4	6/23/2019	WEBSITE	Confirmed	6/24/2019	6/28/2019	42'	4
Guest Dock	8	6/23/2019	WEBSITE	Confirmed	7/5/2019	7/7/2019	17'	2
Guest Dock	28	6/23/2019	WEBSITE	Confirmed	7/1/2019	7/3/2019	40'	2
Guest Dock	29	6/23/2019	WEBSITE	Confirmed	7/3/2019	7/4/2019	40'	1
Guest Dock	2	6/24/2019	Parks Central Reservations	Confirmed	6/24/2019	6/27/2019	26'	3
Guest Dock	20	6/24/2019	Parks Central Reservations	Confirmed	6/24/2019	6/28/2019	38'	4
Guest Dock	12	6/24/2019	Parks Central Reservations	Confirmed	6/24/2019	6/25/2019	27'	1
Guest Dock	12	6/24/2019	Parks Central Reservations	Confirmed	6/25/2019	6/28/2019	27'	3
Guest Dock	5	6/24/2019	WEBSITE	Confirmed	6/24/2019	6/28/2019	33'	4
Guest Dock	9	6/24/2019	WEBSITE	Confirmed	6/25/2019	6/26/2019	28'	1
Guest Dock	20	6/24/2019	WEBSITE	Confirmed	7/3/2019	7/6/2019	52'	3
Guest Dock	11	6/25/2019	WEBSITE	Confirmed	6/28/2019	7/4/2019	36'	6
Guest Dock	26	6/25/2019	WEBSITE	Confirmed	7/4/2019	7/8/2019	36'	4
Guest Dock	5	6/25/2019	Moorings	Confirmed	7/13/2019	7/16/2019	43'	3
Guest Dock	16	6/25/2019	WEBSITE	Confirmed	6/25/2019	6/28/2019	41'	3
Guest Dock	8	6/25/2019	WEBSITE	Confirmed	6/29/2019	7/3/2019	38'	4
Guest Dock	9	6/25/2019	WEBSITE	Confirmed	6/27/2019	6/29/2019	29'	2
Guest Dock	16	6/26/2019	WEBSITE	Confirmed	7/5/2019	7/7/2019	32'	2
Guest Dock	4	6/26/2019	WEBSITE	Confirmed	6/29/2019	6/30/2019	27'	1
Guest Dock	8	6/26/2019	WEBSITE	Confirmed	6/26/2019	6/27/2019	25'	1
Guest Dock	3	6/26/2019	WEBSITE	Confirmed	6/26/2019	6/29/2019	40'	3
Guest Dock	6	6/26/2019	WEBSITE	Confirmed	6/27/2019	6/29/2019	37'	2
Guest Dock	22	6/27/2019	WEBSITE	Confirmed	7/4/2019	7/5/2019	48'	1
Guest Dock	6	6/27/2019	Moorings	Confirmed	7/1/2019	7/3/2019	27'	2
Guest Dock	14	6/27/2019	Moorings	Confirmed	6/27/2019	6/28/2019	43'	1
Guest Dock	14	6/27/2019	WEBSITE	Confirmed	6/29/2019	7/2/2019	42'	3
Guest Dock	7	6/27/2019	WEBSITE	Confirmed	7/2/2019	7/4/2019	42'	2
Guest Dock	10	6/27/2019	Moorings	Confirmed	6/28/2019	6/29/2019	30'	1
Guest Dock	19	6/27/2019	WEBSITE	Confirmed	6/28/2019	6/29/2019	65'	1
Guest Dock	19	6/27/2019	WEBSITE	Confirmed	6/29/2019	7/1/2019	65'	2
Guest Dock	18	6/27/2019	WEBSITE	Confirmed	6/28/2019	6/30/2019	50'	2
Guest Dock	6	6/27/2019	WEBSITE	Confirmed	6/29/2019	7/1/2019	28'	2
Guest Dock	15	6/27/2019	WEBSITE	Confirmed	6/28/2019	7/1/2019	26'	3
Guest Dock	28	6/28/2019	WEBSITE	Confirmed	6/28/2019	6/30/2019	33'	2
Guest Dock	14	6/28/2019	WEBSITE	Confirmed	6/28/2019	6/29/2019	45'	1
Guest Dock	15	6/28/2019	WEBSITE	Confirmed	7/5/2019	7/8/2019	33'	3
Guest Dock	18	6/28/2019	WEBSITE	Confirmed	7/8/2019	7/9/2019	50'	1
Guest Dock	16	6/28/2019	WEBSITE	Confirmed	6/30/2019	7/3/2019	42'	3
Guest Dock	9	6/29/2019	WEBSITE	Confirmed	6/30/2019	7/3/2019	31'	3
Guest Dock	5	6/29/2019	WEBSITE	Confirmed	7/3/2019	7/4/2019	42'	1
Guest Dock	7	6/29/2019	WEBSITE	Confirmed	6/29/2019	7/2/2019	27'	3
Guest Dock	4	6/30/2019	WEBSITE	Confirmed	6/30/2019	7/1/2019	19'	1
Guest Dock	4	6/30/2019	WEBSITE	Confirmed	7/3/2019	7/4/2019	38'	1
Guest Dock	4	6/30/2019	WEBSITE	Confirmed	7/1/2019	7/3/2019	33'	2
Guest Dock	5	6/30/2019	WEBSITE	Confirmed	7/1/2019	7/2/2019	40'	1
Guest Dock	10	6/30/2019	WEBSITE	Confirmed	6/30/2019	7/1/2019	35'	1
Guest Dock	3	6/30/2019	WEBSITE	Confirmed	6/30/2019	7/3/2019	28'	3
Guest Dock	18	6/30/2019	WEBSITE	Confirmed	6/30/2019	7/1/2019	50'	1
Guest Dock	15	6/30/2019	WEBSITE	Confirmed	7/1/2019	7/3/2019	30'	2
Guest Dock	6	6/30/2019	WEBSITE	Confirmed	7/12/2019	7/13/2019	10'	1
Guest Dock	22	7/1/2019	Parks Central Reservations	Confirmed	7/1/2019	7/3/2019	30'	2
Guest Dock	4	7/1/2019	WEBSITE	Confirmed	7/11/2019	7/12/2019	37'	1
Guest Dock	10	7/1/2019	WEBSITE	Confirmed	7/1/2019	7/2/2019	44'	1
Guest Dock	20	7/1/2019	WEBSITE	Confirmed	7/2/2019	7/3/2019	47'	1
Guest Dock	20	7/1/2019	WEBSITE	Confirmed	7/1/2019	7/2/2019	55'	1
Guest Dock	5	7/2/2019	Moorings	Confirmed	7/2/2019	7/3/2019	25'	1
Guest Dock	11	7/2/2019	WEBSITE	Confirmed	7/4/2019	7/5/2019	33'	1

Marina	Mooring	Date Reservation Made	Made At	Status	Arrival Date	Departure Date	Boat Length	Length of Stay (Nights)
Guest Dock	16	7/2/2019	WEBSITE	Confirmed	7/8/2019	7/18/2019	40'	10
Guest Dock	12	7/2/2019	WEBSITE	Confirmed	7/2/2019	7/3/2019	32'	1
Guest Dock	14	7/2/2019	WEBSITE	Confirmed	8/31/2019	9/9/2019	25'	9
Guest Dock	8	7/2/2019	WEBSITE	Confirmed	7/7/2019	7/8/2019	17'	1
Guest Dock	14	7/2/2019	WEBSITE	Confirmed	7/2/2019	7/3/2019	40'	1
Guest Dock	18	7/3/2019	Parks Central Reservations	Confirmed	7/12/2019	7/16/2019	25'	4
Guest Dock	20	7/3/2019	WEBSITE	Confirmed	7/11/2019	7/18/2019	50'	7
Guest Dock	20	7/3/2019	WEBSITE	Confirmed	7/18/2019	7/19/2019	50'	1
Guest Dock	3	7/3/2019	WEBSITE	Confirmed	7/20/2019	7/23/2019	50'	3
Guest Dock	3	7/3/2019	WEBSITE	Confirmed	7/19/2019	7/20/2019	50'	1
Guest Dock	3	7/3/2019	WEBSITE	Confirmed	7/23/2019	7/29/2019	50'	6
Guest Dock	18	7/3/2019	Moorings	Confirmed	7/5/2019	7/7/2019	36'	2
Guest Dock	6	7/3/2019	WEBSITE	Confirmed	7/5/2019	7/6/2019	16'	1
Guest Dock	22	7/3/2019	Parks Central Reservations	Confirmed	7/3/2019	7/4/2019	40'	1
Guest Dock	9	7/3/2019	WEBSITE	Confirmed	7/11/2019	7/18/2019	22'	7
Guest Dock	4	7/5/2019	WEBSITE	Confirmed	7/19/2019	7/20/2019	32'	1
Guest Dock	19	7/5/2019	WEBSITE	Confirmed	7/6/2019	7/7/2019	45'	1
Guest Dock	15	7/5/2019	WEBSITE	Confirmed	7/12/2019	7/15/2019	30'	3
Guest Dock	2	7/5/2019	WEBSITE	Confirmed	7/6/2019	7/7/2019	22'	1
Guest Dock	22	7/5/2019	WEBSITE	Confirmed	7/5/2019	7/6/2019	48'	1
Guest Dock	4	7/5/2019	WEBSITE	Confirmed	7/15/2019	7/18/2019	30'	3
Guest Dock	14	7/5/2019	WEBSITE	Confirmed	7/5/2019	7/6/2019	32'	1
Guest Dock	11	7/5/2019	WEBSITE	Confirmed	7/17/2019	7/21/2019	27'	4
Guest Dock	2	7/5/2019	WEBSITE	Confirmed	7/18/2019	7/23/2019	28'	5
Guest Dock	11	7/5/2019	WEBSITE	Confirmed	7/5/2019	7/6/2019	36'	1
Guest Dock	6	7/6/2019	WEBSITE	Confirmed	7/6/2019	7/7/2019	22'	1
Guest Dock	14	7/6/2019	WEBSITE	Confirmed	7/6/2019	7/8/2019	40'	2
Guest Dock	11	7/6/2019	WEBSITE	Confirmed	7/6/2019	7/7/2019	22'	1
Guest Dock	19	7/6/2019	WEBSITE	Confirmed	7/15/2019	7/16/2019	50'	1
Guest Dock	26	7/6/2019	WEBSITE	Confirmed	7/8/2019	7/10/2019	36'	2
Guest Dock	14	7/6/2019	WEBSITE	Confirmed	7/16/2019	7/20/2019	37'	4
Guest Dock	10	7/6/2019	WEBSITE	Confirmed	7/6/2019	7/7/2019	16'	1
Guest Dock	5	7/6/2019	WEBSITE	Confirmed	7/8/2019	7/12/2019	39'	4
Guest Dock	10	7/7/2019	WEBSITE	Confirmed	7/7/2019	7/19/2019	17'	12
Guest Dock	27	7/7/2019	WEBSITE	Confirmed	7/8/2019	7/12/2019	34'	4
Guest Dock	6	7/7/2019	WEBSITE	Confirmed	7/7/2019	7/8/2019	22'	1
Guest Dock	9	7/7/2019	WEBSITE	Confirmed	7/7/2019	7/9/2019	31'	2
Guest Dock	11	7/8/2019	WEBSITE	Confirmed	7/8/2019	7/9/2019	30'	1
Guest Dock	22	7/8/2019	Parks Central Reservations	Confirmed	7/8/2019	7/12/2019	38'	4
Guest Dock	21	7/8/2019	Parks Central Reservations	Confirmed	7/8/2019	7/12/2019	42'	4
Guest Dock	28	7/8/2019	Parks Central Reservations	Confirmed	7/8/2019	7/9/2019	50'	1
Guest Dock	8	7/8/2019	WEBSITE	Confirmed	7/8/2019	7/9/2019	17'	1
Guest Dock	26	7/8/2019	Parks Central Reservations	Confirmed	7/11/2019	7/21/2019	40'	10
Guest Dock	14	7/8/2019	WEBSITE	Confirmed	7/8/2019	7/9/2019	32'	1
Guest Dock	15	7/8/2019	Moorings	Confirmed	7/8/2019	7/11/2019	38'	3
Guest Dock	13	7/8/2019	Moorings	Confirmed	7/10/2019	7/11/2019	28'	1
Guest Dock	13	7/8/2019	Moorings	Confirmed	7/8/2019	7/10/2019	28'	2
Guest Dock	20	7/8/2019	Moorings	Confirmed	7/8/2019	7/10/2019	25'	2
Guest Dock	4	7/8/2019	Parks Central Reservations	Confirmed	7/8/2019	7/9/2019	26'	1
Guest Dock	9	7/8/2019	WEBSITE	Confirmed	7/9/2019	7/10/2019	31'	1
Guest Dock	20	7/8/2019	Parks Central Reservations	Confirmed	7/10/2019	7/11/2019	30'	1
Guest Dock	19	7/8/2019	Parks Central Reservations	Confirmed	7/8/2019	7/10/2019	30'	2
Guest Dock	5	7/8/2019	WEBSITE	Confirmed	7/12/2019	7/13/2019	42'	1
Guest Dock	19	7/9/2019	WEBSITE	Confirmed	7/11/2019	7/12/2019	46'	1
Guest Dock	14	7/9/2019	WEBSITE	Confirmed	7/9/2019	7/10/2019	32'	1
Guest Dock	4	7/9/2019	WEBSITE	Confirmed	7/9/2019	7/10/2019	22'	1
Guest Dock	20	7/9/2019	Parks Central Reservations	Confirmed	7/20/2019	7/22/2019	45'	2
Guest Dock	8	7/9/2019	WEBSITE	Confirmed	7/10/2019	7/12/2019	31'	2

Marina	Mooring	Date Reservation Made	Made At	Status	Arrival Date	Departure Date	Boat Length	Length of Stay (Nights)
Guest Dock	18	7/9/2019	WEBSITE	Confirmed	7/11/2019	7/12/2019	60'	1
Guest Dock	22	7/9/2019	WEBSITE	Confirmed	7/12/2019	7/13/2019	60'	1
Guest Dock	11	7/9/2019	WEBSITE	Confirmed	7/10/2019	7/13/2019	32'	3
Guest Dock	16	7/9/2019	WEBSITE	Confirmed	7/19/2019	7/21/2019	50'	2
Guest Dock	19	7/9/2019	WEBSITE	Confirmed	7/10/2019	7/11/2019	46'	1
Guest Dock	8	7/9/2019	WEBSITE	Confirmed	7/12/2019	7/13/2019	31'	1
Guest Dock	1	7/9/2019	WEBSITE	Confirmed	7/11/2019	7/12/2019	55'	1
Guest Dock	28	7/10/2019	Parks Central Reservations	Confirmed	7/11/2019	7/12/2019	30'	1
Guest Dock	26	7/10/2019	WEBSITE	Confirmed	7/10/2019	7/11/2019	36'	1
Guest Dock	12	7/10/2019	WEBSITE	Confirmed	7/10/2019	7/11/2019	32'	1
Guest Dock	6	7/10/2019	Moorings	Confirmed	7/10/2019	7/12/2019	27'	2
Guest Dock	7	7/10/2019	Moorings	Confirmed	7/12/2019	7/22/2019	27'	10
Guest Dock	9	7/10/2019	WEBSITE	Confirmed	7/10/2019	7/11/2019	38'	1
Guest Dock	7	7/10/2019	WEBSITE	Confirmed	7/11/2019	7/12/2019	38'	1
Guest Dock	22	7/10/2019	WEBSITE	Confirmed	7/15/2019	7/16/2019	50'	1
Guest Dock	22	7/10/2019	WEBSITE	Confirmed	7/16/2019	7/28/2019	50'	12
Guest Dock	15	7/10/2019	Moorings	Confirmed	7/11/2019	7/12/2019	27'	1
Guest Dock	13	7/10/2019	WEBSITE	Confirmed	7/12/2019	7/14/2019	22'	2
Guest Dock	29	7/11/2019	Parks Central Reservations	Confirmed	7/11/2019	7/13/2019	37'	2
Guest Dock	2	7/11/2019	Parks Central Reservations	Confirmed	7/12/2019	7/15/2019	25'	3
Guest Dock	13	7/11/2019	Parks Central Reservations	Confirmed	7/11/2019	7/12/2019	27'	1
Guest Dock	28	7/11/2019	WEBSITE	Confirmed	7/12/2019	7/20/2019	34'	8
Guest Dock	12	7/11/2019	WEBSITE	Confirmed	7/11/2019	7/12/2019	22'	1
Guest Dock	14	7/11/2019	WEBSITE	Confirmed	7/13/2019	7/15/2019	26'	2
Guest Dock	11	7/11/2019	WEBSITE	Confirmed	7/13/2019	7/15/2019	30'	2
Guest Dock	4	7/11/2019	WEBSITE	Confirmed	7/12/2019	7/15/2019	32'	3
Guest Dock	5	7/11/2019	WEBSITE	Confirmed	7/19/2019	7/20/2019	22'	1
Guest Dock	12	7/11/2019	WEBSITE	Confirmed	7/13/2019	7/14/2019	28'	1
Guest Dock	21	7/12/2019	WEBSITE	Confirmed	7/13/2019	7/14/2019	29'	1
Guest Dock	22	7/12/2019	WEBSITE	Confirmed	7/13/2019	7/14/2019	53'	1
Guest Dock	14	7/13/2019	WEBSITE	Confirmed	7/15/2019	7/16/2019	26'	1
Guest Dock	27	7/13/2019	WEBSITE	Confirmed	7/14/2019	7/18/2019	32'	4
Guest Dock	6	7/13/2019	WEBSITE	Confirmed	7/14/2019	7/17/2019	27'	3
Guest Dock	12	7/13/2019	WEBSITE	Confirmed	7/17/2019	7/18/2019	27'	1
Guest Dock	3	7/13/2019	WEBSITE	Confirmed	7/14/2019	7/15/2019	46'	1
Guest Dock	22	7/13/2019	WEBSITE	Confirmed	7/14/2019	7/15/2019	53'	1
Guest Dock	16	7/13/2019	WEBSITE	Confirmed	7/29/2019	8/10/2019	45'	12
Guest Dock	13	7/13/2019	WEBSITE	Confirmed	7/14/2019	7/15/2019	25'	1
Guest Dock	1	7/13/2019	WEBSITE	Confirmed	7/15/2019	7/16/2019	25'	1
Guest Dock	15	7/14/2019	WEBSITE	Confirmed	7/15/2019	7/16/2019	25'	1
Guest Dock	15	7/14/2019	WEBSITE	Confirmed	7/16/2019	7/19/2019	25'	3
Guest Dock	2	7/14/2019	WEBSITE	Confirmed	7/15/2019	7/16/2019	40'	1
Guest Dock	13	7/14/2019	WEBSITE	Confirmed	7/15/2019	7/19/2019	32'	4
Guest Dock	13	7/14/2019	WEBSITE	Confirmed	7/19/2019	7/20/2019	32'	1
Guest Dock	19	7/14/2019	WEBSITE	Confirmed	7/27/2019	7/28/2019	55'	1
Guest Dock	11	7/14/2019	WEBSITE	Confirmed	7/15/2019	7/17/2019	27'	2
Guest Dock	12	7/15/2019	Parks Central Reservations	Confirmed	7/15/2019	7/16/2019	30'	1
Guest Dock	2	7/15/2019	Parks Central Reservations	Confirmed	7/16/2019	7/18/2019	30'	2
Guest Dock	29	7/15/2019	Moorings	Confirmed	7/15/2019	7/18/2019	26'	3
Guest Dock	9	7/15/2019	WEBSITE	Confirmed	7/18/2019	7/20/2019	22'	2
Guest Dock	18	7/15/2019	Parks Central Reservations	Confirmed	9/6/2019	9/8/2019	45'	2
Guest Dock	5	7/15/2019	Parks Central Reservations	Confirmed	7/16/2019	7/19/2019	38'	3
Guest Dock	21	7/15/2019	Parks Central Reservations	Confirmed	7/19/2019	7/31/2019	38'	12
Guest Dock	1	7/15/2019	Parks Central Reservations	Confirmed	7/16/2019	7/19/2019	30'	3
Guest Dock	12	7/15/2019	WEBSITE	Confirmed	7/18/2019	7/22/2019	46'	4
Guest Dock	6	7/16/2019	WEBSITE	Confirmed	7/17/2019	7/19/2019	38'	2
Guest Dock	16	7/16/2019	WEBSITE	Confirmed	7/18/2019	7/19/2019	38'	1
Guest Dock	15	7/16/2019	WEBSITE	Confirmed	7/19/2019	7/20/2019	38'	1

Marina	Mooring	Date Reservation Made	Made At	Status	Arrival Date	Departure Date	Boat Length	Length of Stay (Nights)
Guest Dock	3	7/16/2019	WEBSITE	Confirmed	7/30/2019	8/2/2019	50'	3
Guest Dock	19	7/16/2019	Moorings	Confirmed	7/21/2019	7/23/2019	60'	2
Guest Dock	9	7/16/2019	WEBSITE	Confirmed	8/20/2019	8/27/2019	24'	7
Guest Dock	10	7/17/2019	WEBSITE	Confirmed	7/19/2019	7/20/2019	26'	1
Guest Dock	6	7/17/2019	Moorings	Confirmed	7/19/2019	7/21/2019	19'	2
Guest Dock	9	7/17/2019	WEBSITE	Confirmed	7/31/2019	8/5/2019	24'	5
Guest Dock	11	7/18/2019	WEBSITE	Confirmed	7/22/2019	7/30/2019	32'	8
Guest Dock	20	7/18/2019	WEBSITE	Confirmed	7/22/2019	7/24/2019	63'	2
Guest Dock	29	7/18/2019	Parks Central Reservations	Confirmed	7/18/2019	7/22/2019	27'	4
Guest Dock	29	7/18/2019	Parks Central Reservations	Confirmed	7/22/2019	7/26/2019	27'	4
Guest Dock	8	7/18/2019	WEBSITE	Confirmed	7/19/2019	7/23/2019	26'	4
Guest Dock	5	7/18/2019	WEBSITE	Confirmed	8/1/2019	8/12/2019	36'	11
Guest Dock	13	7/18/2019	WEBSITE	Confirmed	7/22/2019	7/24/2019	26'	2
Guest Dock	27	7/18/2019	WEBSITE	Confirmed	7/19/2019	7/20/2019	40'	1
Guest Dock	3	7/19/2019	WEBSITE	Confirmed	8/2/2019	8/5/2019	38'	3
Guest Dock	13	7/19/2019	WEBSITE	Confirmed	7/20/2019	7/22/2019	32'	2
Guest Dock	12	7/19/2019	WEBSITE	Confirmed	7/22/2019	7/26/2019	32'	4
Guest Dock	14	7/19/2019	WEBSITE	Confirmed	7/25/2019	7/26/2019	46'	1
Guest Dock	4	7/19/2019	Moorings	Confirmed	7/20/2019	7/22/2019	32'	2
Guest Dock	6	7/19/2019	Moorings	Confirmed	7/21/2019	7/22/2019	23'	1
Guest Dock	14	7/19/2019	WEBSITE	Confirmed	7/20/2019	7/21/2019	26'	1
Guest Dock	6	7/19/2019	WEBSITE	Confirmed	7/22/2019	7/23/2019	27'	1
Guest Dock	27	7/19/2019	WEBSITE	Confirmed	7/22/2019	7/23/2019	33'	1
Guest Dock	4	7/20/2019	WEBSITE	Confirmed	7/26/2019	7/29/2019	30'	3
Guest Dock	10	7/20/2019	WEBSITE	Confirmed	7/22/2019	7/27/2019	32'	5
Guest Dock	15	7/20/2019	WEBSITE	Confirmed	7/20/2019	7/21/2019	43'	1
Guest Dock	9	7/20/2019	WEBSITE	Confirmed	7/22/2019	7/23/2019	30'	1
Guest Dock	14	7/20/2019	WEBSITE	Confirmed	7/21/2019	7/22/2019	45'	1
Guest Dock	18	7/20/2019	WEBSITE	Confirmed	7/22/2019	7/24/2019	38'	2
Guest Dock	18	7/20/2019	WEBSITE	Confirmed	7/24/2019	7/26/2019	38'	2
Guest Dock	26	7/21/2019	WEBSITE	Confirmed	7/22/2019	7/24/2019	31'	2
Guest Dock	26	7/21/2019	WEBSITE	Confirmed	7/24/2019	7/26/2019	31'	2
Guest Dock	12	7/21/2019	WEBSITE	Confirmed	7/29/2019	7/30/2019	33'	1
Guest Dock	16	7/21/2019	WEBSITE	Confirmed	7/26/2019	7/29/2019	22'	3
Guest Dock	5	7/21/2019	WEBSITE	Confirmed	7/21/2019	7/26/2019	19'	5
Guest Dock	5	7/21/2019	WEBSITE	Confirmed	7/26/2019	7/30/2019	19'	4
Guest Dock	7	7/21/2019	WEBSITE	Confirmed	7/26/2019	7/27/2019	36'	1
Guest Dock	28	7/22/2019	Parks Central Reservations	Confirmed	7/22/2019	7/23/2019	25'	1
Guest Dock	10	7/22/2019	WEBSITE	Confirmed	8/4/2019	8/9/2019	22'	5
Guest Dock	7	7/22/2019	Parks Central Reservations	Confirmed	7/23/2019	7/24/2019	30'	1
Guest Dock	4	7/22/2019	Parks Central Reservations	Confirmed	7/22/2019	7/23/2019	30'	1
Guest Dock	14	7/22/2019	Parks Central Reservations	Confirmed	7/22/2019	7/23/2019	26'	1
Guest Dock	14	7/22/2019	Parks Central Reservations	Confirmed	7/23/2019	7/25/2019	26'	2
Guest Dock	4	7/22/2019	Parks Central Reservations	Confirmed	7/25/2019	7/26/2019	32'	1
Guest Dock	7	7/22/2019	Parks Central Reservations	Confirmed	7/22/2019	7/23/2019	32'	1
Guest Dock	4	7/22/2019	Parks Central Reservations	Confirmed	7/23/2019	7/25/2019	32'	2
Guest Dock	7	7/22/2019	WEBSITE	Confirmed	8/4/2019	8/9/2019	25'	5
Guest Dock	9	7/22/2019	Parks Central Reservations	Confirmed	7/29/2019	7/30/2019	30'	1
Guest Dock	18	7/22/2019	Parks Central Reservations	Confirmed	8/2/2019	8/5/2019	23'	3
Guest Dock	20	7/22/2019	WEBSITE	Confirmed	7/26/2019	7/29/2019	48'	3
Guest Dock	13	7/22/2019	WEBSITE	Confirmed	7/24/2019	7/25/2019	26'	1
Guest Dock	8	7/22/2019	WEBSITE	Confirmed	7/23/2019	7/26/2019	38'	3
Guest Dock	7	7/23/2019	WEBSITE	Confirmed	7/31/2019	8/4/2019	36'	4
Guest Dock	13	7/23/2019	WEBSITE	Confirmed	7/25/2019	7/26/2019	26'	1
Guest Dock	15	7/23/2019	WEBSITE	Confirmed	7/24/2019	7/27/2019	35'	3
Guest Dock	15	7/23/2019	WEBSITE	Confirmed	7/27/2019	8/9/2019	35'	13
Guest Dock	20	7/24/2019	WEBSITE	Confirmed	7/24/2019	7/26/2019	63'	2
Guest Dock	14	7/24/2019	WEBSITE	Confirmed	8/5/2019	8/13/2019	30'	8

Marina	Mooring	Date Reservation Made	Made At	Status	Arrival Date	Departure Date	Boat Length	Length of Stay (Nights)
Guest Dock	9	7/24/2019	WEBSITE	Confirmed	7/24/2019	7/25/2019	24'	1
Guest Dock	9	7/25/2019	WEBSITE	Confirmed	7/25/2019	7/27/2019	36'	2
Guest Dock	12	7/25/2019	WEBSITE	Confirmed	7/26/2019	7/27/2019	32'	1
Guest Dock	7	7/25/2019	WEBSITE	Confirmed	7/25/2019	7/26/2019	29'	1
Guest Dock	10	7/25/2019	WEBSITE	Confirmed	7/27/2019	7/28/2019	38'	1
Guest Dock	2	7/25/2019	WEBSITE	Confirmed	8/2/2019	8/5/2019	26'	3
Guest Dock	13	7/26/2019	WEBSITE	Confirmed	7/26/2019	7/28/2019	39'	2
Guest Dock	2	7/26/2019	WEBSITE	Confirmed	7/26/2019	7/31/2019	28'	5
Guest Dock	4	7/26/2019	WEBSITE	Confirmed	7/31/2019	8/4/2019	28'	4
Guest Dock	9	7/27/2019	WEBSITE	Confirmed	7/27/2019	7/29/2019	36'	2
Guest Dock	14	7/27/2019	WEBSITE	Confirmed	8/1/2019	8/2/2019	26'	1
Guest Dock	19	7/27/2019	WEBSITE	Confirmed	7/29/2019	7/30/2019	63'	1
Guest Dock	7	7/28/2019	WEBSITE	Confirmed	8/11/2019	8/15/2019	22'	4
Guest Dock	8	7/28/2019	WEBSITE	Confirmed	8/3/2019	8/4/2019	26'	1
Guest Dock	14	7/28/2019	WEBSITE	Confirmed	7/28/2019	7/30/2019	37'	2
Guest Dock	4	7/28/2019	WEBSITE	Confirmed	8/10/2019	8/11/2019	27'	1
Guest Dock	7	7/28/2019	WEBSITE	Confirmed	7/29/2019	7/30/2019	27'	1
Guest Dock	7	7/28/2019	WEBSITE	Confirmed	8/9/2019	8/11/2019	26'	2
Guest Dock	4	7/28/2019	WEBSITE	Confirmed	7/29/2019	7/31/2019	23'	2
Guest Dock	27	7/28/2019	WEBSITE	Confirmed	7/29/2019	7/30/2019	30'	1
Guest Dock	26	7/28/2019	WEBSITE	Confirmed	7/28/2019	7/29/2019	40'	1
Guest Dock	18	7/28/2019	WEBSITE	Confirmed	7/29/2019	8/2/2019	38'	4
Guest Dock	21	7/29/2019	Parks Central Reservations	Confirmed	7/31/2019	8/1/2019	35'	1
Guest Dock	13	7/29/2019	WEBSITE	Confirmed	7/29/2019	7/30/2019	26'	1
Guest Dock	26	7/29/2019	WEBSITE	Confirmed	7/29/2019	7/31/2019	38'	2
Guest Dock	22	7/29/2019	WEBSITE	Confirmed	8/1/2019	8/2/2019	50'	1
Guest Dock	4	7/29/2019	WEBSITE	Confirmed	8/12/2019	8/15/2019	18'	3
Guest Dock	19	7/29/2019	WEBSITE	Confirmed	7/31/2019	8/1/2019	50'	1
Guest Dock	26	7/29/2019	WEBSITE	Confirmed	8/3/2019	8/5/2019	40'	2
Guest Dock	8	7/29/2019	WEBSITE	Confirmed	7/29/2019	7/31/2019	30'	2
Guest Dock	27	7/29/2019	WEBSITE	Confirmed	7/30/2019	7/31/2019	30'	1
Guest Dock	7	7/30/2019	WEBSITE	Confirmed	7/30/2019	7/31/2019	25'	1
Guest Dock	10	7/30/2019	WEBSITE	Confirmed	7/31/2019	8/1/2019	42'	1
Guest Dock	11	7/30/2019	Parks Central Reservations	Confirmed	7/30/2019	8/2/2019	32'	3
Guest Dock	8	7/30/2019	WEBSITE	Confirmed	7/31/2019	8/1/2019	31'	1
Guest Dock	27	7/30/2019	WEBSITE	Confirmed	7/31/2019	8/2/2019	40'	2
Guest Dock	6	7/30/2019	WEBSITE	Confirmed	8/3/2019	8/4/2019	27'	1
Guest Dock	5	7/30/2019	WEBSITE	Confirmed	7/30/2019	7/31/2019	21'	1
Guest Dock	14	7/31/2019	WEBSITE	Confirmed	8/2/2019	8/5/2019	33'	3
Guest Dock	12	7/31/2019	WEBSITE	Confirmed	7/31/2019	8/2/2019	38'	2
Guest Dock	13	7/31/2019	WEBSITE	Confirmed	7/31/2019	8/1/2019	25'	1
Guest Dock	21	7/31/2019	WEBSITE	Confirmed	8/1/2019	8/2/2019	49'	1
Guest Dock	6	7/31/2019	WEBSITE	Confirmed	7/31/2019	8/2/2019	32'	2
Guest Dock	6	7/31/2019	WEBSITE	Confirmed	8/2/2019	8/3/2019	32'	1
Guest Dock	27	7/31/2019	WEBSITE	Confirmed	8/5/2019	8/8/2019	40'	3
Guest Dock	20	7/31/2019	WEBSITE	Confirmed	8/1/2019	8/2/2019	50'	1
Guest Dock	19	7/31/2019	Parks Central Reservations	Confirmed	8/16/2019	8/22/2019	57'	6
Guest Dock	19	7/31/2019	Parks Central Reservations	Confirmed	8/7/2019	8/16/2019	57'	9
Guest Dock	13	7/31/2019	Moorings	Confirmed	8/1/2019	8/16/2019	46'	15
Guest Dock	5	7/31/2019	Parks Central Reservations	Confirmed	7/31/2019	8/1/2019	30'	1
Guest Dock	2	7/31/2019	WEBSITE	Confirmed	8/1/2019	8/2/2019	21'	1
Guest Dock	10	8/1/2019	WEBSITE	Confirmed	8/1/2019	8/2/2019	25'	1
Guest Dock	11	8/1/2019	WEBSITE	Confirmed	8/9/2019	8/11/2019	30'	2
Guest Dock	9	8/1/2019	WEBSITE	Confirmed	8/10/2019	8/11/2019	25'	1
Guest Dock	6	8/2/2019	WEBSITE	Confirmed	8/15/2019	8/16/2019	10'	1
Guest Dock	21	8/2/2019	Parks Central Reservations	Confirmed	8/8/2019	8/9/2019	50'	1
Guest Dock	22	8/2/2019	Parks Central Reservations	Confirmed	8/5/2019	8/8/2019	50'	3
Guest Dock	11	8/2/2019	WEBSITE	Confirmed	8/2/2019	8/3/2019	26'	1

Marina	Mooring	Date Reservation Made	Made At	Status	Arrival Date	Departure Date	Boat Length	Length of Stay (Nights)
Guest Dock	2	8/2/2019	WEBSITE	Confirmed	8/5/2019	8/8/2019	25'	3
Guest Dock	21	8/3/2019	WEBSITE	Confirmed	8/4/2019	8/8/2019	50'	4
Guest Dock	10	8/3/2019	WEBSITE	Confirmed	8/3/2019	8/4/2019	10'	1
Guest Dock	9	8/3/2019	WEBSITE	Confirmed	8/5/2019	8/6/2019	30'	1
Guest Dock	6	8/3/2019	WEBSITE	Confirmed	8/5/2019	8/6/2019	27'	1
Guest Dock	5	8/4/2019	WEBSITE	Confirmed	10/21/2019	11/4/2019	39'	14
Guest Dock	4	8/4/2019	WEBSITE	Confirmed	8/8/2019	8/9/2019	26'	1
Guest Dock	20	8/4/2019	WEBSITE	Confirmed	10/23/2019	10/30/2019	51'	7
Guest Dock	8	8/4/2019	WEBSITE	Confirmed	8/4/2019	8/5/2019	27'	1
Guest Dock	8	8/4/2019	WEBSITE	Confirmed	8/5/2019	8/6/2019	28'	1
Guest Dock	26	8/4/2019	WEBSITE	Confirmed	8/8/2019	8/10/2019	40'	2
Guest Dock	28	8/4/2019	WEBSITE	Confirmed	8/5/2019	8/9/2019	33'	4
Guest Dock	18	8/4/2019	WEBSITE	Confirmed	10/27/2019	10/30/2019	62'	3
Guest Dock	3	8/4/2019	WEBSITE	Confirmed	10/28/2019	10/30/2019	59'	2
Guest Dock	19	8/4/2019	WEBSITE	Confirmed	10/24/2019	10/30/2019	63'	6
Guest Dock	19	8/4/2019	WEBSITE	Confirmed	8/4/2019	8/5/2019	45'	1
Guest Dock	26	8/5/2019	WEBSITE	Confirmed	8/5/2019	8/7/2019	38'	2
Guest Dock	12	8/5/2019	Parks Central Reservations	Confirmed	8/5/2019	8/8/2019	26'	3
Guest Dock	4	8/5/2019	WEBSITE	Confirmed	10/23/2019	10/30/2019	44'	7
Guest Dock	3	8/5/2019	WEBSITE	Confirmed	8/10/2019	8/18/2019	44'	8
Guest Dock	3	8/5/2019	WEBSITE	Confirmed	8/5/2019	8/6/2019	30'	1
Guest Dock	6	8/5/2019	WEBSITE	Confirmed	8/9/2019	8/11/2019	29'	2
Guest Dock	4	8/5/2019	WEBSITE	Confirmed	8/16/2019	8/19/2019	29'	3
Guest Dock	8	8/5/2019	WEBSITE	Confirmed	8/7/2019	8/12/2019	22'	5
Guest Dock	3	8/6/2019	WEBSITE	Confirmed	8/6/2019	8/7/2019	38'	1
Guest Dock	15	8/6/2019	WEBSITE	Confirmed	8/9/2019	8/10/2019	30'	1
Guest Dock	8	8/6/2019	Parks Central Reservations	Confirmed	8/6/2019	8/7/2019	25'	1
Guest Dock	4	8/6/2019	Parks Central Reservations	Confirmed	8/7/2019	8/8/2019	25'	1
Guest Dock	9	8/6/2019	Parks Central Reservations	Confirmed	8/8/2019	8/10/2019	26'	2
Guest Dock	6	8/6/2019	WEBSITE	Confirmed	8/6/2019	8/9/2019	29'	3
Guest Dock	10	8/6/2019	WEBSITE	Confirmed	8/9/2019	8/12/2019	29'	3
Guest Dock	26	8/6/2019	WEBSITE	Confirmed	8/7/2019	8/8/2019	40'	1
Guest Dock	3	8/7/2019	WEBSITE	Confirmed	8/7/2019	8/8/2019	38'	1
Guest Dock	2	8/7/2019	WEBSITE	Confirmed	8/8/2019	8/11/2019	16'	3
Guest Dock	20	8/7/2019	WEBSITE	Confirmed	8/7/2019	8/9/2019	38'	2
Guest Dock	29	8/7/2019	Parks Central Reservations	Confirmed	8/7/2019	8/9/2019	32'	2
Guest Dock	27	8/7/2019	WEBSITE	Confirmed	8/8/2019	8/9/2019	40'	1
Guest Dock	26	8/8/2019	WEBSITE	Confirmed	8/16/2019	8/18/2019	37'	2
Guest Dock	3	8/8/2019	WEBSITE	Confirmed	8/8/2019	8/9/2019	38'	1
Guest Dock	12	8/8/2019	Moorings	Confirmed	8/8/2019	8/9/2019	26'	1
Guest Dock	2	8/8/2019	Moorings	Confirmed	8/12/2019	8/14/2019	26'	2
Guest Dock	15	8/8/2019	Moorings	Confirmed	8/14/2019	8/16/2019	26'	2
Guest Dock	22	8/8/2019	WEBSITE	Confirmed	8/8/2019	8/10/2019	50'	2
Guest Dock	6	8/8/2019	WEBSITE	Confirmed	8/12/2019	8/13/2019	27'	1
Guest Dock	27	8/8/2019	WEBSITE	Confirmed	8/9/2019	8/11/2019	38'	2
Guest Dock	11	8/8/2019	WEBSITE	Confirmed	8/12/2019	8/13/2019	30'	1
Guest Dock	18	8/8/2019	WEBSITE	Confirmed	8/12/2019	8/13/2019	38'	1
Guest Dock	3	8/8/2019	WEBSITE	Confirmed	8/9/2019	8/10/2019	33'	1
Guest Dock	4	8/9/2019	WEBSITE	Confirmed	8/9/2019	8/10/2019	21'	1
Guest Dock	12	8/9/2019	WEBSITE	Confirmed	8/9/2019	8/10/2019	32'	1
Guest Dock	15	8/9/2019	WEBSITE	Confirmed	8/11/2019	8/13/2019	25'	2
Guest Dock	26	8/9/2019	WEBSITE	Confirmed	8/10/2019	8/13/2019	30'	3
Guest Dock	10	8/9/2019	WEBSITE	Confirmed	8/12/2019	8/13/2019	30'	1
Guest Dock	2	8/9/2019	WEBSITE	Confirmed	8/14/2019	8/18/2019	26'	4
Guest Dock	16	8/9/2019	WEBSITE	Confirmed	8/10/2019	8/12/2019	33'	2
Guest Dock	20	8/9/2019	WEBSITE	Confirmed	8/9/2019	8/11/2019	45'	2
Guest Dock	27	8/9/2019	WEBSITE	Confirmed	8/12/2019	8/15/2019	40'	3
Guest Dock	26	8/10/2019	WEBSITE	Confirmed	8/23/2019	8/25/2019	33'	2

Marina	Mooring	Date Reservation Made	Made At	Status	Arrival Date	Departure Date	Boat Length	Length of Stay (Nights)
Guest Dock	28	8/10/2019	WEBSITE	Confirmed	8/11/2019	8/13/2019	33'	2
Guest Dock	8	8/10/2019	WEBSITE	Confirmed	8/12/2019	8/13/2019	26'	1
Guest Dock	2	8/10/2019	WEBSITE	Confirmed	8/11/2019	8/12/2019	19'	1
Guest Dock	12	8/10/2019	WEBSITE	Confirmed	10/14/2019	10/27/2019	50'	13
Guest Dock	26	8/11/2019	WEBSITE	Confirmed	8/13/2019	8/14/2019	30'	1
Guest Dock	19	8/11/2019	WEBSITE	Confirmed	8/25/2019	8/31/2019	45'	6
Guest Dock	15	8/11/2019	WEBSITE	Confirmed	8/13/2019	8/14/2019	25'	1
Guest Dock	5	8/11/2019	WEBSITE	Confirmed	8/21/2019	8/22/2019	38'	1
Guest Dock	5	8/11/2019	WEBSITE	Confirmed	8/25/2019	8/26/2019	38'	1
Guest Dock	11	8/11/2019	WEBSITE	Confirmed	8/13/2019	8/16/2019	30'	3
Guest Dock	4	8/11/2019	WEBSITE	Confirmed	8/20/2019	8/21/2019	24'	1
Guest Dock	21	8/11/2019	WEBSITE	Confirmed	8/12/2019	8/13/2019	47'	1
Guest Dock	9	8/11/2019	WEBSITE	Confirmed	8/12/2019	8/13/2019	32'	1
Guest Dock	22	8/12/2019	WEBSITE	Confirmed	8/12/2019	8/13/2019	32'	1
Guest Dock	1	8/12/2019	WEBSITE	Confirmed	8/14/2019	8/16/2019	32'	2
Guest Dock	20	8/12/2019	WEBSITE	Confirmed	8/12/2019	8/13/2019	50'	1
Guest Dock	12	8/12/2019	Moorings	Confirmed	8/21/2019	8/22/2019	46'	1
Guest Dock	6	8/12/2019	Moorings	Confirmed	8/13/2019	8/15/2019	30'	2
Guest Dock	4	8/12/2019	Moorings	Confirmed	8/25/2019	8/28/2019	22'	3
Guest Dock	3	8/12/2019	WEBSITE	Confirmed	8/23/2019	8/25/2019	29'	2
Guest Dock	21	8/12/2019	WEBSITE	Confirmed	8/13/2019	8/14/2019	47'	1
Guest Dock	11	8/13/2019	WEBSITE	Confirmed	8/20/2019	8/23/2019	21'	3
Guest Dock	8	8/13/2019	WEBSITE	Confirmed	8/13/2019	8/14/2019	26'	1
Guest Dock	28	8/13/2019	WEBSITE	Confirmed	8/13/2019	8/14/2019	32'	1
Guest Dock	18	8/13/2019	WEBSITE	Confirmed	8/13/2019	8/14/2019	38'	1
Guest Dock	22	8/13/2019	WEBSITE	Confirmed	8/14/2019	8/15/2019	38'	1
Guest Dock	9	8/13/2019	Moorings	Confirmed	8/13/2019	8/16/2019	38'	3
Guest Dock	29	8/13/2019	Moorings	Confirmed	8/12/2019	8/16/2019	27'	4
Guest Dock	26	8/13/2019	WEBSITE	Confirmed	8/14/2019	8/15/2019	30'	1
Guest Dock	27	8/13/2019	WEBSITE	Confirmed	8/15/2019	8/16/2019	40'	1
Guest Dock	28	8/13/2019	WEBSITE	Confirmed	8/14/2019	8/17/2019	33'	3
Guest Dock	28	8/13/2019	WEBSITE	Confirmed	8/17/2019	8/19/2019	33'	2
Guest Dock	5	8/13/2019	WEBSITE	Confirmed	8/16/2019	8/17/2019	21'	1
Guest Dock	10	8/14/2019	Parks Central Reservations	Confirmed	8/13/2019	8/15/2019	28'	2
Guest Dock	20	8/14/2019	Parks Central Reservations	Confirmed	8/14/2019	8/16/2019	31'	2
Guest Dock	18	8/14/2019	Moorings	Confirmed	8/14/2019	8/16/2019	24'	2
Guest Dock	21	8/14/2019	Parks Central Reservations	Confirmed	8/14/2019	8/16/2019	50'	2
Guest Dock	7	8/14/2019	Parks Central Reservations	Confirmed	8/15/2019	8/16/2019	26'	1
Guest Dock	8	8/14/2019	WEBSITE	Confirmed	8/14/2019	8/15/2019	27'	1
Guest Dock	10	8/14/2019	WEBSITE	Confirmed	8/15/2019	8/19/2019	30'	4
Guest Dock	6	8/14/2019	WEBSITE	Confirmed	8/19/2019	8/21/2019	25'	2
Guest Dock	4	8/14/2019	WEBSITE	Confirmed	8/15/2019	8/16/2019	22'	1
Guest Dock	16	8/15/2019	WEBSITE	Confirmed	8/24/2019	8/25/2019	40'	1
Guest Dock	14	8/15/2019	WEBSITE	Confirmed	8/24/2019	8/27/2019	37'	3
Guest Dock	21	8/15/2019	WEBSITE	Confirmed	8/18/2019	8/19/2019	46'	1
Guest Dock	11	8/15/2019	WEBSITE	Confirmed	8/19/2019	8/20/2019	30'	1
Guest Dock	15	8/15/2019	Parks Central Reservations	Confirmed	8/19/2019	8/23/2019	26'	4
Guest Dock	7	8/15/2019	Parks Central Reservations	Confirmed	8/19/2019	8/21/2019	30'	2
Guest Dock	6	8/15/2019	Parks Central Reservations	Confirmed	8/21/2019	8/23/2019	30'	2
Guest Dock	14	8/15/2019	WEBSITE	Confirmed	8/18/2019	8/24/2019	34'	6
Guest Dock	21	8/16/2019	WEBSITE	Confirmed	8/30/2019	9/2/2019	45'	3
Guest Dock	22	8/16/2019	WEBSITE	Confirmed	8/16/2019	8/19/2019	62'	3
Guest Dock	22	8/16/2019	WEBSITE	Confirmed	8/19/2019	8/20/2019	62'	1
Guest Dock	12	8/16/2019	WEBSITE	Confirmed	8/19/2019	8/21/2019	40'	2
Guest Dock	7	8/17/2019	WEBSITE	Confirmed	8/22/2019	8/24/2019	25'	2
Guest Dock	11	8/17/2019	WEBSITE	Confirmed	8/23/2019	8/24/2019	32'	1
Guest Dock	3	8/17/2019	WEBSITE	Confirmed	8/18/2019	8/23/2019	27'	5
Guest Dock	26	8/17/2019	WEBSITE	Confirmed	8/18/2019	8/20/2019	40'	2

Marina	Mooring	Date Reservation Made	Made At	Status	Arrival Date	Departure Date	Boat Length	Length of Stay (Nights)
Guest Dock	5	8/17/2019	WEBSITE	Confirmed	8/19/2019	8/20/2019	27'	1
Guest Dock	11	8/17/2019	WEBSITE	Confirmed	8/17/2019	8/18/2019	26'	1
Guest Dock	13	8/17/2019	WEBSITE	Confirmed	8/18/2019	8/20/2019	27'	2
Guest Dock	5	8/17/2019	WEBSITE	Confirmed	8/17/2019	8/18/2019	35'	1
Guest Dock	18	8/17/2019	WEBSITE	Confirmed	8/18/2019	8/19/2019	50'	1
Guest Dock	27	8/18/2019	WEBSITE	Confirmed	8/18/2019	8/19/2019	30'	1
Guest Dock	2	8/18/2019	WEBSITE	Confirmed	8/18/2019	8/26/2019	28'	8
Guest Dock	8	8/18/2019	WEBSITE	Confirmed	8/20/2019	8/24/2019	26'	4
Guest Dock	28	8/18/2019	WEBSITE	Confirmed	8/19/2019	8/22/2019	32'	3
Guest Dock	21	8/18/2019	WEBSITE	Confirmed	8/19/2019	8/20/2019	50'	1
Guest Dock	18	8/18/2019	WEBSITE	Confirmed	8/27/2019	9/1/2019	65'	5
Guest Dock	8	8/18/2019	WEBSITE	Confirmed	8/30/2019	9/2/2019	26'	3
Guest Dock	1	8/18/2019	WEBSITE	Confirmed	8/19/2019	8/23/2019	32'	4
Guest Dock	29	8/19/2019	Parks Central Reservations	Confirmed	8/19/2019	8/23/2019	32'	4
Guest Dock	8	8/19/2019	WEBSITE	Confirmed	8/19/2019	8/20/2019	28'	1
Guest Dock	5	8/19/2019	WEBSITE	Confirmed	8/20/2019	8/21/2019	55'	1
Guest Dock	9	8/19/2019	Parks Central Reservations	Confirmed	8/19/2019	8/20/2019	30'	1
Guest Dock	22	8/19/2019	Parks Central Reservations	Confirmed	8/20/2019	8/21/2019	30'	1
Guest Dock	19	8/19/2019	WEBSITE	Confirmed	8/31/2019	9/3/2019	50'	3
Guest Dock	12	8/19/2019	WEBSITE	Confirmed	8/31/2019	9/1/2019	40'	1
Guest Dock	10	8/19/2019	WEBSITE	Confirmed	8/30/2019	9/5/2019	23'	6
Guest Dock	13	8/19/2019	WEBSITE	Confirmed	8/20/2019	9/4/2019	30'	15
Guest Dock	26	8/19/2019	Parks Central Reservations	Confirmed	8/20/2019	8/21/2019	30'	1
Guest Dock	10	8/20/2019	WEBSITE	Confirmed	8/23/2019	8/24/2019	19'	1
Guest Dock	26	8/20/2019	Moorings	Confirmed	8/21/2019	8/23/2019	38'	2
Guest Dock	18	8/20/2019	WEBSITE	Confirmed	8/21/2019	8/22/2019	50'	1
Guest Dock	6	8/20/2019	WEBSITE	Confirmed	8/25/2019	9/9/2019	27'	15
Guest Dock	2	8/20/2019	Parks Central Reservations	Confirmed	10/14/2019	10/28/2019	56'	14
Guest Dock	4	8/20/2019	WEBSITE	Confirmed	8/21/2019	8/22/2019	55'	1
Guest Dock	22	8/21/2019	Parks Central Reservations	Confirmed	10/29/2019	11/3/2019	55'	5
Guest Dock	7	8/21/2019	Parks Central Reservations	Confirmed	8/21/2019	8/22/2019	33'	1
Guest Dock	5	8/21/2019	Parks Central Reservations	Confirmed	8/22/2019	8/23/2019	33'	1
Guest Dock	7	8/21/2019	Parks Central Reservations	Confirmed	8/25/2019	8/29/2019	19'	4
Guest Dock	20	8/21/2019	WEBSITE	Confirmed	8/30/2019	9/1/2019	45'	2
Guest Dock	16	8/22/2019	WEBSITE	Confirmed	8/23/2019	8/24/2019	40'	1
Guest Dock	10	8/22/2019	WEBSITE	Confirmed	8/28/2019	8/29/2019	20'	1
Guest Dock	4	8/22/2019	WEBSITE	Confirmed	8/23/2019	8/25/2019	27'	2
Guest Dock	8	8/22/2019	WEBSITE	Confirmed	8/25/2019	8/26/2019	27'	1
Guest Dock	27	8/22/2019	WEBSITE	Confirmed	8/23/2019	8/26/2019	33'	3
Guest Dock	18	8/22/2019	WEBSITE	Confirmed	8/24/2019	8/25/2019	46'	1
Guest Dock	5	8/22/2019	WEBSITE	Confirmed	8/24/2019	8/25/2019	25'	1
Guest Dock	12	8/22/2019	Parks Central Reservations	Confirmed	8/22/2019	8/25/2019	32'	3
Guest Dock	18	8/22/2019	Parks Central Reservations	Confirmed	8/22/2019	8/23/2019	23'	1
Guest Dock	4	8/22/2019	WEBSITE	Confirmed	8/22/2019	8/23/2019	22'	1
Guest Dock	28	8/22/2019	WEBSITE	Confirmed	8/23/2019	8/24/2019	37'	1
Guest Dock	15	8/23/2019	WEBSITE	Confirmed	8/24/2019	8/27/2019	34'	3
Guest Dock	11	8/23/2019	WEBSITE	Confirmed	8/24/2019	8/25/2019	23'	1
Guest Dock	21	8/23/2019	WEBSITE	Confirmed	8/26/2019	8/30/2019	63'	4
Guest Dock	8	8/23/2019	WEBSITE	Confirmed	8/27/2019	8/29/2019	22'	2
Guest Dock	2	8/23/2019	WEBSITE	Confirmed	8/26/2019	8/27/2019	28'	1
Guest Dock	20	8/23/2019	WEBSITE	Confirmed	8/23/2019	8/25/2019	48'	2
Guest Dock	2	8/23/2019	WEBSITE	Confirmed	8/29/2019	9/2/2019	26'	4
Guest Dock	18	8/23/2019	WEBSITE	Confirmed	8/26/2019	8/27/2019	30'	1
Guest Dock	22	8/23/2019	WEBSITE	Confirmed	8/24/2019	8/25/2019	50'	1
Guest Dock	20	8/23/2019	WEBSITE	Confirmed	9/1/2019	9/2/2019	45'	1
Guest Dock	20	8/23/2019	WEBSITE	Confirmed	9/3/2019	9/4/2019	46'	1
Guest Dock	22	8/23/2019	WEBSITE	Confirmed	9/1/2019	9/3/2019	46'	2
Guest Dock	10	8/23/2019	WEBSITE	Confirmed	8/24/2019	8/25/2019	22'	1

Marina	Mooring	Date Reservation Made	Made At	Status	Arrival Date	Departure Date	Boat Length	Length of Stay (Nights)
Guest Dock	18	8/24/2019	WEBSITE	Confirmed	9/1/2019	9/4/2019	65'	3
Guest Dock	8	8/24/2019	WEBSITE	Confirmed	8/24/2019	8/25/2019	38'	1
Guest Dock	26	8/24/2019	WEBSITE	Confirmed	8/26/2019	8/30/2019	33'	4
Guest Dock	21	8/24/2019	WEBSITE	Confirmed	8/24/2019	8/25/2019	46'	1
Guest Dock	4	8/24/2019	WEBSITE	Confirmed	8/28/2019	8/30/2019	40'	2
Guest Dock	11	8/25/2019	WEBSITE	Confirmed	8/25/2019	8/26/2019	28'	1
Guest Dock	20	8/25/2019	WEBSITE	Confirmed	8/26/2019	8/29/2019	50'	3
Guest Dock	4	8/25/2019	WEBSITE	Confirmed	8/30/2019	9/2/2019	16'	3
Guest Dock	10	8/25/2019	WEBSITE	Confirmed	8/26/2019	8/27/2019	27'	1
Guest Dock	5	8/25/2019	WEBSITE	Confirmed	8/30/2019	9/2/2019	19'	3
Guest Dock	10	8/25/2019	WEBSITE	Confirmed	8/25/2019	8/26/2019	41'	1
Guest Dock	11	8/25/2019	WEBSITE	Confirmed	8/31/2019	9/2/2019	23'	2
Guest Dock	15	8/25/2019	WEBSITE	Confirmed	8/29/2019	9/1/2019	26'	3
Guest Dock	11	8/25/2019	WEBSITE	Confirmed	8/30/2019	8/31/2019	23'	1
Guest Dock	2	8/26/2019	Parks Central Reservations	Confirmed	11/1/2019	11/4/2019	45'	3
Guest Dock	11	8/26/2019	Moorings	Confirmed	8/26/2019	8/29/2019	26'	3
Guest Dock	14	8/26/2019	WEBSITE	Confirmed	8/27/2019	8/31/2019	34'	4
Guest Dock	3	8/26/2019	Parks Central Reservations	Confirmed	8/26/2019	8/31/2019	54'	5
Guest Dock	3	8/26/2019	Parks Central Reservations	Confirmed	8/25/2019	8/26/2019	54'	1
Guest Dock	3	8/26/2019	Parks Central Reservations	Confirmed	9/1/2019	9/5/2019	54'	4
Guest Dock	3	8/26/2019	Parks Central Reservations	Confirmed	8/31/2019	9/1/2019	54'	1
Guest Dock	29	8/26/2019	Parks Central Reservations	Confirmed	9/9/2019	9/12/2019	27'	3
Guest Dock	29	8/26/2019	Parks Central Reservations	Confirmed	8/26/2019	8/30/2019	27'	4
Guest Dock	29	8/26/2019	Parks Central Reservations	Confirmed	9/2/2019	9/6/2019	27'	4
Guest Dock	28	8/26/2019	Parks Central Reservations	Confirmed	8/26/2019	8/30/2019	36'	4
Guest Dock	20	8/26/2019	WEBSITE	Confirmed	8/29/2019	8/30/2019	47'	1
Guest Dock	5	8/26/2019	Parks Central Reservations	Confirmed	8/26/2019	8/28/2019	37'	2
Guest Dock	26	8/26/2019	WEBSITE	Confirmed	8/30/2019	9/2/2019	35'	3
Guest Dock	9	8/26/2019	Parks Central Reservations	Confirmed	8/27/2019	8/29/2019	33'	2
Guest Dock	8	8/26/2019	Parks Central Reservations	Confirmed	8/29/2019	8/30/2019	33'	1
Guest Dock	28	8/26/2019	WEBSITE	Confirmed	8/30/2019	9/1/2019	33'	2
Guest Dock	12	8/26/2019	WEBSITE	Confirmed	9/1/2019	9/2/2019	14'	1
Guest Dock	21	8/27/2019	WEBSITE	Confirmed	10/24/2019	10/28/2019	53'	4
Guest Dock	2	8/27/2019	WEBSITE	Confirmed	8/27/2019	8/29/2019	25'	2
Guest Dock	5	8/28/2019	Moorings	Confirmed	8/28/2019	8/29/2019	37'	1
Guest Dock	5	8/28/2019	WEBSITE	Confirmed	9/3/2019	9/6/2019	30'	3
Guest Dock	11	8/28/2019	WEBSITE	Confirmed	8/29/2019	8/30/2019	44'	1
Guest Dock	27	8/28/2019	WEBSITE	Confirmed	9/1/2019	9/3/2019	32'	2
Guest Dock	9	8/28/2019	WEBSITE	Confirmed	9/1/2019	9/8/2019	40'	7
Guest Dock	10	8/29/2019	WEBSITE	Confirmed	8/29/2019	8/30/2019	37'	1
Guest Dock	8	8/29/2019	Parks Central Reservations	Confirmed	9/2/2019	9/3/2019	33'	1
Guest Dock	8	8/29/2019	Parks Central Reservations	Confirmed	9/3/2019	9/12/2019	33'	9
Guest Dock	12	8/29/2019	Parks Central Reservations	Confirmed	9/3/2019	9/5/2019	26'	2
Guest Dock	12	8/29/2019	Parks Central Reservations	Confirmed	9/5/2019	9/6/2019	26'	1
Guest Dock	22	8/29/2019	Parks Central Reservations	Confirmed	8/30/2019	8/31/2019	50'	1
Guest Dock	15	8/29/2019	WEBSITE	Confirmed	9/1/2019	9/4/2019	37'	3
Guest Dock	27	8/29/2019	WEBSITE	Confirmed	9/3/2019	9/4/2019	32'	1
Guest Dock	12	8/30/2019	WEBSITE	Confirmed	8/30/2019	8/31/2019	18'	1
Guest Dock	20	8/30/2019	Parks Central Reservations	Confirmed	10/7/2019	10/11/2019	50'	4
Guest Dock	7	8/30/2019	WEBSITE	Confirmed	9/3/2019	9/4/2019	27'	1
Guest Dock	2	8/30/2019	WEBSITE	Confirmed	9/2/2019	9/5/2019	29'	3
Guest Dock	7	8/31/2019	WEBSITE	Confirmed	9/4/2019	9/6/2019	27'	2
Guest Dock	10	9/1/2019	WEBSITE	Confirmed	9/16/2019	9/17/2019	32'	1
Guest Dock	11	9/1/2019	WEBSITE	Confirmed	9/3/2019	9/4/2019	32'	1
Guest Dock	4	9/1/2019	WEBSITE	Confirmed	9/2/2019	9/4/2019	26'	2
Guest Dock	21	9/1/2019	WEBSITE	Confirmed	9/2/2019	9/3/2019	63'	1
Guest Dock	26	9/2/2019	WEBSITE	Confirmed	9/3/2019	9/6/2019	33'	3
Guest Dock	11	9/2/2019	WEBSITE	Confirmed	9/2/2019	9/3/2019	14'	1

Marina	Mooring	Date Reservation Made	Made At	Status	Arrival Date	Departure Date	Boat Length	Length of Stay (Nights)
Guest Dock	19	9/2/2019	WEBSITE	Confirmed	9/3/2019	9/6/2019	50'	3
Guest Dock	6	9/2/2019	WEBSITE	Confirmed	9/11/2019	9/15/2019	26'	4
Guest Dock	22	9/2/2019	WEBSITE	Confirmed	9/3/2019	9/4/2019	40'	1
Guest Dock	21	9/2/2019	WEBSITE	Confirmed	9/3/2019	9/6/2019	38'	3
Guest Dock	11	9/2/2019	WEBSITE	Confirmed	9/4/2019	9/6/2019	32'	2
Guest Dock	28	9/3/2019	Parks Central Reservations	Confirmed	9/3/2019	9/4/2019	26'	1
Guest Dock	16	9/3/2019	Parks Central Reservations	Confirmed	9/4/2019	9/6/2019	26'	2
Guest Dock	6	9/3/2019	WEBSITE	Confirmed	9/17/2019	9/18/2019	10'	1
Guest Dock	1	9/3/2019	Parks Central Reservations	Confirmed	9/3/2019	9/4/2019	32'	1
Guest Dock	4	9/3/2019	WEBSITE	Confirmed	9/4/2019	9/7/2019	21'	3
Guest Dock	18	9/3/2019	WEBSITE	Confirmed	9/8/2019	9/10/2019	61'	2
Guest Dock	8	9/4/2019	WEBSITE	Confirmed	9/14/2019	9/15/2019	26'	1
Guest Dock	22	9/4/2019	WEBSITE	Confirmed	9/5/2019	9/6/2019	46'	1
Guest Dock	22	9/4/2019	WEBSITE	Confirmed	9/4/2019	9/5/2019	46'	1
Guest Dock	15	9/4/2019	WEBSITE	Confirmed	9/4/2019	9/5/2019	37'	1
Guest Dock	18	9/4/2019	WEBSITE	Confirmed	9/10/2019	9/11/2019	47'	1
Guest Dock	3	9/4/2019	Parks Central Reservations	Confirmed	9/5/2019	9/8/2019	18'	3
Guest Dock	12	9/4/2019	Parks Central Reservations	Confirmed	9/9/2019	9/12/2019	26'	3
Guest Dock	3	9/4/2019	WEBSITE	Confirmed	9/12/2019	9/14/2019	27'	2
Guest Dock	15	9/5/2019	WEBSITE	Confirmed	9/5/2019	9/6/2019	37'	1
Guest Dock	21	9/5/2019	Parks Central Reservations	Confirmed	10/28/2019	10/30/2019	55'	2
Guest Dock	16	9/5/2019	WEBSITE	Confirmed	9/6/2019	9/8/2019	25'	2
Guest Dock	15	9/5/2019	WEBSITE	Confirmed	9/7/2019	9/11/2019	22'	4
Guest Dock	26	9/6/2019	WEBSITE	Confirmed	9/6/2019	9/8/2019	40'	2
Guest Dock	27	9/6/2019	WEBSITE	Confirmed	9/6/2019	9/13/2019	40'	7
Guest Dock	27	9/6/2019	WEBSITE	Confirmed	9/13/2019	9/21/2019	40'	8
Guest Dock	5	9/6/2019	WEBSITE	Confirmed	9/6/2019	9/9/2019	23'	3
Guest Dock	7	9/6/2019	WEBSITE	Confirmed	9/6/2019	9/8/2019	27'	2
Guest Dock	14	9/6/2019	WEBSITE	Confirmed	9/9/2019	9/13/2019	27'	4
Guest Dock	11	9/6/2019	WEBSITE	Confirmed	9/6/2019	9/10/2019	25'	4
Guest Dock	11	9/6/2019	WEBSITE	Confirmed	9/10/2019	9/18/2019	25'	8
Guest Dock	11	9/6/2019	WEBSITE	Confirmed	9/18/2019	9/20/2019	25'	2
Guest Dock	26	9/7/2019	WEBSITE	Confirmed	9/8/2019	9/9/2019	40'	1
Guest Dock	4	9/7/2019	WEBSITE	Confirmed	9/7/2019	9/8/2019	14'	1
Guest Dock	12	9/7/2019	WEBSITE	Confirmed	9/7/2019	9/8/2019	36'	1
Guest Dock	4	9/7/2019	WEBSITE	Confirmed	9/9/2019	9/10/2019	30'	1
Guest Dock	3	9/7/2019	WEBSITE	Confirmed	9/9/2019	9/11/2019	38'	2
Guest Dock	3	9/7/2019	WEBSITE	Confirmed	9/11/2019	9/12/2019	38'	1
Guest Dock	20	9/7/2019	WEBSITE	Confirmed	9/12/2019	9/13/2019	38'	1
Guest Dock	5	9/7/2019	WEBSITE	Confirmed	9/9/2019	9/11/2019	31'	2
Guest Dock	3	9/8/2019	WEBSITE	Confirmed	9/8/2019	9/9/2019	47'	1
Guest Dock	4	9/8/2019	WEBSITE	Confirmed	9/8/2019	9/9/2019	27'	1
Guest Dock	22	9/8/2019	WEBSITE	Confirmed	9/9/2019	9/10/2019	50'	1
Guest Dock	16	9/8/2019	WEBSITE	Confirmed	9/8/2019	9/15/2019	40'	7
Guest Dock	6	9/8/2019	WEBSITE	Confirmed	9/9/2019	9/11/2019	27'	2
Guest Dock	4	9/8/2019	WEBSITE	Confirmed	9/10/2019	9/11/2019	30'	1
Guest Dock	26	9/8/2019	WEBSITE	Confirmed	9/9/2019	9/13/2019	34'	4
Guest Dock	2	9/8/2019	WEBSITE	Confirmed	9/10/2019	9/13/2019	30'	3
Guest Dock	18	9/8/2019	WEBSITE	Confirmed	9/22/2019	10/2/2019	63'	10
Guest Dock	2	9/8/2019	WEBSITE	Confirmed	9/9/2019	9/10/2019	26'	1
Guest Dock	28	9/8/2019	WEBSITE	Confirmed	9/9/2019	9/12/2019	32'	3
Guest Dock	22	9/8/2019	WEBSITE	Confirmed	9/12/2019	9/13/2019	32'	1
Guest Dock	19	9/9/2019	Parks Central Reservations	Confirmed	9/10/2019	9/12/2019	30'	2
Guest Dock	7	9/9/2019	Moorings	Confirmed	9/9/2019	9/12/2019	30'	3
Guest Dock	7	9/9/2019	Moorings	Confirmed	9/8/2019	9/9/2019	30'	1
Guest Dock	20	9/9/2019	Parks Central Reservations	Confirmed	9/9/2019	9/10/2019	26'	1
Guest Dock	19	9/9/2019	Parks Central Reservations	Confirmed	9/12/2019	9/14/2019	45'	2
Guest Dock	4	9/10/2019	Parks Central Reservations	Confirmed	9/12/2019	9/13/2019	26'	1

Marina	Mooring	Date Reservation Made	Made At	Status	Arrival Date	Departure Date	Boat Length	Length of Stay (Nights)
Guest Dock	13	9/10/2019	WEBSITE	Confirmed	9/11/2019	9/13/2019	36'	2
Guest Dock	22	9/10/2019	WEBSITE	Confirmed	9/16/2019	9/19/2019	63'	3
Guest Dock	13	9/10/2019	WEBSITE	Confirmed	9/10/2019	9/11/2019	30'	1
Guest Dock	15	9/11/2019	WEBSITE	Confirmed	9/11/2019	9/14/2019	30'	3
Guest Dock	4	9/11/2019	WEBSITE	Confirmed	9/13/2019	9/23/2019	38'	10
Guest Dock	15	9/11/2019	WEBSITE	Confirmed	10/26/2019	11/10/2019	48'	15
Guest Dock	16	9/11/2019	WEBSITE	Confirmed	10/28/2019	11/11/2019	50'	14
Guest Dock	9	9/11/2019	Parks Central Reservations	Confirmed	9/11/2019	9/12/2019	23'	1
Guest Dock	7	9/11/2019	Parks Central Reservations	Confirmed	9/12/2019	9/14/2019	23'	2
Guest Dock	18	9/11/2019	WEBSITE	Confirmed	9/14/2019	9/17/2019	45'	3
Guest Dock	5	9/12/2019	WEBSITE	Confirmed	9/15/2019	9/17/2019	26'	2
Guest Dock	3	9/12/2019	WEBSITE	Confirmed	9/14/2019	9/16/2019	47'	2
Guest Dock	7	9/12/2019	WEBSITE	Confirmed	9/14/2019	9/17/2019		3
Guest Dock	7	9/12/2019	WEBSITE	Confirmed	9/17/2019	9/20/2019	27'	3
Guest Dock	21	9/13/2019	Parks Central Reservations	Confirmed	9/13/2019	9/14/2019	40'	1
Guest Dock	12	9/13/2019	WEBSITE	Confirmed	9/13/2019	9/14/2019	47'	1
Guest Dock	13	9/13/2019	Parks Central Reservations	Confirmed	10/24/2019	11/4/2019	44'	11
Guest Dock	10	9/13/2019	WEBSITE	Confirmed	9/13/2019	9/15/2019	28'	2
Guest Dock	9	9/13/2019	WEBSITE	Confirmed	9/13/2019	9/16/2019	31'	3
Guest Dock	3	9/13/2019	WEBSITE	Confirmed	9/23/2019	9/24/2019	47'	1
Guest Dock	3	9/13/2019	WEBSITE	Confirmed	9/16/2019	9/17/2019	47'	1
Guest Dock	12	9/13/2019	WEBSITE	Confirmed	9/14/2019	9/16/2019	29'	2
Guest Dock	15	9/14/2019	WEBSITE	Confirmed	9/14/2019	9/16/2019	30'	2
Guest Dock	19	9/14/2019	WEBSITE	Confirmed	9/14/2019	9/15/2019	51'	1
Guest Dock	26	9/14/2019	WEBSITE	Confirmed	9/14/2019	9/16/2019	40'	2
Guest Dock	2	9/14/2019	WEBSITE	Confirmed	9/29/2019	10/2/2019	21'	3
Guest Dock	3	9/14/2019	WEBSITE	Confirmed	9/24/2019	9/25/2019	47'	1
Guest Dock	8	9/15/2019	WEBSITE	Confirmed	9/15/2019	9/25/2019	24'	10
Guest Dock	16	9/15/2019	WEBSITE	Confirmed	9/16/2019	9/19/2019	26'	3
Guest Dock	8	9/15/2019	WEBSITE	Confirmed	9/27/2019	9/29/2019	22'	2
Guest Dock	28	9/15/2019	WEBSITE	Confirmed	9/16/2019	9/17/2019	33'	1
Guest Dock	4	9/15/2019	WEBSITE	Confirmed	9/28/2019	10/1/2019	17'	3
Guest Dock	15	9/15/2019	WEBSITE	Confirmed	9/16/2019	9/17/2019	30'	1
Guest Dock	12	9/15/2019	WEBSITE	Confirmed	9/16/2019	9/17/2019	29'	1
Guest Dock	20	9/16/2019	WEBSITE	Confirmed	9/16/2019	9/21/2019	47'	5
Guest Dock	19	9/16/2019	WEBSITE	Confirmed	9/16/2019	9/20/2019	38'	4
Guest Dock	2	9/16/2019	Parks Central Reservations	Confirmed	9/16/2019	9/18/2019	26'	2
Guest Dock	2	9/16/2019	Parks Central Reservations	Confirmed	9/18/2019	9/20/2019	26'	2
Guest Dock	2	9/16/2019	WEBSITE	Confirmed	9/24/2019	9/25/2019	35'	1
Guest Dock	12	9/16/2019	Parks Central Reservations	Confirmed	9/17/2019	9/18/2019	33'	1
Guest Dock	12	9/16/2019	Parks Central Reservations	Confirmed	9/20/2019	9/25/2019	33'	5
Guest Dock	6	9/16/2019	Parks Central Reservations	Confirmed	9/16/2019	9/17/2019	33'	1
Guest Dock	12	9/16/2019	Parks Central Reservations	Confirmed	9/18/2019	9/20/2019	33'	2
Guest Dock	6	9/16/2019	Parks Central Reservations	Confirmed	9/18/2019	9/22/2019	35'	4
Guest Dock	14	9/16/2019	WEBSITE	Confirmed	9/18/2019	9/19/2019	36'	1
Guest Dock	14	9/16/2019	WEBSITE	Confirmed	9/16/2019	9/18/2019	36'	2
Guest Dock	14	9/16/2019	WEBSITE	Confirmed	9/19/2019	9/20/2019	36'	1
Guest Dock	21	9/16/2019	Parks Central Reservations	Confirmed	9/16/2019	9/20/2019	38'	4
Guest Dock	9	9/16/2019	Parks Central Reservations	Confirmed	9/16/2019	9/18/2019	26'	2
Guest Dock	13	9/16/2019	WEBSITE	Confirmed	9/16/2019	9/17/2019	27'	1
Guest Dock	3	9/16/2019	WEBSITE	Confirmed	9/28/2019	10/5/2019	19'	7
Guest Dock	26	9/16/2019	Parks Central Reservations	Confirmed	9/16/2019	9/20/2019	25'	4
Guest Dock	18	9/16/2019	WEBSITE	Confirmed	9/17/2019	9/19/2019	45'	2
Guest Dock	4	9/16/2019	WEBSITE	Confirmed	10/31/2019	11/4/2019	42'	4
Guest Dock	4	9/16/2019	WEBSITE	Confirmed	10/18/2019	10/21/2019	42'	3
Guest Dock	15	9/16/2019	WEBSITE	Confirmed	9/17/2019	9/20/2019	30'	3
Guest Dock	5	9/16/2019	WEBSITE	Confirmed	9/30/2019	10/3/2019	17'	3
Guest Dock	10	9/16/2019	WEBSITE	Confirmed	9/18/2019	9/20/2019	32'	2

Marina	Mooring	Date Reservation Made	Made At	Status	Arrival Date	Departure Date	Boat Length	Length of Stay (Nights)
Guest Dock	10	9/16/2019	WEBSITE	Confirmed	9/17/2019	9/18/2019	32'	1
Guest Dock	28	9/17/2019	WEBSITE	Confirmed	9/17/2019	9/20/2019	33'	3
Guest Dock	13	9/17/2019	WEBSITE	Confirmed	9/17/2019	9/18/2019	27'	1
Guest Dock	5	9/17/2019	Moorings	Confirmed	9/17/2019	9/18/2019	23'	1
Guest Dock	15	9/17/2019	WEBSITE	Confirmed	9/20/2019	9/22/2019	28'	2
Guest Dock	12	9/17/2019	WEBSITE	Confirmed	10/28/2019	11/4/2019	46'	7
Guest Dock	3	9/17/2019	WEBSITE	Confirmed	9/17/2019	9/18/2019	37'	1
Guest Dock	5	9/17/2019	Moorings	Confirmed	9/22/2019	9/27/2019	44'	5
Guest Dock	9	9/17/2019	WEBSITE	Confirmed	9/19/2019	9/22/2019	22'	3
Guest Dock	22	9/17/2019	Moorings	Confirmed	9/23/2019	9/25/2019	51'	2
Guest Dock	29	9/18/2019	Parks Central Reservations	Confirmed	9/18/2019	9/20/2019	27'	2
Guest Dock	29	9/18/2019	Parks Central Reservations	Confirmed	9/16/2019	9/18/2019	27'	2
Guest Dock	18	9/18/2019	Parks Central Reservations	Confirmed	9/19/2019	9/20/2019	30'	1
Guest Dock	13	9/19/2019	Moorings	Confirmed	9/19/2019	9/21/2019	30'	2
Guest Dock	13	9/19/2019	Moorings	Confirmed	9/21/2019	9/22/2019	30'	1
Guest Dock	13	9/19/2019	Moorings	Confirmed	9/22/2019	9/23/2019	30'	1
Guest Dock	14	9/19/2019	WEBSITE	Confirmed	9/20/2019	9/23/2019	22'	3
Guest Dock	7	9/19/2019	WEBSITE	Confirmed	9/20/2019	9/22/2019	27'	2
Guest Dock	4	9/19/2019	WEBSITE	Confirmed	9/26/2019	9/27/2019	26'	1
Guest Dock	10	9/20/2019	WEBSITE	Confirmed	9/20/2019	9/22/2019	30'	2
Guest Dock	2	9/20/2019	WEBSITE	Confirmed	9/20/2019	9/21/2019	26'	1
Guest Dock	2	9/20/2019	WEBSITE	Confirmed	9/21/2019	9/24/2019	30'	3
Guest Dock	2	9/20/2019	WEBSITE	Confirmed	9/28/2019	9/29/2019	23'	1
Guest Dock	13	9/21/2019	WEBSITE	Confirmed	9/23/2019	9/24/2019	30'	1
Guest Dock	3	9/21/2019	WEBSITE	Confirmed	9/25/2019	9/27/2019	47'	2
Guest Dock	18	9/21/2019	WEBSITE	Confirmed	10/3/2019	10/4/2019	48'	1
Guest Dock	10	9/21/2019	WEBSITE	Confirmed	9/22/2019	9/24/2019	30'	2
Guest Dock	6	9/22/2019	WEBSITE	Confirmed	9/22/2019	9/23/2019	35'	1
Guest Dock	7	9/22/2019	WEBSITE	Confirmed	9/26/2019	9/29/2019	33'	3
Guest Dock	26	9/22/2019	WEBSITE	Confirmed	9/23/2019	9/27/2019	33'	4
Guest Dock	7	9/22/2019	WEBSITE	Confirmed	9/23/2019	9/24/2019	27'	1
Guest Dock	7	9/22/2019	WEBSITE	Confirmed	9/24/2019	9/25/2019	27'	1
Guest Dock	15	9/22/2019	WEBSITE	Confirmed	9/25/2019	9/27/2019	27'	2
Guest Dock	11	9/22/2019	WEBSITE	Confirmed	9/23/2019	9/27/2019	32'	4
Guest Dock	10	9/22/2019	WEBSITE	Confirmed	10/4/2019	10/7/2019	17'	3
Guest Dock	6	9/23/2019	WEBSITE	Confirmed	9/30/2019	10/1/2019	26'	1
Guest Dock	4	9/23/2019	Parks Central Reservations	Confirmed	9/23/2019	9/25/2019	32'	2
Guest Dock	13	9/23/2019	WEBSITE	Confirmed	9/24/2019	9/28/2019	30'	4
Guest Dock	9	9/23/2019	WEBSITE	Confirmed	9/23/2019	9/25/2019	26'	2
Guest Dock	21	9/23/2019	WEBSITE	Confirmed	9/26/2019	9/27/2019	38'	1
Guest Dock	21	9/23/2019	WEBSITE	Confirmed	9/23/2019	9/26/2019	38'	3
Guest Dock	28	9/23/2019	WEBSITE	Confirmed	9/28/2019	10/1/2019	35'	3
Guest Dock	27	9/23/2019	Parks Central Reservations	Confirmed	9/23/2019	9/25/2019	30'	2
Guest Dock	12	9/23/2019	Moorings	Confirmed	9/25/2019	10/2/2019	33'	7
Guest Dock	6	9/23/2019	Parks Central Reservations	Confirmed	9/23/2019	9/24/2019	25'	1
Guest Dock	10	9/23/2019	WEBSITE	Confirmed	9/25/2019	9/26/2019	20'	1
Guest Dock	6	9/23/2019	WEBSITE	Confirmed	9/28/2019	9/29/2019	17'	1
Guest Dock	14	9/23/2019	WEBSITE	Confirmed	9/23/2019	9/24/2019	30'	1
Guest Dock	28	9/23/2019	WEBSITE	Confirmed	9/24/2019	9/26/2019	36'	2
Guest Dock	8	9/24/2019	Moorings	Confirmed	9/25/2019	9/27/2019	26'	2
Guest Dock	8	9/24/2019	Moorings	Confirmed	9/30/2019	10/1/2019	26'	1
Guest Dock	14	9/24/2019	WEBSITE	Confirmed	9/24/2019	9/26/2019	30'	2
Guest Dock	6	9/24/2019	Parks Central Reservations	Confirmed	9/24/2019	9/26/2019	30'	2
Guest Dock	14	9/24/2019	WEBSITE	Confirmed	9/27/2019	9/29/2019	23'	2
Guest Dock	6	9/24/2019	WEBSITE	Confirmed	9/26/2019	9/28/2019	31'	2
Guest Dock	4	9/25/2019	WEBSITE	Confirmed	9/25/2019	9/26/2019	26'	1
Guest Dock	19	9/25/2019	WEBSITE	Confirmed	10/9/2019	10/23/2019	46'	14
Guest Dock	16	9/25/2019	WEBSITE	Confirmed	10/3/2019	10/8/2019	30'	5

Marina	Mooring	Date Reservation Made	Made At	Status	Arrival Date	Departure Date	Boat Length	Length of Stay (Nights)
Guest Dock	7	9/25/2019	WEBSITE	Confirmed	9/29/2019	10/9/2019	33'	10
Guest Dock	10	9/25/2019	Parks Central Reservations	Confirmed	9/24/2019	9/25/2019	32'	1
Guest Dock	9	9/25/2019	Parks Central Reservations	Confirmed	9/25/2019	9/26/2019	32'	1
Guest Dock	19	9/25/2019	Parks Central Reservations	Confirmed	9/30/2019	10/4/2019	65'	4
Guest Dock	28	9/25/2019	WEBSITE	Confirmed	9/26/2019	9/28/2019	36'	2
Guest Dock	11	9/25/2019	WEBSITE	Confirmed	9/28/2019	9/30/2019	18'	2
Guest Dock	21	9/26/2019	WEBSITE	Confirmed	10/20/2019	10/24/2019	53'	4
Guest Dock	14	9/26/2019	WEBSITE	Confirmed	9/26/2019	9/27/2019	30'	1
Guest Dock	15	9/26/2019	WEBSITE	Confirmed	9/28/2019	10/5/2019	31'	7
Guest Dock	27	9/26/2019	Parks Central Reservations	Confirmed	9/26/2019	9/27/2019	30'	1
Guest Dock	9	9/26/2019	WEBSITE	Confirmed	9/26/2019	9/28/2019	31'	2
Guest Dock	9	9/26/2019	WEBSITE	Confirmed	9/29/2019	9/30/2019	31'	1
Guest Dock	11	9/26/2019	WEBSITE	Confirmed	9/30/2019	10/1/2019	31'	1
Guest Dock	21	9/27/2019	WEBSITE	Confirmed	9/30/2019	10/7/2019	63'	7
Guest Dock	5	9/27/2019	WEBSITE	Confirmed	9/27/2019	9/28/2019		1
Guest Dock	10	9/27/2019	WEBSITE	Confirmed	9/28/2019	9/29/2019	31'	1
Guest Dock	13	9/28/2019	WEBSITE	Confirmed	9/28/2019	9/29/2019	21'	1
Guest Dock	16	9/28/2019	WEBSITE	Confirmed	9/29/2019	9/30/2019	27'	1
Guest Dock	18	9/28/2019	WEBSITE	Confirmed	10/24/2019	10/27/2019	52'	3
Guest Dock	14	9/28/2019	WEBSITE	Confirmed	9/30/2019	10/1/2019	45'	1
Guest Dock	9	9/29/2019	WEBSITE	Confirmed	9/30/2019	10/2/2019	40'	2
Guest Dock	19	9/29/2019	WEBSITE	Confirmed	10/5/2019	10/6/2019	50'	1
Guest Dock	16	9/29/2019	WEBSITE	Confirmed	10/1/2019	10/3/2019	27'	2
Guest Dock	14	9/29/2019	WEBSITE	Confirmed	10/3/2019	10/4/2019	27'	1
Guest Dock	16	9/29/2019	WEBSITE	Confirmed	9/30/2019	10/1/2019	27'	1
Guest Dock	26	9/29/2019	WEBSITE	Confirmed	9/30/2019	10/4/2019	33'	4
Guest Dock	10	9/30/2019	Parks Central Reservations	Confirmed	9/30/2019	10/1/2019	32'	1
Guest Dock	10	9/30/2019	Parks Central Reservations	Confirmed	10/1/2019	10/3/2019	32'	2
Guest Dock	27	9/30/2019	Parks Central Reservations	Confirmed	9/30/2019	10/3/2019	27'	3
Guest Dock	6	9/30/2019	Parks Central Reservations	Confirmed	10/3/2019	10/4/2019	27'	1
Guest Dock	12	9/30/2019	Parks Central Reservations	Confirmed	10/4/2019	10/8/2019	44'	4
Guest Dock	13	9/30/2019	WEBSITE	Confirmed	9/30/2019	10/1/2019	27'	1
Guest Dock	6	9/30/2019	WEBSITE	Confirmed	9/29/2019	9/30/2019	17'	1
Guest Dock	3	9/30/2019	WEBSITE	Confirmed	10/11/2019	10/12/2019	55'	1
Guest Dock	5	9/30/2019	Parks Central Reservations	Confirmed	10/7/2019	10/9/2019	38'	2
Guest Dock	5	9/30/2019	Parks Central Reservations	Confirmed	10/14/2019	10/15/2019	38'	1
Guest Dock	5	9/30/2019	Parks Central Reservations	Confirmed	10/9/2019	10/11/2019	38'	2
Guest Dock	11	9/30/2019	Parks Central Reservations	Confirmed	10/21/2019	10/25/2019	38'	4
Guest Dock	6	9/30/2019	Parks Central Reservations	Confirmed	10/15/2019	10/18/2019	38'	3
Guest Dock	8	9/30/2019	Parks Central Reservations	Confirmed	10/13/2019	10/15/2019	32'	2
Guest Dock	14	9/30/2019	Parks Central Reservations	Confirmed	10/18/2019	11/2/2019	46'	15
Guest Dock	19	9/30/2019	Moorings	Confirmed	10/6/2019	10/7/2019	38'	1
Guest Dock	21	9/30/2019	Moorings	Confirmed	10/15/2019	10/16/2019	38'	1
Guest Dock	21	9/30/2019	Moorings	Confirmed	10/14/2019	10/15/2019	38'	1
Guest Dock	7	9/30/2019	WEBSITE	Confirmed	10/9/2019	10/11/2019	32'	2
Guest Dock	14	9/30/2019	WEBSITE	Confirmed	10/1/2019	10/2/2019	42'	1
Guest Dock	2	9/30/2019	WEBSITE	Confirmed	10/4/2019	10/6/2019	23'	2
Guest Dock	11	9/30/2019	WEBSITE	Confirmed	10/1/2019	10/4/2019	27'	3
Guest Dock	11	9/30/2019	WEBSITE	Confirmed	10/4/2019	10/5/2019	27'	1
Guest Dock	6	10/1/2019	WEBSITE	Confirmed	10/14/2019	10/15/2019	10'	1
Guest Dock	12	10/1/2019	Parks Central Reservations	Confirmed	10/2/2019	10/4/2019	33'	2
Guest Dock	6	10/1/2019	Parks Central Reservations	Confirmed	10/22/2019	10/30/2019	39'	8
Guest Dock	13	10/1/2019	WEBSITE	Confirmed	10/1/2019	10/2/2019	50'	1
Guest Dock	21	10/1/2019	WEBSITE	Confirmed	10/11/2019	10/13/2019	54'	2
Guest Dock	4	10/1/2019	WEBSITE	Confirmed	10/7/2019	10/11/2019	26'	4
Guest Dock	8	10/1/2019	Parks Central Reservations	Confirmed	10/22/2019	11/4/2019	36'	13
Guest Dock	9	10/1/2019	Parks Central Reservations	Confirmed	10/3/2019	10/4/2019	26'	1
Guest Dock	16	10/1/2019	Parks Central Reservations	Confirmed	10/10/2019	10/11/2019	26'	1

Marina	Mooring	Date Reservation Made	Made At	Status	Arrival Date	Departure Date	Boat Length	Length of Stay (Nights)
Guest Dock	27	10/1/2019	Parks Central Reservations	Confirmed	10/3/2019	10/5/2019	30'	2
Guest Dock	3	10/1/2019	WEBSITE	Confirmed	10/5/2019	10/7/2019	47'	2
Guest Dock	22	10/2/2019	WEBSITE	Confirmed	10/3/2019	10/4/2019	38'	1
Guest Dock	26	10/2/2019	WEBSITE	Confirmed	10/16/2019	10/18/2019	40'	2
Guest Dock	6	10/2/2019	Parks Central Reservations	Confirmed	10/1/2019	10/2/2019	38'	1
Guest Dock	14	10/2/2019	WEBSITE	Confirmed	10/16/2019	10/17/2019	32'	1
Guest Dock	11	10/2/2019	WEBSITE	Confirmed	10/14/2019	10/16/2019	30'	2
Guest Dock	4	10/2/2019	WEBSITE	Confirmed	10/12/2019	10/13/2019	20'	1
Guest Dock	4	10/2/2019	WEBSITE	Confirmed	10/13/2019	10/18/2019	20'	5
Guest Dock	15	10/2/2019	WEBSITE	Confirmed	10/5/2019	10/6/2019	31'	1
Guest Dock	18	10/2/2019	WEBSITE	Confirmed	10/7/2019	10/8/2019	50'	1
Guest Dock	5	10/3/2019	WEBSITE	Confirmed	10/3/2019	10/4/2019	30'	1
Guest Dock	10	10/3/2019	Parks Central Reservations	Confirmed	10/3/2019	10/4/2019	32'	1
Guest Dock	5	10/3/2019	WEBSITE	Confirmed	10/4/2019	10/5/2019	26'	1
Guest Dock	14	10/3/2019	WEBSITE	Confirmed	10/4/2019	10/8/2019	22'	4
Guest Dock	8	10/3/2019	Moorings	Confirmed	10/7/2019	10/11/2019	26'	4
Guest Dock	9	10/3/2019	WEBSITE	Confirmed	10/4/2019	10/6/2019	43'	2
Guest Dock	18	10/3/2019	WEBSITE	Confirmed	11/1/2019	11/4/2019	45'	3
Guest Dock	6	10/4/2019	WEBSITE	Confirmed	10/7/2019	10/8/2019	27'	1
Guest Dock	13	10/4/2019	WEBSITE	Confirmed	10/4/2019	10/6/2019	18'	2
Guest Dock	28	10/4/2019	WEBSITE	Confirmed	10/4/2019	10/11/2019	33'	7
Guest Dock	28	10/4/2019	WEBSITE	Confirmed	10/11/2019	10/12/2019	33'	1
Guest Dock	4	10/4/2019	WEBSITE	Confirmed	10/4/2019	10/5/2019	37'	1
Guest Dock	8	10/4/2019	WEBSITE	Confirmed	10/5/2019	10/7/2019	36'	2
Guest Dock	11	10/4/2019	WEBSITE	Confirmed	10/5/2019	10/11/2019	42'	6
Guest Dock	5	10/5/2019	WEBSITE	Confirmed	10/19/2019	10/21/2019	42'	2
Guest Dock	27	10/5/2019	WEBSITE	Confirmed	10/5/2019	10/8/2019	31'	3
Guest Dock	6	10/5/2019	WEBSITE	Confirmed	10/5/2019	10/6/2019	37'	1
Guest Dock	15	10/5/2019	WEBSITE	Confirmed	10/6/2019	10/9/2019	30'	3
Guest Dock	9	10/5/2019	WEBSITE	Confirmed	10/6/2019	10/9/2019	33'	3
Guest Dock	26	10/6/2019	WEBSITE	Confirmed	10/8/2019	10/11/2019	38'	3
Guest Dock	11	10/6/2019	WEBSITE	Confirmed	10/18/2019	10/21/2019	40'	3
Guest Dock	10	10/6/2019	WEBSITE	Confirmed	10/18/2019	10/21/2019	40'	3
Guest Dock	9	10/6/2019	WEBSITE	Confirmed	10/20/2019	11/4/2019	43'	15
Guest Dock	6	10/6/2019	WEBSITE	Confirmed	10/6/2019	10/7/2019	43'	1
Guest Dock	5	10/6/2019	WEBSITE	Confirmed	10/6/2019	10/7/2019	37'	1
Guest Dock	13	10/6/2019	WEBSITE	Confirmed	10/6/2019	10/9/2019	38'	3
Guest Dock	18	10/6/2019	WEBSITE	Confirmed	10/11/2019	10/13/2019	50'	2
Guest Dock	2	10/6/2019	WEBSITE	Confirmed	10/7/2019	10/8/2019	28'	1
Guest Dock	14	10/6/2019	WEBSITE	Confirmed	10/10/2019	10/11/2019	39'	1
Guest Dock	14	10/6/2019	WEBSITE	Confirmed	10/9/2019	10/10/2019	39'	1
Guest Dock	10	10/6/2019	WEBSITE	Confirmed	10/7/2019	10/8/2019	39'	1
Guest Dock	14	10/6/2019	WEBSITE	Confirmed	10/8/2019	10/9/2019	39'	1
Guest Dock	22	10/7/2019	Moorings	Confirmed	10/7/2019	10/8/2019	33'	1
Guest Dock	21	10/7/2019	Moorings	Confirmed	10/8/2019	10/11/2019	33'	3
Guest Dock	19	10/7/2019	Moorings	Confirmed	10/7/2019	10/9/2019	36'	2
Guest Dock	15	10/7/2019	Moorings	Confirmed	10/9/2019	10/12/2019	36'	3
Guest Dock	9	10/7/2019	WEBSITE	Confirmed	10/9/2019	10/10/2019	33'	1
Guest Dock	16	10/7/2019	Moorings	Confirmed	10/24/2019	10/28/2019	49'	4
Guest Dock	21	10/7/2019	Moorings	Confirmed	10/30/2019	11/4/2019	49'	5
Guest Dock	15	10/7/2019	Moorings	Confirmed	10/17/2019	10/21/2019	49'	4
Guest Dock	16	10/7/2019	Moorings	Confirmed	10/22/2019	10/23/2019	49'	1
Guest Dock	16	10/7/2019	Moorings	Confirmed	10/21/2019	10/22/2019	49'	1
Guest Dock	16	10/7/2019	Moorings	Confirmed	10/23/2019	10/24/2019	49'	1
Guest Dock	3	10/7/2019	Moorings	Confirmed	10/8/2019	10/10/2019	38'	2
Guest Dock	3	10/7/2019	Moorings	Confirmed	10/7/2019	10/8/2019	32'	1
Guest Dock	16	10/7/2019	Moorings	Confirmed	10/8/2019	10/9/2019	32'	1
Guest Dock	16	10/7/2019	Moorings	Confirmed	10/9/2019	10/10/2019	32'	1

Marina	Mooring	Date Reservation Made	Made At	Status	Arrival Date	Departure Date	Boat Length	Length of Stay (Nights)
Guest Dock	6	10/7/2019	WEBSITE	Confirmed	10/9/2019	10/10/2019	45'	1
Guest Dock	14	10/7/2019	WEBSITE	Confirmed	10/13/2019	10/16/2019	42'	3
Guest Dock	11	10/7/2019	WEBSITE	Confirmed	10/11/2019	10/13/2019	42'	2
Guest Dock	28	10/7/2019	WEBSITE	Confirmed	10/27/2019	11/4/2019	40'	8
Guest Dock	3	10/7/2019	WEBSITE	Confirmed	11/1/2019	11/4/2019	48'	3
Guest Dock	27	10/7/2019	WEBSITE	Confirmed	10/8/2019	10/10/2019	31'	2
Guest Dock	2	10/8/2019	WEBSITE	Confirmed	10/9/2019	10/10/2019	28'	1
Guest Dock	3	10/8/2019	WEBSITE	Confirmed	10/10/2019	10/11/2019	28'	1
Guest Dock	2	10/8/2019	WEBSITE	Confirmed	10/8/2019	10/9/2019	28'	1
Guest Dock	22	10/8/2019	Moorings	Confirmed	10/18/2019	10/21/2019	32'	3
Guest Dock	20	10/8/2019	Moorings	Confirmed	10/21/2019	10/22/2019	32'	1
Guest Dock	10	10/8/2019	Moorings	Confirmed	10/8/2019	10/11/2019	32'	3
Guest Dock	10	10/8/2019	Moorings	Confirmed	10/11/2019	10/15/2019	32'	4
Guest Dock	10	10/8/2019	Moorings	Confirmed	10/15/2019	10/16/2019	32'	1
Guest Dock	16	10/8/2019	WEBSITE	Confirmed	10/18/2019	10/19/2019	35'	1
Guest Dock	16	10/8/2019	WEBSITE	Confirmed	10/19/2019	10/20/2019	35'	1
Guest Dock	22	10/8/2019	Moorings	Confirmed	10/8/2019	10/18/2019	65'	10
Guest Dock	16	10/8/2019	WEBSITE	Confirmed	10/11/2019	10/13/2019	28'	2
Guest Dock	13	10/8/2019	Moorings	Confirmed	10/9/2019	10/12/2019	43'	3
Guest Dock	2	10/8/2019	WEBSITE	Confirmed	10/10/2019	10/12/2019	37'	2
Guest Dock	3	10/9/2019	WEBSITE	Confirmed	10/12/2019	10/14/2019	26'	2
Guest Dock	27	10/9/2019	WEBSITE	Confirmed	10/10/2019	10/12/2019	31'	2
Guest Dock	7	10/9/2019	WEBSITE	Confirmed	10/19/2019	10/20/2019	40'	1
Guest Dock	5	10/9/2019	WEBSITE	Confirmed	10/11/2019	10/12/2019	26'	1
Guest Dock	6	10/9/2019	WEBSITE	Confirmed	10/10/2019	10/12/2019	34'	2
Guest Dock	20	10/9/2019	WEBSITE	Confirmed	10/13/2019	10/14/2019	50'	1
Guest Dock	8	10/9/2019	WEBSITE	Confirmed	10/11/2019	10/12/2019	24'	1
Guest Dock	22	10/9/2019	WEBSITE	Confirmed	10/23/2019	10/26/2019	50'	3
Guest Dock	18	10/9/2019	WEBSITE	Confirmed	10/9/2019	10/11/2019	46'	2
Guest Dock	9	10/9/2019	WEBSITE	Confirmed	10/11/2019	10/14/2019	33'	3
Guest Dock	27	10/10/2019	WEBSITE	Confirmed	10/14/2019	10/15/2019	32'	1
Guest Dock	22	10/10/2019	Parks Central Reservations	Confirmed	10/27/2019	10/29/2019	50'	2
Guest Dock	21	10/10/2019	WEBSITE	Confirmed	10/17/2019	10/18/2019	45'	1
Guest Dock	7	10/10/2019	WEBSITE	Confirmed	10/11/2019	10/17/2019	30'	6
Guest Dock	26	10/10/2019	WEBSITE	Confirmed	10/24/2019	11/4/2019	36'	11
Guest Dock	4	10/10/2019	WEBSITE	Confirmed	10/11/2019	10/12/2019	32'	1
Guest Dock	15	10/10/2019	WEBSITE	Confirmed	10/12/2019	10/15/2019	27'	3
Guest Dock	12	10/10/2019	WEBSITE	Confirmed	10/11/2019	10/12/2019	45'	1
Guest Dock	5	10/11/2019	WEBSITE	Confirmed	10/12/2019	10/13/2019	34'	1
Guest Dock	11	10/11/2019	WEBSITE	Confirmed	10/29/2019	11/13/2019	41'	15
Guest Dock	26	10/11/2019	Parks Central Reservations	Confirmed	10/12/2019	10/15/2019	36'	3
Guest Dock	16	10/11/2019	Parks Central Reservations	Confirmed	10/15/2019	10/17/2019	45'	2
Guest Dock	13	10/11/2019	Parks Central Reservations	Confirmed	10/16/2019	10/23/2019	41'	7
Guest Dock	13	10/11/2019	Parks Central Reservations	Confirmed	10/23/2019	10/24/2019	41'	1
Guest Dock	13	10/11/2019	WEBSITE	Confirmed	10/17/2019	10/19/2019	27'	2
Guest Dock	6	10/11/2019	Parks Central Reservations	Confirmed	10/31/2019	11/4/2019	37'	4
Guest Dock	6	10/11/2019	Parks Central Reservations	Confirmed	10/30/2019	10/31/2019	37'	1
Guest Dock	6	10/11/2019	WEBSITE	Confirmed	10/12/2019	10/13/2019	27'	1
Guest Dock	27	10/11/2019	WEBSITE	Confirmed	10/25/2019	10/27/2019	32'	2
Guest Dock	9	10/12/2019	WEBSITE	Confirmed	10/17/2019	10/20/2019	39'	3
Guest Dock	13	10/12/2019	WEBSITE	Confirmed	10/12/2019	10/13/2019	45'	1
Guest Dock	27	10/12/2019	WEBSITE	Confirmed	10/24/2019	10/25/2019	30'	1
Guest Dock	28	10/12/2019	WEBSITE	Confirmed	10/25/2019	10/27/2019	30'	2
Guest Dock	16	10/12/2019	WEBSITE	Confirmed	10/13/2019	10/14/2019	34'	1
Guest Dock	27	10/13/2019	WEBSITE	Confirmed	10/27/2019	10/28/2019	30'	1
Guest Dock	6	10/13/2019	WEBSITE	Confirmed	10/13/2019	10/14/2019	26'	1
Guest Dock	13	10/13/2019	WEBSITE	Confirmed	10/13/2019	10/14/2019	30'	1
Guest Dock	15	10/13/2019	WEBSITE	Confirmed	10/21/2019	10/24/2019	41'	3

Marina	Mooring	Date Reservation Made	Made At	Status	Arrival Date	Departure Date	Boat Length	Length of Stay (Nights)
Guest Dock	9	10/13/2019	WEBSITE	Confirmed	10/14/2019	10/17/2019	32'	3
Guest Dock	29	10/14/2019	Parks Central Reservations	Confirmed	10/14/2019	10/16/2019	60'	2
Guest Dock	28	10/14/2019	Parks Central Reservations	Confirmed	10/14/2019	10/16/2019	60'	2
Guest Dock	13	10/14/2019	Parks Central Reservations	Confirmed	10/14/2019	10/15/2019	28'	1
Guest Dock	8	10/14/2019	Parks Central Reservations	Confirmed	10/18/2019	10/19/2019	26'	1
Guest Dock	8	10/14/2019	Parks Central Reservations	Confirmed	10/16/2019	10/18/2019	26'	2
Guest Dock	19	10/14/2019	Parks Central Reservations	Confirmed	10/31/2019	11/1/2019	30'	1
Guest Dock	4	10/14/2019	Parks Central Reservations	Confirmed	10/21/2019	10/22/2019	32'	1
Guest Dock	18	10/15/2019	Parks Central Reservations	Confirmed	10/19/2019	10/23/2019	44'	4
Guest Dock	28	10/15/2019	Parks Central Reservations	Confirmed	10/16/2019	10/21/2019	45'	5
Guest Dock	29	10/15/2019	Parks Central Reservations	Confirmed	10/16/2019	10/21/2019	45'	5
Guest Dock	8	10/15/2019	Moorings	Confirmed	10/15/2019	10/16/2019	27'	1
Guest Dock	14	10/15/2019	WEBSITE	Confirmed	10/17/2019	10/18/2019	32'	1
Guest Dock	15	10/15/2019	WEBSITE	Confirmed	10/15/2019	10/17/2019	32'	2
Guest Dock	8	10/15/2019	WEBSITE	Confirmed	10/19/2019	10/22/2019	34'	3
Guest Dock	4	10/15/2019	WEBSITE	Confirmed	11/16/2019	11/24/2019	26'	8
Guest Dock	26	10/15/2019	WEBSITE	Confirmed	10/18/2019	10/24/2019	32'	6
Guest Dock	15	10/15/2019	WEBSITE	Confirmed	10/24/2019	10/25/2019	32'	1
Guest Dock	16	10/16/2019	WEBSITE	Confirmed	10/17/2019	10/18/2019	34'	1
Guest Dock	6	10/16/2019	WEBSITE	Confirmed	10/18/2019	10/19/2019	34'	1
Guest Dock	20	10/16/2019	Parks Central Reservations	Confirmed	10/19/2019	10/21/2019	30'	2
Guest Dock	5	10/16/2019	WEBSITE	Confirmed	10/18/2019	10/19/2019	29'	1
Guest Dock	26	10/16/2019	WEBSITE	Confirmed	11/4/2019	11/5/2019	32'	1
Guest Dock	27	10/16/2019	WEBSITE	Confirmed	10/20/2019	10/23/2019	33'	3
Guest Dock	22	10/16/2019	WEBSITE	Confirmed	10/21/2019	10/22/2019	47'	1
Guest Dock	2	10/16/2019	WEBSITE	Confirmed	10/28/2019	10/30/2019	38'	2
Guest Dock	5	10/17/2019	Parks Central Reservations	Confirmed	10/17/2019	10/18/2019	28'	1
Guest Dock	11	10/17/2019	WEBSITE	Confirmed	10/17/2019	10/18/2019	30'	1
Guest Dock	13	10/17/2019	Parks Central Reservations	Confirmed	10/19/2019	10/22/2019	27'	3
Guest Dock	11	10/17/2019	WEBSITE	Confirmed	10/28/2019	10/29/2019	32'	1
Guest Dock	27	10/17/2019	WEBSITE	Confirmed	10/29/2019	11/1/2019	32'	3
Guest Dock	21	10/17/2019	WEBSITE	Confirmed	11/4/2019	11/8/2019	32'	4
Guest Dock	20	10/17/2019	WEBSITE	Confirmed	10/31/2019	11/4/2019	45'	4
Guest Dock	19	10/18/2019	WEBSITE	Confirmed	11/1/2019	11/4/2019	49'	3
Guest Dock	6	10/18/2019	WEBSITE	Confirmed	10/19/2019	10/20/2019	30'	1
Guest Dock	19	10/18/2019	WEBSITE	Confirmed	10/23/2019	10/24/2019	43'	1
Guest Dock	28	10/18/2019	WEBSITE	Confirmed	10/24/2019	10/25/2019	43'	1
Guest Dock	11	10/18/2019	WEBSITE	Confirmed	10/25/2019	10/27/2019	43'	2
Guest Dock	20	10/18/2019	WEBSITE	Confirmed	10/22/2019	10/23/2019	43'	1
Guest Dock	16	10/18/2019	WEBSITE	Confirmed	10/20/2019	10/21/2019	43'	1
Guest Dock	10	10/18/2019	WEBSITE	Confirmed	10/21/2019	10/22/2019	43'	1
Guest Dock	21	10/18/2019	WEBSITE	Confirmed	10/19/2019	10/20/2019	53'	1
Guest Dock	27	10/19/2019	WEBSITE	Confirmed	10/19/2019	10/20/2019	40'	1
Guest Dock	3	10/19/2019	WEBSITE	Confirmed	10/31/2019	11/1/2019	42'	1
Guest Dock	4	10/20/2019	WEBSITE	Confirmed	10/22/2019	10/23/2019	32'	1
Guest Dock	6	10/20/2019	WEBSITE	Confirmed	10/21/2019	10/22/2019	36'	1
Guest Dock	27	10/20/2019	WEBSITE	Confirmed	10/28/2019	10/29/2019	32'	1
Guest Dock	1	10/21/2019	Parks Central Reservations	Confirmed	10/19/2019	10/22/2019	27'	3
Guest Dock	27	10/21/2019	Parks Central Reservations	Confirmed	11/7/2019	11/8/2019	30'	1
Guest Dock	27	10/21/2019	WEBSITE	Confirmed	10/23/2019	10/24/2019	36'	1
Guest Dock	28	10/22/2019	WEBSITE	Confirmed	11/4/2019	11/11/2019	36'	7
Guest Dock	28	10/22/2019	Moorings	Confirmed	10/22/2019	10/23/2019	32'	1
Guest Dock	3	10/22/2019	Moorings	Confirmed	10/30/2019	10/31/2019	43'	1
Guest Dock	1	10/22/2019	Moorings	Confirmed	10/31/2019	11/4/2019	43'	4
Guest Dock	1	10/22/2019	Moorings	Confirmed	10/22/2019	10/23/2019	27'	1
Guest Dock	1	10/22/2019	Moorings	Confirmed	10/23/2019	10/25/2019	27'	2
Guest Dock	22	10/22/2019	WEBSITE	Confirmed	10/26/2019	10/27/2019	45'	1
Guest Dock	22	10/23/2019	WEBSITE	Confirmed	11/3/2019	11/4/2019	58'	1

Marina	Mooring	Date Reservation Made	Made At	Status	Arrival Date	Departure Date	Boat Length	Length of Stay (Nights)
Guest Dock	29	10/23/2019	Parks Central Reservations	Confirmed	10/28/2019	10/30/2019	38'	2
Guest Dock	2	10/24/2019	WEBSITE	Confirmed	10/30/2019	11/1/2019	40'	2
Guest Dock	9	10/25/2019	WEBSITE	Confirmed	11/8/2019	11/10/2019	26'	2
Guest Dock	11	10/25/2019	WEBSITE	Confirmed	10/27/2019	10/28/2019	32'	1
Guest Dock	15	10/25/2019	Parks Central Reservations	Confirmed	10/25/2019	10/26/2019	22'	1
Guest Dock	29	10/25/2019	Parks Central Reservations	Confirmed	10/26/2019	10/28/2019	22'	2
Guest Dock	4	10/25/2019	Moorings	Confirmed	11/4/2019	11/8/2019	42'	4
Guest Dock	5	10/25/2019	WEBSITE	Confirmed	11/8/2019	11/10/2019	42'	2
Guest Dock	27	10/25/2019	WEBSITE	Confirmed	11/3/2019	11/7/2019	40'	4
Guest Dock	3	10/27/2019	WEBSITE	Confirmed	10/27/2019	10/28/2019		1
Guest Dock	19	10/28/2019	WEBSITE	Confirmed	10/30/2019	10/31/2019	53'	1
Guest Dock	4	10/29/2019	WEBSITE	Confirmed	10/30/2019	10/31/2019	32'	1
Guest Dock	29	10/30/2019	Parks Central Reservations	Confirmed	11/2/2019	11/4/2019	46'	2
Guest Dock	18	10/30/2019	WEBSITE	Confirmed	10/30/2019	10/31/2019	51'	1
Guest Dock	12	10/30/2019	Parks Central Reservations	Confirmed	11/4/2019	11/6/2019	26'	2
Guest Dock	18	10/30/2019	WEBSITE	Confirmed	10/31/2019	11/1/2019	63'	1
Guest Dock	26	10/30/2019	Parks Central Reservations	Confirmed	11/5/2019	11/10/2019	36'	5
Guest Dock	13	10/31/2019	Parks Central Reservations	Confirmed	11/4/2019	11/8/2019	47'	4
Guest Dock	22	10/31/2019	Parks Central Reservations	Confirmed	11/8/2019	11/19/2019	47'	11
Guest Dock	3	10/31/2019	Parks Central Reservations	Confirmed	11/4/2019	11/5/2019	60'	1
Guest Dock	6	10/31/2019	WEBSITE	Confirmed	11/4/2019	11/5/2019	32'	1
Guest Dock	27	10/31/2019	WEBSITE	Confirmed	11/1/2019	11/2/2019	40'	1
Guest Dock	9	11/2/2019	WEBSITE	Confirmed	11/4/2019	11/7/2019	34'	3
Guest Dock	27	11/2/2019	WEBSITE	Confirmed	11/9/2019	11/10/2019	40'	1
Guest Dock	18	11/2/2019	WEBSITE	Confirmed	11/4/2019	11/5/2019	45'	1
Guest Dock	14	11/3/2019	WEBSITE	Confirmed	11/4/2019	11/7/2019	43'	3
Guest Dock	7	11/3/2019	WEBSITE	Confirmed	11/4/2019	11/5/2019	27'	1
Guest Dock	8	11/3/2019	WEBSITE	Confirmed	11/4/2019	11/6/2019	33'	2
Guest Dock	26	11/3/2019	WEBSITE	Confirmed	11/13/2019	11/15/2019	33'	2
Guest Dock	19	11/3/2019	WEBSITE	Confirmed	11/6/2019	11/8/2019	33'	2
Guest Dock	2	11/3/2019	WEBSITE	Confirmed	11/12/2019	11/13/2019	33'	1
Guest Dock	29	11/3/2019	WEBSITE	Confirmed	11/18/2019	11/22/2019	33'	4
Guest Dock	26	11/3/2019	WEBSITE	Confirmed	11/25/2019	11/26/2019	33'	1
Guest Dock	26	11/3/2019	WEBSITE	Confirmed	11/26/2019	11/27/2019	33'	1
Guest Dock	10	11/3/2019	WEBSITE	Confirmed	11/4/2019	11/5/2019	32'	1
Guest Dock	20	11/4/2019	Moorings	Confirmed	11/4/2019	11/7/2019	36'	3
Guest Dock	6	11/4/2019	WEBSITE	Confirmed	11/18/2019	11/19/2019	10'	1
Guest Dock	7	11/4/2019	WEBSITE	Confirmed	11/6/2019	11/7/2019	27'	1
Guest Dock	6	11/4/2019	WEBSITE	Confirmed	11/7/2019	11/8/2019	27'	1
Guest Dock	7	11/4/2019	WEBSITE	Confirmed	11/5/2019	11/6/2019	27'	1
Guest Dock	19	11/4/2019	WEBSITE	Confirmed	11/9/2019	11/11/2019	49'	2
Guest Dock	2	11/4/2019	Parks Central Reservations	Confirmed	11/4/2019	11/6/2019	37'	2
Guest Dock	7	11/4/2019	WEBSITE	Confirmed	11/7/2019	11/8/2019	30'	1
Guest Dock	4	11/4/2019	WEBSITE	Confirmed	11/14/2019	11/15/2019	26'	1
Guest Dock	18	11/4/2019	WEBSITE	Confirmed	11/8/2019	11/9/2019	40'	1
Guest Dock	18	11/4/2019	WEBSITE	Confirmed	11/5/2019	11/8/2019	40'	3
Guest Dock	8	11/4/2019	WEBSITE	Confirmed	11/7/2019	11/9/2019	40'	2
Guest Dock	9	11/5/2019	WEBSITE	Confirmed	11/7/2019	11/8/2019	34'	1
Guest Dock	6	11/5/2019	WEBSITE	Confirmed	11/5/2019	11/6/2019	32'	1
Guest Dock	14	11/5/2019	WEBSITE	Confirmed	11/7/2019	11/11/2019	43'	4
Guest Dock	4	11/5/2019	WEBSITE	Confirmed	11/9/2019	11/11/2019	25'	2
Guest Dock	12	11/5/2019	Parks Central Reservations	Confirmed	11/6/2019	11/7/2019	26'	1
Guest Dock	18	11/5/2019	Parks Central Reservations	Confirmed	11/9/2019	11/10/2019	40'	1
Guest Dock	20	11/6/2019	WEBSITE	Confirmed	11/7/2019	11/8/2019	50'	1
Guest Dock	3	11/6/2019	Parks Central Reservations	Confirmed	11/7/2019	11/10/2019	52'	3
Guest Dock	8	11/6/2019	Parks Central Reservations	Confirmed	11/6/2019	11/7/2019	45'	1
Guest Dock	10	11/6/2019	WEBSITE	Confirmed	11/6/2019	11/7/2019	32'	1
Guest Dock	2	11/6/2019	Parks Central Reservations	Confirmed	11/6/2019	11/8/2019	28'	2

Marina	Mooring	Date Reservation Made	Made At	Status	Arrival Date	Departure Date	Boat Length	Length of Stay (Nights)
Guest Dock	20	11/6/2019	Parks Central Reservations	Confirmed	11/8/2019	11/11/2019	28'	3
Guest Dock	12	11/6/2019	WEBSITE	Confirmed	11/8/2019	11/11/2019	40'	3
Guest Dock	19	11/6/2019	Parks Central Reservations	Confirmed	11/12/2019	11/14/2019	30'	2
Guest Dock	13	11/7/2019	WEBSITE	Confirmed	11/8/2019	11/9/2019	34'	1
Guest Dock	6	11/7/2019	Moorings	Confirmed	11/8/2019	11/13/2019	42'	5
Guest Dock	3	11/7/2019	WEBSITE	Confirmed	11/10/2019	11/13/2019	52'	3
Guest Dock	7	11/7/2019	Moorings	Confirmed	11/8/2019	11/11/2019	36'	3
Guest Dock	19	11/7/2019	WEBSITE	Confirmed	11/8/2019	11/9/2019	49'	1
Guest Dock	4	11/7/2019	WEBSITE	Confirmed	11/11/2019	11/12/2019	32'	1
Guest Dock	21	11/8/2019	WEBSITE	Confirmed	11/9/2019	11/12/2019	41'	3
Guest Dock	4	11/8/2019	WEBSITE	Confirmed	11/8/2019	11/9/2019	32'	1
Guest Dock	15	11/8/2019	WEBSITE	Confirmed	11/10/2019	11/17/2019	34'	7
Guest Dock	18	11/8/2019	Parks Central Reservations	Confirmed	11/17/2019	11/18/2019	38'	1
Guest Dock	2	11/8/2019	WEBSITE	Confirmed	11/14/2019	11/17/2019	25'	3
Guest Dock	27	11/8/2019	WEBSITE	Confirmed	11/8/2019	11/9/2019	38'	1
Guest Dock	10	11/8/2019	WEBSITE	Confirmed	11/8/2019	11/12/2019	32'	4
Guest Dock	8	11/8/2019	WEBSITE	Confirmed	11/9/2019	11/10/2019	24'	1
Guest Dock	13	11/9/2019	WEBSITE	Confirmed	11/9/2019	11/11/2019	32'	2
Guest Dock	4	11/9/2019	WEBSITE	Confirmed	11/12/2019	11/13/2019	32'	1
Guest Dock	21	11/10/2019	WEBSITE	Confirmed	11/12/2019	11/15/2019	41'	3
Guest Dock	27	11/10/2019	WEBSITE	Confirmed	11/10/2019	11/11/2019	40'	1
Guest Dock	5	11/10/2019	WEBSITE	Confirmed	11/10/2019	11/11/2019	42'	1
Guest Dock	9	11/10/2019	WEBSITE	Confirmed	11/10/2019	11/16/2019	32'	6
Guest Dock	26	11/10/2019	WEBSITE	Confirmed	11/10/2019	11/12/2019	32'	2
Guest Dock	18	11/10/2019	WEBSITE	Confirmed	11/10/2019	11/11/2019		1
Guest Dock	27	11/10/2019	WEBSITE	Confirmed	11/11/2019	11/12/2019	40'	1
Guest Dock	20	11/11/2019	WEBSITE	Confirmed	11/15/2019	11/18/2019	63'	3
Guest Dock	16	11/11/2019	WEBSITE	Confirmed	11/18/2019	11/23/2019	50'	5
Guest Dock	7	11/11/2019	WEBSITE	Confirmed	11/11/2019	11/13/2019	36'	2
Guest Dock	12	11/11/2019	WEBSITE	Confirmed	11/11/2019	11/13/2019	28'	2
Guest Dock	9	11/11/2019	WEBSITE	Confirmed	11/16/2019	11/23/2019	32'	7
Guest Dock	16	11/11/2019	WEBSITE	Confirmed	11/12/2019	11/15/2019	27'	3
Guest Dock	5	11/11/2019	WEBSITE	Confirmed	11/11/2019	11/12/2019	42'	1
Guest Dock	18	11/11/2019	WEBSITE	Confirmed	11/12/2019	11/13/2019	38'	1
Guest Dock	2	11/11/2019	WEBSITE	Confirmed	11/21/2019	11/22/2019	38'	1
Guest Dock	27	11/11/2019	WEBSITE	Confirmed	11/12/2019	11/13/2019	40'	1
Guest Dock	28	11/11/2019	WEBSITE	Confirmed	11/12/2019	11/13/2019	32'	1
Guest Dock	16	11/12/2019	Parks Central Reservations	Confirmed	11/15/2019	11/17/2019	28'	2
Guest Dock	14	11/12/2019	Parks Central Reservations	Confirmed	11/12/2019	11/15/2019	32'	3
Guest Dock	10	11/12/2019	Moorings	Confirmed	11/12/2019	11/17/2019	38'	5
Guest Dock	2	11/12/2019	WEBSITE	Confirmed	11/26/2019	11/30/2019	36'	4
Guest Dock	12	11/12/2019	Moorings	Confirmed	11/19/2019	11/22/2019	26'	3
Guest Dock	11	11/12/2019	Moorings	Confirmed	11/19/2019	11/22/2019	44'	3
Guest Dock	3	11/12/2019	WEBSITE	Confirmed	11/13/2019	11/16/2019	52'	3
Guest Dock	20	11/12/2019	Parks Central Reservations	Confirmed	11/12/2019	11/13/2019	50'	1
Guest Dock	4	11/12/2019	WEBSITE	Confirmed	11/13/2019	11/14/2019	38'	1
Guest Dock	27	11/12/2019	WEBSITE	Confirmed	11/13/2019	11/23/2019	45'	10
Guest Dock	28	11/13/2019	WEBSITE	Confirmed	11/13/2019	11/14/2019	32'	1
Guest Dock	18	11/13/2019	WEBSITE	Confirmed	11/13/2019	11/15/2019	38'	2
Guest Dock	8	11/13/2019	Parks Central Reservations	Confirmed	12/2/2019	12/5/2019	26'	3
Guest Dock	8	11/13/2019	Parks Central Reservations	Confirmed	12/11/2019	12/12/2019	26'	1
Guest Dock	20	11/13/2019	WEBSITE	Confirmed	11/18/2019	11/22/2019	63'	4
Guest Dock	28	11/13/2019	WEBSITE	Confirmed	11/14/2019	11/15/2019	32'	1
Guest Dock	19	11/13/2019	WEBSITE	Confirmed	11/14/2019	11/15/2019	50'	1
Guest Dock	5	11/13/2019	Parks Central Reservations	Confirmed	11/15/2019	11/18/2019	43'	3
Guest Dock	20	11/13/2019	WEBSITE	Confirmed	11/23/2019	11/27/2019	42'	4
Guest Dock	13	11/13/2019	WEBSITE	Confirmed	11/16/2019	11/18/2019	41'	2
Guest Dock	5	11/13/2019	WEBSITE	Confirmed	11/13/2019	11/14/2019	38'	1

Marina	Mooring	Date Reservation Made	Made At	Status	Arrival Date	Departure Date	Boat Length	Length of Stay (Nights)
Guest Dock	21	11/14/2019	WEBSITE	Confirmed	11/15/2019	11/19/2019	50'	4
Guest Dock	11	11/14/2019	WEBSITE	Confirmed	11/14/2019	11/17/2019	43'	3
Guest Dock	6	11/14/2019	WEBSITE	Confirmed	11/16/2019	11/17/2019	41'	1
Guest Dock	20	11/14/2019	Parks Central Reservations	Confirmed	11/14/2019	11/15/2019	36'	1
Guest Dock	13	11/14/2019	Parks Central Reservations	Confirmed	11/14/2019	11/15/2019	50'	1
Guest Dock	5	11/14/2019	WEBSITE	Confirmed	11/14/2019	11/15/2019	30'	1
Guest Dock	7	11/14/2019	WEBSITE	Confirmed	11/16/2019	11/17/2019	26'	1
Guest Dock	7	11/14/2019	WEBSITE	Confirmed	11/17/2019	11/19/2019	30'	2
Guest Dock	26	11/14/2019	WEBSITE	Confirmed	11/15/2019	11/22/2019	32'	7
Guest Dock	19	11/14/2019	WEBSITE	Confirmed	11/15/2019	11/17/2019	50'	2
Guest Dock	18	11/14/2019	WEBSITE	Confirmed	11/15/2019	11/17/2019	65'	2
Guest Dock	28	11/14/2019	WEBSITE	Confirmed	11/16/2019	11/17/2019	33'	1
Guest Dock	8	11/15/2019	WEBSITE	Confirmed	11/16/2019	11/19/2019	38'	3
Guest Dock	2	11/15/2019	WEBSITE	Confirmed	11/22/2019	11/24/2019	25'	2
Guest Dock	15	11/15/2019	WEBSITE	Confirmed	11/17/2019	11/24/2019	42'	7
Guest Dock	5	11/15/2019	WEBSITE	Confirmed	11/18/2019	11/22/2019	26'	4
Guest Dock	12	11/16/2019	WEBSITE	Confirmed	11/18/2019	11/19/2019	32'	1
Guest Dock	10	11/16/2019	WEBSITE	Confirmed	11/18/2019	11/22/2019	43'	4
Guest Dock	12	11/16/2019	WEBSITE	Confirmed	11/16/2019	11/17/2019	37'	1
Guest Dock	14	11/16/2019	WEBSITE	Confirmed	11/18/2019	11/19/2019	27'	1
Guest Dock	3	11/17/2019	WEBSITE	Confirmed	11/17/2019	11/20/2019	47'	3
Guest Dock	3	11/17/2019	WEBSITE	Confirmed	11/20/2019	11/26/2019	47'	6
Guest Dock	12	11/17/2019	WEBSITE	Confirmed	11/17/2019	11/18/2019	33'	1
Guest Dock	13	11/17/2019	WEBSITE	Confirmed	11/18/2019	11/19/2019	32'	1
Guest Dock	18	11/17/2019	WEBSITE	Confirmed	11/18/2019	11/19/2019	33'	1
Guest Dock	18	11/17/2019	WEBSITE	Confirmed	11/19/2019	12/4/2019	46'	15
Guest Dock	14	11/17/2019	WEBSITE	Confirmed	11/19/2019	11/20/2019	27'	1
Guest Dock	28	11/17/2019	WEBSITE	Confirmed	11/18/2019	11/19/2019	30'	1
Guest Dock	2	11/18/2019	WEBSITE	Confirmed	11/18/2019	11/21/2019	38'	3
Guest Dock	11	11/18/2019	Parks Central Reservations	Confirmed	11/18/2019	11/19/2019	26'	1
Guest Dock	19	11/18/2019	Parks Central Reservations	Confirmed	11/18/2019	11/22/2019	36'	4
Guest Dock	1	11/18/2019	Parks Central Reservations	Confirmed	11/18/2019	11/22/2019	32'	4
Guest Dock	13	11/18/2019	WEBSITE	Confirmed	11/19/2019	11/21/2019	32'	2
Guest Dock	6	11/18/2019	WEBSITE	Confirmed	11/24/2019	12/1/2019	40'	7
Guest Dock	8	11/18/2019	WEBSITE	Confirmed	11/19/2019	11/20/2019	38'	1
Guest Dock	14	11/18/2019	WEBSITE	Confirmed	11/20/2019	11/22/2019	27'	2
Guest Dock	6	11/18/2019	WEBSITE	Confirmed	11/19/2019	11/20/2019	33'	1
Guest Dock	6	11/19/2019	WEBSITE	Confirmed	11/20/2019	11/23/2019	33'	3
Guest Dock	7	11/19/2019	WEBSITE	Confirmed	11/22/2019	11/24/2019	14'	2
Guest Dock	13	11/19/2019	WEBSITE	Confirmed	11/21/2019	11/22/2019	32'	1
Guest Dock	8	11/19/2019	WEBSITE	Confirmed	11/20/2019	11/23/2019	38'	3
Guest Dock	5	11/20/2019	WEBSITE	Confirmed	11/28/2019	11/29/2019	26'	1
Guest Dock	21	11/20/2019	Moorings	Confirmed	11/21/2019	11/22/2019	30'	1
Guest Dock	7	11/20/2019	WEBSITE	Confirmed	11/26/2019	11/28/2019	27'	2
Guest Dock	7	11/20/2019	WEBSITE	Confirmed	11/25/2019	11/26/2019	27'	1
Guest Dock	26	11/21/2019	WEBSITE	Confirmed	11/28/2019	12/1/2019	40'	3
Guest Dock	5	11/22/2019	WEBSITE	Confirmed	11/25/2019	11/28/2019	26'	3
Guest Dock	22	11/22/2019	Parks Central Reservations	Confirmed	11/25/2019	11/28/2019	38'	3
Guest Dock	22	11/22/2019	Parks Central Reservations	Confirmed	12/2/2019	12/6/2019	38'	4
Guest Dock	12	11/22/2019	Parks Central Reservations	Confirmed	11/22/2019	11/23/2019	32'	1
Guest Dock	14	11/22/2019	WEBSITE	Confirmed	11/25/2019	11/26/2019	32'	1
Guest Dock	4	11/22/2019	WEBSITE	Confirmed	12/4/2019	12/5/2019	36'	1
Guest Dock	4	11/22/2019	WEBSITE	Confirmed	11/26/2019	12/4/2019	36'	8
Guest Dock	4	11/22/2019	WEBSITE	Confirmed	11/25/2019	11/26/2019	32'	1
Guest Dock	9	11/22/2019	WEBSITE	Confirmed	11/26/2019	11/27/2019	32'	1
Guest Dock	16	11/23/2019	WEBSITE	Confirmed	11/23/2019	11/26/2019	50'	3
Guest Dock	15	11/23/2019	WEBSITE	Confirmed	11/24/2019	11/26/2019	45'	2
Guest Dock	8	11/23/2019	WEBSITE	Confirmed	11/25/2019	11/28/2019	42'	3

Marina	Mooring	Date Reservation Made	Made At	Status	Arrival Date	Departure Date	Boat Length	Length of Stay (Nights)
Guest Dock	13	11/24/2019	WEBSITE	Confirmed	11/25/2019	11/30/2019	44'	5
Guest Dock	3	11/24/2019	WEBSITE	Confirmed	11/26/2019	11/29/2019	33'	3
Guest Dock	8	11/24/2019	WEBSITE	Confirmed	12/8/2019	12/9/2019	26'	1
Guest Dock	27	11/25/2019	Parks Central Reservations	Confirmed	11/25/2019	11/28/2019	32'	3
Guest Dock	11	11/25/2019	Moorings	Confirmed	11/25/2019	11/28/2019	36'	3
Guest Dock	11	11/25/2019	Moorings	Confirmed	12/2/2019	12/3/2019	36'	1
Guest Dock	12	11/25/2019	Parks Central Reservations	Confirmed	11/25/2019	11/26/2019	28'	1
Guest Dock	16	11/25/2019	WEBSITE	Confirmed	11/29/2019	11/30/2019	37'	1
Guest Dock	5	11/25/2019	WEBSITE	Confirmed	12/2/2019	12/3/2019	30'	1
Guest Dock	28	11/25/2019	WEBSITE	Confirmed	11/25/2019	11/26/2019	30'	1
Guest Dock	10	11/25/2019	WEBSITE	Confirmed	11/25/2019	11/29/2019	44'	4
Guest Dock	19	11/25/2019	Moorings	Confirmed	11/25/2019	11/29/2019	43'	4
Guest Dock	9	11/25/2019	WEBSITE	Confirmed	11/25/2019	11/26/2019	42'	1
Guest Dock	15	11/25/2019	WEBSITE	Confirmed	11/26/2019	12/3/2019	50'	7
Guest Dock	29	11/25/2019	Parks Central Reservations	Confirmed	11/25/2019	11/27/2019	41'	2
Guest Dock	29	11/25/2019	Parks Central Reservations	Confirmed	11/27/2019	11/29/2019	41'	2
Guest Dock	26	11/25/2019	Moorings	Confirmed	12/1/2019	12/4/2019	46'	3
Guest Dock	12	11/25/2019	WEBSITE	Confirmed	11/26/2019	11/28/2019	42'	2
Guest Dock	28	11/26/2019	WEBSITE	Confirmed	11/26/2019	11/28/2019	38'	2
Guest Dock	14	11/26/2019	Parks Central Reservations	Confirmed	11/29/2019	12/1/2019	28'	2
Guest Dock	14	11/26/2019	Parks Central Reservations	Confirmed	11/26/2019	11/27/2019	34'	1
Guest Dock	12	11/26/2019	WEBSITE	Confirmed	11/29/2019	11/30/2019	25'	1
Guest Dock	5	11/26/2019	WEBSITE	Confirmed	11/30/2019	12/1/2019	36'	1
Guest Dock	4	11/26/2019	WEBSITE	Confirmed	12/7/2019	12/14/2019	38'	7
Guest Dock	21	11/27/2019	WEBSITE	Confirmed	11/27/2019	11/29/2019	45'	2
Guest Dock	3	11/27/2019	WEBSITE	Confirmed	11/29/2019	12/3/2019	33'	4
Guest Dock	21	11/27/2019	WEBSITE	Confirmed	11/29/2019	11/30/2019	45'	1
Guest Dock	11	11/27/2019	WEBSITE	Confirmed	11/28/2019	11/30/2019	42'	2
Guest Dock	26	11/27/2019	WEBSITE	Confirmed	11/27/2019	11/28/2019	40'	1
Guest Dock	2	11/27/2019	WEBSITE	Confirmed	11/30/2019	12/2/2019	38'	2
Guest Dock	7	11/28/2019	WEBSITE	Confirmed	11/28/2019	11/29/2019		1
Guest Dock	7	11/28/2019	WEBSITE	Confirmed	11/29/2019	12/2/2019	26'	3
Guest Dock	6	11/29/2019	WEBSITE	Confirmed	12/1/2019	12/3/2019	37'	2
Guest Dock	19	11/29/2019	WEBSITE	Confirmed	11/29/2019	11/30/2019	57'	1
Guest Dock	7	11/29/2019	WEBSITE	Confirmed	12/2/2019	12/3/2019	27'	1
Guest Dock	19	11/29/2019	WEBSITE	Confirmed	11/30/2019	12/10/2019	57'	10
Guest Dock	12	11/29/2019	WEBSITE	Confirmed	11/30/2019	12/1/2019	25'	1
Guest Dock	5	11/30/2019	WEBSITE	Confirmed	12/14/2019	12/16/2019	38'	2
Guest Dock	16	11/30/2019	WEBSITE	Confirmed	12/1/2019	12/6/2019	37'	5
Guest Dock	6	11/30/2019	WEBSITE	Confirmed	12/3/2019	12/10/2019	37'	7
Guest Dock	10	11/30/2019	WEBSITE	Confirmed	11/30/2019	12/3/2019	25'	3
Guest Dock	5	12/1/2019	WEBSITE	Confirmed	12/5/2019	12/10/2019	44'	5
Guest Dock	4	12/1/2019	WEBSITE	Confirmed	12/5/2019	12/6/2019	26'	1
Guest Dock	12	12/1/2019	WEBSITE	Confirmed	12/2/2019	12/3/2019	32'	1
Guest Dock	28	12/1/2019	WEBSITE	Confirmed	12/2/2019	12/4/2019	30'	2
Guest Dock	21	12/1/2019	WEBSITE	Confirmed	12/2/2019	12/3/2019	28'	1
Guest Dock	2	12/2/2019	Parks Central Reservations	Confirmed	12/2/2019	12/3/2019	26'	1
Guest Dock	20	12/2/2019	Parks Central Reservations	Confirmed	12/2/2019	12/6/2019	44'	4
Guest Dock	1	12/2/2019	Parks Central Reservations	Confirmed	12/2/2019	12/6/2019	32'	4
Guest Dock	5	12/2/2019	WEBSITE	Confirmed	12/3/2019	12/5/2019	30'	2
Guest Dock	18	12/2/2019	Parks Central Reservations	Confirmed	12/7/2019	12/15/2019	65'	8
Guest Dock	18	12/2/2019	Parks Central Reservations	Confirmed	12/15/2019	12/17/2019	65'	2
Guest Dock	13	12/2/2019	Moorings	Confirmed	12/2/2019	12/3/2019	30'	1
Guest Dock	11	12/2/2019	Moorings	Confirmed	12/26/2019	1/7/2020	30'	12
Guest Dock	21	12/2/2019	WEBSITE	Confirmed	12/3/2019	12/6/2019	63'	3
Guest Dock	6	12/2/2019	WEBSITE	Confirmed	12/16/2019	12/17/2019	10'	1
Guest Dock	11	12/2/2019	Parks Central Reservations	Confirmed	12/3/2019	12/6/2019	36'	3
Guest Dock	12	12/2/2019	WEBSITE	Confirmed	12/3/2019	12/4/2019	32'	1

Marina	Mooring	Date Reservation Made	Made At	Status	Arrival Date	Departure Date	Boat Length	Length of Stay (Nights)
Guest Dock	3	12/2/2019	WEBSITE	Confirmed	12/3/2019	12/4/2019	46'	1
Guest Dock	3	12/2/2019	WEBSITE	Confirmed	12/4/2019	12/5/2019	46'	1
Guest Dock	7	12/2/2019	WEBSITE	Confirmed	12/5/2019	12/6/2019	30'	1
Guest Dock	14	12/2/2019	WEBSITE	Confirmed	12/3/2019	12/4/2019	28'	1
Guest Dock	28	12/3/2019	WEBSITE	Confirmed	12/4/2019	12/7/2019	30'	3
Guest Dock	13	12/3/2019	WEBSITE	Confirmed	12/3/2019	12/6/2019	30'	3
Guest Dock	14	12/3/2019	Parks Central Reservations	Confirmed	12/5/2019	12/6/2019	28'	1
Guest Dock	12	12/3/2019	WEBSITE	Confirmed	12/5/2019	12/6/2019	32'	1
Guest Dock	3	12/4/2019	WEBSITE	Confirmed	12/5/2019	12/6/2019	46'	1
Guest Dock	12	12/4/2019	WEBSITE	Confirmed	12/4/2019	12/5/2019	32'	1
Guest Dock	5	12/4/2019	WEBSITE	Confirmed	12/16/2019	12/17/2019	30'	1
Guest Dock	8	12/4/2019	WEBSITE	Confirmed	12/7/2019	12/8/2019	22'	1
Guest Dock	9	12/5/2019	WEBSITE	Confirmed	12/5/2019	12/6/2019	39'	1
Guest Dock	26	12/5/2019	Parks Central Reservations	Confirmed	12/5/2019	12/6/2019	30'	1
Guest Dock	2	12/5/2019	WEBSITE	Confirmed	12/5/2019	12/6/2019	32'	1
Guest Dock	16	12/5/2019	WEBSITE	Confirmed	12/6/2019	12/8/2019	37'	2
Guest Dock	19	12/6/2019	WEBSITE	Confirmed	12/11/2019	12/14/2019	45'	3
Guest Dock	7	12/6/2019	Parks Central Reservations	Confirmed	12/6/2019	12/10/2019	35'	4
Guest Dock	4	12/6/2019	WEBSITE	Confirmed	12/20/2019	12/21/2019	36'	1
Guest Dock	12	12/6/2019	WEBSITE	Confirmed	12/6/2019	12/13/2019	46'	7
Guest Dock	13	12/6/2019	WEBSITE	Confirmed	12/8/2019	12/10/2019	38'	2
Guest Dock	10	12/6/2019	WEBSITE	Confirmed	12/7/2019	12/8/2019	30'	1
Guest Dock	27	12/6/2019	WEBSITE	Confirmed	12/7/2019	12/8/2019	30'	1
Guest Dock	16	12/6/2019	WEBSITE	Confirmed	12/9/2019	12/10/2019	26'	1
Guest Dock	15	12/7/2019	WEBSITE	Confirmed	12/7/2019	12/8/2019	44'	1
Guest Dock	11	12/7/2019	WEBSITE	Confirmed	12/7/2019	12/8/2019	19'	1
Guest Dock	18	12/7/2019	WEBSITE	Confirmed	12/21/2019	12/22/2019	58'	1
Guest Dock	26	12/7/2019	WEBSITE	Confirmed	12/21/2019	12/29/2019	40'	8
Guest Dock	11	12/7/2019	WEBSITE	Confirmed	12/9/2019	12/10/2019	32'	1
Guest Dock	11	12/7/2019	WEBSITE	Confirmed	12/10/2019	12/13/2019	32'	3
Guest Dock	9	12/7/2019	WEBSITE	Confirmed	12/8/2019	12/11/2019	25'	3
Guest Dock	14	12/7/2019	WEBSITE	Confirmed	12/8/2019	12/9/2019	43'	1
Guest Dock	10	12/8/2019	WEBSITE	Confirmed	12/8/2019	12/9/2019	30'	1
Guest Dock	16	12/8/2019	WEBSITE	Confirmed	12/8/2019	12/9/2019	37'	1
Guest Dock	26	12/8/2019	WEBSITE	Confirmed	12/9/2019	12/13/2019	34'	4
Guest Dock	27	12/8/2019	WEBSITE	Confirmed	12/8/2019	12/9/2019	30'	1
Guest Dock	15	12/8/2019	WEBSITE	Confirmed	12/9/2019	12/10/2019	32'	1
Guest Dock	14	12/8/2019	WEBSITE	Confirmed	12/9/2019	12/10/2019	28'	1
Guest Dock	8	12/8/2019	WEBSITE	Confirmed	12/9/2019	12/10/2019	34'	1
Guest Dock	16	12/9/2019	WEBSITE	Confirmed	12/10/2019	12/11/2019	37'	1
Guest Dock	2	12/9/2019	Moorings	Confirmed	12/24/2019	12/26/2019	26'	2
Guest Dock	12	12/9/2019	Moorings	Confirmed	12/23/2019	12/27/2019	44'	4
Guest Dock	10	12/9/2019	WEBSITE	Confirmed	12/9/2019	12/10/2019	27'	1
Guest Dock	27	12/9/2019	WEBSITE	Confirmed	12/9/2019	12/10/2019	30'	1
Guest Dock	28	12/9/2019	Moorings	Confirmed	12/9/2019	12/10/2019	36'	1
Guest Dock	28	12/9/2019	Moorings	Confirmed	12/10/2019	12/11/2019	36'	1
Guest Dock	28	12/9/2019	Moorings	Confirmed	12/11/2019	12/13/2019	36'	2
Guest Dock	2	12/9/2019	Moorings	Confirmed	12/9/2019	12/10/2019	26'	1
Guest Dock	2	12/9/2019	Moorings	Confirmed	12/10/2019	12/11/2019	26'	1
Guest Dock	27	12/9/2019	Moorings	Confirmed	12/10/2019	12/13/2019	34'	3
Guest Dock	22	12/9/2019	Moorings	Confirmed	12/9/2019	12/10/2019	34'	1
Guest Dock	15	12/9/2019	WEBSITE	Confirmed	12/10/2019	12/11/2019	32'	1
Guest Dock	13	12/9/2019	WEBSITE	Confirmed	12/10/2019	12/16/2019	38'	6
Guest Dock	6	12/9/2019	WEBSITE	Confirmed	12/11/2019	12/12/2019	38'	1
Guest Dock	3	12/9/2019	WEBSITE	Confirmed	12/10/2019	12/11/2019	52'	1
Guest Dock	14	12/9/2019	WEBSITE	Confirmed	12/10/2019	12/11/2019	45'	1
Guest Dock	10	12/10/2019	Moorings	Confirmed	12/10/2019	12/12/2019	28'	2
Guest Dock	6	12/10/2019	WEBSITE	Confirmed	12/10/2019	12/11/2019	26'	1

Marina	Mooring	Date Reservation Made	Made At	Status	Arrival Date	Departure Date	Boat Length	Length of Stay (Nights)
Guest Dock	3	12/10/2019	WEBSITE	Confirmed	12/24/2019	12/26/2019	50'	2
Guest Dock	16	12/10/2019	Moorings	Confirmed	12/11/2019	12/13/2019	41'	2
Guest Dock	16	12/10/2019	Moorings	Confirmed	12/13/2019	12/17/2019	41'	4
Guest Dock	19	12/10/2019	Moorings	Confirmed	12/10/2019	12/11/2019	41'	1
Guest Dock	15	12/10/2019	WEBSITE	Confirmed	12/11/2019	12/12/2019	32'	1
Guest Dock	14	12/11/2019	WEBSITE	Confirmed	12/11/2019	12/14/2019	30'	3
Guest Dock	9	12/11/2019	WEBSITE	Confirmed	12/11/2019	12/12/2019	10'	1
Guest Dock	7	12/11/2019	WEBSITE	Confirmed	12/11/2019	12/13/2019	12'	2
Guest Dock	20	12/11/2019	WEBSITE	Confirmed	12/13/2019	12/16/2019	63'	3
Guest Dock	20	12/11/2019	WEBSITE	Confirmed	12/23/2019	12/25/2019	63'	2
Guest Dock	5	12/11/2019	WEBSITE	Confirmed	12/12/2019	12/14/2019	30'	2
Guest Dock	15	12/11/2019	WEBSITE	Confirmed	12/12/2019	12/13/2019	32'	1
Guest Dock	10	12/12/2019	WEBSITE	Confirmed	12/12/2019	12/13/2019	28'	1
Guest Dock	16	12/12/2019	WEBSITE	Confirmed	12/23/2019	12/25/2019	37'	2
Guest Dock	8	12/12/2019	WEBSITE	Confirmed	12/13/2019	12/14/2019	38'	1
Guest Dock	6	12/12/2019	WEBSITE	Confirmed	12/12/2019	12/13/2019	37'	1
Guest Dock	21	12/13/2019	WEBSITE	Confirmed	12/13/2019	12/16/2019	45'	3
Guest Dock	9	12/13/2019	WEBSITE	Confirmed	12/13/2019	12/14/2019	37'	1
Guest Dock	12	12/13/2019	WEBSITE	Confirmed	12/13/2019	12/14/2019	32'	1
Guest Dock	22	12/13/2019	WEBSITE	Confirmed	12/13/2019	12/19/2019	46'	6
Guest Dock	26	12/13/2019	WEBSITE	Confirmed	12/13/2019	12/16/2019	36'	3
Guest Dock	14	12/13/2019	WEBSITE	Confirmed	12/14/2019	12/16/2019	30'	2
Guest Dock	4	12/14/2019	WEBSITE	Confirmed	12/14/2019	12/16/2019	30'	2
Guest Dock	8	12/14/2019	WEBSITE	Confirmed	12/14/2019	12/16/2019	44'	2
Guest Dock	21	12/14/2019	WEBSITE	Confirmed	12/16/2019	12/21/2019	45'	5
Guest Dock	13	12/14/2019	WEBSITE	Confirmed	12/17/2019	12/20/2019	48'	3
Guest Dock	16	12/15/2019	WEBSITE	Confirmed	12/17/2019	12/19/2019	41'	2
Guest Dock	2	12/15/2019	WEBSITE	Confirmed	12/17/2019	12/20/2019	32'	3
Guest Dock	7	12/15/2019	WEBSITE	Confirmed	12/16/2019	12/17/2019	40'	1
Guest Dock	9	12/15/2019	WEBSITE	Confirmed	12/15/2019	12/16/2019	22'	1
Guest Dock	4	12/15/2019	WEBSITE	Confirmed	12/16/2019	12/17/2019	27'	1
Guest Dock	14	12/16/2019	WEBSITE	Confirmed	12/16/2019	12/19/2019	30'	3
Guest Dock	13	12/16/2019	WEBSITE	Confirmed	12/16/2019	12/17/2019	38'	1
Guest Dock	11	12/16/2019	Parks Central Reservations	Confirmed	12/16/2019	12/18/2019	28'	2
Guest Dock	26	12/16/2019	Parks Central Reservations	Confirmed	12/16/2019	12/20/2019	33'	4
Guest Dock	10	12/16/2019	Parks Central Reservations	Confirmed	12/16/2019	12/17/2019	32'	1
Guest Dock	3	12/16/2019	Parks Central Reservations	Confirmed	12/16/2019	12/20/2019	38'	4
Guest Dock	27	12/16/2019	Moorings	Confirmed	12/18/2019	12/20/2019	34'	2
Guest Dock	27	12/16/2019	Moorings	Confirmed	12/17/2019	12/18/2019	34'	1
Guest Dock	27	12/16/2019	Moorings	Confirmed	12/16/2019	12/17/2019	34'	1
Guest Dock	28	12/16/2019	Parks Central Reservations	Confirmed	12/16/2019	12/20/2019	36'	4
Guest Dock	8	12/16/2019	Parks Central Reservations	Confirmed	12/17/2019	12/20/2019	26'	3
Guest Dock	8	12/16/2019	Parks Central Reservations	Confirmed	12/16/2019	12/17/2019	26'	1
Guest Dock	19	12/16/2019	Moorings	Confirmed	12/15/2019	12/16/2019	36'	1
Guest Dock	9	12/16/2019	WEBSITE	Confirmed	12/16/2019	12/21/2019	33'	5
Guest Dock	19	12/16/2019	WEBSITE	Confirmed	12/16/2019	12/17/2019	60'	1
Guest Dock	22	12/16/2019	Parks Central Reservations	Confirmed	12/20/2019	12/21/2019	30'	1
Guest Dock	27	12/16/2019	Parks Central Reservations	Confirmed	12/23/2019	12/25/2019	30'	2
Guest Dock	22	12/16/2019	Parks Central Reservations	Confirmed	12/19/2019	12/20/2019	30'	1
Guest Dock	7	12/16/2019	WEBSITE	Confirmed	12/17/2019	12/19/2019	40'	2
Guest Dock	5	12/16/2019	WEBSITE	Confirmed	12/17/2019	12/18/2019	27'	1
Guest Dock	18	12/17/2019	Parks Central Reservations	Confirmed	12/18/2019	12/19/2019	37'	1
Guest Dock	7	12/17/2019	Parks Central Reservations	Confirmed	12/23/2019	12/25/2019	27'	2
Guest Dock	27	12/18/2019	WEBSITE	Confirmed	12/25/2019	12/30/2019	36'	5
Guest Dock	11	12/19/2019	Parks Central Reservations	Confirmed	12/19/2019	12/20/2019	28'	1
Guest Dock	2	12/19/2019	WEBSITE	Confirmed	12/20/2019	12/21/2019	32'	1
Guest Dock	4	12/19/2019	WEBSITE	Confirmed	12/19/2019	12/20/2019	30'	1
Guest Dock	19	12/20/2019	WEBSITE	Confirmed	12/23/2019	12/26/2019	46'	3

Marina	Mooring	Date Reservation Made	Made At	Status	Arrival Date	Departure Date	Boat Length	Length of Stay (Nights)
Guest Dock	28	12/20/2019	Moorings	Confirmed	12/24/2019	12/25/2019	36'	1
Guest Dock	9	12/20/2019	Moorings	Confirmed	12/24/2019	12/25/2019	26'	1
Guest Dock	19	12/20/2019	WEBSITE	Confirmed	12/22/2019	12/23/2019	46'	1
Guest Dock	4	12/20/2019	WEBSITE	Confirmed	12/23/2019	12/26/2019	37'	3
Guest Dock	9	12/20/2019	WEBSITE	Confirmed	12/21/2019	12/22/2019	33'	1
Guest Dock	11	12/21/2019	WEBSITE	Confirmed	12/23/2019	12/25/2019	32'	2
Guest Dock	5	12/21/2019	WEBSITE	Confirmed	12/22/2019	12/27/2019	35'	5
Guest Dock	13	12/21/2019	WEBSITE	Confirmed	12/22/2019	12/24/2019	43'	2
Guest Dock	8	12/21/2019	WEBSITE	Confirmed	12/22/2019	12/25/2019	33'	3
Guest Dock	6	12/22/2019	WEBSITE	Confirmed	12/23/2019	12/25/2019	36'	2
Guest Dock	14	12/22/2019	WEBSITE	Confirmed	12/23/2019	12/25/2019	34'	2
Guest Dock	15	12/22/2019	WEBSITE	Confirmed	12/23/2019	12/25/2019	30'	2
Guest Dock	10	12/22/2019	WEBSITE	Confirmed	12/23/2019	12/25/2019	28'	2
Guest Dock	2	12/22/2019	WEBSITE	Confirmed	12/22/2019	12/24/2019	25'	2
Guest Dock	22	12/22/2019	WEBSITE	Confirmed	12/23/2019	12/24/2019	45'	1
Guest Dock	3	12/23/2019	WEBSITE	Confirmed	12/23/2019	12/24/2019	27'	1
Guest Dock	13	12/23/2019	WEBSITE	Confirmed	12/24/2019	12/27/2019	43'	3
Guest Dock	16	12/23/2019	WEBSITE	Confirmed	12/30/2019	1/2/2020	22'	3
Guest Dock	18	12/23/2019	WEBSITE	Confirmed	12/24/2019	12/25/2019	45'	1
Guest Dock	28	12/23/2019	WEBSITE	Confirmed	12/23/2019	12/24/2019	31'	1
Guest Dock	8	12/24/2019	WEBSITE	Confirmed	12/25/2019	12/26/2019	30'	1
Guest Dock	22	12/24/2019	WEBSITE	Confirmed	12/24/2019	1/8/2020	61'	15
Guest Dock	18	12/24/2019	WEBSITE	Confirmed	12/25/2019	12/26/2019	45'	1
Guest Dock	9	12/24/2019	WEBSITE	Confirmed	12/25/2019	12/26/2019	31'	1
Guest Dock	18	12/24/2019	WEBSITE	Confirmed	12/26/2019	12/27/2019	46'	1
Guest Dock	28	12/24/2019	WEBSITE	Confirmed	12/25/2019	12/27/2019	37'	2
Guest Dock	21	12/25/2019	WEBSITE	Confirmed	12/27/2019	12/29/2019	47'	2
Guest Dock	10	12/25/2019	WEBSITE	Confirmed	12/25/2019	12/30/2019	32'	5
Guest Dock	16	12/25/2019	WEBSITE	Confirmed	12/25/2019	12/26/2019	32'	1
Guest Dock	4	12/25/2019	WEBSITE	Confirmed	12/26/2019	12/31/2019	37'	5
Guest Dock	5	12/25/2019	WEBSITE	Confirmed	12/27/2019	1/1/2020	35'	5
Guest Dock	14	12/26/2019	WEBSITE	Confirmed	12/26/2019	12/27/2019	32'	1
Guest Dock	19	12/26/2019	Parks Central Reservations	Confirmed	12/26/2019	12/28/2019	39'	2
Guest Dock	20	12/26/2019	Parks Central Reservations	Confirmed	12/25/2019	12/26/2019	39'	1
Guest Dock	3	12/26/2019	Moorings	Confirmed	12/30/2019	12/31/2019	26'	1
Guest Dock	12	12/26/2019	Moorings	Confirmed	12/30/2019	1/3/2020	44'	4
Guest Dock	9	12/26/2019	WEBSITE	Confirmed	12/26/2019	12/27/2019	31'	1
Guest Dock	13	12/26/2019	WEBSITE	Confirmed	12/27/2019	12/28/2019	43'	1
Guest Dock	6	12/27/2019	WEBSITE	Confirmed	12/27/2019	12/30/2019	24'	3
Guest Dock	20	12/27/2019	WEBSITE	Confirmed	12/27/2019	12/28/2019	58'	1
Guest Dock	12	12/27/2019	WEBSITE	Confirmed	12/27/2019	12/29/2019	23'	2
Guest Dock	15	12/27/2019	WEBSITE	Confirmed	12/27/2019	12/29/2019	16'	2
Guest Dock	3	12/27/2019	WEBSITE	Confirmed	12/29/2019	12/30/2019	48'	1
Guest Dock	7	12/27/2019	WEBSITE	Confirmed	12/27/2019	12/28/2019	45'	1
Guest Dock	21	12/27/2019	WEBSITE	Confirmed	12/29/2019	12/30/2019	58'	1
Guest Dock	3	12/27/2019	WEBSITE	Confirmed	12/28/2019	12/29/2019	58'	1
Guest Dock	28	12/28/2019	WEBSITE	Confirmed	12/28/2019	1/1/2020	32'	4
Guest Dock	26	12/28/2019	WEBSITE	Confirmed	12/29/2019	12/31/2019	40'	2
Guest Dock	13	12/28/2019	WEBSITE	Confirmed	12/29/2019	12/30/2019	43'	1
Guest Dock	6	12/29/2019	WEBSITE	Confirmed	12/30/2019	12/31/2019	24'	1
Guest Dock	13	12/29/2019	WEBSITE	Confirmed	12/30/2019	12/31/2019	43'	1
Guest Dock	2	12/30/2019	WEBSITE	Confirmed	12/30/2019	12/31/2019	33'	1
Guest Dock	21	12/30/2019	WEBSITE	Confirmed	12/30/2019	12/31/2019	58'	1
Guest Dock	9	12/30/2019	WEBSITE	Confirmed	12/30/2019	1/3/2020	32'	4
Guest Dock	19	12/30/2019	Moorings	Confirmed	12/30/2019	1/2/2020	46'	3
Guest Dock	13	12/30/2019	WEBSITE	Confirmed	12/31/2019	1/1/2020	43'	1
Guest Dock	6	12/31/2019	WEBSITE	Confirmed	12/31/2019	1/1/2020	24'	1

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DATA FOR SIYB MARINAS AND YACHT CLUBS

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Facility	Slip/Mooring Reference Number	Percent of Time Occupied	Vessel Type (Power or Sail)	Vessel Length	Vessel Beam	Paint Type Copper, Low or Non	Paint Product Name	Product Number	Boatyard Name or Purchase Date	Painting Date Month (mm)	Painting Date Year (yyyy)	% Copper	Category 1 reg #
SDYC	1016	99	Electric	18	6	Low Copper	Interlux Ultrakote Blue	Y3669F	Shelter Island Boatyard	Sept	2015	55	2693-212-AA
SDYC	1223	96	Electric	25	19	Low Copper	Proline 1088-6	A1088G	Shelter Island Boatyard	Nov	2016	60	60061-94-ZB
SDYC	1246	100	Electric	20	7	Low Copper	Interlux Ultra Black	Y3779F	Shelter Island Boatyard	Jun	2017	55	2693-212-AA
SDYC	1270	100	Electric	18	6	Low Copper	Interlux Bottomkote Pro	79	Shelter Island Boatyard	Jun	2017	22	
SDYC	1280	80	Electric	23	7.2	Low Copper	Interlux Ultra	Y3779F	Driscoll	Apr	2017	55	2693-212-AA
SDYC	1286	100	Electric	18	6	Low Copper	SeaHawk AF33	3345	Driscoll	Jun	2015	33	44891-12-AA
SDYC	1293	100	Electric	19	7	Copper			Purchased Feb 2017		2017	67	
SDYC	1384	93	Electric	21	6	Copper	Interlux Ultra Black	Y3779F	Shelter Island Boatyard	Oct	2018	55	
SDYC	1417	100	Electric	30	8.5	non Copper	Ceramcote	99M	Shelter Island Boatyard	Jun	2002	0	
SDYC	1545	95	Electric	30	9	Low Copper	Pettit Z-spar Protector	B-94	Driscoll	Dec	2009	65	
SDYC	1575	100	Electric	18	7	Low Copper	Interlux Ultra - Blue	Y3669F	Shelter Island Boatyard	May	2018	55	2693-212-AA
SDYC	1584	100	Electric	31	11.3	Low Copper	Pettit Z-Spar	411187706	Driscoll	Dec	2011	65	60061-94-ZE
SDYC	1383	98	May	39	12	Copper			Shelter Island Boatyard	Mar	2017	0	
SDYC	1000	100	Power	40	13.5	Copper	Interlux Ultra	Y3779F	N/A		N/A	67	2693-212-AA
SDYC	1001		Power	37	12	Copper	Purchased aug 2018			Aug	2018	67	
SDYC	1004	100	Power	47	14.6	Low Copper	Interlux Ultra Blue	Y3669F	Shelter Island BoatYard	Mar	2015	55	2693-212-AA
SDYC	1006	86	Power	35	9.5	Low Copper	Interlux VC Offshore	V118	Driscoll	May	2016	41.19	
SDYC	1007	92	Power	38.2	13.4	Low Copper	Interlux Ultra	Y3779F	Shelter Island Boatyard	April	2019	55	2693-212-AA
SDYC	1009	93	Power	21	8	Low Copper	Pettit Trinidad	A1088G	Shelter Island Boatyard	Aug	2019	60	60061-94-ZB
SDYC	1010	100	Power	38	10	Low Copper	Seahawk AF33	3345	Driscoll	Jan	2005	33	44891-12-AA
SDYC	1012	99	Power	21	8	Copper	Proline 1088-6	1088C-01	Shelter Island Boatyard	Jan	2019	66.9	
SDYC	1013	100	Power	36	13	Low Copper	Proline 1088-6	A1088G	Shelter Island Boatyard	Nov	2018	67	60061-94-ZB
SDYC	1015	97	Power	25	8	Low Copper	Interlux Ultra Black	Y3779F	Shelter Island Boatyard	Mar	2019	55	2693-212-AA
SDYC	1022	92	Power	43	14	Low Copper	Bluewater Shelter Island		Shelter Island Boatyard	Mar	2018	0	
SDYC	1023	95	Power	42	12	Low Copper	Interlux Ultra	Y3779F	Shelter Island Boatyard	Apr	2018	55	2693-212-AA
SDYC	1026	99	Power	31	10.3	Low Copper	Zspar Bottom Pro Gold Black	411127906	SD Boatyard	May	2016	40	60061-117-ZE
SDYC	1032	99	Power	18.5	7	Low Copper	SeaHawk AF33	3345	Shelter Island Boatyard	Apr	2006	33	44891-12-AA
SDYC	1034	75	Power	20	6	Non Copper	No Bottom Paint				N/A	0	
SDYC	1035	89	Power	63.5	16.6	Low Copper	Interlux Ultra	Y3779F	Driscoll	Mar	2017	55	2693-212-AA
SDYC	1037	96	Power	40	14	Low Copper	Interlux Bottomkote	10397	Driscoll	Jun	2016	42.75	
SDYC	1038	95	Power	25	6.5	Low Copper	Nautical Super Proguard Modified Epoxy - Blue	NAU770	Nielsen Beaumont	Mar	2017	55	23566-20-ZR
SDYC	1042	100	Power	33	12.8	Copper	Pettit Z-Spar Protector	B-94	Sunset Aquatic Shipyard	Mar	2017	65	
SDYC	1043	95	Power	40	14	Low Copper	Interlux K92	K91	Driscoll	Jul	2016	70.2	
SDYC	1044	98	Power	50	15.8	Low Copper	Proline 1088-6	A1088G	Shelter Island Boatyard	Aug	2017	60	60061-94-ZB
SDYC	1045	98	Power	59	16	Low Copper	Interlux Ultra	Y3779F	Shelter Island Boatyard	Nov	2018	55	2693-212-AA
SDYC	1047		Power	42	15	Low Copper	Interlux Ultra	Y3669F	Driscoll Mission Bay	Oct	2016	55	2693-212-AA
SDYC	1052	100	Power	48	15.2	Low Copper	Interlux Bottomkote	10397	Driscoll	Jul	2016	42.75	
SDYC	1053	96	Power	42	15	Low Copper	Pettit Ultima / Bottom Pro Gold - Kop Coat	411187706	Huntington Harbor Yard	Oct	2015	65	60061-94-ZE
SDYC	1059	100	Power	42	13.5	Low Copper	Trinidad Pro-7	A1877G	Driscoll	Aug	2014	60	60061-94-ZD
SDYC	1061	97	Power	42	13.6	Copper	Interlux Ultra	Y3779F	Koehler	Oct	2018	55	2693-212-AA
SDYC	1065	90	Power	36	12.6	Low Copper	Purchased Aug 2016				2016	67	
SDYC	1066	98	Power	57	14.5	Low Copper	Interlux Bottomkote	10397	Shelter Island Boatyard	Sep	2010	42.75	
SDYC	1067	97	Power	25	8	Low Copper	Interlux Ultra Red	YBA472	Self Applied	Jan	2017	35	2693-187-ZE
SDYC	1068	84	Power	17	6	Low Copper	Pettit B-94 Protector Black	B-94	Driscoll Boat Works	Oct	2015	65	
SDYC	1072	100	Power	40	12	Low Copper	Interlux Ultra	Y3779F	Shelter Island Boatyard	May	2019	55	2693-212-AA
SDYC	1076	98	Power	31.7	11.4	Low Copper	Woolsey Defense Black	4901	Nielsen Beaumont Boat Yard	Jul	2017	40	60061-117-ZA
SDYC	1077	100	Power	39	12	Low Copper	Ultrakote-6	Y3559U	Shelter Island Boatyard	Nov	2015	57	
SDYC	1081	0	Power	21	8.3	Low Copper	Proguard Ablative Blue	NAU990	Explorer Marine Services	Apr	2018	41.97	
SDYC	1083	75	Power	46	14.6	Copper	Pettit Trinidad Black	1875	Self Applied	Aug	2017	70	
SDYC	1084	97	Power	50	15	Copper	Interlux Calif Bottomkote-7	YBA140	Outside SD County	Oct	2018	35	2693-18-ZA
SDYC	1087	96	Power	25	8.3	Low Copper	Interlux Micron	YBA470	Shelter Island Boatyard	Apr	2018	65	2693-187-ZD
SDYC	1088	84	Power	17	7	Copper	Interlux Aqua	YBA549	Driscoll	Aug	2019	46	
SDYC	1089	98	Power	32	12	Low Copper	Pettit Horizons	1250	Shelter Island Boatyard	Jul	2019	40.5	60061-101-AA
SDYC	1090	99	Power	38	13	Low Copper	Super Proguard Epoxy	NAU773	Nielsen Beaumont	Mar	2018	55	23566-20-ZT
SDYC	1091	99	Power	48	15	Low Copper	Trinidad	A1088G	Shelter Island Boatyard	Nov	2019	60	60061-94-ZB
SDYC	1093	97	Power	38.4	13.8	Low Copper	Interlux Ultrakote Black	2779N	Shelter Island Boatyard	Nov	2015	66.5	
SDYC	1095	99	Power	36	14	Low Copper	Interlux Ultra	Y3779F	Shelter Island Boatyard	May	2017	55	2693-212-AA
SDYC	1096	94	Power	36.3	11.9	Low Copper	Interlux Ultrakote	2779N	Shelter Island Boatyard	Apr	2016	66.5	
SDYC	1099	95	Power	33	10	Copper	Pettit Z-Spar Protector	B-94	Driscoll	Feb	2017	65	
SDYC	1100	100	Power	31	10	Low Copper	Awlstar	BP501	Driscoll	Jun	2018	40.36	
SDYC	1102	98	Power	23	8.5	Low Copper	Interlux Calif Bottomkote-7	YBA143	Driscoll	Dec	2015	35	2693-18-ZA

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SDYC	1105	90	Power	38	13.5	Low Copper	Interlux Ultra	Y3779F	Koehler Kraft	Jun	2019	55	2693-212-AA
SDYC	1108	98	Power	37	13.5	Low Copper	Proline	A1088G	Driscoll Mission Bay	Dec	2014		60061-94-ZB
SDYC	1111	100	Power	45.7	14.5	Low Copper	Pettit Z-Spar Protector	B-94	Driscoll	Aug	2016	65	
SDYC	1112	99	Power	35	12	Low Copper	Interlux	Y3779F	Shelter Island Boatyard	Jun	2018	55	2693-212-AA
SDYC	1114	89	Power	32	11.5	Low Copper	Interlux	Y3779F	Koehler	Jul	2018	55	2693-212-AA
SDYC	1117	95	Power	42	14.5	Low Copper	Interlux Ultra	Y3779F	Shelter Island Boatyard	Mar	2016	55	2693-212-AA
SDYC	1118	99	Power	17	5	Low Copper	Monterey	5445	Self Applied	Sept	2016	58	
SDYC	1119	100	Power	53	14	Low Copper	Interlux Ultra	Y3669F	Shelter Island Boatyard	Aug	2018	55	2693-212-AA
SDYC	1121	98	Power	48.6	16	Low Copper	Interlux Ultra	Y3779F	Shelter Island Boatyard	Feb	2017	55	2693-212-AA
SDYC	1122	98	Power	47.9	15.5	Low Copper	Interlux Ultra	Y3779F	Shelter Island Boatyard	Nov	2017	55	2693-212-AA
SDYC	1124	99	Power	37	10	Low Copper	Interlux Nautical Proguard red	NAU772	Driscoll	Jul	2019	55	23566-20-ZS
SDYC	1125	100	Power			Low Copper						0	
SDYC	1129	67	Power	32.4	12.3	Non Copper	Ceramcoat	99M	Shelter Island Boatyard	Jun	2008	0	
SDYC	1132	95	Power	21.3	8.4	Low Copper	Bottomshield	411186606	Cogswell Marine	Aug	2015	28.86	60061-129-AA
SDYC	1134	95	Power	37	13	Copper	Ultrakote-6	Y3669U	Koehler	Jun	2017	57	
SDYC	1135	100	Power	33	12.5	Copper	Interlux Ultra - "Ultra Coat"	2779N	Koehler	Jun	2017	66.5	
SDYC	1136	99	Power	38	13	Low Copper	Interlux Calif Bottomkote - 7	69	Outside SD County	May	2019	22	
SDYC	1142	84	Power	42	13	Copper	Interlux Bottomkote	B-91	Koehler	Jun	2019	65	
SDYC	1145	98	Power	28	8	Low Copper	Interlux Interspeed	BQA659/5GL	Shelter Island Boatyard	Oct	2014	38	2693-176-ZB
SDYC	1149	99	Power	47.3	14.9	Low Copper	Interlux Ultra	Y3779F	Shelter Island Boatyard	Apr	2019	55	2693-212-AA
SDYC	1150	100	Power	35	11	Low Copper	Interlux Ultra	Y3779F	Shelter Island Boatyard	Mar	2018	55	2693-212-AA
SDYC	1153	100	Power	38	13	Low Copper	Proline 1088-6	A1088G	Shelter Island Boatyard	Jun	2017	60	60061-94-ZB
SDYC	1155	99	power	36	13	Low Copper	Bluewater Copper Pro	8101	Shelter Island Boatyard	Apr	2016	67	
SDYC	1158	90	Power	70	19	Low Copper	SeaHawk AF33	3345	Marine Group / South Bay	Feb	2017	33	44891-12-AA
SDYC	1162	99	Power	36	13	Low Copper	Trinidad Pro-7	A1088G	Shelter Island Boatyard	Oct	2019	60	60061-94-ZB
SDYC	1166	100	Power	33.1	9.7	copper						67	
SDYC	1167	98	Power	42	12.8	Copper	Purchased April 2017				2017	67	
SDYC	1170	98	Power	27.1	13.3	Copper	Interlux Micron	YBA470	Nielsen Beaumont	Jul	2017	35	2693-187-ZD
SDYC	1173	99	Power	33	9	Low Copper	Interlux Ultra	Y3779F	Other	May	2019	55	2693-212-AA
SDYC	1174	96	Power	31	10	Copper	Interlux Ultra	Y3779F	Shelter Island Boatyard	Apr	2019	55	2693-212-AA
SDYC	1181	100	Power	46.4	11.6	Low Copper	Interlux Ultra	Y3779F	Shelter Island Boatyard	Jul	2017	55	2693-212-AA
SDYC	1188	98	Power	38	13	Low Copper	Interlux Ultra	Y3779F	Shelter Island Boatyard	Mar	2016	67	2693-212-AA
SDYC	1189	92	Power	26	7	Low Copper	ABC 3-2	ABC3-41	Outside SD County	Feb	2010	47.99	
SDYC	1191	99	Power	33	11.3	Low Copper	Proline 1088-6	A1088G	Driscoll	Dec	2013	60	60061-94-ZB
SDYC	1192	86	Power	21	8	Low Copper	Sharkskin-7	6145	Shelter island Boatyard	Jun	2013	45	44891-11-AA
SDYC	1194	81	Power	22	8	Low Copper	ABC3-2	ABC3-92	SD Boatyard	Oct	2006	47.99	
SDYC	1197		Power	44	15		Interlux Black	Y3779F	Driscoll	Feb	2017	55	2693-212-AA
SDYC	1202	93	Power	68	18	Low Copper	Interlux Micron	5693	Shelter Island Boatyard	Jul	2019	35	
SDYC	1206	97	Power	43	14	Low Copper	Pettit Z-Spar Protector	B-94	Shelter Island Boatyard	Aug	2015	65	
SDYC	1207	97	Power	40	12	Low Copper	Interlux Ultra	Y3779F	Shelter Island Boatyard	Mar	2016	55	2693-212-AA
SDYC	1208	98	Power	35	11	Low Copper	Interlux Bottomkote	10397	Koehler	Nov	2016	42.75	
SDYC	1210	100	Power	30	10.3	Low Copper	Interlux Ultra	Y3449F	Shelter Island Boatyard	Jun	2018	55	2693-212-AA
SDYC	1212	99	Power			Low Copper						0	
SDYC	1213	99	Power	34	12.6	Copper	Purchased Jun 2017				2017	67	
SDYC	1214	96	Power	40	14	Low Copper	Pettit Black	Y3779F	Shelter Island Boatyard	Jan	2019	55	2693-212-AA
SDYC	1217	98	Power	25.3	9.5	Low Copper	Pettit Vivid-3	1861	Driscoll	Jan	2014	25	60061-116-AA
SDYC	1220	97	Power	46	14	Copper	Pettit Protector	B-94	Marine Group Boat Works	Jul	2018	65	
SDYC	1224	100	Power	28	9	Copper	Pettit Z-Spar Protector	B-91	Driscoll	Jun	2019	65	
SDYC	1227	76	Power	42	14	Copper	Interlux Aqua	YBA579	Driscoll	Jan	2018	46	
SDYC	1228	87	Power	30	10	Low Copper	Interlux Ultra Blue	Y3669F	Shelter Island Boatyard	Mar	2018	55	2693-212-AA
SDYC	1229	63	Power	42	15	Low Copper	Interlux Ultra	Y3779F	Shelter Island Boatyard	Feb	2019	55	2693-212-AA
SDYC	1230	100	Power	31	10	Copper	Interlux Bottomkote	10397	Shelter Island Boatyard	Jun	2018	42.75	
SDYC	1231	90	Power	41	13	Low Copper	Interlux Ultra	Y3669F	Shelter Island Boatyard	Mar	2018	55	2693-212-AA
SDYC	1232	96	Power	33.5	11.6	Low Copper	Interlux Ultra	Y3779F	Shelter Island Boatyard	Mar	2018	55	2693-212-AA
SDYC	1238	97	Power	35	10.6	Low Copper	Pettit Z-Spar Protector	B-94	Driscoll	Jan	2015	65	
SDYC	1239	100	Power	39	12.5	Low Copper	Interlux Ultra	Y3669F	Mountain Marine Industires (Colorado)	Jun	2015	55	2693-212-AA
SDYC	1240	99	Power	25	8.6	Low Copper	Interlux Ultra Black	Y3779F	Shelter Island Boatyard	Mar	2019	67	2693-212-AA
SDYC	1241	90	Power	23	8	Low Copper	Interlux Ultra	Y3669F	Shelter Island Boatyard	Mar	2019	55	2693-212-AA
SDYC	1242	100	Power	47.6	14.4	Low Copper	Interlux Ultra Black 3779F	Y3779F	Shelter Island Boat Yard	Sep	2015	55	2693-212-AA
SDYC	1245	100	Power	25	8	Low Copper	Pettit Vivid-3	1861	Driscoll - Mission Bay	Apr	2016	25	60061-116-AA
SDYC	1248	98	Power	47.1	15.6	Low Copper	Sharkskin-7	6145	SD Boatyard	Nov	2012	45	44891-11-AA

Facility	Slip/Mooring Reference Number	Percent of Time Occupied	Vessel Type (Power or Sail)	Vessel Length	Vessel Beam	Paint Type Copper, Low or Non	Paint Product Name	Product Number	Boatyard Name or Purchase Date	Painting Date Month (mm)	Painting Date Year (yyyy)	% Copper	Category 1 reg #
SDYC	1249	95	Power	36	13.6	Low Copper					2012	67	
SDYC	1252	83	Power	42	13.3	Low Copper	Interlux Ultra Red	YBA472	Shelter Island Boatyard	Mar	2019	35	2693-187-ZE
SDYC	1255	100	Power	50	16.8	Low Copper	Interlux Ultra	Y3779F	Shelter Island Boatyard	May	2015	55	2693-212-AA
SDYC	1257	84	Power	53	19	Copper	Interlux Bottomkote	10397	Marine Group / South Bay	Nov	2018	42.75	
SDYC	1258	100	Power	31	10	Non Copper	Epoxy Bottom	V127/A	Shelter Island Boatyard	Sept	2014	0	
SDYC	1261	99	Power	21	8	Low Copper	Pettit Copper-Guard	1048	Shelter Island Boatyard	Nov	2015	33.26	
SDYC	1266	98	Power	31	11	Copper	Proline 1088-6	1088C-01	Shelter Island Boatyard	Nov	2019	66.9	
SDYC	1269	94	Power	48	14	Low Copper	Interlux Ultra 3669F - Blue	Y3669F	Shelter Island Boatyard	Jan	2018	55	2693-212-AA
SDYC	1273	97	Power	23	6	Copper	Interlux Bottomkote	10397	Shelter Island Boatyard	Jan	2017	42.75	
SDYC	1274	100	Power	25	8	Low Copper	Interlux Ultra	Y3779F	Driscoll	July	2017	55	2693-212-AA
SDYC	1277	99	Power	42	13.5	Low Copper	Interlux Ultra Blue Paint	Y3669F	Shelter Island Boatyard	Jul	2017	55	2693-212-AA
SDYC	1278	98	Power	32	11.5	Copper	Interlux Bottomkote	10397	Koehler	Jan	2017	42.75	
SDYC	1279	90	Power	42	13.5	Low Copper	Interlux Ultra	Y3779F	Shelter Island Boatyard	Apr	2017	55	2693-212-AA
SDYC	1281	100	Power	42	14	Low Copper	Pettit Hydrocoat red	1640	Driscoll	Feb	2017	40.43	60061-87-ZL
SDYC	1283	92	Power	48	15.5	Low Copper	Proline 1088-6	A10886	Driscoll	Aug	2018	60	60061-94-ZB
SDYC	1284	91	Power	39.9	14.2	Non Copper	UNK Red Oxide		Shelter Island Boatyard	Jun	2019	67	
SDYC	1287	95	Power	36	13	Copper	Trilux33-4	YBA060	Driscoll	Jul	2017	16.95	2693-203-AA
SDYC	1290	95	Power	68	18	Low Copper	Interlux Ultra	Y3779F	Shelter Island Boatyard	Apr	2016	55	2693-212-AA
SDYC	1295	98	Power	38	13	Copper						67	
SDYC	1296	94	Power	42	13	non Copper	SeaHawk Tropicoat		Boatyard in Mexico	Mar	2019	0	
SDYC	1297	100	Power	39.5	13.8	Low Copper	Interlux Micron Extra	5693	KKMI and Sausalito, CA	Aug	2015	35	
SDYC	1300	100	Power	39.1	11.9	Copper	Purchased may 2017					67	
SDYC	1301	99	Power	26	9	Low Copper	Trinidad VOC Black	1878	The Boat Yard, MDR	Jan	2013	75.8	
SDYC	1303	100	Power	58	17	Low Copper	Interlux Ultra	Y3779F	Shelter Island Boatyard	Aug	2019	55	2693-212-AA
SDYC	1305	96	Power	56	16.9	Low Copper	Interlux Ultra Black	Y3779F	Shelter Island Boatyard	Oct	2017	55	2693-212-AA
SDYC	1308	100	Power	33.6	10.3	Low Copper	Interlux Ultra	Y3779F	Shelter Island Boatyard	Jun	2015	55	2693-212-AA
SDYC	1310	94	Power	42	15	Non Copper	Intersleek 9000	FXA979/A	Shelter Island Boatyard	Jun	2019	0	
SDYC	1313	97	Power	45.3	14.3	Copper	Interlux UltraKote Black	2779N	Shelter Island Boatyard	Mar	2017	66.5	
SDYC	1315	72	Power	34	11	Low Copper	Pettit Horizons	1850	Driscoll	Jul	2016	40.5	60061-101-AA
SDYC	1318	99	Power	23.5	8.5	Low Copper	Zspar Bottom Pro Gold Black	411127906	Driscoll	Aug	2018	40	60061-117-ZE
SDYC	1320	95	Power	36	12	Low Copper	Interlux Ultra	Y3779F	Shelter Island Boatyard	Aug	2018	55	2693-212-AA
SDYC	1321	97	Power	30	20.5	Low Copper	Purchased November 2016				2016	67	
SDYC	1325	98	Power	32.5	12.3	Low Copper	Interlux Ultra	Y3779F	Koehler	Feb	2011	55	2693-212-AA
SDYC	1326	77	Power	23	7	Low Copper	Trilux33-3	YBA060	Koehler	Jul	2017	16.95	2693-203-AA
SDYC	1328	70	Power	63	15.8	Low Copper	Interlux Ultra Black	Y3779F	Nielsen Beaumont	Jun	2015	55	2693-212-AA
SDYC	1330	100	Power	35	10	Copper	Purchased Oct 2017				2017	67	
SDYC	1332	95	Power	32	9	Low Copper	Interlux Ultra	Y3779F	Shelter Island Boatyard	Jul	2018	55	2693-212-AA
SDYC	1335	100	Power	42	13	Low Copper	Interlux Ultra	Y3779F	Marine Group / South Bay	Apr	2017	55	2693-212-AA
SDYC	1339	100	Power	29	10	Low Copper	Pettit Z-Spar Protector	B-91	Driscoll	Apr	2016	67	
SDYC	1340	100	Power	21	8	Low Copper	Interlux Ultra	Y3779F	Driscoll Mission Bay	Aug	2016	55	2693-212-AA
SDYC	1341	100	Power	27	8	Low Copper	Pettit Vivid White	11161	Nielsen Beaumont	Aug	2017	25	60061-116-AA
SDYC	1342	74	Power	48	14	Low Copper	Purchased Mar 2017	A1088G		Mar	2017	60	60061-94-ZB
SDYC	1344	99	Power	32.9	12	Low Copper	Interlux Ultra	Y3779F	Shelter Island Boatyard	Dec	2017	55	2693-212-AA
SDYC	1347	92	Power	58	16	Copper	Interlux Ultra Cote 3779U	Y3779U	Shelter Island Boatyard	Aug	2017	57	
SDYC	1348	98	Power	47	14.8	Copper	Purchased Mar 2016					67	
SDYC	1349	99	Power	47.2	14.3	Copper	Purchased Feb 2017				2017	67	
SDYC	1351	97	Power	40	14	Non Copper	Intersleek 900	FXA979/A	Shelter Island Boatyard	Feb	2013	0	
SDYC	1354	100	Power	25.5	7	Non Copper	No Bottom Paint				N/A	0	
SDYC	1355	96	Power	47	14.3	Copper	Purchased December 2017				2018	67	
SDYC	1358	97	Power	73	16.4	Copper	Pettit Z-Spar Protector	B-94	Driscoll	Nov	2018	65	
SDYC	1362	100	Power	32	11	Low Copper	Purchased Oct 2013				2016	67	
SDYC	1366	92	Power	65	17	Low Copper	Seaguard-2	P30BQ12	Driscoll	Jul	2015	48	
SDYC	1367	98	Power	17	6	Low Copper	Trinidad SR	A1877G	Shelter Island Boatyard	Jun	2019	60	60061-94-ZD
SDYC	1369	79	Power	44	13.7	Non Copper	Bluewater Shelter Island	8202	Shelter Island Boatyard	Apr	2011	0	
SDYC	1370	90	Power	35.5	13.3	Non Copper	Pettit Ultima Eco	1208	Driscoll	Jun	2018	0	
SDYC	1371	100	Power	24	9	Low Copper	Proline 1088-6	A1088G	Shelter Island Boatyard	Nov	2018	67	60061-94-ZB
SDYC	1372	95	Power	41	12.5	Low Copper	Interlux Ultra	Y3779F	Shelter Island Boatyard	Feb	2015	55	2693-212-AA
SDYC	1375	90	Power	35	10	Low Copper	Interlux Ultra	Y3669F	Shelter Island Boatyard	May	2019	55	2693-212-AA
SDYC	1376	100	Power	36	12.5	Low Copper	Nautical Proguard Ablative	NAU993	Nielsen Beaumont	Nov	2016	41.97	
SDYC	1377	100	Power	38	13.5	Copper	Purchased June 2014				2017	67	
SDYC	1378	95	Power	21	6	Copper	Pettit Z-Spar Protector	B-94	Driscoll	Jul	2017	65	

Facility	Slip/Mooring Reference Number	Percent of Time Occupied	Vessel Type (Power or Sail)	Vessel Length	Vessel Beam	Paint Type Copper, Low or Non	Paint Product Name	Product Number	Boatyard Name or Purchase Date	Painting Date Month (mm)	Painting Date Year (yyyy)	% Copper	Category 1 reg #
SDYC	1379	75	Power	51	14.4	Low Copper	Interlux Ultra	Y3779F	Shelter Island Boatyard	Jun	2018	55	2693-212-AA
SDYC	1388	49	Power	54.6	16.2	Non Copper	Intersleek 900	FXA979/A	Driscoll	Mar	2013	0	
SDYC	1389	100	Power	40	12.6	Copper	Pettit Z-Spar Protector	B-94	Port Salerno Marine (Florida)	Jul	2017	65	
SDYC	1390	99	Power	30	11	Low Copper	Micron Extra-2	5690	Driscoll	Jan	2018	35	
SDYC	1393	97	Power	52.8	15	Low Copper	Interlux Ultra	Y3779F	Shelter Island Boatyard	Feb	2014	55	2693-212-AA
SDYC	1394	100	Power	34	12	Copper	Interlux Bottomkote Pro	YBA579	Shelter Island Boatyard	Jan	2019	46	
SDYC	1395	98	Power	36	12	Low Copper	Interlux Ultra	Y3779F	Shelter Island Boatyard	Oct	2015	55	2693-212-AA
SDYC	1397	100	Power	50	15	Low Copper	Proline 1088-6	A1088G	Shelter Island Boatyard	Nov	2014	60	
SDYC	1400	96	Power	78	20	Low Copper	Interlux Micron CSC HS	YBC582	Shelter Island Boatyard	Mar	2017	33.4	2693-225-AA
SDYC	1403	98	Power	38	12	Low Copper	Interlux Ultra	Y3779F	Shelter Island Boatyard	Apr	2018	65	2693-212-AA
SDYC	1404	78	Power	50	16.5	Low Copper	Interlux Ultra Blue	Y3669F	Shelter Island Boatyard	May	2019	67	2693-212-AA
SDYC	1406		Power	17	8	Copper	Pettit Trinidad HD Black		Shelter Island Boatyard	Jun	2019	55	
SDYC	1408	95	Power	62	16.8	Copper	Interlux Aqua	YBA579	Driscoll	Mar	2016	46	
SDYC	1410	100	Power	33	10.2	Copper	Interlux Interspeed	BZA646	Driscoll	Aug	2015	0	
SDYC	1412	89	Power	30	10	Copper	Purchased Jan 2018				2018	67	
SDYC	1413	99	Power	36.4	10	Low Copper	Pettit-Pro	16471732	Driscoll	May	2015	65	
SDYC	1415	100	Power	38.6	12.3	Low Copper	Interlux Ultra Green	Y3559F	Shelter Island Boatyard	Nov	2017	55	2693-212-AA
SDYC	1419	86	Power	40.9	12.4	Non Copper	Hydro Hoist				N/A	0	
SDYC	1421	95	Power	23.5	9	Low Copper	Interlux Black	Y3779F	Puerto Escondido, Mexico	Aug	2017	55	2693-212-AA
SDYC	1425	96	Power	27.5	9.5	Low Copper	Interlux Ultra	Y3779F	Shelter Island Boatyard	Dec	2011	55	2693-212-AA
SDYC	1427	99	Power	37	13	Low Copper	Interlux Ultra	Y3669F	Koehler	Dec	2018	55	2693-212-AA
SDYC	1428	95	Power	41	14.6	Copper	Interlux Ultrakote 3779U	Y3779U	Shelter Island Boatyard	Jul	2017	57	
SDYC	1431	95	Power	42	13.9	Non Copper	Interlux Interspeed	BZA646	Shelter Island Boatyard	Apr	2018	0	
SDYC	1432	99	Power	59.5	16.5	Copper	Interlux Ultra B 3669	3669	Shelter Island Boatyard	Jul	2018	55	
SDYC	1433	99	Power	34	11.5	Low Copper	Nautical, Super Proguard, Modified Epoxy	NK52	Nielsen Beaumont	Oct	2016	33.4	2693-70-ZA
SDYC	1434	100	Power	38	14	Low Copper	Interlux Fiberglass Bottomkote Aqua	YBA579	Driscoll	May	2013	46	
SDYC	1438	95	Power	26.7	9.5	Low Copper	Interlux Bottomkote	10397	Knight &Carver	Jun	2009	42.75	
SDYC	1443	100	Power	33	12	Copper	Interlux Ultra	Y3779F	Driscoll	Feb	2017	67	2693-212-AA
SDYC	1444	97	Power	22	8	Low Copper	Interlux K91	K91	Driscoll	Mar	2007	70.2	
SDYC	1445	78	Power	47	15	Low Copper	SeaHawk Topikote Antifouling Blue		Outside SD County	May	2019	0	
SDYC	1447	78	Power	22	8	Low Copper	Woolsey Defense Black	4901	Nielsen Beaumont	Jul	2017	40	60061-117-ZA
SDYC	1450	96	Power	28.2	9.5	Low Copper	Pettit Vivid White	11161	Shelter Island Boatyard	Nov	2017	25	60061-116-AA
SDYC	1451	99	Power	35	12	Low Copper	Interlux Ultra	Y3779F	Koehler	July	2017	55	2693-212-AA
SDYC	1452	98	Power	45.1	13.8	Copper	Interlux Ultra	Y3779F	Shelter Island Boatyard	Oct	2017	55	
SDYC	1455	70	Power	40	12.5	Copper	Proline 1088-7	A1088G	Driscoll	Oct	2016	60	60061-94-ZB
SDYC	1456	100	Power	35	10	Low Copper	Interlux Ultrakote	2779N	Shelter Island Boatyard	Jun	2016	66.5	
SDYC	1457	100	Power	52	15	Low Copper	Interlux Ultra	Y3779F	Shelter Island Boatyard	Nov	2018	55	2693-212-AA
SDYC	1458	92	Power	17	6	Low Copper	Interlux Ultra	Y3779F	Marine Group Boat Works	Oct	2016	55	2693-212-AA
SDYC	1459	99	Power	20	8	Low Copper	Z-spar bottom pro blue	411187706	Driscoll	Aug	2019	65	60061-94-ZE
SDYC	1460	100	Power	36.3	16.5	Non Copper	Intersleek 900	FXA979/A	Shelter Island Boatyard	Jun	2013	0	
SDYC	1461	100	Power	32	11	Copper	Interlux Ultra Blue	Y3669U	Shelter Island Boatyard	Jun	2018	57	
SDYC	1463	98	Power	32	10.6	Low Copper	Interlux Bottomkote Pro	79	Driscoll	Jan	2016	22	
SDYC	1465	90	Power	46	15	Low Copper	Interlux Interprotect	B-94	Shelter Island Boatyard	Jun	2015	65	
SDYC	1467	100	Power	30.5	10.6	Low Copper	Interlux Bottomkote Pro	79	Shelter Island Boatyard	Aug	2014	22	
SDYC	1468	94	Power	31	25	Low Copper	Interlux Ultra	Y3669F	Shelter Island Boatyard	Dec	2017	55	2693-212-AA
SDYC	1473	100	Power	34	12.3	Low Copper	Nautical Super Proguard NAU 770	NAU770	Nielsen Beaumonth	Jun	2016	55	23566-20-ZR
SDYC	1474	98	Power	35.7	12.6	Low Copper	Proline 1088-6	A1088G	Shelter Island Boatyard	Apr	2017	60	60061-94-ZB
SDYC	1483	100	Power	33	11.6	Low Copper	Interlux Ultra Black	Y3779F	Shelter Island Boatyard	Mar	2018	55	2693-212-AA
SDYC	1485	98	Power	24	9	Low Copper	Interlux Bottomkote	10397	Driscoll	Oct	2016	42.75	
SDYC	1487	95	Power	17	6	Low Copper	Interlux Ultra	Y3779F	Shelter Island Boatyard	Jun	2016	55	2693-212-AA
SDYC	1491	100	Power	32	12.5	Low Copper	Interlux Ultra	Y3779F	Shelter Island Boatyard	Jun	2016	55	
SDYC	1502	94	Power	21	9	Copper	Interlux Bottomkote	69	Shelter Island Boatyard	Jan	2017	22	
SDYC	1503	99	Power	33	11	Low Copper	Interlux Ultra Blue	Y3669F	Shelter Island Boatyard	Jan	2019	55	2693-212-AA
SDYC	1505	100	Power	80	23.5	Low Copper	Interspeed 640	BRA641		Jan	2017	38	2693-142-ZO
SDYC	1506	100	Power	33	10.8	Low Copper	Interlux Interspeed	BQA659/5GL	Koehler	Feb	2017	38	2693-176-ZB
SDYC	1507	96	Power	30.3	10.3	Copper	Interlux Ultra	Y3779F	Shelter Island Boatyard	Mar	2017	55	2693-212-AA
SDYC	1515	59	Power	42	13.6	Low Copper	Proline 1088-6 Black	A1088G	Shelter Island Boatyard	Aug	2017	60	60061-94-ZB
SDYC	1519	98	Power	29	9	Low Copper	Pettit Hydrocoat	1240	Florida	Feb	2018	40.43	60061-87-ZH
SDYC	1520	98	Power	24	8.5	Low Copper	Interlux Ultra	Y3779F	Driscolls Mission Bay	Jan	2016	55	2693-212-AA
SDYC	1521	98	Power	31	10	Low Copper	Interlux Bottomkote Pro	79	Shelter Island Boatyard	May	2014	22	
SDYC	1523	98	Power	38	12	Low Copper	Interlux Ultra	Y3779F	Shelter Island Boatyard	Apr	2018	55	2693-212-AA

Facility	Slip/Mooring Reference Number	Percent of Time Occupied	Vessel Type (Power or Sail)	Vessel Length	Vessel Beam	Paint Type Copper, Low or Non	Paint Product Name	Product Number	Boatyard Name or Purchase Date	Painting Date Month (mm)	Painting Date Year (yyyy)	% Copper	Category 1 reg #
SDYC	1524	99	Power	61	16	Copper	Pettit Z-Spar Protector	B-91	Shelter Island Boatyard	Oct	2018	65	
SDYC	1525	100	Power	31.9	11.5	Low Copper	Interlux Ultra Blue 3669 F	Y3669F	Shelter Island Boatyard	Jun	2015	55	2693-212-AA
SDYC	1526	100	Power	48	15.1	Low Copper	Proline 1088-6	A1088G	Shelter Island Boatyard	Jan	2016	60	60061-94-ZB
SDYC	1529	92	Power	43.9	14.6	Low Copper	Interlux Micron Ultra / blue	YBA472	Driscoll Shelter Island	May	2019	35	2693-187-ZE
SDYC	1530	94	Power	45.9	12	Low Copper	Interlux Ultra Kote	Y3449U	Shelter Island Boatyard	Mar	2016	57	
SDYC	1535	96	Power	32.2	10.2	Low Copper	Interlux Ultra	Y3779F	Shelter Island Boatyard	May	2015	55	2693-212-AA
SDYC	1537	99	Power	36	11.8	Low Copper	Interlux Ultra w/ Biolux	Y3559F	Koehler	Sept	2019	55	2693-212-AA
SDYC	1538	100	Power	52	14	Low Copper	Interlux Calif Bottomkote - 7	YBA143	Driscoll	Jul	2017	35	2693-18-ZA
SDYC	1543	100	Power	25	9	Low Copper	Interlux	Y3779F	Shelter Island Boatyard	Oct	2019	55	2693-212-AA
SDYC	1544	100	Power	32.2	12	Copper	Interlux Ultra-Kote Black	2779N		Feb	2017	66.5	
SDYC	1552	100	Power	49	14.2	Low Copper	Proline 1088-6	A1088G	Shelter Island Boatyard	Apr	2015	60	60061-94-ZB
SDYC	1554	96	Power	26.5	8.5	Low Copper	Pettit-Vivid 3	1861	Driscoll	Jul	2016	25	60061-116-AA
SDYC	1555	93	Power	30.4	11.5	Low Copper	Interlux UltraKote Blue	Y3669U	Shelter Island Boatyard	Feb	2016	57	
SDYC	1556	98	Power	28	7	Low Copper	Interlux Bottomkote Pro	79	Driscoll	Mar	2015	22	
SDYC	1558	99	Power	26	9.2	Copper			Purchased Mar 2017		2017	67	
SDYC	1560	95	Power	47.3	14.3	Low Copper	Interlux Ultra	Y3779F			2018	67	2693-212-AA
SDYC	1561	95	Power	35.7	12.6	Low Copper	Trinidad Black	1875	Shelter Island Boatyard	May	2016	70	
SDYC	1564	96	Power	64	19	Low Copper	Interlux Ultra	Y3669F	Shelter Island Boatyard	May	2019	55	2693-212-AA
SDYC	1569	73	Power	22	8	Low Copper	Interlux Ultra	Y3779F	Shelter Island Boatyard	May	2016	55	2693-212-AA
SDYC	1570	100	Power	34	11	Low Copper	Interlux Ultra	Y3779F	Outside SD County	Jul	2016	55	2693-212-AA
SDYC	1573	99	Power	38	13	Low Copper	Inuterlux Ultra Blue	Y3669F	Shelter Island Boatyard	Sept	2018	55	2693-212-AA
SDYC	1577	96	Power	55	16	Low Copper	Interlux Ultra	Y3779F	Shelter Island Boatyard	Feb	2015	55	2693-212-AA
SDYC	1580	99	Power	50	14	Low Copper	Interlux Ultra	Y3669F	Shelter Island Boatyard	May	2019	55	2693-212-AA
SDYC	1582	0	Power	32	12	Low Copper	Hydrocoat	1240	Driscoll	Dec	2018	40.43	60061-87-ZH
SDYC	1587	95	Power	33	9.6	Low Copper	Interlux Ultra	Y3779F	Nielsen Beaumont	Jun	2013	55	2693-212-AA
SDYC	1589	99	Power	36	12.5	Low Copper	Interspeed 641	BRA641	Shelter Island Boatyard	Mar	2015	38	2693-142-ZO
SDYC	1590	88	Power	20	8	Copper	Interlux Ultra	Y3669U	Shelter Island Boatyard	Jan	2019	67	
SDYC	1591	99	Power	48	14.8	Low Copper	Trinidad-6	A1088G	Driscoll	Oct	2017	60	60061-94-ZB
SDYC	1597	97	Power	37	12	Non Copper	Pacifica Plus	YBA160	Outside San Diego County	Jun	2017	0	
SDYC	1002	85	Sail	47	13.2	Low Copper	Micron Extra VOC	5793	Driscoll	Nov	2013	38.6	2693-190-ZJ
SDYC	1003	99	Sail	37'	13.5	Low Copper	Zspar Interlux Protector	B-94	Charleston City Boat Yard	Aor	2015	65	
SDYC	1011	100	Sail	43	13	Low Copper	Zspar Bottom Pro Gold modified Epoxy	411187706	Shelter island Boatyard	Feb	2019	65	60061-94-ZE
SDYC	1014	95	Sail	40	12	Low Copper	Proline 1088-6	A1088G	Shelter Island Boatyard	Jul	2017	60	60061-94-ZB
SDYC	1017	99	Sail	38	11	Low Copper	Interlux Ultra	Y3669F	Shelter Island Boatyard	Jun	2019	55	2693-212-AA
SDYC	1019	95	Sail	30	10.5	Low Copper	Proline 1088-6	A10886	Shelter Island Boatyard	Sept	2017	60	60061-94-ZB
SDYC	1020	100	Sail	46	18.6	Copper	Z-Spar Bottom pro	A411187706	Driscoll	Aug	2017	65	
SDYC	1024	100	Sail	36	12	Low Copper	Trinidad SR	A1877G	Driscoll	Feb	2016	60	60061-94-ZD
SDYC	1025	83	Sail	34.5	11	Low Copper	Proline 1088-6 Epoxy	A1088G	Driscoll	Aug	2015	60	60061-94-ZB
SDYC	1027	97	Sail	46.3	13.8	Low Copper	Interlux Ultra	Y3779F	Shelter Island Boatyard	Mar	2017	25	2693-212-AA
SDYC	1028	100	Sail	33.1	9.7	Low Copper	Interlux Ultra	Y3779F	Shelter Island Boatyard	Mar	2013	55	2693-212-AA
SDYC	1029	92	Sail	33.6	11.8	Low Copper			Shelter Island Boatyard	Apr	2014	33	
SDYC	1030	100	Sail	31.1	6	Low Copper	Pettit Vivid Blue	1261	Driscoll	Nov	2017	25	60061-116-AA
SDYC	1033	100	Sail	36.4	12.5	Copper	Pettit Z-Spar Protector	B-94	Shelter Island Boatyard	Mar	2017	65	
SDYC	1036	81	Sail	37.5	13	Low Copper	Hydrocoat	1840	Nielsen Beaumont	Jul	2015	40.43	60061-87-ZI
SDYC	1039	98	Sail	41	10.3	Copper	Ultrakote - 6	Y3669U	Koehler Kraft	Mar	2017	57	
SDYC	1040	100	Sail	30	9.6	Low Copper	Hard Coat Expox Primer - No Anti-Fouling Paint	V127/A	Driscoll	Oct	2016	67	
SDYC	1041	98	Sail	35	11	Non- Copper	Epoxy				N/A	0	
SDYC	1046	100	Sail	38	8	Low Copper	Interlux Bottomkote	10397	Nielsen Beaumont	Jun	2014	42.75	
SDYC	1048	93	Sail	48	12	Low Copper	Zspar Bottom Pro Blue	411187706	Driscoll	Oct	2019	65	60061-94-ZE
SDYC	1049	98	Sail	59	10.6	non Copper	Pettit Green		Koehler	Jun	2016	0	
SDYC	1051	100	Sail	34	11	Copper	Pettit Z-Spar Protector	B-91	Driscoll	Oct	2018	65	
SDYC	1054	99	Sail	53	14	Copper	Interlux VC Offshore	V118	Outside SD County	Oct	2018	67	
SDYC	1055	100	Sail	85	20	Low Copper	Interlux Ultra Blue	Y3669F	Outside SD County	Oct	2019	55	2693-212-AA
SDYC	1056	100	Sail	37	12	Copper	Pettit Trinidad HO	1271	Shelter Island Boatyard	Nov	2019	67	#N/A
SDYC	1057	100	Sail	28	6	Low Copper	Proline	A10886	Driscoll Mission Bay	Oct	2010	60	60061-94-ZB
SDYC	1058	98	Sail	40	11.11	Low Copper	Proline 1088-6	A1088G	Endurance Marine	Apr	1991	60	60061-94-ZB
SDYC	1060	100	Sail	32	9	Low Copper	Pettit Z-Spar	411187706	Driscoll	Jul	2012	65	60061-94-ZE
SDYC	1062	100	Sail	29	9	Low Copper	Interlux Ultra	Y3779F	Other	Dec	2016	55	2693-212-AA
SDYC	1063	96	Sail	30	10	Low Copper	Interlux Ultra	Y3779F	Shelter Island Boatyard	Oct	2013	55	2693-212-AA
SDYC	1069	97	Sail	38	20	Copper	Pettit z-Spar Protector	B-94	Driscoll	Mar	2017	65	
SDYC	1070	100	Sail	32	7	non Copper	Bluewater Shelter Island	1208	Shelter Island Boatyard	Jun	2019	0	

Facility	Slip/Mooring Reference Number	Percent of Time Occupied	Vessel Type (Power or Sail)	Vessel Length	Vessel Beam	Paint Type Copper, Low or Non	Paint Product Name	Product Number	Boatyard Name or Purchase Date	Painting Date Month (mm)	Painting Date Year (yyyy)	% Copper	Category 1 reg #
SDYC	1071	91	Sail	47	14.8	Low Copper	Zspar Bottom Pro Gold	411187706	Driscoll	May	2017	65	60061-94-ZE
SDYC	1073	100	Sail	45.9	14	Low Copper	Interlux Ultra Black 3779F	Y3779F	Shelter Island Boatyard	Apr	2015	55	2693-212-AA
SDYC	1078	99	Sail	40	12	Low Copper	Interlux Ultra	Y3779F	Koehler	May	2018	55	2693-212-AA
SDYC	1079	99	Sail	36.3	11.9	Copper	Woolsey Defense Black	4901	Driscoll	Jul	2017	40	60061-117-ZA
SDYC	1082	100	Sail	28.5	9.2	Copper	Interlux Ultra Kote	2779N	Shelter Island Boatyard	Aug	2017	66.5	
SDYC	1086	100	Sail	34.5	11	Low Copper	Proline 1088-7	A1088G	Driscoll Mission Bay	Apr	2011	60	60061-94-ZB
SDYC	1092	98	Sail	40	12	Low Copper	Interlux Ultra	Y3669F	Shelter Island Boatyard	May	2019	55	2693-212-AA
SDYC	1094	97	Sail	32	5.1	Low Copper	Inerlux Ultrakote Blue	2669N	Koehler Kraft	Jul	2016	66.5	
SDYC	1098	98	Sail	31.1	9.8	Low Copper	Interlux Bottomkote	10397	Shelter Island Boatyard	Jun	2014	42.75	
SDYC	1101	97	Sail	30	10	Non Copper	Intersleek 900	FXA979/A	Driscoll Mission Bay	Apr	2017	0	
SDYC	1104	98	Sail	29.11	10.1	Copper	Interlux Bottomkote	B-91	Shelter Island boatyard	May	2018	65	
SDYC	1107	100	Sail	46	14.7	Copper	Nautical Progaurd Ablative Blue	NAU993	Nielsen Beaumont	Jun	2019	41.97	
SDYC	1109	94	Sail	50	13.8	Low Copper	SeaHawk AF33	3345	Shelter Island Boatyard	Apr	2006	33	44891-12-AA
SDYC	1110	100	Sail	79	16.4	Low Copper	Proline 1088-6	A1088G	Ventura Harbor Boatyard	Nov	2014	60	60061-94-ZB
SDYC	1113	96	Sail	44.2	14.5	Low Copper	Interlux Ultra Black	Y3779F	Svendsens Boat Yard (San Fran)	Apr	2015	67	2693-212-AA
SDYC	1115	99	Sail	35.6	10.4	Low Copper	Interlux Ultra	Y3779F	Driscoll	Jan	2007	55	2693-212-AA
SDYC	1116	100	Sail	29.9	11.3	Low copper	Pettit Z-Spar Protector	B-94	Driscoll	Jun	2016	65	
SDYC	1120	82	Sail	35	11.6	Non Copper	Interlux White Epoxy Paint	V127/A	Driscoll	Apr	2017	0	
SDYC	1123	98	Sail	39.1	12.3	Low Copper	Interlux Ultra	Y3779F	Shelter Island Boatyard	Nov	2017	55	2693-212-AA
SDYC	1126	95	Sail	38	12	Low Copper	Trinidad-6	A1088G	Shelter Island Boatyard	Jun	2015	60	60061-94-ZB
SDYC	1128	100	Sail	34.5	11	Copper	Epoxy non toxic bottom	V127/A	Driscoll	Nov	2013	0	
SDYC	1130	100	Sail	34	10.8	Low Copper	Micron	5584G			N/A	37.2	
SDYC	1131	96	Sail	31.8	10.6	Low Copper	Pettit Vivid-3	1861	Shelter Island Boatyard	Jul	2017	25	60061-116-AA
SDYC	1133	70	Sail	34.4	11.9	Low Copper	Pettit Z-Spar Protector	B-94	Shelter Island Boatyard	Apr	2015	65	
SDYC	1137	100	Sail	28	9.6	Low Copper	Pettit Vivid White	11161	Shelter Island Boatyard	Jan	2015	25	60061-116-AA
SDYC	1138	95	Sail	38	13.2	non Copper	SeaHawk Smart Solution	4002	Driscoll	Mar	2016	0	
SDYC	1139	100	Sail	32	6	Low Copper	Proline 1088-7	A1088G	Shelter Island Boatyard	Jun	2014	60	60061-94-ZB
SDYC	1140	95	Sail	43.8	13.6	Non Copper	Black Widow by Pettit Paint	1862	Shelter Island Boatyard	Aug	2016	0	
SDYC	1141	94	Sail	27	7.5	Non Copper	Epoxy bottom		Shelter Island Boatyard	Dec	2017	0	
SDYC	1143	99	Sail	37	14	Copper	Z-Spar Bottom Pro Gold	411127906	Driscoll	Jun	2009	67	60061-117-ZE
SDYC	1144	93	Sail	40	12.1	Copper	Pettit 1271 Trinidad Blue	1275	Shelter Island Boatyard	Aug	2019	70	
SDYC	1146	96	Sail	35	9	Low Copper	Interlux Bottomkote	10397	Shelter Island Boatyard	Jun	2012	42.75	
SDYC	1147	96	Sail	44	13	Low Copper	Interlux Ultra	Y3669F	Driscoll	Apr	2017	55	2693-212-AA
SDYC	1148	90	Sail	40	9	Low Copper	Pettit Z-Spar Protector	B-94	Driscoll	Mar	2015	65	
SDYC	1151	83	Sail	37	22.4	Low Copper	International Ultra	Y3779F	Painted in Thailand	Jan	2018	55	2693-212-AA
SDYC	1152	78	Sail	53	13	Low Copper	Interlux Ultra Black	Y3779F	Koehler	Nov	2019	55	2693-212-AA
SDYC	1154	98	Sail	35	11.7	Low Copper	Trinidad-6	A1088G	Driscoll	Jun	2017	60	60061-94-ZB
SDYC	1156	97	Sail	42	12.9	Low Copper	Interlux Ultra	Y3779F	Shelter Island Boatyard	Jul	2015	55	2693-212-AA
SDYC	1157	99	Sail	41	10.5	Low Copper	Monterey	5445	Driscoll	Jun	2014	58	
SDYC	1159	94	Sail	39.6	12	Low Copper	Ultrakote-6	Y3669U	Shelter Island Boatyard	Jan	2014	57	
SDYC	1160	98	Sail	34	10.6	Low Copper	ABC 3-3	ABC3-41	Driscoll	Mar	2018	47.99	
SDYC	1161	40	Sail	47	14.8	Low Copper	Proline 1088-6	A1088G	Shelter Island Boatyard	Jul	2015	60	60061-94-ZB
SDYC	1164	84	Sail	36	11.9	Low Copper	Proline 1088 01 Blue	1088C-01	Shelter Island Boatyard	Jan	2014	66.9	
SDYC	1165	100	Sail	45	13.5	Low Copper	Zspar Bottom Pro Gold Blue	411127906	Driscoll	Oct	2018	40	60061-117-ZE
SDYC	1168	99	Sail	49.2	15.11	Low Copper	Interlux Ultra	Y3779F	Shelter Island Boatyard	Dec	2016	55	2693-212-AA
SDYC	1169	75	Sail	22	8	Non Copper	Boat is on Hydrolift - No bottom paint				N/A	0	
SDYC	1171	80	Sail	30	7	Copper	Pettit Black 1088	1088C-02	Driscoll Mission Bay	Jun	2017	60	
SDYC	1172	86	Sail	32.7	9.15	Low Copper	Interlux Ultra	Y3779F	Koehler Kraft	Jul	2018	55	2693-212-AA
SDYC	1176	100	Sail	39.5	12.6	Low Copper	Interlux Ultra Red	YBA473		Oct	2015	35	2693-187-ZG
SDYC	1177	97	Sail	49.5	14.8	Low Copper	Interlux Bottomkote	10397	Shelter Island Boatyard	Apr	2016	42.75	
SDYC	1178	92	Sail	34	11.5	Low Copper	Pettit Z-Spar Pro Gold	411187706	South Coast Shipyard / Newport Beach	Sept	2017	65	60061-94-ZE
SDYC	1179	69	Sail	59	18	Low Copper	Interlux Ultra	Y3779F	Koehler	Oct	2014	55	2693-212-AA
SDYC	1180	93	Sail	29.2	6.4	Copper						67	
SDYC	1184	91	Sail	43	11	Low Copper	Interlux Calif Bottomkote-7	YBA143	Koehler	Apr	2015	35	2693-18-ZA
SDYC	1185	72	Sail	30	10.1	Low Copper	Proline 1088-6	A1088G	Shelter Island Boatyard	Jan	2012	60	60061-94-ZB
SDYC	1186	98	Sail	30	10.8	Low Copper	Pettit Zspar Bottom Pro Gold/Trinidad Pro	411187706	Driscoll	Oct	2017	65	60061-94-ZE
SDYC	1187	97	Sail	47	14	Low Copper	SeaHawk AF33	3345	Shelter Island Boatyard	Aug	2015	33	44891-12-AA
SDYC	1190	99	Sail	36	11	Non Copper	No Bottom Paint				N/A	0	
SDYC	1193	100	Sail	39	12.6	Low Copper	Proline 1088-6	A1088G	Shelter Island Boatyard	Oct	2017	60	60061-94-ZB
SDYC	1195	97	Sail	50	11	Low Copper	Interlux Ultra	Y3779F	Koehler	Nov	2018	55	2693-212-AA
SDYC	1196	83	Sail	29	9.3	Low Copper	Sharksin-7	6145	Shelter Island Boatyard	Jul	2014	45	44891-11-AA

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SDYC	1198	98	Sail	57.3	15.3	Low Copper	Trilux 33-3	YBA060	Driscoll	Jul	2017	17	2693-203-AA
SDYC	1199	97	Sail	34	9.3	Copper						67	
SDYC	1200	100	Sail	31.6	9.3	Low Copper	Proline 1088 Red	A10886	Shelter Island Boatyard	Mar	2016	60	60061-94-ZB
SDYC	1201	86	Sail	30	11	Low Copper	Proline 1088-6	A10886	Shelter Island Boatyard	Aug	2015	60	60061-94-ZB
SDYC	1203	98	Sail	27	9	Low Copper	Proline 1088-6	A1088G	Shelter Island Boatyard	Jan	2015	60	60061-94-ZB
SDYC	1205	96	Sail	42	13	Copper	Pettit 1271 Trinidad	1275	Shelter Island Boatyard	Oct	2019	70	
SDYC	1209	94	Sail	28	7	Low Copper	Purchased Feb 2016				2016	67	
SDYC	1211	100	Sail	72	15	Low Copper	Interlux Ultra	Y3779F	Shelter Island Boatyard	Jul	2016	55	2693-212-AA
SDYC	1215	99	Sail	29	11	Low Copper	Pettit Vivid Black	1861	Koehler Craft	Apr	2016	67	60061-116-AA
SDYC	1216	100	Sail	32	6.7	Low Copper	Proline 1088-7	A1088G	Driscoll	Aug	2015	60	60061-94-ZB
SDYC	1218		Sail	37	12	Copper	Purchased June 2019					67	
SDYC	1219	86	Sail	40	12	Low Copper	Interlux Ultra	Y3779F	Driscoll	Aug	2014	55	2693-212-AA
SDYC	1221	100	Sail	32	7	Low Copper	Interlux Ultra	Y3669F	Koehler	Jun	2015	55	2693-212-AA
SDYC	1222	95	Sail	45	12	Low Copper	Prline 1088-6	A1088G	Shelter Island Boatyard	Oct	2016	60	60061-94-ZB
SDYC	1225		Sail	34	11		Z-Spar Bottom Pro Gold	411127906	Driscoll	Mar	2018	67	60061-117-ZE
SDYC	1226	84	Sail	20	7	Low Copper	Pettit Ultima	1092	Shelter Island Boatyard	Jul	2019	40	60061-117-ZB
SDYC	1233	100	Sail	26	7	Low Copper	Super KL-6	K93	Driscoll	May	2010	70.2	
SDYC	1234	91	Sail	43	13	Low Copper	Interlux Ultra	Y3779F	Shelter Island Boatyard	Jul	2012	55	2693-212-AA
SDYC	1235		Sail	49	12	Low Copper	Trinidad Pro-7	A1877G	Shelter Island Boatyard	Feb	2017	60	60061-94-ZD
SDYC	1236	65	Sail	45	13	Low Copper	Interlux Ultra	Y3779F	Shelter Island Boatyard	Jun	2017	55	2693-212-AA
SDYC	1237	100	Sail	40	12	Low Copper	Interlux Ultra	Y3779F	Shelter Island Boatyard	Nov	2018	55	2693-212-AA
SDYC	1243	97	Sail	37	11.8	Copper	Boat is on Hydrolift - No bottom paint		Driscoll Mission Bay	Feb	2017	0	
SDYC	1244	99	Sail	36	11.9	Low Copper	Interlux Ultra	Y3779F	Shelter Island Boatyard	Dec	2015	55	2693-212-AA
SDYC	1250	100	Sail	37	12	Low Copper	Interlux Ultra	Y3779F	Shelter Island Boatyard	Sept	2011	55	2693-212-AA
SDYC	1251	95	Sail	62	35.7	Low Copper	VC Offshore Black	V118	New England Boat Works, Portsmouth, RI	July	2016	41.19	
SDYC	1254	98	Sail	33	11	Low Copper	Interlux Bottomkote Pro	79	Driscoll	Sept	2017	22	
SDYC	1256	93	Sail	48	14.75	Low Copper	Interlux Ultra	Y3779F	Driscoll	Jun	2017	55	2693-212-AA
SDYC	1259	86	Sail	36	13	Low Copper	Interlux Ultra	Y3779F	Shelter Island Boatyard	Feb	2014	55	2693-212-AA
SDYC	1260	99	Sail	52	15	Low Copper	Interlux Bottomkote	69	Outside San Diego County	Mar	2015		
SDYC	1262	100	Sail	38	11.7	Low Copper	Trinidad VOC Black	1875	Shelter Island Boatyard	Mar	2015	70	
SDYC	1263	91	Sail	36.6	13.1	Low Copper	Interluc Ultra	Y3779F	Shelter Island Boatyard	May	2017	55	2693-212-AA
SDYC	1264	100	Sail	46	14	Low Copper	Proline 1088-6	A10886	Shelter Island Boatyard	Jun	2014	60	60061-94-ZB
SDYC	1265	95	Sail	40	12	Low Copper	Proline 1088-6	A1088G	Driscoll	May	2016	60	60061-94-ZB
SDYC	1267	100	Sail	43	13.7	Low Copper	Interlux Ultra	Y3669F	Shelter Island Boatyard	Oct	2018	55	2693-212-AA
SDYC	1268	99	Sail	52	14	Low Copper	Interlux Ultra	Y3669F	Shelter Island Boatyard	Jan	2019	55	2693-212-AA
SDYC	1271	96	Sail	44.2	13	Low Copper	Proline 1088-6	A1088G	Shelter Island Boatyard	Mar	2013	60	60061-94-ZB
SDYC	1272	79	Sail	62	16	Low Copper	Interlux Ultra Black	Y3779F	Shelter Island Boatyard	Jul	2017	55	2693-212-AA
SDYC	1275	30	Sail	25.5	8	Copper	Purchased Aug 2017				2017	67	
SDYC	1276	97	Sail	40.1	12	Copper	Interlux VC Offshore	V118	Shelter Island Boatyard	Jun	2017	41.19	
SDYC	1285	86	Sail	43	13	Low Copper	Interlux Epoxycop	NK51	Other	Mar	2016	33.4	2693-70-ZA
SDYC	1288	97	Sail	37	12	Copper	Interlux Ultra	Y3779F	Shelter Island Boatyard	Oct	2017	55	
SDYC	1289	96	Sail	35	11	Low Copper	Proline 1088-6	Y3779F	Shelter Island Boatyard	Jul	2017	55	2693-212-AA
SDYC	1291	92	Sail	36	12	Non Copper	Purchased Feb 2017		Shelter Island Boatyard	May	2018	0	
SDYC	1292	100	Sail	28	9.5	non Copper	Ceram-kote	99M	Self applied	Jun	2010	0	
SDYC	1294	99	Sail	39.7	11.8	Low Copper	Pettit Vivid White	11161	Shelter Island Boatyard	Jan	2011	25	60061-116-AA
SDYC	1299	98	Sail	48	14	Low Copper	SeaHawk AF33	3345	Outside SD County	May	2019	33	44891-12-AA
SDYC	1302	100	Sail	32	7	Low Copper	Pettit Vivid White	11161	Driscoll	Jun	2018	25	60061-116-AA
SDYC	1304	98	Sail	32	6.7	Copper	Pettit Z-Spar Protector	B-91	Self Applied	April	2019	65	
SDYC	1306	91	Sail	35	10.6	Low Copper	Trinidad SR	A1877G	Driscoll	Oct	2018	60	60061-94-ZD
SDYC	1307	100	Sail	35	10	Low Copper	Interlux Ultra	Y3779F	Koehler	Aug	2017	55	2693-212-AA
SDYC	1309	97	Sail	34.5	11	Low Copper	Proline 1088-G	A1088G	Shelter Island Boatyard	Aug	2017	60	60061-94-ZB
SDYC	1312	99	Sail	43.1	13.1	Low Copper	Proline 1088	A1088G	Shelter Island Boatyard	Feb	2013	60	60061-94-ZB
SDYC	1314	92	Sail	51	15	Low Copper	Pettit Vivid White w/ graphite	11161	Driscoll	Oct	2014	25	60061-116-AA
SDYC	1316	98	Sail	40	12.5	Low Copper	Interlux Ultra	Y3669F	Driscoll	Mar	2018	55	2693-212-AA
SDYC	1317	94	Sail	37	11.4	Low Copper	Trinidad Pro Blue	A1088G	Shelter Island Boatyard	Aug	2019	60	60061-94-ZB
SDYC	1319	100	Sail	32.6	10.1	Low Copper	Interlux Ultra	Y3779F	Shelter Island Boatyard	May	2012	55	2693-212-AA
SDYC	1323	100	Sail	36	12.5	Low Copper	Ultrakote-6	Y3669U	Shelter Island Boatyard	Feb	2016	57	
SDYC	1324	97	Sail	34.5	11	Low Copper	Interlux Ultra Red	YBA472	Shelter Island Boatyard	May	2018	35	2693-187-ZE
SDYC	1327	100	Sail	20	7	Low Copper	Interlux Ultra	Y3779F	Driscoll	Jul	2016	55	2693-212-AA
SDYC	1329	99	Sail	40	13	Non Copper	VC Performance Epoxy	V127/A	Shelter Island Boatyard	Jan	2018	0	
SDYC	1331	91	Sail	39.2	10.8	Low Copper	Interlux Ultra	Y3779F	Koehler	Jun	2013	55	2693-212-AA

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SDYC	1333	100	Sail	31	10	Low Copper	Interlux Ultra	Y3779F	Shelter Island Boatyard	Jun	2015	55	2693-212-AA
SDYC	1334	98	Sail	30	6.5	Low Copper	Interlux Ultra	Y3779F	Koehler	Mar	2015	55	2693-212-AA
SDYC	1336	96	Sail	29	11	Low Copper	Z-Spar Bottom Pro Gold Blue	411127906	Driscoll	Jan	2018	40	60061-117-ZE
SDYC	1337	78	Sail	42.5	13.5	Low Copper	Interlux Ultra	Y3779F	Shelter Island Boatyard	Apr	2018	55	2693-212-AA
SDYC	1338	100	Sail	49	11.5	Copper						67	
SDYC	1345	98	Sail	28	5.11	Low Copper	Interlux Ultra	Y3669F	Koehler	Oct	2019	55	2693-212-AA
SDYC	1346	90	Sail	46	14.4	Copper	Purchased June 2018		JK3 Alameda		2018	67	
SDYC	1350	92	Sail	50	12	Low Copper	Zspar Bottom Pro Gold	411187706	Driscoll	Feb	2016	65	60061-94-ZE
SDYC	1352	99	Sail	36.1	10.1	Low Copper	Interlux Ultra	Y3779F	Shelter Island Boatyard	Apr	2018	55	2693-212-AA
SDYC	1353	88	Sail	50	13.1	Low Copper	Pettit Vivid White	11161	Shelter Island Boatyard	Oct	2018	25	60061-116-AA
SDYC	1356	96	Sail	25	8.6	Copper	Purchased Apr 2017				2017	67	
SDYC	1359	94	Sail	33.2	10	Low Copper	Boat Purchased in 2016				2016	67	
SDYC	1360	98	Sail	35	13	Copper	Nautical Super Proguard NAU 770	NAU770	Nielsen Beaumont	Sept	2016	55	23566-20-ZR
SDYC	1361	99	Sail	44.9	13	Low Copper	Interlux Bottomkote Pro	79	Nielsen Beaumont	Feb	2017	22	
SDYC	1363	99	Sail	47	14	Low Copper	Interlux Ultra	Y3779F	Shelter Island Boatyard	Oct	2018	55	2693-212-AA
SDYC	1364	95	Sail	36	6	Low Copper	Bluewater Copper Pro	8102	Koehler	Oct	2019	67	
SDYC	1365	99	Sail	33	11.4	Low Copper	Trinidad SR	A1877G	Old Kettenberg Yard	Jun	2006	60	60061-94-ZD
SDYC	1373	100	Sail	39	13.6	Low Copper	Interlux Epoxycop	NK52	Nielsen Beaumont	May	2015	33.4	2693-70-ZA
SDYC	1374	95	Sail	40	13	Non Copper	Intersleek -8	FXA979/A	Shelter Island Boatyard	Mar	2013	0	
SDYC	1381	97	Sail	52	13.6	Low Copper	Trinidad SR	A1877G	Shelter Island Boatyard	Jun	2015	60	60061-94-ZD
SDYC	1386	99	Sail	32	6.7	Low Copper	Interlux Ultrakote	2779N	Self applied	Jan	2013	66.5	
SDYC	1391	100	Sail	42	13	Low Copper	Proline 1088-6	A1088G	Shelter Island Boatyard	Dec	2013	60	60061-94-ZB
SDYC	1392	99	Sail	34	11.6	Low Copper	Pettit Z-Spar	411187706	Driscoll	Dec	2017	65	60061-94-ZE
SDYC	1398	97	Sail	62	14	Low Copper	Interlux Ultra 2 ** only avail in NZ		New Zealand	Mar	2016	50	
SDYC	1399	96	Sail	39	13.6	Copper	Purchased Jun 2016					67	
SDYC	1401	98	Sail	32	6.7	Copper	SeaHawk AF34	3345	Koehler	Oct	2016	33	44891-12-AA
SDYC	1402	75	Sail	35	11	Low Copper	Interlux Ultra	Y3779F	Shelter Island Boatyard	Jun	2014	55	2693-212-AA
SDYC	1405	90	Sail	35	11	Low Copper	Interlux Ultra	Y3669F	Koehler	Apr	2019	55	2693-212-AA
SDYC	1407	98	Sail	28.2	8.2	Low Copper	Interlux Ultra	Y3779F	Shelter Island Boatyard	Apr	2014	55	2693-212-AA
SDYC	1411	92	Sail	41.8	12.5	Low Copper	Pettit-Vivid 3	1861	Driscoll	Mar	2018	25	60061-116-AA
SDYC	1416	100	Sail	41.8	13.8	Low Copper	Interlux Ultra	Y3779F	Shelter island Boatyard	Jul	2016	55	2693-212-AA
SDYC	1418	99	Sail	34	11	Low Copper	Purchased 2015				2015	67	
SDYC	1420	98	sail	22	7.11	Low Copper	Interlux		Shelter Island Boatyard	Feb	2016	67	
SDYC	1422	98	Sail	52	14	Low Copper	Interlux Ultra	Y3779F	Driscoll	Jun	2017	55	2693-212-AA
SDYC	1423	100	Sail	39.3	13	Low Copper	Pettit Copper-Guard	1042	Shelter Island Boatyard	Jun	2014	33.26	
SDYC	1424	99	Sail	27	9	Low Copper	Interlux Ultra	Y3779F	Driscoll Mission Bay	Jul	2019	55	2693-212-AA
SDYC	1429	100	Sail	15	5	Low Copper	Proline 1088	1088C-02	Driscoll Mission Bay	6	2010	55.7	
SDYC	1436	66	Sail	35	11	Low Copper	Interlux Ultra	Y3779F	Koehler	Oct	2016	55	2693-212-AA
SDYC	1439	98	Sail	40	12	Copper	Pettit Z-Spar Protector	B-94	Driscoll	Oct	2018	65	
SDYC	1441	100	Sail	28.5	10	Low Copper	Proline 1088	A1088G	Shelter Island Boatyard	Aug	2016	60	60061-94-ZB
SDYC	1442	99	Sail	38	12	Low Copper	Interlux Ultra	Y3779F	Marine Group / South Bay	Jun	2019	55	2693-212-AA
SDYC	1448	81	Sail	40.9	12.9	Low Copper	Proline 1088-7	A1088G	Driscoll	Mar	2015	60	60061-94-ZB
SDYC	1449	98	Sail	46.4	9.9	Copper	Interlux Ultra-Coat	2779N	Shelter Island Boatyard	Apr	2017	66.5	
SDYC	1453	100	Sail	32	11	Low Copper	Proline 1088-6	A1088G	Shelter Island Boatyard	Jun	2010	60	60061-94-ZB
SDYC	1454	92	Sail	32	10	Low Copper	Pettit Z-spar Protector	B-94	Shelter Island Boatyard	May	2012	65	
SDYC	1462	100	Sail	55	16	Low Copper	Pettit Hydrocoat Antifouling Black	1847G	Nielsen Beaumont	Jan	2019	25.25	
SDYC	1464	92	Sail	32	11	Low Copper	Pettit Z-Spar Protector	B-94	Shelter Island Boatyard	May	2016	65	
SDYC	1466	90	Sail	45	13.1	Low Copper	Interlux Ultra	Y3779F	Shelter Island Boatyard	Apr	2014	55	2693-212-AA
SDYC	1469	100	Sail	40	12	Copper	Pettit Z-Spar Protector	B-91	Driscoll	Oct	2019	65	
SDYC	1470	100	Sail	25	8	Low Copper	Purchased 2016		Purchased Apr 2016		2016	67	
SDYC	1471	100	Sail	33.8	11.5	Non Copper	Hydrolift				N/A	0	
SDYC	1472	100	Sail	36.3	11.8	Low Copper	Interlux Ultra	Y3779F	Shelter Island Boatyard	Jun	2015	55	2693-212-AA
SDYC	1476	100	Sail	32	6.7	Low Copper	Interlux Bottomkote	10397	Koehler	Jul	2016	42.75	
SDYC	1477	99	Sail	52	15.4	Low Copper	Pettit Ultima	1038	Driscolls	Apr	2016	60	
SDYC	1478	98	Sail	42	13.6	Low Copper	Zspar Bottom Pro Gold	411187706	Driscoll	Jun	2014	65	60061-94-ZE
SDYC	1479	100	Sail	32	6	Low Copper	VC Offshore Interlux	V118	Shelter Island Boatyard	Mar	2015	41.19	
SDYC	1482	99	Sail	37	11.6	Low Copper	Pettit Z-Spar Protector	B-94	Driscoll	Apr	2012	65	
SDYC	1486	100	Sail	46.9	11.1	Low Copper	Proline 1088-6	A1088G	Shelter Island Boatyard	Apr	2016	60	60061-94-ZB
SDYC	1488	67	Sail	34.1	10	Low Copper	Pettit-Vivid-3	1861	Koehler	May	2015	25	60061-116-AA
SDYC	1489	92	Sail	48	13.2	Low Copper	VC Offshore Interlux	V117	Driscoll	Feb	2013	41.19	
SDYC	1490	100	Sail	34.5	11	Low Copper	Proline 1088-G	A1088G	Shelter Island Boatyard	Aug	2017	60	60061-94-ZB

Facility	Slip/Mooring Reference Number	Percent of Time Occupied	Vessel Type (Power or Sail)	Vessel Length	Vessel Beam	Paint Type Copper, Low or Non	Paint Product Name	Product Number	Boatyard Name or Purchase Date	Painting Date Month (mm)	Painting Date Year (yyyy)	% Copper	Category 1 reg #
SDYC	1492	98	Sail	40	12	Copper	Proline 1088-6	1088C-01	Shelter Island Boatyard	Feb	2019	66.9	
SDYC	1494	100	Sail	27	9	Low Copper	Proline 1088-6	A1088G	Shelter Island Boatyard	Mar	2014	60	60061-94-ZB
SDYC	1495	76	Sail	43.8	12	Low Copper	Interlux Ultra	Y3779F	Shelter Island Boatyard	Nov	2017	55	2693-212-AA
SDYC	1496	100	Sail	46	14	Low Copper	Pettit Z-Spar Protector	B-94	Shelter Island Boatyard	Apr	2016	65	
SDYC	1498	94	Sail	59	10	Low Copper	Interlux Ultra	Y3669F	Koehler	Apr	2018	55	2693-212-AA
SDYC	1499	9	Sail	33	12	Low Copper	Interlux Ultra	Y3779F	Driscoll	Jun	2013	55	2693-212-AA
SDYC	1501	88	Sail	52	14.8	Low Copper	Proline 1088-6	A1088G	Shelter Island Boatyard	Jul	2005	60	60061-94-ZB
SDYC	1508	81	Sail	34.5	11	Low Copper	Interlux VC Offshore	V118	Driscoll	Aug	2015	41.19	
SDYC	1509	100	Sail	45.6	14.1	Low Copper	Interlux Ultra	Y3779F	Driscoll	Jun	2015	55	2693-212-AA
SDYC	1511	100	Sail	34	11	Non Copper	Bluewater Shelter Island	8202	Shelter Island boatyard	Apr	2015	0	
SDYC	1512	97	Sail	35.3	11.6	Copper	Purchased July 2017				2017	67	
SDYC	1513	87	Sail	33	11	Copper	Nautical Proguard Ablative Blue	NAU990	Nielsen Beaumont	Jul	2017	41.97	
SDYC	1514	93	Sail	41.7	13	Low Copper	Pettit Hydrocoat Eco	1847G	Nielsen Beaumont	Jun	2017	25.25	
SDYC	1516	84	Sail	50	12.2	Low Copper	Seaguard-2	P30BQ12	Driscoll	Mar	2017	48	
SDYC	1517	99	Sail	32	7	LowCopper	Interlux Ultra Black	Y3779F	Driscoll	Apr	2016	55	2693-212-AA
SDYC	1518	100	Sail	25	8.3	Low Copper	Interlux Bottomkote	10397	Driscoll	Jun	2015	42.75	
SDYC	1522	89	Sail	32	6.7	Copper	Black Widow by Pettit Paint	1862	Driscoll	Jun	2015	0	
SDYC	1528	87	Sail	32	6.7	Copper	Proline 1088-7	A1877G				60	60061-94-ZD
SDYC	1531	99	Sail	30	11	Copper	Pettit Trinidad HD	1271	Shelter Island Boatyard	Jun	2019	67	#N/A
SDYC	1532	71	Sail	41	11	Copper	Proline 1088-6	1088C-01	Shelter Island Boatyard	Jun	2019	66.9	
SDYC	1533	80	Sail	31	7	Low Copper	Interlux Ultrakote	2779N	Driscoll	Jun	2012	66.5	
SDYC	1534	100	Sail	35	11.9	Low Copper	Pettit Pro	A1088G	Shelter Island Boatyard	Oct	2019	60	60061-94-ZB
SDYC	1536	100	Sail	30	10	Copper	Purchased Oct 2017		Private Party		2017	67	
SDYC	1541	88	Sail	57	16	Low Copper	Proline 1088 Blue	1088C-01	Shelter Island Boatyard	Dec	2015	66.9	
SDYC	1546	95	Sail	35	11	Low Copper	Interlux Ultra	Y3779F	Shelter Island Boatyard	Jun	2015	55	2693-212-AA
SDYC	1547	100	Sail	31	7.3	non Copper	VC Performance Epoxy	V127/A	Other - Manufacturer	Jun	2015	0	
SDYC	1548	99	Sail	31.1	7.6	Low Copper	SeaHawk Tropicoat	2142GL	Driscoll - Mssion Bay	May	2016	75.8	
SDYC	1549	100	Sail	39	12	Copper	Interlux Ultra Blue	Y3669F	Driscoll Mission Bay	May	2016	55	2693-212-AA
SDYC	1550	99	Sail	26	8.6	Low Copper	Z Spar Bottom Pro Gold	411187706	Driscoll	Feb	2018	65	60061-94-ZE
SDYC	1553	100	Sail	33.3	10	non Copper	Ceram-kote	99M	Shelter Island Boatyard	Oct	2014	0	
SDYC	1559	100	Sail	33.9	11.3	Low Copper	Pettit-Z Spar	411187706	Marine Group	Jun	2013	65	60061-94-ZE
SDYC	1562	100	Sail	39.2	10.8	Copper	Pettit Z-Spar Protector	B-94	Driscoll Mission Bay	Aug	2017	65	
SDYC	1563	100	Sail	35	11	Non Copper	Interlux Epoxycop	V127/A	Applied by manufacturer	Sept	2001	0	
SDYC	1565	100	Sail	30	11	Low Copper	West Marine BottomPro Gold	411127906	Shelter Island Boatyard	Jun	2018	40	60061-117-ZE
SDYC	1567	94	Sail	35	11	Low Copper	Pettit Ultima Eco	1208	SD Boatyard	Jul	2004	55	
SDYC	1568	97	Sail	44.11	13	Copper	Interlux Ultrakote	2779N	Shelter Island Boatyard	Oct	2017	66.5	
SDYC	1571	97	Sail	28	9.3	Non Copper	Coppercoat	85396-1-AA	Driscoll	Apr	2013	0	
SDYC	1572	100	Sail	34	11.5	Low Copper	Interlux Ultra	Y3779F	Shelter Island Boatyard	Feb	2017	55	2693-212-AA
SDYC	1576	96	Sail	53	15.4	Low Copper	Proline 1088-6	A1088G	Shelter Island Boatyard	Jun	2012	60	60061-94-ZB
SDYC	1578	100	Sail	36.4	11.9	Copper	Interlux Ultrakote	2779N	Shelter Island Boatyard	Jan	2017	66.5	
SDYC	1579	99	Sail	44	9.1	Low Copper	NFU 993 40% copper ablative	NAU993	Nielsen Beaumont	Jun	2016	41.97	
SDYC	1583	82	Sail	41.8	13.8	Low Copper	Interlux Ultra	Y3779F	Shelter Island Boatyard	Nov	2015	55	2693-212-AA
SDYC	1586		Sail	53	14	Low Copper	Interlux Ultra	Y3669F	Shelter Island Boatyard	Aug	2018	55	2693-212-AA
SDYC	1588	98	Sail	35	10.25	Low Copper	Proline 1088-6	A10886	Shelter Island Boatyard	Sep	2015	60	60061-94-ZB
SDYC	1592	99	Sail	31	10.5	Non Copper	Has not painted since before 2007		Has not painted since before 2007		2007	0	
SDYC	1593	98	Sail	32	6.7	Copper	Ultrakote - 7	Y3669U	Koehler	May	2019	57	
SDYC	1594	100	Sail	30	21.2	Low Copper	Pettit Vivid Free-3	1361	Marine Group	Jul	2014	25	60061-116-AA
SDYC	1596	95	Sail	40	13	Low Copper	Pettit Unepoxy Tropic Formula	1628	Shelter Island Boatyard	Oct	2018	53	
SDYC	1598	96	Sail	50	10	Low Copper	Pettit Vivid - 3	1861	Driscoll	Dec	2018	25	60061-116-AA
SDYC	1599	96	Sail	68	14	Copper	SeaHawk Smart Solution	4705	Windward Boatyard - MDR	Mar	2015	0	
SDYC	1311	80	Sail	35	11.3	Low Copper	Proline 1088-6	A10886	Driscoll	May	2019	60	60061-94-ZB
SDYC	1127	0	vacant			Non Copper						0	
SDYC	1175	0	vacant			Non Copper						0	
SDYC	1282	0	vacant			Non Copper						0	
SDYC	1409	0	vacant			Non Copper						0	
SDYC	1414	0	vacant			Non Copper						0	
SDYC	1426	0	vacant			Non Copper						0	
SDYC	1435	0	vacant			Non Copper						0	
SDYC	1440	0	vacant			Non Copper						0	
SDYC	1446	0	vacant			Non Copper						0	
SDYC	1493	0	vacant			Non Copper						0	

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SDYC	1574	0	vacant	21	7	Non Copper	Pettit-Vivid 4	1862	Koehler Kraft	Oct	2018	0	
SDYC	1005	100				Non Copper						0	
SDYC	1018	98		65	58	Low Copper	Interlux Ultra	Y3779F	Marine Group/South Bay	Jun	2018	55	2693-212-AA
SDYC	1021	97										0	
SDYC	1074	98		32.5	11.75	Copper	Boat Purchased Apr 2017				2017	67	
SDYC	1075	100			11	Copper	Purchased Aug 2018					67	
SDYC	1085	0				Non Copper			Cruising			0	
SDYC	1097	99				Copper						57	
SDYC	1106	98										0	
SDYC	1253	96										0	
SDYC	1322	92				Non Copper						0	
SDYC	1357	95				Copper						57	
SDYC	1382	100				Copper						57	
SDYC	1385	0				Non Copper						0	
SDYC	1387	93		32.8	9.25	Low Copper	Interlux Ultrakote	Y3669U	Shelter Island Boatyard	May	2016	57	
SDYC	1396	99										67	
SDYC	1430	97				Non Copper						0	
SDYC	1437	93										0	
SDYC	1481	100				Copper						0	
SDYC	1484	0				Non Copper						0	
SDYC	1504	97										0	
SDYC	1539	0				Non Copper						0	
SDYC	1542	92				Copper						67	
SDYC	1566	83				Copper						67	

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SGYC	3002	95	S	35	12	COPPER	INTERLUX ULTRA	Y3669F	SHELTER ISLAND BOAT YARD	04	2019	55	2693-212-AA
SGYC	3004	90	S	41	12.6	COPPER	PROLINE	1088C-01	SHELTER ISLAND BOAT YARD	11	2016	67	
SGYC	3006	95	S	32.5	11.7	COPPER	PETTIT Z-SPAR	B-91	KOEHLER KRAFT	04	2018	65	
SGYC	3007	98	P	27	8.6	COPPER	WEST MARINE BOTTOM PRO	411137906	LONG BEACH YACHT SALES	09	2016		60061-117-ZE
SGYC	3009	0	vacant			non						0	
SGYC	3015	87	S	44	13.6	COPPER	PETTIT PROTECTOR	B-91	DRISCOLLS	12	2016	57	
SGYC	3016	100	S	30	10							67	
SGYC	3019	100	S	30	10.1	COPPER	INTERLUX ULTRA	3669	SHELTER ISLAND BOAT YARD	10	2009	55	
SGYC	3020	0	vacant			non						0	
SGYC	3021	98	P	42	14		PETTIT TRINIDAD	1875	SHELTER ISLAND BOAT YARD	10	2018	70	
SGYC	3023	100	S	30	11	COPPER	INTERLUX	3779	SHELTER ISLAND BOAT YARD	06	2015	55	
SGYC	3024	100		35	13.5							67	
SGYC	3042	100	S	43	12.5	COPPER	PROLINE	Y1088C-01	SHELTER ISLAND BOAT YARD	11	2016	67	
SGYC	3048	90	S	33.3	10	COPPER	PRO LINE	Y1088C-01	SHELTER ISLAND BOAT YARD	12	2014	67	
SGYC	3053	100	S	36	12	COPPER	INTERLEX ULTRA	3669	SHELTER ISLAND BOAT YARD	04	2019	55	
SGYC	3054	95	S	38	12	COPPER	PRO LINE	1088C-01	SHELTER ISLAND BOAT YARD	03	2015	67	
SGYC	3056	95	S	32	10.9	COPPER	PETTIT PROTECTOR	B-91	DRISCOLL	03	2016	65	
SGYC	3057	0	vacant			non						0	
SGYC	3059	99	S	26	8	NON	SLIP LINER					0	
SGYC	3060	99	S	36	11.11		UNKNOWN		SHELTER ISLAND BOAT YARD	03	2007	67	
SGYC	3065	100	S	35	12	COPPER	INTERLUX ULTRA	Y3669F	SHELTER ISLAND BOAT YARD	11	2014	65	2693-212-AA
SGYC	3066	99	S	32.8	9.15	NON	SLIP LINER					0	
SGYC	3067	95	P	50.3	15.7	COPPER	INTERLUX ULTRA	3669	SHELTER ISLAND BOAT YARD	01	2017	55	
SGYC	3071	100	S	34	11	COPPER	INTERLUX ULTRA	Y3669F	SHELTER ISLAND BOAT YARD	09	2018	55	2693-212-AA
SGYC	3076	99	S	42	13.9	COPPER	INTERLEX ULTRA	Y3779F	KOEHLER KRAFT	05	2018	55	2693-212-AA
SGYC	3083	99	S	27	8.9	NON	SLIP LINER		AQUARIUS BOAT YARD	06	2015	0	
SGYC	3087	98	S	38	12.6	COPPER	INTERLUX ULTRA	Y3669F	SHELTER ISLAND BOAT YARD	2	2018	55	2693-212-AA
SGYC	3090	100	S	30	10.6							67	
SGYC	3091	90	S	39.8	12.6	COPPER	INTERLUX ULTRA	411167706	MARINE GROUP	12	2014	60	60061-94-ZE
SGYC	3093	100	S	44	14.6	COPPER	INTERLUXE ULTRA KOTE	Y3669U	SHELTER ISLAND BOAT YARD	06	2018	57	
SGYC	3095	100	S	33	12.6	COPPER	INTERLUX ULTRA	Y3779F	SHELTER ISLAND BOAT YARD	04	2014	55	2693-212-AA
SGYC	3096	99	S	32	11	COPPER	PETITT SR 60	1032	SHELTER ISLAND BOAT YARD	10	2017		
SGYC	3098	95	S	30	10.6		PETTIT TRINIDAD BLUE	1275	SHELTER ISLAND BOAT YARD	07	2019	70	
SGYC	3100	90	S	30	10.1							67	
SGYC	3105	99	S	29.11	10.9	COPPER	INTERLUX ULTRA	Y3559F	SHELTER ISLAND BOAT YARD	10	2018	55	2693-212-AA
SGYC	3109	100	S	40	7	COPPER	INTERLUX ULTRA KOTE	Y3449F	KOEHLER KRAFT	3	2018	55	2693-212-AA
SGYC	3118	90	S	49	13	non	INTERLUX	YBA168	SHELTER ISLAND BOAT YARD	11	2017	0	
SGYC	3130	100	P	24	9							67	
SGYC	3134	90	S	38	13	COPPER	INTERLUX ULTRA	3669	SHELTER ISLAND BOAT YARD	07	2015	55	
SGYC	3138	98	S	32	10	COPPER	PETITE	B-91	DRISCOLL	04	2016	65	
SGYC	3145	100	P	38	12	COPPER	PROLINE 1088	Y1088C-01	SHELTER ISLAND BOAT YARD	7	2016	70	
SGYC	3149	50	S	42	12	COPPER	INTERLUX ULTRA KOTE	Y3779F	KOHLER	2	2018	55	2693-212-AA
SGYC	3151	75	P	26	8							67	
SGYC	3156	100	S	38	13.5	COPPER	INTERLUX ULTRA	3669	SHELTER ISLAND BOAT YARD	04	2017	55	
SGYC	3158	100	S	39.5	13	COPPER	PROLINE	Y1088C-01	MARINE GROUP	03	2017	67	
SGYC	3161	100	P	43	13.7	COPPER	Z-SPAR	B-91	KOEHLER KRAFT	01	2017	65	
SGYC	3165	99	P	28	10	COPPER	INTERLUX ULTRA	Y3779F	SHELTER ISLAND BOAT YARD	02	2017	55	2693-212-AA
SGYC	3169	0	vacant			non						0	
SGYC	3171	100	P	37	12	LOW	MICRON CSC	YBC583	NIELSON BEAUMONT	03	2009	33.4	2693-225-AA
SGYC	3172	100	S	30	10	COPPER	INTERLUX ULTRA	Y3669F	SHELTER ISLAND BOAT YARD	01	2013	55	2693-212-AA
SGYC	3173	98	S	30	10	COPPER	INTERLUX ULTRA	Y3559F	KOEHLER KRAFT	11	2017	55	2693-212-AA
SGYC	3175	100	S	37	12.5	COPPER	PRO LINE 1088	Y1088C-01	KOEHLER KRAFT	11	2018	67	
SGYC	3177	100	S	38	12				SHELTER ISLAND BOAT YARD	01	2012	67	
SGYC	3180	75	P	59	18	COPPER	INTERLUX ULTRA COAT	Y3779U	SHELTER ISLAND BOAT YARD	01	2016	55	
SGYC	3188	100	S	32	10.6		UNKOWN			05	2007		

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SGYC	3189	100	P	42	13.7	COPPER	INTERLUX ULTRA	Y3449F	SHELTER ISLAND BOAT YARD	06	2015	55	2693-212-AA
SGYC	3194	100	P	31.6	12	COPPER	INTERLUX ULTRA BIOLUX	Y3559U	SHELTER ISLAND BOAT YARD	06	2017	57	
SGYC	3201	100	S	37.7	12.8	COPPER	PROLINE	1088C-02	SHELTER ISLAND BOAT YARD	03	2016	56	
SGYC	3203	95	S	42	13	COPPER	INTERLUX ULTRA KOTE	Y3669F	SHELTER ISLAND BOAT YARD	02	2017	55	2693-212-AA
SGYC	3208	98	S	36.3	11.9		INTERLUX	YBA470	KOEHLER KRAFT	04	2019		2693-187-ZD
SGYC	3209	90	S	32	9.1	COPPER	INTERLUX ULTRA KOTE	Y3559F	SHELTER ISLAND BOAT YARD	07	2017	55	2693-212-AA
SGYC	3210	95	S	32	6.8	COPPER	PETIT PROTECTOR	B-91	DRISCOLLS MISSION BAY	08	2019	65	
SGYC	3213	90	S	37	10.1	COPPER	PRO LINE	Y1088C-01	SHELTER ISLAND BOAT YARD	08	2018	67	
SGYC	3214	100	S	34.5	12	COPPER	INTERLUX ULTRA	3669	SHELTER ISLAND BOAT YARD	03	2017	55	
SGYC	3218	85	S	36	12	COPPER	INTERLUX ULTRA	3669	SHELTER ISLAND BOAT YARD	02	2013	55	
SGYC	3219	98	S	27	8.1	COPPER	INTERLUX ULTRA	3669	SHELTER ISLAND BOAT YARD	07	2019	55	
SGYC	3220	90	S	41	12	COPPER	INERLUX ULTRA	Y3779F	SHELTER ISLAND BOAT YARD	10	2018	55	2693-212-AA
SGYC	3223	100	P	43	15	COPPER	INTERLUX ULTRA	Y3669U	DRISCOLLS MISSION BAY	07	2006	55	
SGYC	3227	100	S	43	14.5		UNKNOWN			01	2009	67	
SGYC	3232	100	S	34	11.9	COPPER	INTERLUX ULTRA	3669	SHELTER ISLAND BOAT YARD	11	2018	55	
SGYC	3236	98	P	43	14	COPPER	Ultra	Y3779F	SHELTER ISLAND BOAT YARD	09	2017	55	2693-212-AA
SGYC	3241	98.5	S	46.9	14.2								
SGYC	3246	95	S	28	9.6	COPPER	INTERLUX ULTRAKOTE	Y3669U	SHELTER ISLAND BOAT YARD	07	2013	57	
SGYC	3249	100	S	30	10.8	COPPER	Z-SPAR BOTTOM PRO	41127706	DRISCOLL	09	2017	65	60061-94-ZE
SGYC	3252	85	S	30	10.5	NON	INTERLUX	YBA168	SHELTER ISLAND BOAT YARD	01	2014	0	
SGYC	3258	90	S	38	12	COPPER	PETTIT TRINIDAD	A1108206	DRISCOLLS	09	2016	67	
SGYC	3260	97	S	36	12.5	COPPER	Z SPAR BOTTOM PRO	B-91	DRISCOLL	07	2018	65	
SGYC	3261	100	P	48	15	COPPER	INTERLUX ULTRA	A10886	SHELTER ISLAND BOAT YARD	03	2015	60	60061-94-ZB
SGYC	3263	99	S	36	11.6							67	
SGYC	3268	90	S	39	12.1	COPPER	INTERLUX	Y3669F	SHELTER ISLAND BOAT YARD	07	2015	55	2693-212-AA
SGYC	3269	90	S	34	11	COPPER	INTERLUX ULTRA	Y3669U	SHELTER ISLAND BOAT YARD	07	2017	57	
SGYC	3273	100	S	39.8	12.8	COPPER	INTERLUX	Y3559F	SHELTER ISLAND BOAT YARD	11	2014	55	2693-212-AA
SGYC	3274	100	S	30	10							67	
SGYC	3275	100	P	30	12	COPPER	INTERLUX ULTRA	Y3779F	SHELTER ISLAND BOAT YARD	04	2015	55	2693-212-AA
SGYC	3276	100	S	30	10.3	COPPER	PRO-LINE	1088C-02	SHELTER ISLAND BOAT YARD	08	2015	56	
SGYC	3280	90	P	50	16		INTERLUX ULTRA	Y3559U	NIELSON BEAUMONT	10	2015	57	
SGYC	3282	100	P	30	10							67	
SGYC	3283	95	P	26.9	19.5	LOW	MICRON CSC	5583G	AQUARIUS BOAT YARD	06	2015	33.4	
SGYC	3284	98	S	39.25	12.5	COPPER	PROLINE	1088C-02	SHELTER ISLAND BOAT YARD	11	2015	56	
SGYC	3289	100	S	38	14.2	COPPER	SUPER INTERLUX	K90B	SHELTER ISLAND BOAT YARD	07	2008	70	
SGYC	3290	100	P	42	13.6	COPPER				01	2011	67	
SGYC	3295	95	S	41.1	13.1	COPPER	INTERNATIONAL ULTRA	Y3669U	SHELTER ISLAND BOAT YARD	10	2017	57	
SGYC	3301	100	P	43	14.6	COPPER	ZSPAR BP GOLD	3669	SHELTER ISLAND BOAT YARD	01	2019	55	
SGYC	3303	100	P	40	12.2					11	2010	67	
SGYC	3307	99	S	27	8	COPPER	INTERLUX ULTRAKOTE	Y3669U	SHELTER ISLAND BOAT YARD	11	2016	57	
SGYC	3311	100	P	27	8.8							67	
SGYC	3314	90	P	50	16	COPPER	INTERLUX ULTRA	Y3449U	KOEHLER KRAFT	09	2017	57	
SGYC	3318	100	S	40	13.8	COPPER	Z SPAR	Y3669F	SHELTER ISLAND BOAT YARD	05	2018	55	2693-212-AA
SGYC	3319	100	P	30	8.5		PETTIT TRINIDAD BLACK	1875	SHELTER ISLAND BOAT YARD	05	2019	70	
SGYC	3322	90	S	42	11	COPPER	PROLINE	1088c-02	SHELTER ISLAND BOAT YARD	06	2014	56	
SGYC	3326	90	S	36	6	COPPER	TRINIDAD	1875	DRISCOLLS	03	2015	70	
SGYC	3328	90	S	37	11.6	COPPER	INTERLUX	Y3669F	SHELTER ISLAND BOAT YARD	07	2016	55	2693-212-AA
SGYC	3329	100	S	34	10						2003	0	
SGYC	3330	100	S	30	9							67	
SGYC	3332	100	S	27	9	COPPER	INTERLUX ULTRA	3669	SHELTER ISLAND BOAT YARD	07	2017	55	
SGYC	3334	100	P	50	16	COPPER	INTERLUX ULTRA KOTE	Y3449U	SHELTER ISLAND BOAT YARD	10	2015	55	
SGYC	3335	100	S	30	12	COPPER	INTERLUX ULTRA BIO LUX	Y3669F	SHELTER ISLAND BOAT YARD	02	2018	55	2693-212-AA
SGYC	3336	98	S	37	11.8	COPPER	PETIT TRINIDAD	1875	MARINA DEL REY BOAT YARD	05	2015	67	
SGYC	3340	95	S	45	15	COPPER	PETTIT PROTECTOR	B-91	DRISCOLLS	12	2016	65	
SGYC	3341	90	S	49.5	14.8	COPPER	INTERLUX ULTRA KOTE	Y3779U	SHELTER ISLAND BOAT YARD	01	2017	55	

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SGYC	3345	95	S	51.6	15.3	COPPER	UNTERLUX ULTRA	Y3779F	SHELTER ISLAND BOAT YARD	11	2017	55	2693-212-AA
SGYC	3346	100	P	42	15.7	COPPER	PROLINE	Y1088C-01	SHELTER ISLAND BOAT YARD	06	2015	67	
SGYC	3351	98	S	25.11	8	COPPER	INTERLUX ULTRA KOTE	Y3449U	KOHLER KRAFT	06	2018	57	
SGYC	3365	95	S	31	10.3	COPPER	Z-SPAR PRO GOLD	411187706	DRISCOLL	02	2018	65	60061-94-ZE
SGYC	3375	90	P	57	14.5		UNKNOWN			01	2013	67	
SGYC	3377	100	S	30	9.6	COPPER			SHELTER ISLAND BOAT YARD	03	2016	67	
SGYC	3378	75	P	42	15	COPPER	PROLINE 1088	Y1088C-01	SHELTER ISLAND BOAT YARD	05	2019	67	
SGYC	3379	90	S	46	14	COPPER	INTERLUX EXTRA KOTE	Y3669U	SHELTER ISLAND BOAT YARD	04	2016	57	
SGYC	3382	100	S	31.3	10.9	COPPER	INTERLUX	Y3779F	SHELTER ISLAND BOAT YARD	11	2018	55	2693-212-AA
SGYC	3385	80	P	29.8	9.6							67	
SGYC	3388	90	S	40	10	COPPER	INTERLUX ULTRA	Y3669F	SHELTER ISLAND BOAT YARD	01	2017	55	2693-212-AA
SGYC	3392	90	S	30	10.1	NON	INTERSLEEK 900	FXA970/A	SHELTER ISLAND BOAT YARD	05	2014	0	
SGYC	3394	100	S	32	11		UNKNOWN				2003	67	
SGYC	3398	100	P	54	14	COPPER	INTERLUX ULTRA	Y3779F	SHELTER ISLAND BOAT YARD	07	2017	55	2693-212-AA
SGYC	3399	50	S	44	12.6	COPPER	INTERLUX ULTRA	Y3449F	SHELTER ISLAND BOAT YARD	10	2018	55	2693-212-AA
SGYC	3400	95	S	35	12		INTERLUX MICRON EXTRA VOC	5692	DRISCOLL	05	2014	67	
SGYC	3406	100	S	30	10	COPPER	INTERLUX NAUTICAL	3432	DRISCOLLS MISSION BAY	01	2006	47	
SGYC	3408	100	S	44	14.5	COPPER	INTERLEX ULTRA	3669	SHELTER ISLAND BOAT YARD	06	2017	55	
SGYC	3409	99	S	34	10					06	1995	67	
SGYC	3412	99	S	32	11.9	COPPER	INTERLUX ULTRA	3669	SHELTER ISLAND BOAT YARD	03	2015	55	
SGYC	3415	99	S	36	12	COPPER	INTERLUX	Y3669F	SHELTER ISLAND BOAT YARD	05	2013	55	2693-212-AA
SGYC	3418	99	S	30	11	NON	COPPER COAT	85396	DRICOLLS	03	2016	0	#N/A
SGYC	3420	100	P	45.5	13.8	COPPER	INTERLUX ULTRA	Y3779F	SHELTER ISLAND BOAT YARD	02	2014	55	2693-212-AA
SGYC	3421	95	P	46.8	14.1	COPPER	INERLUX ULTRA	Y3559U	NIELSON BEAUMONT	07	2014	57	
SGYC	3422	99	S	30	10	NON	INTERSLEEK 900	FXA972/A	SHELTER ISLAND BOAT YARD	02	2013	0	
SGYC	3426	90	S	36	12	COPPER	INTERLUX ULTRA BIO LUX	3669	KOEHLER KRAFT	11	2014	55	
SGYC	3428	90	S	32.5	11.9	COPPER	PETIT ZSPAR	B-91	DRISCOLL BOAT WORKS	11	2016	65	
SGYC	3429	96	S	34.6	11.9	LOW	PETTIT	1281	SHELTER ISLAND BOAT YARD	04	2017	37	60061-71-ZA
SGYC	3430	100	P	36	12.6		TRINIDAD PRO HD	1278	SHELTER ISLAND BOAT YARD	07	2019	65	
SGYC	3433	100	S	11.6	10.8	COPPER	INTERLUX	2449H	SHELTER ISLAND BOAT YARD	05	2016	76	
SGYC	3435	90	S	40	11.8	COPPER	INTERLUX ULTRA	Y3779U	SHELTER ISLAND BOAT YARD	07	2016	57	
SGYC	3442	95	S	31	10.6	COPPER	PRO LINE	Y1088C-02	SHELTER ISLAND BOAT YARD	07	2015	67	
SGYC	3444	95	S	34	11.6	COPPER	INTERLUX SUPER KL	K90B	SHELTER ISLAND BOAT YARD	11	2011	70	
SGYC	3446	100	P	35	12.9	COPPER	INTERLUX ULTRA	3779	SHELTER ISLAND BOAT YARD	09	2015	55	
SGYC	3447	90	S	34	11	COPPER	INTERLUX ULTRA	Y3669F	SHELTER ISLAND BOAT YARD	07	2017	55	2693-212-AA

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SWYC	8598	92	SAIL	38	12	copper	ULTRA-KOTE	Y3779U	SI	3	2017	57	
SWYC	8597	96	SAIL	49	13	copper	PRO-LINE 1088	Y1088C-02	SI	11	2018	67	
SWYC	8596	94	SAIL	35	9	non-biocide	NO PAINT - UNPAINTED					0	
SWYC	8595	96	SAIL	34	10	non-biocide	INTERSLEEK 900	FXA972/A	SI	7	2013	0	
SWYC	8594	96	POWER	36	13	copper	ULTRA 3669	3669	SI	8	2018	55	
SWYC	8593	88	POWER	40	14	copper	BOTTOMKOTE	10397	SI	3	2017	43	
SWYC	8592	96	SAIL	39	12	copper	ULTRA-KOTE 2669N	2669N	SI	1	2019	67	2693-135-ZF
SWYC	8591	94	POWER	32	10	copper	NOT LISTED ABOVE			12	2018	70	
SWYC	8590	94	SAIL	34	11	copper	PROGUARD ABLATIVE	NAU992	SI	7	2015	42	
SWYC	8586	98	SAIL	40	12	low copper	VIVID	11161	SI	1	2018	25	
SWYC	8585	100	SAIL	31	11	copper	Z-SPAR BOTTOM PRO GOLD	41127706	Dr SI	12	2017	65	
SWYC	8583	96	POWER	53	15	copper	NOT LISTED ABOVE		NB	6	2017	70	
SWYC	8582	100	POWER	33	10					10	2016	67	
SWYC	8581	100	SAIL	41	13	copper	NOT LISTED ABOVE		SI	6	2017	70	
SWYC	8578		VACANT										
SWYC	8577	98	POWER	30	10	copper	ULTRA 3669	3669	SI	5	2018	55	
SWYC	8576	96	SAIL	37	12	copper	ULTRA-KOTE	Y3669U	SI	8	2016	57	
SWYC	8575	88	SAIL	44	13	copper	ULTRA	Y3779F	SI	1	2018	55	
SWYC	8573	100	POWER	43	14	copper	PRO-LINE 1088	Y1088C-01	KK	5	2017	67	
SWYC	8571	100	POWER	24	11					8	2016		
SWYC	8570	85	POWER	41	15	zinc	SHELTER ISLAND PLUS	8204	SI	12	2018	0	2693-212-AA
SWYC	8567	96	SAIL	25	11	copper	ULTRA-KOTE 2779N	2779N	KK	1	2019	67	
SWYC	8562	100	POWER	51	15	copper	ABC 3	ABC3-92	SI	9	2016	48	
SWYC	8561	98	POWER	48	14	non-biocide	INTERSLEEK 900	FXA970/A	SI	4	2013	0	
SWYC	8560	98	SAIL	40	13	copper	PRO-LINE 1088	Y1088C-01	Dr SI	11	2018	67	
SWYC	8557	92	POWER	57	16	copper	PRO-LINE 1088	Y1088C-01	SI	4	2019	67	
SWYC	8556	98	SAIL	45	12	copper	ULTRA	Y3669F	SI	2	2014	55	2693-212-AA
SWYC	8555	92	POWER	36	12	low copper	MICRON 66	YBA470		5	2016	35	2693-187-ZD
SWYC	8554	100	POWER	41	13	copper	NOT LISTED ABOVE		Dr SI	3	2019	70	
SWYC	8551		VACANT										
SWYC	8549		VACANT										
SWYC	8546	98	SAIL	36	10	copper	TRINIDAD SR	A1277Q	SI	10	2013	60	
SWYC	8545	100	POWER	38	12		NOT LISTED ABOVE		Dr SI	8	2015	70	
SWYC	8543	81	SAIL	54	11	copper	TRINIDAD SR	A1277Q	SI	9	2017	60	60061-94-ZD
SWYC	8542	92	SAIL	40	12	copper	TRINIDAD PRO	A1088G	SI	10	2019	60	
SWYC	8541	77	SAIL	49	16	low copper	CALIFORNIA BOTTOMKOTE	YBA143	SI	10	2016	35	2693-18-ZA
SWYC	8540	96	POWER	43	13	copper	ULTRA 3779	3779	SI	3	2018	55	
SWYC	8539	100	SAIL	25	8					10	2019		
SWYC	8538	92	SAIL	42	14	copper	Z-SPAR BOTTOM PRO GOLD	41127706	Dr SI	6	2019	65	60061-94-ZE
SWYC	8537	98	POWER	30	9	copper	ULTRA	Y3779F	SI	1	2014	55	2693-212-AA
SWYC	8536	96	POWER	37	12	copper	ULTRA 3669	3669	SI	10	2018	55	
SWYC	8535	77	SAIL	46	14	copper	ULTRA 3669	3669	SI	8	2018	55	
SWYC	8533	92	POWER	40	13	copper	PRO-LINE 1088	Y1088C-01		8	2019	67	
SWYC	8532	98	POWER	44	14	copper	Z*SPAR THE PROTECTOR VOC HARD TYPE	B-91	KK	7	2017	65	
SWYC	8531	100	SAIL	35	13	copper	ULTRA	Y3779F	SI	4	2018	55	2693-212-AA
SWYC	8529	92	POWER	14	7	copper	Z*SPAR THE PROTECTOR VOC HARD TYPE	B-91	KK	11	2019	65	
SWYC	8528	94	SAIL	36	12	non-biocide	INTERSLEEK 900	FXA979/A	SI	8	2013	0	
SWYC	8526	100	SAIL	46	13	copper	TRINIDAD SR	A1277Q	Dr SI	8	2014	60	
SWYC	8525	100	SAIL	35	10	copper	Z-SPAR BOTTOM PRO GOLD	41127706	Dr SI	11	2014	65	
SWYC	8524	98	POWER	43	13	copper	PRO-LINE 1088	Y1088C-01	SI	5	2018	67	
SWYC	8520	96	SAIL	32	8	copper	PRO-LINE 1088	Y1088C-02	SI	5	2017	67	
SWYC	8519		SAIL	43	12							67	
SWYC	8518	98	SAIL	32	11	copper	Z-SPAR BOTTOM PRO GOLD	411187706	Dr SI	10	2019	65	60061-94-ZE
SWYC	8517	100	SAIL	40	13	copper	ULTRA-KOTE	Y3669U	SI	7	2016	57	
SWYC	8516	100	SAIL	30	11	copper	ULTRA-KOTE	Y3669U	SI	7	2016	57	
SWYC	8515	96	SAIL	31	12	copper	NOT LISTED ABOVE			9	2018	70	

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SWYC	8513	94	SAIL	42	13	zinc	SHELTER ISLAND	8201	SI	6	2017	0	
SWYC	8512	98	POWER	34	10	copper	ULTRA 3779	3779	SI	1	2019	55	2693-119-ZD
SWYC	8511	98	POWER	38	12	copper	Z-SPAR BOTTOM PRO GOLD	411187706	Dr SI	11	2018	65	
SWYC	8510	94	SAIL	38	11	copper	AWLGRIP AWLSTAR GOLD LABEL	BP701	Dr SI	4	2017	40	41750-1-ZC
SWYC	8509	98	POWER	62	16	copper	TRINIDAD VOC	1878	KK	4	2015	65	
SWYC	8508	94	POWER	30	11	copper	TRINIDAD PRO	16471757		11	2015	65	
SWYC	8507	100	SAIL	34	11	copper	Z-SPAR BOTTOM PRO GOLD	41127706	Dr SI	3	2017	65	
SWYC	8506	81	SAIL	47	11	copper	PRO-LINE 1088	Y1088C-01		10	2012	67	
SWYC	8505	98	SAIL	36	12	copper	ULTRA	Y3669F	MG	9	2019	55	
SWYC	8504	92	SAIL	42	13	low copper	MICRON CSC	5586G	KK	2	2014	37	
SWYC	8503	98	SAIL	36	9	copper	ULTRA-KOTE	Y3669U	Dr SI	1	2018	57	
SWYC	8500	94	POWER	72	18	non-biocide	NO PAINT - UNPAINTED					0	
SWYC	8499	96	SAIL	34	11	copper	ULTRA 3669	3669	SI	6	2016	55	
SWYC	8498	94	POWER	41	13	copper	NOT LISTED ABOVE			1	2019	70	
SWYC	8497	100	SAIL	31	11	copper	NOT LISTED ABOVE			6	2017	70	
SWYC	8494	100	SAIL	41	13	low copper	MICRON 66	YBA470	SI	9	2015	35	2693-187-ZD
SWYC	8493	98	SAIL	32	1	non-biocide	NO PAINT - UNPAINTED					0	
SWYC	8489	92	SAIL	37	12	copper	Z*SPAR THE PROTECTOR VOC HARD TYPE	B-91	SI	7	2017	65	60061-49-ZG
SWYC	8488	96	POWER	30	1	copper	TRINIDAD	1875	SI	6	2019	70	60061-49-ZJ
SWYC	8487	100	SAIL	39	11	copper	ULTRA	Y3779F	SI	6	2016	55	2693-212-AA
SWYC	8486	98	POWER	43	14	copper	BOTTOMKOTE	10397	SI	2	2017	43	
SWYC	8484	96	SAIL	51	12	copper	ULTRA	Y3449F	SI	6	2014	55	2693-212-AA
SWYC	8483	81	POWER	42	14	copper	ULTRA	Y3669F	SI	2	2010	55	2693-212-AA
SWYC	8479	98	POWER	28	0	copper	NOT LISTED ABOVE			6	2019	70	
SWYC	8476	85	POWER	57	17	copper	TROPIKOTE	2145GL		10	2019	76	
SWYC	8475	81	SAIL	37	13	copper	ULTRA-KOTE	Y3669U	SI	1	2014	57	2693-119-ZD
SWYC	8473	100	POWER	39	13	copper	PRO-LINE 1088	Y1088C-03	MG	12	2015	67	
SWYC	8472	100	SAIL	33	11	low copper	ACT WITH SLIME FIGHTER	7790b	Dr SI	4	2017	30	2693-227-AA
SWYC	8471	96	POWER	31	9	copper	PRO-LINE 1088	Y1088C-01	SI	5	2017	67	
SWYC	8468	100	POWER	33	12	copper	ULTRA-KOTE	Y3449U	SI	6	2016	57	
SWYC	8467	96	POWER	41	12	copper	ULTRA	Y3779F	SI	2	2019	55	2693-212-AA
SWYC	8466	96	SAIL	43	12	copper	ULTRA	Y3779F	SI	6	2019	55	2693-212-AA
SWYC	8464	98	SAIL	38	13				Dr SI	2	2011		
SWYC	8463	98	POWER	38	14	copper	ULTRA	Y3669F	SI	2	2019	55	2693-212-AA
SWYC	8462	100	SAIL	29	10	copper	ULTRA	Y3669F	SI	6	2015	55	2693-212-AA
SWYC	8459	81	SAIL	34	11	copper	Z*SPAR THE PROTECTOR VOC HARD TYPE	B-91	Dr SI	9	2016	65	
SWYC	8458	62	POWER	66	14	copper	NOT LISTED ABOVE			12	2014	70	
SWYC	8457		VACANT										
SWYC	8456	90	SAIL	26	8	zinc	EP-2000	EP-401	SI	8	2008	0	
SWYC	8455	98	POWER	36	12	copper	ULTRA	Y3779F	SI	8	2017	55	2693-212-AA
SWYC	8454	100	POWER	42	14	copper	ULTRA	Y3779F	Dr SI	3	2014	55	2693-212-AA
SWYC	8453	100	POWER	48	16	copper	PRO-LINE 1088	Y1088C-01	SI	5	2015	67	
SWYC	8452	100	SAIL	38	12	copper	ULTRA	Y3669F	SI	4	2010	55	2693-212-AA
SWYC	8451	100	SAIL	38	13	low copper	MICRON EXTRA VOC	5794	KK	6	2011	35	2693-190-ZK
SWYC	8450		VACANT										
SWYC	8446	81	SAIL	43	13	copper	Z*SPAR THE PROTECTOR VOC HARD TYPE	B-94	Dr SI	5	2019	65	
SWYC	8441	100	SAIL	35	10	copper	SUPER KL	K90	Dr SI	4	2006	70	
SWYC	8440	94	SAIL	32	8	copper	PETTIT UNEPOXY TIN-FREE	1228	SI	3	2015	53	
SWYC	8436	96	SAIL	33	6	copper	TRINIDAD VOC	1278	SI	9	2018	65	
SWYC	8435	96	SAIL	34	11	copper	ULTRA 3779	3779	SI	9	2015	55	2693-192-AA
SWYC	8434	90	POWER	40	13	copper	ULTRA 3779	3779	SI	6	2018	55	2693-192-AA
SWYC	8432		VACANT										
SWYC	8431	88	POWER	40	13	copper	PRO-LINE 1088	Y1088C-02	SI	12	2013	67	
SWYC	8430	88	POWER	35	10	copper	ULTRA-KOTE	Y3779U	KK	1	2016	57	
SWYC	8427	100	POWER	23	8	copper	PRO-LINE 1088	Y1088C-02	SI	12	2016	67	
SWYC	8425	100	POWER	29	8	low copper	CALIFORNIA BOTTOMKOTE	YBA143		3	2017	35	2693-18-ZA

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SWYC	8424	100	POWER	55	16	copper	NOT LISTED ABOVE		SI	12	2018	70	
SWYC	8422	92	POWER	21	8	copper	ULTRA	Y3779F	SI	5	2017	55	2693-212-AA
SWYC	8421	100	POWER	51	16	copper	ULTRA-KOTE	Y3779U	SI	4	2017	57	2693-119-ZD
SWYC	8419	96	SAIL	38	13	copper	PRO-LINE 1088	Y1088C-02	SI	7	2017	67	
SWYC	8418	94	SAIL	36	13	copper	ULTRA-KOTE	Y3779U	SI	6	2017	57	
SWYC	8413	100	SAIL	32	9	low copper	VIVID	1661		4	2017	25	
SWYC	8412	98	SAIL	31	10	copper	ULTRA	Y3669F	SI	1	2014	55	2693-212-AA
SWYC	8410	13	SAIL	33	11	copper	PRO-LINE 1088	Y1088C-03	SI	10	2018	67	
SWYC	8409	90	POWER	41	12	copper	ULTRA	Y3779F	SI	7	2017	55	2693-212-AA
SWYC	8408	98	SAIL	33	11	copper	Z-SPAR BOTTOM PRO GOLD	411187706	Dr SI	11	2018	65	60061-94-ZE
SWYC	8404	90	SAIL	32	11	copper	BOTTOMKOTE	10397		11	2018	43	
SWYC	8402	100	SAIL	27	8	copper	Z-SPAR BOTTOM PRO GOLD	411187706	Dr SI	1	2019	65	
SWYC	8400	100	POWER	30	10	copper	PRO-LINE 1088	Y1088C-03	KK	3	2014	67	
SWYC	8399	100	POWER	43	14	copper	Z-SPAR BOTTOM PRO GOLD	411187706	Dr SI	9	2014	65	
SWYC	8397		VACANT										
SWYC	8395	100	SAIL	24	7	copper	ULTRA	Y3669F		4	2014	55	2693-212-AA
SWYC	8394	96	SAIL	45	15	copper	NOT LISTED ABOVE		SI	1	2012	70	2693-212-AA
SWYC	8393	90	POWER	45	14	copper	ULTRA-KOTE	Y3669U	SI	2	2019	57	
SWYC	8392	94	SAIL	37	12	copper	PRO-LINE 1088	Y1088C-01	SI	5	2010	67	
SWYC	8391	96	POWER	48	15	copper	ULTRA	Y3779F	SI	2	2018	55	2693-212-AA
SWYC	8389	100	POWER	29	8	copper	ULTRA-KOTE	Y3779U	SI	3	2016	57	
SWYC	8387	100	SAIL	31	10	copper	Z-SPAR BOTTOM PRO GOLD	41127706	KK	11	2015	65	
SWYC	8386	98	POWER	48	14	copper	ULTRA	Y3669F	KK	1	2016	55	
SWYC	8384	100	POWER	27	0	low copper	CALIFORNIA BOTTOMKOTE	YBA143	Dr SI	2	2013	35	
SWYC	8380	96	POWER	37	12	copper	PROGUARD ABLATIVE	NAU990	NB	12	2016	42	
	8379												
SWYC	8377	98	SAIL	24	8	copper	ULTRA-KOTE	Y3669U	KK	7	2019	57	
SWYC	8376	100	SAIL	42	14	copper	ULTRA	Y3779F	KK	4	2013	55	2693-212-AA
SWYC	8375	60	SAIL	24	10		NOT LISTED ABOVE			1	2016	70	
SWYC	8373	100	SAIL	36	12	copper	ULTRA	Y3669F	SI	1	2015	55	2693-212-AA
SWYC	8372	98	POWER	41	13	copper	ULTRA-KOTE	Y3669U	SI	5	2016	57	
SWYC	8370	98	SAIL	31	10	low copper	WEST MARINE BOTTOMSHIELD	411126606		12	2011	29	60061-135-AA
SWYC	8368	98	SAIL	30	10	copper	ULTRA	Y3669F	SI	11	2018	55	2693-212-AA
SWYC	8366	100	POWER	49	15	copper	PRO-LINE 1088	Y1088C-01	SI	4	2004	67	
SWYC	8365	100	SAIL	20	0	copper	ULTRA	Y3669F		2	2011	55	2693-212-AA
SWYC	8363	100	POWER	38	13	copper	Z*SPAR THE PROTECTOR VOC HARD TYPE	B-94		9	2016	65	
SWYC	8362	98	SAIL	34	12	copper	ULTRA	Y3779F	SI	9	2018	55	2693-212-AA
SWYC	8361	94	SAIL	51	11	copper	BOTTOMKOTE	10397	SI	4	2017	43	
SWYC	8360	92	SAIL	44	13	copper	ULTRA	Y3669F	SI	4	2018	55	
SWYC	8359	85	POWER	45	14	copper	TRINIDAD	1875	Dr SI	3	2017	70	
SWYC	8358	96	POWER	58	16	copper	PRO-LINE 1088	Y1088C-01	SI	5	2017	67	
SWYC	8356	100	POWER	33	10	copper composite	COPPERCOAT		Dr MB	3	2012	85	
SWYC	8355	92	SAIL	34	12	copper	Z-SPAR BOTTOM PRO GOLD	411167706	Dr MB	8	2018	65	
SWYC	8353	100	POWER	34	10	copper	ULTRA-KOTE	Y3669U	SI	3	2015	57	
SWYC	8352	98	SAIL	36	12	copper	NOT LISTED ABOVE			6	2013	70	
SWYC	8351	96	SAIL	27	0	copper	ULTRA	Y3669F	SI	9	2017	55	2693-212-AA
SWYC	8350	96	POWER	24	9	low copper	BOTTOMKOTE NT	YBB379	Dr SI	7	2017	25	
SWYC	8349	90	POWER	46	13	copper	TRINIDAD SR	A1877G		11	2017	60	
SWYC	8348	100	POWER	35	12	copper	ULTRA	Y3449F	SI	4	2016	55	2693-212-AA
SWYC	8347	92	SAIL	37	12	copper	ULTRA	Y3779F	SI	5	2018	55	
SWYC	8346	98	SAIL	44	13	copper	ULTRA	Y3669F	SI	10	2017	55	2693-212-AA
SWYC	8345	100	SAIL	35	11	copper	ULTRA	Y3779F	Dr MB	3	2018	55	2693-212-AA
SWYC	8344	90	SAIL	42	13	copper	ULTRA	Y3779F	SI	5	2018	55	2693-212-AA
SWYC	8343	98	SAIL	43	1	zinc	PACIFICA PLUS	YBB260		1	2017	0	2693-220-ZA
SWYC	8340	98	POWER	11	5	low copper	EPOXYCOP	NK52	SI	2	2019	33	2693-70-ZA
SWYC	8339	100	POWER	22	10	low copper	CALIFORNIA BOTTOMKOTE	YBA143	Dr SI	1	2016	35	

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SWYC	8337	88	SAIL	27	5				KK	1	2011		
SWYC	8336	100	SAIL	35	12	copper	ULTRA-KOTE 2669N	2669N	SI	4	2017	67	
SWYC	8335	42	SAIL	30	11	copper	TRINIDAD	1875	SI	7	2019	70	60061-49-ZJ
SWYC	8334	94	POWER	24	8	copper	PRO-LINE 1088	Y1088C-02	SI	4	2019	67	577-551-ZB
SWYC	8332	94	SAIL	43	13	copper	ULTRA	Y3779F	SI	6	2018	55	2693-212-AA
SWYC	8331	98	POWER	36	12	copper	ULTRA 3779	3779	SI	2	2019	55	2693-192-AA
SWYC	8330	98	SAIL	34	11	low copper	VIVID	1861	Dr SI	10	2018	25	
SWYC	8329	100	POWER	25	8	zinc	SHELTER ISLAND	8202	SI	5	2018	0	
SWYC	8328	100	SAIL	30	10	copper	TRINIDAD SR	A1877G	Dr SI	9	2014	60	
SWYC	8327	100	SAIL	28	10	copper	Z*SPAR THE PROTECTOR VOC HARD TYPE	B-91	Dr SI	9	2015	65	
SWYC	8326	96	SAIL	31	10	copper	ULTRA-KOTE	Y3669U	SI	5	2017	57	
SWYC	8323	100	POWER	22	7	low copper	INTERCLENE 245 NA	BRA570	SI	7	2017	27	
SWYC	8321	96	SAIL	28	9	copper	Z*SPAR THE PROTECTOR VOC HARD TYPE	B-91	SI	2	2017	65	
SWYC	8320	98	SAIL	33	11	copper	NOT LISTED ABOVE			12	2015	70	
SWYC	8319	100	POWER	30	11	non-biocide	INTERSLEEK 900	FXA970/A	SI	1	2013	0	
SWYC	8317	96	POWER	31	9	non-biocide	PCM MARINE-RC		NB	11	2016	0	
SWYC	8316	62	SAIL	33	0	low copper	VC-OFFSHORE	V116		11	2017	41	
SWYC	8315	96	SAIL	34	11	copper	Z-SPAR BOTTOM PRO GOLD	411167706	Dr SI	7	2019	65	
SWYC	8314	100	SAIL	47	13	copper	ULTRA	Y3669F	KK	4	2015	55	2693-212-AA
SWYC	8313	100	SAIL	41	12	copper	NOT LISTED ABOVE			10	2014	70	
SWYC	8312	96	SAIL	38	12	copper	ULTRA-KOTE	Y3669U	SI	4	2017	57	
SWYC	8309	92	POWER	40	13	copper	ULTRA	Y3669F	SI	7	2015	55	2693-212-AA
SWYC	8308	94	SAIL	30	11	copper	ULTRA	Y3669F	SI	6	2018	55	2693-212-AA
SWYC	8307	94	POWER	45	14	copper	NOT LISTED ABOVE			12	2015	70	
SWYC	8306	100	SAIL	36	12	copper	ULTRA	Y3669F	KK	6	2018	55	2693-212-AA
SWYC	8305	100	POWER	39	13	copper	ULTRA	Y3779F	SI	12	2017	55	2693-212-AA
SWYC	8304	98	SAIL	30	9	copper	ULTRA	Y3669F	SI	4	2019	55	2693-212-AA
SWYC	8302	98	SAIL	33	11	copper	ULTRA	Y3669F	SI	7	2019	55	2693-212-AA
SWYC	8301	100	SAIL	27	8	copper	PRO-LINE 1088	Y1088C-02	SI	5	2010	67	
SWYC	8299	98	SAIL	43	14	copper	ULTRA-KOTE	Y3669U	SI	6	2016	57	
SWYC	8298	88	SAIL	34	11	copper	PRO-LINE 1088	Y1088C-01	SI	2	2011	67	
SWYC	8297	96	SAIL	30	10	copper	PRO-LINE 1088	Y1088C-02	SI	10	2018	67	
SWYC	8296	98	SAIL	50	13	copper	ULTRA	Y3779F	SI	11	2016	55	
SWYC	8295	100	POWER	36	12	copper	PRO-LINE 1088	Y1088C-01	MG	7	2016	67	
SWYC	8294	100	SAIL	32	10	low copper	BLACK WIDOW ULTRA-SLICK RACING	1869		2	2019	25	60061-116-ZA
SWYC	8293	96	SAIL	35	10	copper	Z*SPAR THE PROTECTOR VOC HARD TYPE	B-91	Dr SI	4	2016	65	
SWYC	8289	100	SAIL	42	12	copper	ULTRA-KOTE	Y3669U	KK	2	2017	57	
SWYC	8288	92	POWER	19	9	non-biocide	NO PAINT - UNPAINTED					0	
SWYC	8286	96	SAIL	39	12	copper	ULTRA 3779	3779	SI	9	2015	55	
SWYC	8285	100	POWER	32	12	copper	ULTRA-KOTE	Y3779U	SI	7	2017	57	
SWYC	8283	100	POWER	39	13	copper	Z*SPAR THE PROTECTOR VOC HARD TYPE	B-94		3	2010	65	
SWYC	8282	98	SAIL	49	14	copper	ULTRA 3779	3779	SI	1	2019	55	
SWYC	8281		VACANT										2693-190-ZG
SWYC	8280	98	POWER	36	11	copper	ULTRA	Y3669F	SI	3	2013	55	2693-212-AA
SWYC	8279	94	SAIL	34	12	copper	ULTRA-KOTE	Y3779U	SI	2	2017	57	
SWYC	8277	100	SAIL	33	11	copper	ULTRA-KOTE 2669N	2669N	MG	3	2018	67	2693-135-ZF
SWYC	8275	98	POWER	40	13	copper	ULTRA	Y3669F	SI	10	2018	55	2693-212-AA
SWYC	8274	96	POWER	41	13	low copper	CALIFORNIA BOTTOMKOTE	YBA140	SI	3	2019	35	2693-18-ZA
SWYC	8272	96	POWER	33	9	copper	ULTRA-KOTE	Y3779U		7	2016	57	
SWYC	8271	100	POWER	39	13	copper	TRINIDAD SR	A1277Q	SI	6	2019	60	60061-94-ZD
SWYC	8270	100	SAIL	39	12	copper	Z*SPAR THE PROTECTOR VOC HARD TYPE	B-94	Dr SI	3	2014	65	
SWYC	8269	100	SAIL	34	11	copper	ULTRA-KOTE 2779N	2779N		6	2016	67	
SWYC	8267	88	SAIL	34	11	copper	ULTRA 3669	3669	Dr SI	12	2013	55	2693-192-ZB
SWYC	8265	100	DINGY	10	6	non-biocide	NO PAINT - UNPAINTED					0	
SWYC	8262	100	SAIL	34	11	copper	ULTRA-KOTE	Y3449U	SI	1	2016	57	2693-135-ZF
SWYC	8261	100	POWER	62	17	copper	ULTRA 3669	3669	SI	08	2018	55	2693-192-ZB

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SWYC	8260	96	POWER	22	8	low copper	MICRON 66	YBA470		9	2014	35	2693-187-ZD
SWYC	8259	98	POWER	41	12	copper	PROGUARD ABLATIVE	NAU993	NB	3	2016	42	
SWYC	8258	96	POWER	34	11	copper	ULTRA	Y3669F	SI	11	2017	55	
SWYC	8257	92	SAIL	35	11	low copper	AQUAGARD WATERBASE	10103	SI	11	2011	26	9339-19-AA-70383
SWYC	8255	100	SAIL	29	8	copper	ULTRA	Y3669F	SI	7	2016	55	2693-212-AA
SWYC	8254	98	POWER	41	12	copper	PETTIT UNEPOXY TIN-FREE	1228	Dr MB	5	2017	53	60061-63-AA
SWYC	8253	96	SAIL	33	12	copper	TRINIDAD	1875	SI	7	2014	70	
SWYC	8252	88	POWER	41	13	copper	ULTRA	Y3669F	SI	8	2018	55	2693-212-AA
SWYC	8249	96	SAIL	34	11	copper	Z*SPAR THE PROTECTOR VOC HARD TYPE	B-91	NB	10	2013	65	
SWYC	8248	85	SAIL	42	13	copper	ULTRA	Y3449F	Dr MB	9	2012	55	2693-212-AA
SWYC	8247	100	SAIL	38	12	copper	ULTRA-KOTE	Y3669U	SI	12	2015	57	
SWYC	8246	88	SAIL	58	20	copper	PRO-LINE 1088	Y1088C-01	SI	4	2018	67	
SWYC	8242	98	SAIL	33	8	copper	ULTRA 3779	3779	SI	8	2018	55	
SWYC	8241		VACANT										
SWYC	8240	98	POWER	34	11	copper	ULTRA-KOTE	Y3779U	SI	8	2016	57	
SWYC	8239	100	SAIL	31	10	copper	ULTRA	Y3669F	SI	6	2013	55	2693-212-AA
SWYC	8237	81	SAIL	30	11	copper	ULTRA	Y3669F	SI	6	2018	55	2693-212-AA
SWYC	8235	90	SAIL	34	11	copper	Z-SPAR BOTTOM PRO GOLD	41127706	SI	6	2015	65	
SWYC	8234		VACANT										
SWYC	8233	96	POWER	13	1	copper	NOT LISTED ABOVE			6	2012	70	
SWYC	8230	98	POWER	33	11	copper	Z*SPAR THE PROTECTOR VOC HARD TYPE	B-94	Dr SI	7	2014	65	
SWYC	8229	100	SAIL	27	10	copper	Z-SPAR BOTTOM PRO GOLD	41127706	Dr SI	12	2018	65	
SWYC	8228	100	SAIL	34	11	copper	PRO-LINE 1088	Y1088C-01	KC	9	2010	67	
SWYC	8227	100	SAIL	26	7	copper	HYDROCOAT ABLATIVE	1640	KK	7	2019	40	
SWYC	8226		VACANT										
SWYC	8225		VACANT										
SWYC	8224	96	POWER	32	8	copper	ULTRA-KOTE	Y3779U	SI	1	2017	57	
SWYC	8223	100	SAIL	34	11	copper	ULTRA-KOTE	Y3779U	SI	7	2016	57	
SWYC	8220	94	POWER	25	9	copper	ULTRA-KOTE	Y3669U	MG	7	2018	57	2693-212-AA
SWYC	8219	98	SAIL	51	14	copper	ULTRA	Y3669F	SI	6	2018	55	2693-119-ZD
SWYC	8217	98	SAIL	33	11	copper	ULTRA	Y3669F	SI	3	2018	55	2693-212-AA
SWYC	8214	96	POWER	43	13	copper	ULTRA	Y3779F	SI	1	2013	55	2693-212-AA
SWYC	8211	100	SAIL	25	8	low copper	INTERCLENE 5170	BCA 170/5		9	2018	27	
SWYC	8209	100	POWER	27	8				SI	11	2012		
SWYC	8208	100	SAIL	29	9	low copper	TRILUX 33	YBA063		5	2016	17	2693-203-ZB
SWYC	8207	96	SAIL	23	8	low copper	CALIFORNIA BOTTOMKOTE	YBA143	SI	8	2017	35	
SWYC	8206	92	POWER	33	12	copper	Z*SPAR THE PROTECTOR VOC HARD TYPE	B-94		10	2019	65	
SWYC	8204	100	POWER	13	6	non-biocide	NO PAINT - UNPAINTED					0	
SWYC	8202	100	POWER	33	11	copper	NOT LISTED ABOVE			7	2018	70	
SWYC	8201	94	SAIL	41	14	copper	PRO-LINE 1088	Y1088C-01	SI	9	2019	67	
SWYC	8200	88	SAIL	41	13	copper	TRINIDAD PRO	16471732		3	2016	65	
SWYC	8199	92	SAIL	34	11	copper	Z-SPAR BOTTOM PRO GOLD	411187706	SI	8	2017	65	
SWYC	8196	96	SAIL	37	11	non-biocide	INTERSLEEK 900	FXA972/A	SI	3	2013	0	
SWYC	8193	98	SAIL	40	13	copper	PRO-LINE 1088	Y1088C-02	MG	4	2017	67	
SWYC	8191	98	SAIL	33	10	copper	PRO-LINE 1088	Y1088C-03		7	2018	67	
SWYC	8190	100	SAIL	40	13	copper	ULTRA	Y3779F	SI	4	2012	55	2693-212-AA
SWYC	8189	77	POWER	12	12	copper	PRO-LINE 1088	Y1088C-01		1	2019	67	
SWYC	8188	98	POWER	41	14	copper	ULTRA 3669	3669	SI	4	2019	55	
SWYC	8185	98	SAIL	44	12	copper	Z*SPAR THE PROTECTOR VOC HARD TYPE	B-91	KK	7	2017	65	
SWYC	8180	92	POWER	47	14	copper	NOT LISTED ABOVE			4	2019	70	
SWYC	8178	94	SAIL	35	11	copper	Z*SPAR THE PROTECTOR VOC HARD TYPE	B-94	Dr SI	9	2011	65	60061-49-ZH
SWYC	8175	100	POWER	38	13	low copper	TRILUX 33	YBA062		2	2013	17	
SWYC	8171	100	SAIL	30	1	copper	ULTRA 3779	3779	SI	9	2019	55	2693-192-AA
SWYC	8168	100	SAIL	41	12	copper	PRO-LINE 1088	Y1088C-01	SI	8	2013	67	
SWYC	8167	100	SAIL	34	11				SI	1	2008	67	
SWYC	8166	98	POWER	22	8	copper	ULTRA 3449	3449	SI	6	2019	55	

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SWYC	8165	25	SAIL	45	12	copper	TRINIDAD	1275		10	2014	70	
SWYC	8164	92	POWER	34	9	copper	ULTRA 3779	3779	SI	12	2017	55	
SWYC	8163	96	SAIL	30	10	copper	TRINIDAD	1275	Dr SI	5	2008	70	
SWYC	8162	85	POWER	44	14	low copper	BOTTOMKOTE ACT WITH IRGAROL	6690B	Dr SI	8	2011	30	
SWYC	8161	98	SAIL	31	9	copper	ULTRA	Y3779F	SI	9	2018	55	2693-212-AA
SWYC	8160	50	SAIL	48	13	copper	ULTRA	Y3669F	SI	9	2015	55	2693-212-AA
SWYC	8159		POWER	34	11								
SWYC	8157	94	SAIL	50	13	low copper	VIVID	11161	SI	9	2018	25	60061-116-AA
SWYC	8156	100	POWER	32	10	copper	ULTRA-KOTE	Y3779U	SI	5	2016	57	
SWYC	8155	96	POWER	46	15	low copper	BOTTOMKOTE CLASSIC	YBB669G	KK	6	2015	35	
SWYC	8154	92	POWER	40	13	copper	ULTRA 3779	3779	SI	7	2018	55	
SWYC	8153	96	POWER	54	15	copper	NOT LISTED ABOVE		SI	6	2019	70	
SWYC	8152	81	POWER	37	12	copper	ULTRA 3779	3779	SI	3	2018	55	
SWYC	8149	100	POWER	36	12	copper	ULTRA	Y3779F	SI	6	2018	55	
SWYC	8148	100	SAIL	34	11	non-biocide	CERAM-KOTE 99	99M	Dr SI	5	2019	0	
SWYC	8147	85	POWER	27	8	copper	HYDROCOAT ABLATIVE	1240		2	2017	40	
SWYC	8144		VACANT										
SWYC	8143	96	POWER	42	13	copper	ULTRA	Y3449F	Dr SI	3	2013	55	2693-212-AA
SWYC	8142	100	SAIL	38	11	copper	ULTRA-KOTE	Y3669U	SI	8	2010	57	
SWYC	8141	100	POWER	44	14	copper	Z-SPAR BOTTOM PRO GOLD	411187706	Dr SI	9	2017	65	
SWYC	8140	100	DINGY	11	6	non-biocide	NO PAINT - UNPAINTED					0	
SWYC	8138	98	SAIL	31	11	copper	ULTRA	Y3779F	SI	9	2014	55	2693-212-AA
SWYC	8137	88	POWER	55	15	copper	ULTRA	Y3779F	SI	5	2018	55	2693-212-AA
SWYC	8136	96	POWER	38	13	copper	ULTRA	Y3779F	SI	2	2014	55	2693-212-AA
SWYC	8134	100	SAIL	25	9	copper	Z-SPAR BOTTOM PRO GOLD	41127706	Dr SI	6	2015	65	
SWYC	8132	94	SAIL	31	11	copper	ULTRA	Y3669F	SI	10	2014	55	2693-212-AA
SWYC	8130	100	SAIL	36	12	copper	ULTRA	Y3669F	SI	9	2006	55	2693-212-AA
SWYC	8129	96	SAIL	43	14	copper	ULTRA	Y3669F	KK	10	2019	55	2693-212-AA
SWYC	8128	98	SAIL	30	10								
SWYC	8124	81	SAIL	25	9	low copper	MICRON CSC	5584G		10	2019	37	2693-132-ZV
SWYC	8123	98	POWER	21	9	copper	NOT LISTED ABOVE			4	2014	70	
SWYC	8122	96	SAIL	32	11	copper	NOT LISTED ABOVE			8	2016	70	
SWYC	8120	100	POWER	27	8	copper	ULTRA-KOTE	Y3779U	SI	11	2015	57	
SWYC	8119	98	SAIL	26	7	copper	ULTRA	Y3559F	KK	8	2017	55	2693-212-AA
SWYC	8118	100	POWER	35	10	copper	ULTRA	Y3449F		5	2018	55	
SWYC	8117	96	POWER	38	13	copper	ULTRA 3669	3669	SI	6	2014	55	
SWYC	8115	90	POWER	29	10	copper	ULTRA	Y3779F	SI	4	2019	55	2693-212-AA
SWYC	8114	100	SAIL	36	12	copper	NOT LISTED ABOVE			9	2017	70	
SWYC	8113	81	SAIL	49	9	copper	PRO-LINE 1088	Y1088C-01	KK	6	2019	67	
SWYC	8112	92	POWER	33	12	copper	ULTRA	Y3779F	Dr MB	4	2019	55	
SWYC	8108	98	SAIL	30	11	copper	Z*SPAR THE PROTECTOR VOC HARD TYPE	B-91	Dr SI	8	2014	65	
SWYC	8107	92	POWER	29	10	copper	ULTRA	Y3669F	Dr SI	2	2019	55	2693-212-AA
SWYC	8102	98	POWER	39	14	copper	ULTRA	Y3669F	KK	5	2014	55	2693-212-AA
SWYC	8101	100	POWER	40	13	low copper	CALIFORNIA BOTTOMKOTE	YBA143		10	2017	35	
SWYC	8099	100	SAIL	28	10	copper	ULTRA-KOTE 2669N	2669N	SI	4	2016	67	
SWYC	8097	94	SAIL	37	11	copper	ULTRA 3779	3779	SI	1	2019	55	
SWYC	8096	94	SAIL	35	11	low copper	MICRON CSC	5583G	KK	10	2018	37	
SWYC	8094	94	POWER	44	1	copper	TRINIDAD SR	A1277Q		11	2017	60	60061-94-ZD
SWYC	8093	96	POWER	62	17	copper	NOT LISTED ABOVE		SI	8	2019	70	
SWYC	8092	100	POWER	39	12	copper	Z*SPAR THE PROTECTOR VOC HARD TYPE	B-94	Dr SI	10	2019	65	
SWYC	8091	100	POWER	22	0	copper	ULTRA	Y3449F	KK	8	2018	55	
SWYC	8089	77	POWER	53	13	copper	Z-SPAR BOTTOM PRO GOLD	411167706	SI	4	2016	65	
SWYC	8088	96	SAIL	32	10	organic biocide	ULTIMA ECO	1608		7	2012	0	
SWYC	8087	100	POWER	26	9	copper	TRINIDAD PRO	16471732	SI	6	2019	65	60061-49-ZM
SWYC	8085	96	SAIL	36	13	copper	PRO-LINE 1088	Y1088C-02	SI	3	2017	67	
SWYC	8084	98	POWER	37	11	low copper	WEST MARINE CPP ABLATIVE		SI	5	2017	24	60061-71-ZD

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SWYC	8083	90	POWER	25	7	low copper	INTERSPEED 6400NA	BQA679/5GL	SI	9	2018	38	
SWYC	8082	100	POWER	35	12	copper	ULTRA-KOTE	Y3669U	SI	5	2016	57	2693-119-ZD
SWYC	8081	100	POWER	52	10	low copper	MICRON CSC	5583G		4	2017	37	
SWYC	8080	75	SAIL	40	13	copper	Z*SPAR THE PROTECTOR VOC HARD TYPE	B-94	Dr SI	3	2017	65	
SWYC	8076	90	POWER	28	9	copper	ULTRA-KOTE	Y3669U	SI	7	2017	57	
SWYC	8073	98	POWER	28	9	copper	ULTRA	Y3779F	SI	5	2018	55	2693-212-AA
SWYC	8071	88	POWER	34	11	copper	NOT LISTED ABOVE		NB	5	2017	70	
SWYC	8070	98	SAIL	37	12	copper	ULTRA	Y3779F	SI	2	2015	55	2693-212-AA
SWYC	8069	96	POWER	37	13	copper	EPOXYCOP K51	K51	SI	6	2019	43	
SWYC	8068	98	POWER	71	13	copper	ULTRA	Y3669F	KK	12	2013	55	2693-212-AA
SWYC	8067	100	SAIL	29	8	non-biocide	NO PAINT - UNPAINTED					0	
SWYC	8066	100	SAIL	33	10	low copper	VC-OFFSHORE	V118	KK	11	2017	41	
SWYC	8063	100	SAIL	38	11	non-biocide	NO PAINT - UNPAINTED					0	
SWYC	8061	100	SAIL	43	14	copper	ULTRA	Y3669F	SI	7	2013	55	2693-212-AA
SWYC	8060	96	POWER	63	15	low copper	AF33	3345	Dr SI	6	2013	33	
SWYC	8059	96	SAIL	36	12	copper	ULTRA	Y3669F	SI	6	2017	55	2693-212-AA
SWYC	8055	92	POWER	41	14	copper	SEAGUARD ABLATIVE	P30BQ12		7	2018	48	
SWYC	8054	94	POWER	24	0	copper	ULTRA-KOTE	Y3669U	MG	9	2016	57	2693-119-ZD
SWYC	8053	98	POWER	58	16	copper	ULTRA 3779	3779	SI	7	2018	55	
SWYC	8052	92	SAIL	28	7	copper	ULTRA 3449	3449	SI	9	2019	55	
SWYC	8051		VACANT										
SWYC	8050	96	SAIL	28	9	copper	ULTRA-KOTE	Y3669U	Dr MB	2	2018	57	
SWYC	8048	100	POWER	29	8	low copper	MICRON EXTRA VOC	5792	NB	6	2017	35	2693-190-ZG
SWYC	8047		VACANT										
SWYC	8046	94	POWER	34	11	copper	ULTRA 3669	3669	SI	5	2019	55	
SWYC	8045		VACANT										
SWYC	8040	100	SAIL	56	16	copper	ULTRA-KOTE	Y3449U	SI	2	2017	57	
SWYC	8039	98	POWER	37	12	copper	NOT LISTED ABOVE			10	2017	70	
SWYC	8038	96	SAIL	39	12	copper	PRO-LINE 1088	Y1088C-01	KK	10	2017	67	
SWYC	8037	92	SAIL	41	12	copper	ULTRA	Y3669F	SI	8	2018	55	2693-212-AA
SWYC	8035	100	POWER	25	8	copper	ULTRA 3669	3669	SI	9	2018	55	
SWYC	8031	98	POWER	29	9	copper	PRO-LINE 1088	Y1088C-02	SI	9	2017	67	
SWYC	8030	100	POWER	41	13	copper	ULTRA	Y3779F	SI	11	2014	55	2693-212-AA
SWYC	8029	100	POWER	10	4	non-biocide	NO PAINT - UNPAINTED					0	
SWYC	8028	92	SAIL	40	13	copper	ULTRA	Y3669F	SI	6	2018	55	2693-212-AA
SWYC	8027	92	SAIL	44	13	non-biocide	CERAM-KOTE 99	99M	SI	3	2017	0	
SWYC	8026	100	SAIL	47	13	copper	Z-SPAR BOTTOM PRO GOLD	411187706	Dr SI	3	2015	65	
SWYC	8025	92	POWER	34	11	copper	HYDROCOAT ABLATIVE	1840		6	2017	40	
SWYC	8024	100	SAIL	40	13					6	2017	67	
SWYC	8020	94	SAIL	27	9	copper	ULTRA 3669	3669	SI	3	2019	55	
SWYC	8019	100	SAIL	30	11	copper	ULTRA	Y3669F	SI	7	2014	55	2693-212-AA
SWYC	8018	100	SAIL	32	6	copper	BOTTOMKOTE AQUA	YBA579	KK	7	2016	46	
SWYC	8015	98	SAIL	30	12	copper	TRINIDAD PRO	A10882	SI	10	2019	60	
SWYC	8013	100	SAIL	32	8	copper	ULTRA	Y3669F	SI	10	2013	55	2693-212-AA
SWYC	8012	81	POWER	21	8	low copper	BOTTOMKOTE PRO	79	Dr SI	10	2017	22	
SWYC	8011	92	POWER	33	13	copper	PRO-LINE 1088	Y1088C-02	SI	1	2018	67	
SWYC	8010	100	POWER	41	15	copper	Z*SPAR THE PROTECTOR VOC HARD TYPE	B-91	Dr SI	7	2015	65	
SWYC	8009	98	POWER	32	11	copper	ULTRA	Y3449F	SI	1	2019	55	2693-212-AA
SWYC	8008	96	POWER	41	13	copper	ULTRA 3779	3779	SI	3	2018	55	
SWYC	8005	96	POWER	47	17	copper	ULTRA	Y3779F	SI	8	2018	55	
SWYC	8000	94	SAIL	37	12	copper	ULTRA-KOTE	Y3669U	SI	4	2016	57	

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LPYC	11001	100	Power	43	13'4"	Low Copper	Bottom Pro Gold	411127906	Driscolls	Jan	2017	40	60061-117-ZE
LPYC	11002	vacant											
LPYC	11003	100	Power	22	7	Low Copper			Koehler Kraft	Jun	2012	67	
LPYC	11004	vacant											

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SIM	9516	1	S	23	9	Copper	Unknown		SIBY	4	2006	57	
SIM	9384	1	P	21	8	Copper	Interlux Ultra	Y3779U	SIBY	5	2017	67	
SIM	9619	1	P	25	8.6	Copper	Interlux Ultra	Y3779F	HH Marine Services	9	2017	55	2693-212-AA
SIM	9464	0.8333	S	21	6.3	Copper	Interlux Ultra	Y3669F	Self Applied	9	2017	55	2693-212-AA
SIM	9793	0.9409	S	21	6.3	Copper	Interlux Ultra	Y3669F	SIBY	4	2018	55	2693-212-AA
SIM	9568	1	S	24	8	Copper	Interlux Ultra	Y3669F	SIBY	9	2017	55	2693-212-AA
SIM	9047	1	S	25	8	Copper	Interlux Ultra	Y3669F	SIBY	8	2017	55	2693-212-AA
SIM	9354	1	S	21	6	Copper	Interlux Ultra	Y3669F	Self Applied	7	2018	55	2693-212-AA
SIM	9705	1	P	16	5	Copper	Trilux 33	YBA063	Self Applied	10	2013	17	2693-203-ZB
SIM	9328	1	P	30	10.5	Low	Micron CSC	YBC583	SIBY	4	2015	33	2693-225-AA
SIM	9306	0.8333	P	20	6	Low	PetitVivid Hard SR Ab	1261	Self Applied	6	2018	25	60061-116-AA
SIM	9010	0.9489	P	20	7	Copper	Interlux Ultra	Y3779F	SIBY	5	2016	55	2693-212-AA
SIM	9883	1	E	18	7.9	Copper	Interlux Ultra	Y3779F	SIBY	4	2018	55	2693-212-AA
SIM	9091	1	S	18	8	Non	Seahawk Smart Solut	4705	Koehler Kraft	3	2015	0	
SIM	9716	1	P	23	9	Copper	Interlux Ultra	Y3669F	SIBY	12	2016	67	2693-212-AA
SIM	9454	1	P	23	8.6	Copper	Interlux Ultra	Y3449F	SIBY	12	2017	55	2693-212-AA
SIM	9641	1	P	25	7	Copper	Interlux Ultra	Y3669F	SIBY	4	2018	55	2693-212-AA
SIM	9782	1	P	17	6	Copper	Proline	Y1088C-01	Self Applied	12	2012	67	
SIM	9233	1	P	22	7.5	Copper	Interlux Ultra	Y3449F	Nielsen Beaumont	8	2014	55	2693-212-AA
SIM	9367	1	S	23	7.8	Copper	Interlux Ultra	Y3779F	Koehler	4	2019	55	2693-212-AA
SIM	9413	1	P	28	11	Copper	Interlux Ultra	Y3779F	Driscolls	8	2018	55	2693-212-AA
SIM	9221	1	P	44	13.9	Low	Micron CSC	YBC583	SIBY	9	2011	33	
SIM	9173	1	S	45	13	Copper	Interlx Ultra	3779	SIBY	4	2014	55	
SIM	9136	0.8333	S	49	12	Copper	Proline vinyl Copper	1088C-01	Self applied	12	2017	67	
SIM	9666	0.7253	S	47	13.9	Copper	Interlux Ultra	Y3779F	SIBY	10	2013	67	2693-212-AA
SIM	9189	1	S	42	11.5	Copper	Unknown	Unknown	43221	unknown	unknown	67	
SIM	9980	0.9892	P	42	12	Copper	Interlux Ultra	Y3779F	SIBY	10	2015	55	2693-212-AA
SIM	9798	0.9792	P	44	14	LOW	Micron CSCHS	5690	Port Charles Harbor	8	2017	33	
SIM	9717	0.9624	S	46	14	Copper	Unknown	Unknown	43525	unknown	unknown	67	
SIM	9624	0.9913	P	50	15.8	Copper	Interlux Ultra	Y3669F	SIBY	9	2018	55	2693-212-AA
SIM	9002	0.9973	S	46	13.3	Copper	Interlux Ultra	Y3779F	Driscolls	5	2016	67	2693-212-AA
SIM	9341	0.9194	S	52	14	Copper	ZsparProGold	41127706	KKMI	11	2017	55	60061-94-ZE
SIM	9794	0.9973	S	47	14.8	Copper	Zspar	B-91	Driscoll SI	6	2017	67	
SIM	9357	1	P	50	16	Copper	Zspar Pro Gold Blak	41127706	SIBY	11	2015	75	60061-94-ZE
SIM	9937	1	S	45	14	Low	SeaHawk AF33	3345	Gambol Ind	5	2016	33	44891-12-AA
SIM	9251	1	S	48	14.2	Copper	Interlux Ultra	Y3669F	SIBY	3	2012	55	2693-212-AA
SIM	9930	1	S	47	14	Copper	Zspar	41127706	Newp Harbor Ship	11	2016	67	60061-94-ZE
SIM	9406	0.9346	P	53	15	Copper	Zspar Progold	41127706	Driscolls SI	11	2018	67	60061-94-ZE
SIM	9230	1	S	47	14	Low	CSC Micron	YBC583	SIBY	1	2016	33	2693-225-AA
SIM	9681	0.997	S	48	17	Copper	Pettit Ultima	1032	Baja Navall	12	2016	60	
SIM	9288	0.9861	P	40	14.2	Copper	Interlux Ultra	Y3779F	SIBY	4	2018	55	2693-212-AA
SIM	9916	0.8228	S	51.6	15.5	Copper	Petit	1875	SIBY	8	2019	55	
SIM	9305	0.9677	P	40	13	Copper	Interlux Ultra	Y3779F	Driscolls MB	7	2019	55	2693-212-AA
SIM	9715	1	S	38	11.5	Copper	Interlux Ultra	Y3779F	Anchors Away	10	2010	55	2693-212-AA
SIM	9465	1	S	41	12	Copper	Woolsey	4802	self applied	2	2017	67	60061-101-ZA
SIM	9461	1	P	50	14.6	Copper	Unknown	Unknown	42948	unknown	unknown	67	
SIM	9089	1	P	38	13.4	Copper	Interlux Ultra	Y3669F	SIBY	6	2014	55	2693-212-AA
SIM	9844	1	S	41	12	Copper	Proline	1088C-02	SIBY	7	2018	67	
SIM	9377	0.9328	P	30	10.4	Copper	Interlux Ultra	Y3779F	Driscolls MB	4	2014	55	2693-212-AA
SIM	9096	1	P	56	15.9	Low	Proline	1088C-02	SIBY	5	2015	67	
SIM	9653	1	P	28	10	Copper	Interlux Ultra	Y3779F	SIBY	5	2018	55	2693-212-AA

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SIM	9272	0.9919	P	37	14.5	Copper	Unknown	unknown	41913	unknown	unknown	67	
SIM	9287	0.8387	S	31	10.1	Copper	Total Boat by Spartan	4020	Self Applied	1	2019	55	
SIM	9450	0.9698	P	38	13	Copper	Unknown	Unknown	43313	Unknown	Unknown	67	
SIM	9396	1	P	30	11	Copper	Zspar Pro Gold	41127706	Dricolls	11	2018	67	60061-94-ZE
SIM	9852	0.901	P	41	14	Copper	Unknown	Unknown	43040	unknown	unknown	67	
SIM	9647	0.8501	P	33	10.7	Non	Proguard Ablative	NAU773	Neilson Beaumont	4	2018	55	23566-20-ZT
SIM	9150	1	S	42	13	Copper	ZsparPro	411187706	Driscolls	11	2019	37	60061-94-ZE
SIM	9902	1	P	30	12	Copper	Interlux Ultra	Y3779F	SIBY	7	2016	67	2693-212-AA
SIM	9894	0.9866	P	42	13	Copper	Unknown	Unknown	Florida	12	2017	67	
SIM	9238	0.9919	S	33	11	Copper	Proline 1088	1088C-01	SIBY	4	2011	33	
SIM	9631	1	S	38	12.4	Copper	Pettit Protector	B-94	The Boatyard Oxnard	12	2017	60	
SIM	9453	1	S	27	8	Copper	Purchase		42186	unknown	2015	67	
SIM	9197	1	S	39	13	Copper	Woolsey Defense	4802	Nielson Beaumont	8	2017	48	60061-101-ZA
SIM	9224	1	p	33.5	11.5	Copper	Pettit Trinidad	A10882	SIBY	8	2019	55	60061-94-ZB
SIM	9727	0.9725	S	39.7	12.6	Low	Micron CSC	YBC580	SIBY	1	2014	33	2693-225-AA
SIM	9631	0.9105	P	31	11.6	Copper			Texas	6	2018	67	
SIM	9989	0.9648	S	40	11	Copper	Pettit Trinidad	A10882	Self Applied	6	2017	55	60061-94-ZB
SIM	9683	0.9302	P	28	9.5	Copper	Interlux Ultra	Y3669F	SIBY	6	2019	55	2693-212-AA
SIM	9171	1	P	29	13	Non	Super ProGuard	NAU773	Neilson Beaumont	3	2016	48	23566-20-ZT
SIM	9381	1	S	25	8	Low	Micron CSC	YBC580	SIBY	11	2013	33	2693-225-AA
SIM	9450	0.9863	S	35.6	12	Copper	Woolsey Defense	4801	Nielson Beaumont	8	2017	55	60061-101-ZA
SIM	9720	1	S	30	10	Copper	Zspar ProGold	41127706	Driscolls	5	2016	40	60061-94-ZE
SIM	9472	1	S	43	13.3	Copper	Interlux Ultra	Y3779F	SIBY	8	2018	55	2693-212-AA
SIM	9030	0.8181	P	24	8	Copper	Unknown	Unknown	43497	Hasn't painted	unknown	67	
SIM	9107	0.9944	S	28.5	10.3	Copper	Interlux Ultra	Y3779F	SIBY	8	2018	55	2693-212-AA
SIM	9638	1	P	22	8.3	Copper	Zspar	411187706	Driscolls	8	2019	65	60061-94-ZE
SIM	9199	1	S	27	9	Copper	Interlux Ultra	Y3779F	SIBY	10	2016	55	2693-212-AA
SIM	9636	0.9806	P	69	17.2	Copper	Pettit Zspar	B-94	Driscolls	6	2015	67	
SIM	9573	1	S	40.5	12	Copper	Unknown	unknown	2009	unknown	unknown	67	
SIM	9067	0.9944	P	46	15	Copper	Interlux Ultra	Y3669F	SIBY	6	2017	55	2693-212-AA
SIM	9510	1	S	36	11.9	Copper	Pettit	1875	So Tex Yacht Serv	11	2016	70	
SIM	9180	0.818	S	41	10.9	Copper	Unknown	unknown	43770	unknown	unknown	67	
SIM	9916	1	P	38	14	Copper	Interlux Ultra	Y3779F	Unknown	2	2015	55	2693-212-AA
SIM	9477	0.9806	P	35	13	Copper	Pettit Protector	B-94	Driscolls MB	9	2013	65	
SIM	9146	0.9266	S	42	14	Copper	Interlux Ultra	3559	SIBY	2	2015	65	
SIM	9816	0.9355	P	41	14	Non	Seavoyage	N51B301	Driscolls MB	9	2019	0	
SIM	9994	0.9361	S	38	12.3	Copper	Interlux Ultra	Y3779F	Driscolls MB	9	2009	55	2693-212-AA
SIM	9143	1	P	36	13	Copper	Petit Zspar	B-94	Boatyard, Marina Del Rey	7	2019	65	
SIM	9123	1	P	44	14.6	Copper	Interlux Ultra	Y3779F	SIBY	5	2018	55	2693-212-AA
SIM	9955	1	S	36.6	13.1	Copper	Petitt Trinidad	A10882	SIBY	11	2018	67	60061-94-ZB
SIM	9695	1	S	42	13	Copper	Zspar ProGold	411187706	Driscolls SI	8	2016	65	60061-94-ZE
SIM	9918	1	P	38	13.3	Copper	Interlux Ultra	Y3669F	Koehler Kraft	3	2017	55	2693-212-AA
SIM	9189	1	P	36	12.6	Copper	Interlux Ultra	Y3669F	SIBY	11	2014	55	2693-212-AA
SIM	9649	1	P	38	11	non	Naut Super Pro Guar	NAU773	Neilson Beaumont	1	2016	55	23566-20-ZT
SIM	9745	1	P	36.2	12.5	Copper	Interlux Ultra	Y3669F	Driscolls	7	2012	55	2693-212-AA
SIM	9144	0.9946	S	44.5	14	Copper	Trinidad Pro	A1088G	Boatyard @ Rocky Point	4	2016	55	60061-94-ZB
SIM	9958	0.9946	S	43	11	Copper	Interlux Ultra	Y3779F	SIBY	6	2018	55	2693-212-AA
SIM	9186	0.9785	S	40	13	Copper	Unknown	unknown	43603	unknown	unknown	67	
SIM	9375	1	S	42	12	Copper	Zspar Progold	41127706	Driscolls	4	2017	40	60061-94-ZE
SIM	9374	1	P	36.4	12.5	Copper	Interlux Ultra	Y3449F	SIBY	1	2014	55	2693-212-AA
SIM	9892	0.8472	P	42	13	Copper	Interlux Ultra	Y3779F	SIBY	7	2016	25	2693-212-AA

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SIM	9546	1	S	37	12.4	Low	Hydrocoat	1840	Self Applied	6	2016	40	60061-87-ZI
SIM	9378	1	S	44	12	Copper	Interlux Ultra	Y3669F	SIBY	5	2017	55	2693-212-AA
SIM	9352	1	P	40	13.6	Unknown	Unknown-new boat	unknown	42826	unknown	unknown	67	
SIM	9006	0.9891	P	37	12.4	Copper	Interlux Ultra	Y3779F	SIBY	4	2018	55	2693-212-AA
SIM	9447	1	P	36	13.6	Copper	Unknown	unknown	Driscolls	11	2015	65	
SIM	9007	1	P	32	12	Non	hydrohoist		sits on hydrohoist	10	2008	0	
SIM	9963	1	S	30	11	Copper	Interlux Ultra	Y3669F	SIBY	9	2015	55	2693-212-AA
SIM	9140	1	S	22	6	Copper	Unknown	unknown	43313	unknown	unknown		
SIM	9204	0.9919	P	33	11	Non	no bottom paint	no paint	not painted	not painted	not painted	0	
SIM	9931	0.9722	S	31	11.1	Copper	Interlux Ultra	Y3669F	SIBY	6	2017	55	2693-212-AA
SIM	9095	0.9919	S	33	11.6	Copper	Interlux Ultra	Y3779F	SIBY	5	2016	55	2693-212-AA
SIM	9771	0.9116	P	22	8	Non	no bottom paint	no paint	not painted	not painted	not painted	0	
SIM	9960	1	P	16	7	Copper	Unknown -New boat	Unknown	43586	unknown	unknown		
SIM	9290	0.9389	S	21	6.3	Copper	Interlux ultra	Y3669F	SIBY	6	2019	55	2693-212-AA
SIM	9010	1	S	34	10.5	Copper	Proline	1088C-01	Self Applied	4	2018	67	
SIM	9371	1	P	28	10.5	Copper	Unknown	unknown	unknown	unknown	unknown	67	
SIM	9692	0.9919	S	33	8	Copper	Petit Protector	B-94	Driscoll's SI	1	2017	67	
SIM	9959	1	S	27	8	Copper	Interlux Ultra	Y3779F	Koehler Kraft	3	2015	55	2693-212-AA
SIM	9111	1	P	28.3	9.8	Copper	Interlux Ultra	Y3779F	SIBY	5	2013	55	2693-212-AA
SIM	9446	1	S	31	10.9	Copper	Unknown -New boat	unknown	43374	unknown	unknown	55	
SIM	9868	1	S	30	10.9	Copper	Unknown	unknown	43252	unknown	unknown	67	
SIM	9385	1	S	29	7	Copper	Interlux Ultra	Y3779F	SIBY	4	2012	67	2693-212-AA
SIM	9041	1	S	32.11	11.2	Low	Proline	1088C-02	Driscolls	7	2016	67	
SIM	9035	1	S	30	11	Copper	Interlux Ultra	Y3669U	SIBY	9	2015	55	
SIM	9531	1	P	30	11	Copper	Interlus Ultra	Y3779F	SIBY	3	2017	55	2693-212-AA
SIM	9652	1	S	30	10	Copper	Interlux Ultra	Y3779F	SIBY	7	2017	55	2693-212-AA
SIM	9992	1	S	29	9.6	Copper	Zspar Pro Gold Bp91	A411187706	SIBY	4	2013	65	
SIM	9176	1	P	32	6	Copper	Interlux Ultra	Y3779F	MGBW	12	2017	55	2693-212-AA
SIM	9631	0.9866	S	30	10	Copper	Unknown	Unknown	Unknown	11	2015	65	
SIM	9405	1	P	23	7.6	Copper	Zspar	B-94	Sunset Aquatic Mar Cn	1	2014	65	
SIM	9348	1	P	30	10	Copper	Interlux Ultra	Y3779F	SIBY	12	2018	55	2693-212-AA
SIM	9375	1	S	29.6	10	Low	Pettit Kop Coat	1881	KKMI	3	2015	38	60061-71-ZA
SIM	9139	1	S	30	10.6	Copper	Interlux Ultra	Y3669F	SIBY	5	2016	55	2693-212-AA
SIM	9678	1	S	30	11	Copper	Petit Trinidad	A10882	Dolphin Divers	9	2011	60	60061-94-ZB
SIM	9499	1	S	33	10.5	Copper	Interlux Ultra	Y3669F	SIBY	11	2017	55	2693-212-AA
SIM	9803	1	P	32	11.3	Copper	Interlux Ultra	Y3779F	Driscolls SI	2	2014	55	2693-212-AA
SIM	9538	1	S	30	11.3	Copper	Interlux Ultra	Y3669F	SIBY	10	2007	55	2693-212-AA
SIM	9634	1	P	30	10	Copper	Interlux Ultra	Y3669U	SIBY	7	2016	57	
SIM	9879	1	S	30	10.25	Low	Proline	1088C-02	Santa Barbara	10	2010	67	
SIM	9944	0.9639	P	54	16	non	Epaint	EPT S1-105-1	Driscolls MB	8	2019	0	
SIM	9135	1	P	48	15.5	Copper	Interlux Ultra	Y3669F	Koehler Kraft	10	2018	55	2693-212-AA
SIM	9038	1	P	37	14	Copper	Interlux Ultra	Y3669F	Hale Marine AZ	4	16	55	2693-212-AA
SIM	9321	1	P	29.9	11.5	Copper	Interlux Ultra	Y3779F	SIBY	12	2015	55	2693-212-AA
SIM	9507	1	S	35	11.4	NON	Ceram Kote	99M	SIBY	2	2015	0	
SIM	9808	0.8694	P	35	12	Copper	Pettit Trinidad	A10882	SIBY	11	2019	55	60061-94-ZB
SIM	9372	1	S	36	12	Copper	Seaguard	P30RQ10	SIBY	6	2018	48	
SIM	9383	1	S	36	11.75	non	Ceram Kote	99M	Self	5	2015	0	
SIM	9640	0.5599	S	39	11.2	Copper	Unknown	Unknown	Mexico Botayard	1	2018	55	
SIM	9713	0.9889	S	35	11.6	Copper	Unknown	Unknown	Mexico	6	2016	67	
SIM	9442	0.9107	S	39	13.5	Copper	Interlux Ultra	Y3669F	SIBY	5	2016	55	2693-212-AA
SIM	9078	0.9861	S	36	11.9	Copper	Zspar	B-91	Driscolls	5	2017	67	

Facility	Slip/Mooring Reference Number	Percent of Time Occupied	Vessel Type (Power or Sail)	Vessel Length	Vessel Beam	Paint Type Copper, Low or Non	Paint Product Name	Product Number	Boatyard Name or Purchase Date	Painting Date Month (mm)	Painting Date Year (yyyy)	% Copper	Category 1 reg #
SIM	9825	0.8952	S	42	12.2	Copper	Petit SR Green	A1377G	Unknown	5	2014	60	60061-94-ZD
SIM	9308	0.9972	P	34	12.6	Copper	Interlux Ultra	Y3669U	SIBY	7	2017	55	
SIM	9780	1	S	42	13.9	Copper	Interlux Ultra	Y3669U	Koehler Kraft	12	2018	55	
SIM	9714	1	S	35	12.5	non	Micron CF	YB0103	Koehler Kraft	2	2016	0	
SIM	9664	0.9911	S	43	14	Copper	Zspar ProGold	41127706	Driscolls	2	2019	55	60061-94-ZE
SIM	9612	1	S	34	11.9	Low	Micron CSC	YBC583	SIBY	4	2018	33	2693-225-AA
SIM	9714	1	P	42	14	Copper	Interlux Ultra	2669N	SIBY	11	2015	55	
SIM	9987	1	P	38	13	Low	Proline	1088C-02	SIBY	10	2013	67	
SIM	9691	1	P	32	13	Low	Micron CSC	YBC580	SIBY	11	2014	33	2693-225-AA
SIM	9142	0.922	P	36.6	10	Copper	Interlux Ultra	Y3669F	SIBY	1	2019	55	2693-212-AA
SIM	9440	1	S	39	13	Copper	Interlux Ultra	Y3669F	SIBY	2	2019	67	2693-212-AA
SIM	9322	0.7633	P	38	13.6	Unknown	Unknown-New Boat	Unknown	43545	Hasn't painted	since purchas	60	
SIM	9671	0.8842	P	55	17	Low	Micron CSC	YBC583	Hinckley Marine	11	2019	55	2693-225-AA
SIM	9135	0.9973	P	36	12.2	Copper	Interlux Ultra	Y3779F	SIBY	2	2015	55	2693-212-AA
SIM	9590	1	S	40	12	Copper	Interlux Ultra	Y3779F	SIBY	1	2014	55	2693-212-AA
SIM	9124	1	P	64	17	Copper	Interlux Ultra	Y3779F	SIBY	8	2017	55	2693-212-AA
SIM	9844	0.7934	P	106	25	Low	SeaHawk Island 44	1005	Ensenada	6	2019	55	
SIM	9922	1	P	92	20.5	Copper	Interlux	Y3779F	SIBY	5	2018	55	2693-212-AA
SIM	9348	0.8474	P	89	21	Copper	Zspar Progold	41127706	Driscolls SI	2	2019	40	60061-94-ZE
SIM	9557	0.973	S	112	25	Non	Interspeed	BZA646	MGBW	12	2019	0	
SIM	9347	0.9946	P	115	25	Low	Seahawk Island 44	1005	MGBW	4	2019	55	
SIM	9969	0.9382	P	103	24.5	Low	Seahawk	1205-1	SIBY	11	2018	38	
SIM	9761	0.918	P	105	24	Low	Seaguard	P30BQ12	Delta, WA	6	2018	48	
SIM	9616	0.8517	P	90	22	Low	Proline	1088C-01	MGBW	11	2018	67	
SIM	9052	0.8025	P	151	30	Low	Seahawk	1205-1	MGBW	8	2019	38	
SIM	9215	0.8858	P	151	28	Low	SeaHawk Biocop	1205-1	Marine Group	6	2019	38	
SIM	9001	0.9312	P	99.6	25.2	Low	Micron 66	YBA473	SIBY	11	2017	55	2693-187-ZG
SIM	9001	0.8823	P	75	19	Copper	Interlux Ultra	Y3559F	SIBY	4	2019	33	2693-212-AA
SIM	9186	0.975	S	58	16	Copper	Pettit Trinidad	A10882	SIBY	3	2016	55	60061-94-ZB
SIM	9113	0.7987	P	128	26	Non	Seavoyage	N51B301	MGBW	6	2018	38	
SIM	9304	1		113	23.6							55	
SIM	9838	0.9152	P	48	15.4	Copper	Interlux Ultra	Y3779F	SIBY	3	2019	38	2693-212-AA
SIM	9389	0.8316	P	110	24	Low	SeaHawk Biocop TF	1205-1	MGBW	8	2017	38	
SIM	9222	0.9694	P	137	23	Non	Trilux 33	YBA060	Platypus	9	2019	17	2693-203-AA
SIM	9227	0.775	p	53	15	Copper	Interlux Ultra	Y3779F	MGBW	7	2016	55	2693-212-AA

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HMM	7	100	S	27	9	Copper	Unknown		Unknown	Unknown	Unknown	67	
HMM	12	100	S	34	12	Copper	Interlux Ultra	Y3779F	Shelter Island Boatyard	4	2017	67	2693-212-AA
HMM	15	100	S	37	11	Low	Unknown		Unknown	Unknown	Unknown	67	
HMM	16	100	S	27	9	Copper	Interlux Ultra	Y3449F	Shelter Island Boatyard	6	2012	55	2693-212-AA
HMM	17	70	S	40	13	Copper	Unknown		Driscoll SI	10	2019	67	
HMM	19	85	S	35	12	Low	Interlux UltraKote	Y3669U	Shelter Island Boatyard	12	2016	33	
HMM	20	100	S	47	14	Low	Interlux UltraKote	2449H	Koehler Kraft	1	2012	33	
HMM	22	100	S	38	12	Low	Unknown		Channel Islands Landing	3	2015	67	
HMM	26	100	P	30	12	Low	Unknown		Shelter Island Boatyard	6	2016	67	
HMM	27	100	S	27	9	Low	Unknown		Unknown	2	2011	67	
HMM	30	100	P	33	11	Copper	Unknown		Unknown	Unknown	Unknown	67	
HMM	33	100	S	35	12	Copper	Unknown		Unknown	Unknown	Unknown	67	
HMM	36	100	S	23	9	Low	West Marine CPP Ablative	411181108	Self Applied	7	2018	24	60061-71-ZD
HMM	50	Vacant										0	
HMM	51	95	P	41	13	Low	Pettit Vivid	11161	Nielsen-Beaumont	2	2019	25	60061-116-AA
HMM	56	100	p	10	5	Copper	Unknown		Unknown	Unknown	Unknown	67	
HMM	60	100	S	40	13	Low	Interlux Ultra	Y3779F	Shelter Island Boatyard	6	2013	33	2693-212-AA
HMM	67	100	S	22	9	Low	Unknown		Unknown	12	2011	67	
HMM	72	65	P	23	9	Copper	Interlux Ultra	Y3779F	Shelter Island Boatyard	11	2017	67	2693-212-AA
HMM	74	100	S	31	10	Low	Pettit Trinidad SR	A1277Q	Driscoll SI	12	2014	33	60061-94-ZD
HMM	80	100	P	42	15	Copper	Interlux Ultra	Y3669F	Shelter Island Boatyard	11	2016	55	2693-212-AA
HMM	83	100	S	36	11	Low	Pettit Z-Spar	411187706	Driscoll SI	6	2015	35	60061-94-ZE
HMM	86	100	S	25	9	Copper	Interlux Ultra	Y3779F	Shelter Island Boatyard	3	2019	55	2693-212-AA
HMM	97	100	S	23	8	Low	Unknown		Shelter Island Boatyard	12	1990	67	
HMM	99	90	S	32	8	Copper	Unknown		Unknown	12	2017	67	
HMM	100	Vacant	NA	NA	NA	Non						0	
HMM	104	100	S	34	10	Low	Unknown		Shelter Island Boatyard	11	2016	67	
HMM	109	100	S	35	11	Low	Interlux Ultra	Y3669F	Shelter Island Boatyard	11	2013	33	2693-212-AA
HMM	110	100	S	36	12	Low	Interlux Ultra	Y3669F	Shelter Island Boatyard	12	2018	33	2693-212-AA
HMM	112	95	P	30	12	Copper	Seaguard	P30BQ12	Self Applied	12	2014	49	
HMM	113	100	P	22	8	Low	Interlux Ultra	Y3779F	Driscoll MB	1	2013	33	2693-212-AA
HMM	115	100	S	47	13	Low	Unknown		Shelter Island Boatyard	12	2006	67	
HMM	121	90	P	28	10	Low	West Marine CPP Ablative	411128006	Shelter Island Boatyard	8	2018	23	60061-71-ZD
HMM	123	90	P	29	10	Non	Pettit	1808Q	Shelter Island Boatyard	4	2015	67	
HMM	124	100	P	20	8	Low	West Marine CPP Ablative	411168006	Self Applied	6	2017	24	60061-71-ZD
HMM	126	100	S	35	12	Copper	Unknown		Unknown	Unknown	Unknown	67	
HMM	133	100	S	24	8	Low	Unknown		Unknown	2	2015	67	
HMM	134	100	S	34	12	Low	Interlux Ultra	Y3779F	Shelter Island Boatyard	4	2014	33	2693-212-AA
HMM	135	100	S	25	8	Low	Interlux Ultra	Y3559F	Shelter Island Boatyard	5	2011	33	2693-212-AA
HMM	138	100	S	26	9	Low	Interlux Ultra	Y3779U	Shelter Island Boatyard	9	2017	33	
HMM	143	100	S	40	13	Copper	Unknown		Unknown	Unknown	Unknown	67	
HMM	144	100	S	23	8	Low	Pettit Trinidad Ultra Kote	Y3779U	Shelter Island Boatyard	8	2016	57	
HMM	145	100	P	52	15	Copper	Unknown		Unknown	Unknown	Unknown	67	
HMM	151	100	P	30	10	Low	Interlux Ultra	Y3779F	Koehler Kraft	7	2019	33	2693-212-AA
HMM	157	100	P	41	12	Low	Interlux Ultra	Y3779F	Shelter Island Boatyard	9	2013	33	2693-212-AA
HMM	171	100	S	24	8	UNK	Unknown		Unknown	Unknown	Unknown	Unknown	
HMM	180	100	S	30	9	Low	Interlux Ultra	Y3779F	Shelter Island Boatyard	5	2010	33	2693-212-AA
HMM	185	Vacant										0	
HMM	193	90	P	29	11	Non	Armored Hull (liner)	NA		10	2017	0	#N/A
HMM	194	100	P	52	14	Low	Unknown		Baja Naval	1	2009	67	
HMM	195	100	S	38	12	Low	Interlux Micron Biolux	5693	British Marine	9	2013	35	
HMM	196	80	S	30	11	Non	Interlux Intersleek 900	FXA972/A	Shelter Island Boatyard	5	2015	0	
HMM	198	100	P	18	8	Low	Unknown		Self Applied	12	2010	67	
HMM	199	100	P	36	12	Low	Interlux Ultra	Y3779F	Shelter Island Boatyard	3	2013	33	2693-212-AA

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HMM	201	98	S	17	6	Low	West Marine Bottom Shield	411186606	Self Applied	12	2016	33	60061-129-AA
HMM	202	90	R	19	6	Copper	Interlux Ultra	Y3449F	Shelter Island Boatyard	1	2019	55	2693-212-AA
HMM	203	100	S	30	11	Low	Pettit Z-Spar Protector	B-91	Driscoll SI	2	2016	33	
HMM	206	100	S	26	7	Low	Unknown		Shelter Island Boatyard	4	2014	67	
HMM	207	65	S	33	11	Low	Proline	1088C-01	Shelter Island Boatyard	4	2012	33	
HMM	213	95	P	50	15	Low	Interlux Ultra	Y3779U	Shelter Island Boatyard	2	2016	33	
HMM	215	100	P	24	9	Copper	Unknown		Unknown	Unknown	Unknown	67	
HMM	218	100	P	36	13	Low	Unknown		Unknown	Unknown	Unknown	67	
HMM	221	100	P	32	12	Low	Unknown		Unknown	Unknown	Unknown	67	
HMM	222	100	S	48	14	Low	Unknown		Unknown	Unknown	Unknown	67	
HMM	227	100	S	36	12	Low	Interlux Ultra	Y3669F	Shelter Island Boatyard	7	2015	33	2693-212-AA
HMM	228	95	S	34	10	Copper	Interlux Ultra	Y3669F	Driscoll SI	10	2018	67	2693-212-AA
HMM	229	100	S	42	13	Low	Unknown		Shelter Island Boatyard	6	2006	67	
HMM	231		S	36	12	Copper	Unknown		Unknown	Unknown	Unknown	67	
HMM	232	95	S	33	12	Copper	Unknown		Dana Point Shipyard	1	2017	67	
HMM	233	90	S	41	11	Low	Unknown		Shelter Island Boatyard	2	2016	67	
HMM	234		S	34	12	Copper	Unknown		Unknown	Unknown	Unknown	67	
HMM	235	90	P	47	14	Copper	Interlux Ultra	Y3779U	Shelter Island Boatyard	6	2017	67	
HMM	237	100	E	18	7	Copper	Unknown		Unknown	Unknown	Unknown	67	
HMM	239	100	S	38	11	Low	Interlux Ultra	Y3669F	Koehler Kraft	5	2019	33	2693-212-AA
HMM	246	94	S	44	13	Low	Interlux Ultra	Y3559F	Shelter Island Boatyard	5	2014	33	2693-212-AA
HMM	249	100	S	35	11	Low	Pettit Trinidad	A1088G	Koehler Kraft	12	2015	33	60061-94-ZB
HMM	250	100	P	31	10	Copper	Zspar Bottom Pro Black	411187706	Driscoll SI	8	2019	53	60061-94-ZE
HMM	255	Vacant										0	
HMM	265	100	S	34	10	Low	Interlux Ultra	Y3669F	Shelter Island Boatyard	9	2014	33	2693-212-AA
HMM	266	100	S	47	14	Low	Pettit Trinidad	1275	Self Applied	3	2011	33	
HMM	272	100	S	30	11	Low	Interlux Ultra	Y3669F	Shelter Island Boatyard	4	2015	33	2693-212-AA
HMM	274	100	S	39	12	Low	Interlux Ultra	Y3669F	Mexico	11	2014	33	2693-212-AA
HMM	275	100	S	42	14	Low	Interlux Ultra	Y3669F	Shelter Island Boatyard	11	2018	33	2693-212-AA
HMM	277	100	S	30	12	Copper	Unknown		Unknown	Unknown	Unknown	67	
HMM	280	100	P	26	9	Low	Pettit Hydracoat	1240	Self Applied	3	2014	33	60061-87-ZH
HMM	282	Vacant										0	
HMM	285	100	S	32	11	Copper	Nautical Super Proguard	NAU990	Nielsen-Beaumont	10	2017	67	
HMM	286	100	P	40	12	Low	Unknown		Shelter Island Boatyard	1	2000	67	
HMM	287	98	S	33	13	Low	Interlux Ultra Kote	Y3559U	Shelter Island Boatyard	5	2016	33	
HMM	290	80	S	36	13	Low	Interlux Ultra	Y3559F	Shelter Island Boatyard	3	2018	33	2693-212-AA
HMM	292	100	S	36	10	Low	Interlux UltraKote	Y3779U	Shelter Island Boatyard	6	2016	33	
HMM	295	100	E	18	8	Copper	Unknown		Unknown	Unknown	Unknown	67	
HMM	305	100	P	48	15	Low	Interlux Ultra	Y3779F	Shelter Island Boatyard	8	2013	33	2693-212-AA
HMM	306	95	P	38	15	Low	Interlux Ultra Kote	Y3669U	Shelter Island Boatyard	12	2015	33	
HMM	308	100	S	30	10	Low	Proline	1088C-01	Shelter Island Boatyard	10	2012	33	
HMM	318	95	P	18	8	Copper	Unknown		Unknown	Unknown	Unknown	67	
HMM	325	100	S	32	10	Low	Interlux Ultra	Y3779F	Shelter Island Boatyard	1	2017	33	2693-212-AA
HMM	333	100	S	22	9	Copper	Unknown		Unknown	Unknown	Unknown	67	
HMM	337		P	24	8	Copper	Unknown		Unknown	Unknown	Unknown	67	
HMM	339	90	P	23	8	Copper	Pettit Z-Spar Protector	B-91	Driscoll SI	3	2019	53	60061-137
HMM	340	100	S	26	10	Low	Interlux Ultra	Y3669F	Driscoll MB	5	2014	33	2693-212-AA
HMM	350	100	S	34	12	Copper	Unknown		Unknown	Unknown	Unknown	67	
HMM	354	100	P	21	8	Low	Unknown		Unknown	4	2015	67	
HMM	357	98	S	28	9	Low	Unknown		Unknown	4	2012	67	
HMM	359	100	P	26	8	Low	Unknown		Unknown	Unknown	Unknown	67	
HMM	360	100	S	35	12	Non	Unknown		Unknown	Unknown	Unknown	67	
HMM	362	100	S	32	9	Low	Unknown		Shelter Island Boatyard	12	2012	67	
HMM	366	100	P	37	13	Low	Interlux Ultra Kote	Y3779U	Shelter Island Boatyard	1	2013	33	

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HMM	374	100	S	34	11	Low	Interlux Ultra	Y3779F	Shelter Island Boatyard	10	2018	33	2693-212-AA
HMM	375	100	P	34	12	Copper	Unkown		Unknown	Unknown	Unknown	67	
HMM	376	100	S	33	10	Low	Unknown		Nielsen-Beaumont	10	2012	67	
HMM	380	100	P	19	8	Copper	Pettit Trinidad SR	A1277Q	Unknown	6	2018	70	60061-94-ZD
HMM	386	98	P	36	13	Low	Interlux Ultra	Y3779F	Shelter Island Boatyard	10	2014	33	2693-212-AA
HMM	390	95	S	41	12	Low	Interlux Ultra Kote	Y3669U	Shelter Island Boatyard	10	2016	33	
HMM	403	100	S	32	12	Low	Unknown		Unknown	Unknown	Unknown	67	
HMM	407	95	P	33	12	Copper	Pettit Z Spar Pro Gold	411187706	Marine Group Boat Works	8	2018	65	60061-94-ZE
HMM	408	100	S	36	12	Low	Interlux UltraKote	2779N	Shelter Island Boatyard	5	2011	33	
HMM	424	100	S	30	10	Low	Interlux Ultra	Y3669U	Shelter Island Boatyard	4	2015	33	
HMM	427	99	S	50	12	Copper	Interlux Ultra	Y3779F	Koehler Kraft	1	2019	67	2693-212-AA
HMM	438		P	34	11	Copper	Unknown		Unknown	Unknown	Unknown	67	
HMM	439	100	S	25	8	Copper	Unknown		Unknown	Unknown	Unknown	67	
HMM	440	100	S	34	12	Copper	Pettit Trinidad HD	1271	Shelter Island Boatyard	11	2019	67	#N/A
HMM	445	75	P	28	10	Copper	Pettit		Self Applied	Unknown	Unknown	66	
HMM	447	100	P	29	10	Non	Finsulate	EZ-Clean	Driscoll SI	10	2018	0	#N/A
HMM	449	100	P	23	9	Copper	Unknown		Unknown	Unknown	Unknown	67	
HMM	450	100	P	21	8	Low	Unknown		Shelter Island Boatyard	6	2013	67	
HMM	451	95	S	31	11	Copper	Unknown		Shelter Island Boatyard	6	2018	67	
HMM	456	100	P	32	10	Low	Interlux UltraKote	Y3779U	Shelter Island Boatyard	6	2016	33	
HMM	461	Vacant										0	
HMM	462	100	P	27	10	Copper	Unknown		Unknown	Unknown	Unknown	67	
HMM	463	95	S	34	10	Low	Interlux Ultra Kote	Y3669U	Shelter Island Boatyard	7	2016	33	
HMM	470	100	S	43	13	Non	Interlux Ultra Biolux	Y3779F	Basin Marine - Newport Bch	6	2015	0	2693-212-AA
HMM	472	100	S	30	11	Low	Interlux Ultra	Y3669U	Shelter Island Boatyard	6	2016	33	
HMM	478	Vacant										0	
HMM	481	100	S	25	8	Copper	Unknown		Unknown	Unknown	Unknown	67	
HMM	482	100	S	20	6	Copper	Unknown		Unknown	Unknown	Unknown	67	
HMM	486	95	P	33	11	Copper	Zspar Bottom Pro Gold	411187706	Driscoll SI	4	2019	54	60061-94-ZE
HMM	488	80	S	34	12	Copper	UNK		Knight and Carver	1	2018	67	
HMM	491	90	S	37	12	Low	Unknown		Florida	4	2008	67	
HMM	492	Vacant										0	
HMM	493	100	S	36	12	Low	Interlux Ultra	Y3669F	Shelter Island Boatyard	6	2018	33	2693-212-AA
HMM	494	100	P	30	10	Copper	Woolsey Defense	593-4301	Nielsen-Beaumont	11	2018	43	#N/A
HMM	495	100	S	34	11	Low	Unknown		Unknown	4	2011	67	
HMM	497	Vacant										0	
HMM	498	100	P	35	11	Low	Pettit Z-Spar	B-94	Driscoll SI	8	2014	65	
HMM	502	100	P	35	12	Copper	Interlux Ultra	Y3669F	Shelter Island Boatyard	10	2018	55	2693-212-AA
HMM	503	100	S	27	8	Low	Unknown		Driscoll SI	12	2010	67	
HMM	505	100	S	26	8	Low	Interlux Micron VOC Extra	5790	Knight and Carver	2	2011	33	2693-190-ZI
HMM	518	90	P	29	10	Non	Thorn D	None	Shelter Island Boatyard	6	2013	0	#N/A
HMM	520	50	S	47	14	Low	Interlux Ultra	Y3669F	Shelter Island Boatyard	5	2012	33	2693-212-AA
HMM	526	100	P	35	11	Low	Pettit Z-Spar	B-94	Driscoll SI	8	2014	65	
HMM	531	100	S			Copper	Unknown		Unknown	Unknown	Unknown	67	
HMM	532	100	P	24	9	Copper	Unknown		Unknown	Unknown	Unknown	67	
HMM	534	100	P	33	8	Copper	Unknown		Unknown	Unknown	Unknown	67	
HMM	535	100	P	42	14	Low	Interlux Ultra	Y3669F	Shelter Island Boatyard	6	2018	33	2693-212-AA
HMM	542	100	P	22	7	Low	Interlux Ultra	Y3779U	Shelter Island Boatyard	4	2017	57	
HMM	544	100	S	30	12	Copper	Interlux Ultra	Y3449F	Shelter Island Boatyard	1	2017	55	2693-212-AA
HMM	545		P	10	5	Copper	Unknown		Unknown	Unknown	Unknown	67	
HMM	546	100	S	38	13	Low	Unknown		Shelter Island Boatyard	6	2013	67	
HMM	548	100	S	36	13	Low	Interlux Ultra	2669N	Shelter Island Boatyard	12	2016	33	
HMM	551	90	S	36	12	Low	Interlux CSC	5583G	Shelter Island Boatyard	6	2017	36	
HMM	552	100	P	21	8	Copper	Unknown		Unknown	1	2017	67	

Facility	Slip/Mooring Reference Number	Percent of Time Occupied	Vessel Type (Power or Sail)	Vessel Length	Vessel Beam	Paint Type Copper, Low or Non	Paint Product Name	Product Number	Boatyard Name or Purchase Date	Painting Date Month (mm)	Painting Date Year (yyyy)	% Copper	Category 1 reg #
HMM	553	100	P	16	8	Low	Unknown		Self Applied	12	2016	67	
HMM	559	100	S	38	12	Non	Proline	1088C-01	Self Applied	11	2017	67	
HMM	563	100	S	37	12	Copper	Pettit Z-Spar	411187706	Seven Seas Bay Marine	6	2017	54	60061-94-ZE
HMM	568	100	P	18	9	Copper	Pettit Trinidad	A1277Q	Unknown	Unknown	Unknown	67	60061-94-ZD
HMM	581	100	P	33	12	Low	Unknown		Unknown	Unknown	Unknown	67	
HMM	583	100	P	28	11	Low	Interlux UltraKote	Y3779U	Shelter Island Boatyard	2	2014	33	
HMM	585	95	P	20	8	Non	Pettit Hydro Coat Eco Ablative	1110400	Self Applied	3	2019	0	#N/A
HMM	586	90	S	53	13	Copper	Interlux Ultra	Y3669F	Koehler Kraft	9	2019	67	2693-212-AA
HMM	587	100	S	30	10	Low	Unknown		Shelter Island Boatyard	9	2016	67	
HMM	588	90	S	30	11	Low	Seahawk	6142	Driscoll SI	1	2006	33	44891-11-AA
HMM	590	90	S	27	8	Low	Interlux Super Slime Fighter KL	K90B	Driscoll MB	11	2008	33	
HMM	594	100	S	30	11	Non	No bottom paint					0	
HMM	595	100	S	45	14	Low	Unknown		Shelter Island Boatyard	10	2016	67	
HMM	596	95	P	30	8	Low	Interlux Ultra	Y3669F	Shelter Island Boatyard	6	2013	33	2693-212-AA
HMM	600	100	S	34	13	Low	Interlux Ultra	Y3669F	Shelter Island Boatyard	4	2015	33	2693-212-AA

Facility	Slip/Mooring Reference Number	Percent of Time Occupied	Vessel Type (Power or Sail)	Vessel Length	Vessel Beam	Paint Type Copper, Low or Non	Paint Product Name	Product Number	Boatyard Name or Purchase Date	Painting Date Month (mm)	Painting Date Year (yyyy)	% Copper	Category 1 reg #
GCA	4575	50	Power	40'	12'4"	Non-copper	Proline	Y3066	Shelter Island Boat Yard	2	2019		
GCA	4550	50	Power	77'8"	20'	Low-copper	Sea Hawk Biocop TF	1202-1	Marine Group	5	2019	38	
GCA	4547	80	Power	48'	14'4"	Copper	Interlux Ultra	Y3779F	Shelter Island Boat Yard	8	2018	55	
GCA	4524	100	Sail	64.5'	15'	Unknown							
GCA	4487	100	Sail	45'9"	14'9"		Unknown		43282				
GCA	4462	50	Power	54'	15'6"	Copper	Woolsey Defense	4301	Nielsen Beaumont Marine Inc	10	2017	65	60061-49
GCA	4458	90	Power	50'	17'		Unknown		43617			40	
GCA	4434	0	Vacant									0	
GCA	4432	75	Sail	57'	17'	Copper	Interlux Ultra	Y3779F	Shelter Island Boat Yard	10	2015	55	2693-212-AA
GCA	4404	100	Power	40'	13'6"	Unknown							
GCA	4402	95	Power	54'	15'5"	Copper	Interlux Ultra	Y3779F	Shelter Island Boat Yard	1	2014	55	
GCA	4397	90	Power	75'	21'	Copper	Nautical Proguard	NAU993	Driscoll's	9	2018	42	
GCA	4387	100	Power	80'	23'	Copper	Interlux Ultra	Y3779U	Shelter Island Boat Yard	2	2018	57	
GCA	4384	0	Vacant									0	
GCA	4367	100	Power	40'	11'5"	Copper	Z-Spar Protector	B-94	Nielsen Beaumont Marine Inc	11	2013	65	
GCA	4356	95	Power	30'	10'	Copper	Woolsey Defense	4301	Nielsen Beaumont Marine Inc	5	2017	65	60061-49
GCA	4347	95	Power	55'	14'	Copper	Petit Trinidad SR	A1877G	Marina Shipyard	9	2017	60	60061-94-ZD
GCA	4327	100	Sail	48'	15'5"	Copper	Interlux Ultra	Y3779F	Shelter Island Boat Yard	12	2018	55	2693-212-AA
GCA	4293	100	Power	40'	13'4"		Unknown		43101				
GCA	4288	100	Power	38'	14'	Copper	Woolsey Defense	4901	Nielsen Beaumont Marine Inc	9	2018	40	60061-117-ZA
GCA	4286	100	Sail	45	14'4"	Copper	Interlux Ultra	Y3779F	Shelter Island Boat Yard	12	2018	55	2693-212-AA
GCA	4270	80	Sail	45'	14'9"	Copper	Interlux Ultra	Y3779U	Shelter Island Boat Yard	10	2016	42	
GCA	4229	100	Power	37'	10'10"	Copper	Z-Spar Bottom Pro Gold	411187706	Driscoll's	9	2019	65	60061-94-ZE
GCA	4192	100	Power	40'	13'	Copper	Interlux Ultra	Y3779F	Shelter Island Boat Yard	7	2017	55	2693-212-AA
GCA	4132	100	Power	42'	14'3"	Copper	Woolsey Defense	4301	Nielsen Beaumont Marine Inc	2	2016	65	60061-49
GCA	4126	0	Vacant									0	
GCA	4119	90	Power	56'	15'	Copper	Interlux Ultra	Y3779F	Shelter Island Boat Yard	2	2016	55	2693-212-AA
GCA	4116	0	Vacant									0	
GCA	4089	100	Power	28'	9'4"	Copper	Interlux Ultra	Y3779F	Shelter Island Boat Yard	5	2019	55	2693-212-AA
GCA	4088	100	Power	42'	14'		Unknown		43556				
GCA	4085	95	Power	42'	10'	Low-copper	Petit Vivid	11161	Nielsen Beaumont Marine Inc	10	2017	25	60061-116-AA
GCA	4081	0	Vacant									0	
GCA	4068	95	Power	45'	14'7"	Copper	Woolsey Defense	4301	Nielsen Beaumont Marine Inc	5	2017	65	60061-49
GCA	4049	100	Power	58'	16'	Unknown							
GCA	4040	90	Power	38'	13'	Copper	Proline	1088C-02	Koehler Kraft	8	2017	56	
GCA	4010	100	Power	61'	17'4"	Copper	Interlux Ultra	Y3779F	Shelter Island Boat Yard	5	2014	55	2693-212-AA

Facility	Slip/Mooring Reference Number	Percent of Time Occupied	Vessel Type (Power or Sail)	Vessel Length	Vessel Beam	Paint Type Copper, Low or Non	Paint Product Name	Product Number	Boatyard Name or Purchase Date	Painting Date Month (mm)	Painting Date Year (yyyy)	% Copper	Category 1 reg #
Tonga	none	0.5	Power	54		Copper	Sea Hawk Cukote	3445	Factory		2019	47.5	
Tonga	none	0.5	Power	54		Copper	Sea Hawk Cukote	3445	Factory		2019	47.5	
Tonga	none	0.5	Power	45		Copper	Sea Hawk Cukote	3445	Factory		2019	47.5	
Tonga	none	0.5	Power	44		Low-copper	InterluxMicron CSC HS	YBC580	Factory		2019	38	2693-225-AA
Tonga	none	0.5	Power	34		Low-copper	InterluxMicron CSC HS	YBC580	Factory		2019	38	2693-225-AA
Tonga	none	0.5	Sail	54		Low-copper	Interlux Ultra	Y3779F	La Paz, Mexico	June	2019	55	2693-212-AA
Tonga	none	0.75	Sail	33		Copper	Proline	1088c-02		November	2017	59	
Tonga	none	0.75	Power	55		Low-copper	Interlux Micron CSC	5583G	Factory			38	
Tonga	none	0.75	Power	81		Low Copper	Interlux Ultra	Y3779F	Shelter Island Boatyard	February	2019	55	2693-212-AA
Tonga	none	0.25	Power	70		Copper	Sea Hawk Cukote	3445	Pacific Coast Yachting Serv	May	2018	47.5	
Tonga	none	0.75	Power	50		Low	Interlux Ultra	Y3779F	Shelter Island Boatyard	February	2018	55	2693-212-AA
Tonga	none	0.75	Power	42		Copper	Interlux Ultra w/Biolux	3669	Newport Harbor Shipyard	August	2018	55	
Tonga	none	0.75	Power	43		Copper	Nautical Proguard	NAU992	Nielsen Beaumont	August	2018	42	
Tonga	none	0.5	Power	36		Copper	Customer unsure	Customer unsu	Customer unsure	unknown	unknown	67	#N/A
Tonga	none	0.75	Power	38		Low Copper	Interlux Ultra	Y3779F	Shelter Island Boatyard	unknown	2018	55	2693-212-AA

Facility	Slip Reference	Percent Occupied	Vessel Type	Vessel Length	Vessel Beam	Paint Type	Paint Product Name	Product Number	Boatyard Name	Painting Date Month	Painting Date Year	Percent Copper	EPA Registration Number
BCM	1	100	Power	36	14	LOW COPPER	ULTRA KOTE	Y3669U	SIBY	10	2016		2693-119-ZD
BCM	2	100	Power	28	10	LOW COPPER	ULTRA BLUE	3669	SIBY	4	2016		2693-192-ZB
BCM	3	100	Sail	30	9.5	COPPER	ULTRA GREEN	3559	SIBY	5	2019		2693-192-ZC
BCM	4	100	Sail	36	11	LOW COPPER	ULTRA BLUE	3669	SIBY	1	2014		2693-192-ZB
BCM	5	100	Sail	32	10.1	LOW COPPER			DRISCOLL	7	2010		
BCM	6	100	Power	32	12	LOW COPPER				6	2015		
BCM	7	99	Sail	34	11.5	COPPER	ULTRA KOTE	Y3669U	SIBY	1	2017		2693-119-ZD
BCM	8	100	Power	33	10.6	COPPER	ULTRA BLUE	Y3669U	SIBY	7	2017		2693-192-ZB
BCM	9	88	Sail	35	11.11	COPPER	ULTRA BLUE	3669	SIBY	5	2019		2693-192-ZB
BCM	10	100	Sail	39	19.4	LOW COPPER	ULTRA BLUE	3669	SIBY	9	2016		2693-192-ZB
BCM	11	100	Sail	29	9.5	COPPER							
BCM	12	95	Sail	27	9	COPPER				2	2017		
BCM	13	100	Sail	26	4.6	LOW COPPER				3	2012		
BCM	14	100	Sail	24	8	LOW COPPER	ULTRA-KOTE	Y3669U	SIBY	1	2016		2693-119-ZD
BCM	15	100	Power	19	6.6	COPPER	ULTRA BLACK	3779	SIBY	2	2018		2693-192-AA
BCM	16	Vacant	Vacant			NON COPPER							
BCM	17	100	Power	40	10.6	LOW COPPER	ULTRA GREEN	3559	SIBY	3	2012		2693-192-ZC
BCM	18	99	Power	34	12	COPPER	ULTRA BLACK	3779	SIBY	10	2018		2693-192-AA
BCM	19	100	Power	36	14	COPPER							
BCM	20	99	Power	31	11.5	COPPER	ULTRA BLACK	3779	SUN CNTY MARINE	7	2019		2693-192-AA
BCM	21	82	Power	26	8.6	COPPER	ULTRAKOTE BLUE	2669N	KOEHLER	4	2017		2693-135-ZF
BCM	22	100	Power	32	11	LOW COPPER	ULTRA BLACK	3779	SIBY	7	2010		2693-192-AA
BCM	23	100	Power	34.5	11.8	LOW COPPER	Z*SPAR	B 94	NB	10	2010		60061-49-ZH
BCM	24	100	Power	32	11.6	LOW COPPER	ULTRA BLUE	3669	SIBY	7	2013		2693-192-ZB
BCM	25	99	Power	34	11	LOW COPPER	ULTRA-KOTE	Y3669U	SIBY	10	2016		2693-119-ZD
BCM	26	92	Sail	38	21.5	COPPER	ULTRA-KOTE	Y3669U	SIBY	3	2017		2693-119-ZD
BCM	27	86	Sail	26	11	LOW COPPER				2	2011		
BCM	28	100	Sail	25	8	LOW COPPER	PETTIT PROTECTOR		DRISCOLL	6	2011		
BCM	29	100	Sail	24	8	COPPER	ULTRAKOTE BLUE	2669	MGBW	8	2018		2693-135-Zf
BCM	30	88	Power	26	8.6	COPPER	ULTRA-KOTE	Y3779U	DRISCOLL MB	9	2017		2693-119-ZD
BCM	31	Vacant	Vacant			NON COPPER							
BCM	32	100	Power	13.3	4	LOW COPPER			SELF	6	2011		
BCM	33	100	Sail			NON COPPER	INTERSLEEK 900	FXA979/A	SIBY	10	2013		Registration NR2
BCM	34	99	Power	40	14.1	LOW COPPER	PROLINE	1088C-02	Vee Jay Marine	5	2006		577-551-ZC
BCM	35	96	Power	48	12	LOW COPPER	PROLINE	1088C-02	SIBY	7	2012		577-551-ZC
BCM	36	99	Power	38	13	LOW COPPER	ULTRA BLACK	3779	SIBY	8	2013		2693-192-AA
BCM	37	100	Sail	50	14.9	COPPER							
BCM	38	100	Sail	44.6	14	LOW COPPER	PROLINE	1088C-02	SIBY	10	2011		577-551-ZC
BCM	39	97	Power	39.5	14.2	COPPER	Z*SPAR BOTTOM PRO GOLD	411187706	DRISCOLL	3	2017		60061-94-ZE
BCM	40	100	Power	40	14	LOW COPPER	ULTRA BLACK	3779	KOEHLER	8	2015		2693-192-AA
BCM	41	100	Power	42	13.6	COPPER	ULTRA-KOTE	Y3669U	SIBY	7	2017		2693-119-ZD
BCM	42	100	Sail	31	11	COPPER	ULTRA-KOTE BLACK	2779	SIBY	7	2017		60061-94-ZE
BCM	43	100	Sail	30	10.1	COPPER							
BCM	44	93	Sail	29.11	10.1	COPPER	PROLINE	1088C-02	SIBY	8	2018		577-551-ZC
BCM	45	100	Sail	29	11	LOW COPPER	WEST MARINE		82005	8	2005		
BCM	46	100	Sail	35.5	11.5	LOW COPPER	PROLINE	1088C-02	SIBY	5	2011		577-551-ZC
BCM	47	100	Sail	29.11	10.1	LOW COPPER	PETTIT TRINIDAD PRO	A1088G	KOEHLER	8	2014		60061-94-ZB
BCM	48	100	Sail	34.5	12	COPPER	ULTRA BLACK	3779	SIBY	4	2018		2693-192-AA
BCM	49	100	Sail	32	9.6	LOW COPPER	PETTIT TRINIDAD	A1088G	KOEHLER	6	2012		60061-94-ZB
BCM	50	93	Sail	31	10	COPPER	PETTIT HYDROCOAT	1640	NB	1	2017		60061-87-ZL
BCM	51	100	Sail	41	12	LOW COPPER	Z*SPAR	B90	LONG BEACH	6	2011		60061-49-ZG
BCM	52	100	Power	57	16.5	COPPER							
BCM	53	88	Sail	45	13.6	COPPER	ULTRAKOTE BLUE	2669N	KOEHLER	11	2017		2693-135-ZF

Facility	Slip Reference	Percent Occupied	Vessel Type	Vessel Length	Vessel Beam	Paint Type	Paint Product Name	Product Number	Boatyard Name	Painting Date Month	Painting Date Year	Percent Copper	EPA Registration Number
BCM	54	99	Power	42	13.8	COPPER	ULTRA RED	3449	SIBY	2	2018		2693-192-AA
BCM	55	100	Power	46	14.6	LOW COPPER	ULTRA BLUE	3669	DRISCOLL	3	2010		2693-192-ZB
BCM	56	100	Sail	46	13.5	LOW COPPER	PROLINE	1088C-02	SIBY	4	2016		577-551-ZC
BCM	57	100	Sail	46	13.8	COPPER	PROLINE	1088C-02	SIBY	3	2017		577-551-ZC
BCM	58	100	Sail	40	13	COPPER	ULTRA-KOTE BLUE	Y3669U	SIBY	4	2017		2693-119-ZD
BCM	59	100	Sail	40	13	LOW COPPER			SIBY	3	2011		
BCM	60	100	Sail	42	13	COPPER	ULTRA BLACK	3779	SIBY	1	2014		2693-192-AA
BCM	61	96	Sail	32	11.5	COPPER	Z*SPAR BOTTOM PRO GOLD	41127706	DRISCOLL	5	2019		60061-94-ZE
BCM	62	100	Power	26	7	LOW COPPER	PROLINE	1088C-02	SELF	4	2016		577-551-ZC
BCM	63	100	Sail	25	6	LOW COPPER				6	2013		
BCM	64	94	Sail	30	9	LOW COPPER	ULTRA BLUE	3669	SIBY	7	2014		2693-192-ZB
BCM	65	100	Sail	26.6	10.6	LOW COPPER	ULTRA BLUE	3669	SIBY	7	2015		2693-192-ZB
BCM	66	99	Sail	32.6	11.6	LOW COPPER	ULTRA BLUE	3669	SIBY	11	2015		2693-192-ZB
BCM	67	99	Sail	35	11.5	COPPER	PROLINE	1088C-02	SIBY	1	2018		577-551-ZC
BCM	68	100	Sail	27	8	COPPER	ULTRA BLUE	3669	SIBY	4	2019		2693-192-ZB
BCM	69	100	Sail	30	10	LOW COPPER	PROLINE	1088C-02	SIBY	3	2012		577-551-ZC
BCM	70	100	Sail	30	10.6	LOW COPPER	PETTIT TRINIDAD PRO BLUE	1082	SIBY	1	2015		60061-94-ZB
BCM	71	100	Power	54	14	COPPER				10	2017		
BCM	72	100	Sail	36	11.6	LOW COPPER				7	2013		
BCM	73	93	Power	36	12	LOW COPPER	ULTRA BLACK	3779	SIBY	1	2013		2693-192-AA
BCM	74	100	Power	38	13	LOW COPPER	ULTRA BLACK	3779	SIBY	2	2014		2693-192-AA
BCM	75	100	Sail	34	11	COPPER	ULTRA-KOTE	Y3559U	SIBY	2	2017		2693-119-ZD
BCM	76	100	Sail	37	12	LOW COPPER	Z*SPAR	B91	DRISCOLL	9	2012		60061-50-ZE
BCM	77	100	Power	36.3	12.1	COPPER							
BCM	78	67	Sail	35	11.4	LOW COPPER	ULTRA BLUE	3669	SIBY	3	2015		2693-192-ZB
BCM	79	93	Power	48	12	LOW COPPER	ULTRA BLACK	3779	SIBY	12	2014		2693-192-AA
BCM	80	96	Power	37	13.9	COPPER	ULTRAKOTE	Y3669U	SIBY	8	2018		2693-119-ZD
BCM	81	99	Sail	43	11.8	LOW COPPER	MICRON CSC	5583G	KOEHLER	5	2018		2693-132-ZV
BCM	82	100	Sail	46	12.2	COPPER							
BCM	83	98	Sail	44	13	COPPER	PETTIT ULTIMA SR 40	1109606	DRISCOLL	10	2017		60061-101-ZC
BCM	84	96	Sail	36	10.5	NON-COPPER	INTERSHIELD 300V	ENA311	KOEHLER	3	2017		--
BCM	85	100	Power	44	11	COPPER	ULTRA BLUE	3669	SIBY	2	2019		2693-192-ZB
BCM	86	100	Sail	38	14.11	LOW COPPER	WEST MARINE BOTTOMSHIELD	411186606	KOHLER KRAFT	2	2015		60061-129-AA
BCM	87	100	Sail	41	12	COPPER	ULTRA BLACK	3779	SIBY	11	2017		2693-192-AA
BCM	88	82	Power	49	15.6	COPPER	Z*SPAR BOTTOM PRO GOLD	41127706	DRISCOLL	10	2018		60061-94-ZE
BCM	89	93	Power	42	13.5	LOW COPPER	ULTRA RED	3449	SIBY	7	2014		2693-192-ZA
BCM	90	100	Sail	36	11.6	COPPER							
BCM	91	100	Sail	37	12	LOW COPPER	ULTRA BLUE	3669	SIBY	5	2010		2693-192-ZB
BCM	92	100	Sail	36	11	LOW COPPER	Z*SPAR BOTTOM PRO GOLD	411187706	SIBY	2	2014		60061-94-ZE
BCM	93	93	Sail	35	11.6	COPPER	ULTRA BLUE	3669	SIBY	5	2017		2693-192-ZB
BCM	94	90	Sail	36	12.6	LOW COPPER	Z*SPAR	B91	SIBY	4	2015		60061-50-ZE
BCM	95	96	Sail	36	10	LOW COPPER			BAY MARINE	6	2011		
BCM	96	92	Sail	37	12.6	COPPER							
BCM	97	100	Sail	42	14	LOW COPPER	PETTIT TRINIDAD PRO HD	1871	SIBY	9	2019		60061-94-ZD
BCM	98	73	Sail	44	13	COPPER	ULTRA BLACK	3779	SIBY	4	2018		2693-192-AA
BCM	99	100	Sail	34	11	COPPER	ULTRA GREEN	3559	SIBY	5	2019		2693-192-ZC
BCM	100	100	Sail	42	14.5	LOW COPPER			KNIGHT & CARVER	8	2010		
BCM	101	95	Sail	44	8	COPPER							
BCM	102	100	Sail	46	14	LOW COPPER	PROLINE	1088C-02	SIBY	2	2009		577-551-ZC
BCM	103	99	Sail	37.6	12	COPPER	ULTRA BLUE	3669	SIBY	1	2017		2693-192-ZB
BCM	104	93	Sail	38	12.11	LOW COPPER	Z*SPAR	B91	OXNARD	11	2018		60061-49-ZG
BCM	105	82	Sail	41	13.9	COPPER	ULTRA BLACK	3779	SIBY	3	2018		2693-192-AA
BCM	106	82	Power	46	14.5	LOW COPPER	Z*SPAR GOLD	411127706	SIBY	3	2015		60061-117-ZE

Facility	Slip Reference	Percent Occupied	Vessel Type	Vessel Length	Vessel Beam	Paint Type	Paint Product Name	Product Number	Boatyard Name	Painting Date Month	Painting Date Year	Percent Copper	EPA Registration Number
BCM	107	100	Sail	30	10.1	LOW COPPER	ULTRAKOTE BLUE	2669N	SIBY	8	2015		2693-135-ZF
BCM	108	99	Sail	32	11	LOW COPPER	PETTIT		SIBY	4	2009		
BCM	109	95	Sail	35	10	LOW COPPER	ULTRA BLACK	3779	SIBY	7	2010		2693-192-AA
BCM	110	97	Sail	36	11.5	COPPER							
BCM	111	100	Power	30	9.9	COPPER	ULTRA BLUE	3669	SIBY	7	2016		2693-192-ZB
BCM	112	80	Power	32.5	11.1	LOW COPPER	Z*SPAR	B 94	DRISCOLL	9	2015		60061-49-ZH
BCM	113	99	Sail	33	10	COPPER	ULTRA BLACK	3779	SIBY	2	2019		2693-192-AA
BCM	114	100	Sail	27	7	LOW COPPER	PACIFICA PLUS	YBB260	SVENDSENS BAY	3	2018		2693- 220-ZA
BCM	115	100	Sail	29	9.25	LOW COPPER	MICRON EXTRA	5793	DRISCOLL	4	2014		2693-190-ZJ
BCM	116	100	Power	32	11	LOW COPPER				10	2012		
BCM	117	82	Sail	65	18	NON COPPER	SEAHAWK SMART SOLUTION	4705	GRENADA	3	2018		44891-19-AA
BCM	118	Vacant	Vacant			NON COPPER							
BCM	119	99	Sail	32	11.8	COPPER	PETTIT TRINIDAD PRO	A10882	SIBY	8	2018		60061-94-ZB
BCM	120	96	Sail	32	11.5	COPPER	PROLINE	1088C-02	SIBY	5	2018		577-551-ZC
BCM	121	100	Sail	34	11.5	COPPER							
BCM	122	100	Sail	30	10	LOW COPPER	ULTRA BLACK	3779	SIBY	6	2015		2693-192-AA
BCM	123	97	Sail	36	11.5	COPPER							
BCM	124	100	Power	31.6	11.5	COPPER	Z*SPAR	B94	DRISCOLL	4	2017		60061-49-ZH
BCM	125	100	Sail	33	9.7	LOW COPPER	PROLINE	1088C-02	DRISCOLL	5	2016		577-551-ZC
BCM	126	100	Sail	35	10.5	LOW COPPER	ULTRA BLACK	3779	KOEHLER	2	2013		2693-192-AA
BCM	127	96	Sail	33	9.7	LOW COPPER	ULTRA BLACK	3779	SIBY	6	2011		2693-192-AA
BCM	128	100	Sail	36	11	COPPER	ULTRA BLACK	3779	SIBY	2	2019		2693-192-AA
BCM	129	97	Sail	32	11	LOW COPPER	SUPER PROGUARD	NAU770	NB	7	2016		23566-20-ZR
BCM	130	100	Sail	33.5	11.5	LOW COPPER				12	2013		
BCM	131	100	Sail	34	11	LOW COPPER				2	2014		
BCM	132	100	Sail	28	8.5	COPPER							
BCM	133	100	Sail	30	10	COPPER	ULTRA BLACK	3779	SIBY	6	2018		2693-192-AA
BCM	134	100	Sail	33	11.5	LOW COPPER	PROLINE	1088C-02	SIBY	3	2016		577-551-ZC
BCM	135	97	Sail	30	10.5	COPPER	ULTRA BLUE	3669	SIBY	2	2018		2693-192-ZB
BCM	136	90	Sail	34.8	10	COPPER				6	2016		
BCM	137	100	Sail	29	8	COPPER							
BCM	138	92	Sail	34	11.9	COPPER	ULTRA BLUE	3669	SIBY	4	2019		2693-192-ZB
BCM	139	84	Sail	33	11.1	LOW COPPER	ULTRA BLACK	3779	DRISCOLL MB	4	2015		2693-192-AA
BCM	140	100	Sail	36	11.5	COPPER				2	2019		
BCM	141	93	Sail	34	9.8	LOW COPPER	ULTRA BLACK	3779		4	2010		2693-192-AA
BCM	142	82	Sail	27	9	COPPER	Z*SPAR BOTTOM PRO GOLD	411127706	DRISCOLL	10	2017		60061-117-ZE
BCM	143	96	Sail	31	9.75	COPPER							
BCM	144	99	Sail	30	10	LOW COPPER	ULTRA BLUE	3669	SIBY	10	2018		2693-192-ZB
BCM	145	99	Sail	37.1	11.7	COPPER							
BCM	146	100	Sail	30	9.6	LOW COPPER	WEST MARINE CPP ABLATIVE	5436936	KOHLER KRAFT	5	2016		60061-132-AA
BCM	147	68	Sail	31	10	COPPER				7	2016		
BCM	148	96	Sail	30	9.6	LOW COPPER	WEST MARINE BOTTOM SHIELD BLACK	411184308	KOEHLER KRAFT	2	2019		60061-135-AA
BCM	149	90	Sail	32	9.8	COPPER	Z*SPAR BOTTOM PRO GOLD	411127706	DRISCOLL	11	2018		60061-117-ZE
BCM	150	96	Sail	34	11.3	LOW COPPER	ULTRA BLUE	3669		3	2011		2693-192-ZB
BCM	151	Vacant	Vacant			NON COPPER							
BCM	152	100	Power	17	6	COPPER	ULTRA BLUE	3669	SIBY	12	2018		2693-192-ZB
BCM	153	Vacant	Vacant			NON COPPER							
BCM	154	Vacant	Vacant			NON COPPER							
BCM	155	Vacant	Vacant			NON COPPER							
BCM	156	Vacant	Vacant			NON COPPER							

Facility	Slip	% Year Occupying Slip	Vessel Type Power or Sail (P or S)	Vessel Length	Vessel Beam	Paint Brand Name	EPA REGISTRATION NUMBER	Product Number	Paint Type (Copper, Low, NON, UNK)	% Copper	Boatyard Where Paint Was Applied	Month Painted	Year Painted
KKM	1	100%	p	32	13	interlux micron 66		yba473			dana point	04	2019
KKM	2	10%	P	38	13	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
KKM	3	60%	S	32	9				UNK	NA	NA	NA	NA
KKM	4	60%	p	34	10	petit hydro coat		1840	UNK	NA	NA	06	2018
KKM	5	100%	p	31.5	10.4	INTERLUX ULTRA 3379F black		3379	COPPER	40%	Shelter Island Boat Yard	12	2018
KKM	6	100%	p	28.5	10.5								
KKM	7	95%	s	32	11	silicon			Non Copper	0%	NA	06	2011
KKM	8	95%	s	36	10.5	TRINIDAD PETTIT	60061-50	1675	unk	NA	driscolls	04	2015
KKM	9	90%	S	34	10				UNK	NA	NA	NA	NA
KKM	10	100%	S	30	10	Interlux Ultra Black		3779F	UNK	NA	Shelter Island Boat Yard	03	2018
KKM	11	100%	p	27	10								
KKM	12	80%	P	36	13	INTERLUX ULTRA		377F	LOW	NA	SHELTER ISLAND BOATYARD	02	2015
KKM	13	hydrohoist											
KKM	14	100%	s	36	10								
KKM	15	100%	p	28	9	Pettit	60061-64	1871	UNK	NA	shelter island	07	2019
KKM	16	95%	P	28	9				LOW	NA	BASIN MARINE	12	2010
KKM	17	95%	P	26	8	Interlux Ultrakote	2693-119-ZD	3779U	COPPER	NA	Shelter Island Boatyard	10	2017
KKM	18	90%	S	36	13	INTERLUX ULTRA			LOW	NA	SHELTER ISLAND	06	2009
KKM	19	90%	p	31	11	Z*Spar Anti Fouling	#16471682		UNK	NA	Koeler Krafts	04	2017
KKM	20	90%	P	35	11	interlux ultra black	2693-212-AA	3779F	copper	NA	shelter island boatyard	05	2018
KKM	21	98%	P	32.7	11.5				unk	unk	unk	unk	unk
KKM	22	90%	S	35	11	INTERLUX ULTRA BLACK		3779F	UNK	NA	Shelter Island Boatyard	05	2018
KKM	23	10%	p	32.2	10.2	Intrerlux micron extra		y5693	low	20%	MarineMax	08	2017
KKM	24	90%	P	34	11.9	blue water porcoat hard		67	unk	unk	Shelter Island Boatyard	11	2016
KKM	25	90%	P	29	9.9				UNK	NA	Shelter Island Boatyard	10	2016
KKM	26	90%	P	32	11.5	INTERLUX ultra		3779f			SHELTER ISLAND BOATYARD	03	2019
KKM	27	100%	p	32.9	10.7								
KKM	28	25%	S	36	11	Proline 1088	577-550-ZE	168	COPPER	65%	Shelter Island Boatyard	06	2013
KKM	29	100%	p	30	11.6								
KKM	30	90%	p	34	10	pettit			copper	40%	LA CRUZ SHIPYARD	09	2016
KKM	31	100%	p	26	5	Interlux Ultrakote		1088	UNK	NA	SHELTER ISLAND	01	2018
KKM	32	100%	P	31	9.8		103-5580-01		UNK	NA	Nick's Creative Marine	08	2019
KKM	33	100%	p	34	8	Trilux 33		yba063					
KKM	34	vacant											
KKM	35	100%	P	32	12	INTERLUX ULTRA	2693-212-AA	3669F	COPPER	55%	SHELTER ISLAND	12	2017
KKM	36	100%	P	33	9.6	Interlux Ultra Kote	2693-212	y3779u	unk	NA	Koehler	04	2017
KKM	37	100%	s	34	10								
KKM	38	55%	P	32	10	E PAINT EP2000	64684-6	35	UNK	NA	DRISCOLL	08	2012
KKM	39	100%	S	35	11.5	Interlux Ultra		y3669f			Shelter Island Boatyard	03	2018
KKM	40	100%	s	36	12	Zspar Pettit	60061-64	1391			Driscoll	09	2016
KKM	41	100%	p	30	10	Blue water marine AF 45		BWC 4502	UNK	NA	Shelter Island	12	2018
KKM	42	100%	P	35	10	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
KKM	43	90%	S	33	11.4	INTERLUX ULTRAKOTE	2693-119-ZD	366916	NON	NA	SHELTER ISLAND	NA	NA
KKM	44	vacant											
KKM	45	55%	S	34	10	NA		NA	LOW	NA	DRISCOLL MB	10	2011
KKM	46	95%	S	36	11	NA		NA	LOW	NA	SHELTER ISLAND	11	2004

Facility	Slip	% Year Occupying Slip	Vessel Type Power or Sail (P or S)	Vessel Length	Vessel Beam	Paint Brand Name	EPA REGISTRATION NUMBER	Product Number	Paint Type (Copper, Low, NON, UNK)	% Copper	Boatyard Where Paint Was Applied	Month Painted	Year Painted
KKM	47	80%	P	34	na	Boat Paint - Professional		NA	unk	na	NA	NA	NA
KKM	48	80%	P	35	11	NA		NA	UNK	NA	SHELTER ISLAND	07	2013
KKM	49	100%	p	29.2	9.6								
KKM	50	100%	S	31	22	PROLINE	577-550-ZE	1088	copper	0%	Shelter Island Boatyard	12	2016
KKM	51	100%	S	34	11	INTERLUX ULTRAKOTE		NA	copper	76%	KOLAR MARINE	02	2010
KKM	52	100%	P	32	14	NA	2693-212	NA	NA	NA	NIELSON BEAUMONT	07	2019
KKM	53	35%	S	44	13	PETTITE		NA	UNK	NA	SHELTER ISLAND BOAT YARD	10	2014
KKM	54	100%	p	45	17	sea hawk biocop	44891-15	1205-1			van isle marina	08	2018
KKM	55	95%	P	38	12	NA		NA	NA	NA	NA	NA	NA
KKM	56	95%	p	23	8	NO Bottom Paint							
KKM	57	100%	p	42.7	12.8								
KKM	58	60%	P	24	8.5	Sherwin Williams		N51B301	non copper	0%	Driscoll	06	2019
KKM	59	100%	p	35	11	interlus ultra		3779f			shelter island	03	2018
KKM	60	95%	P	24	8	ANTI-FOUL VIVID		NA	NA	NA	SHELTER ISLAND BOATYARD	11	2013
KKM	61	80%	P	30	12	NA		NA	NA	NA	NA	NA	NA
KKM	62	100%	p	30.9	10	Z-Spar		NA	NA	NA	Depth Perceptions, Inc	06	2018
KKM	63	100%	P	35	16	NA		NA	NON	NA	Neilsen Boatyard	04	2014
KKM	64	100%	P	29	12.6	INTERLUX HARD		3779-1	COPPER		SELF APPLIED	09	2017
KKM	65	100%	P	40	14	INTERLUX ULTRA	2693-212	NA	NA	NA	Shelter Island Boatyard	04	2019
KKM	66	100%	p	30	9.5								
KKM	67	100%	p	35	10	interlux ultra		3779f				03	2019
KKM	68	100%	P	26	8.5	Woolsey Defense	4301G	4301G			Neilsen Boatyard	06	2018
KKM	69	100%	p	40	13	seaguard p30	p30bq12	160-0634			delta boat works	03	2017
KKM	70	100%	p	18	10	zpar bottom pro gold	8109106	BP-001-BOTTOM PAINT		NA	Driscoll	11	2017
KKM	71	90%	P	42	16	NA		NA	UNK	0%	MARINE WORKS	05	2013
KKM	72	90%	S	27	9	NA		NA	LOW	NA	DRISCOLL	05	2013
KKM	73	100%	p	39	15								
KKM	74	60%	S	30	9	INTERSEEK 900	Registration NR2	35	LOW	NA	SHELTER ISLAND	09	2009
KKM	75	90%	P	40	14	INTERLUX ULTRAKOTE	2693-192-AA	3779	COPPER	55%	SHELTER ISLAND	06	2017
KKM	76	75%	P	22	8	Sherwin Williams Pro line		1088C	UNK	NA	SELF APPLIED	05	2018
KKM	77	98%	P	38	13.6	Interlux		K3669F			KOEHLER KRAFT	01	19
KKM	78	45%	S	25	8	NA		NA	UNK	NA	NA	NA	NA
KKM	79	100%	p	35.7	11.8	na		na	unk	na	na	na	na
KKM	80	vacant											
KKM	81	100%	S	40.5	13.5	INTERLUX ULTRAKOTE	2693-119-ZD	3669U	COPPER	55%	Shelter Island Boatyard	08	2016
KKM	82	100%	p	30	10								
KKM	83	50%	P	36	12	NA		NA	UNK	NA	Shelter Island Boatyard	07	2014
KKM	84	90%	P	28	10	WEST BOTTOM PRO		NA	LOW	NA	MARINE WORKS	04	2009
KKM	85	100%	P	35	13	INTERLUX ULTRAKOTE		NA	NA	NA	SHELTER ISLAND	JAN	2018
KKM	86	90%	P	33.1	9.6	VIVID	60061-116-AA	6886170	LOW	40%	The Boat Yard Channel Islands	09	2011
KKM	87	100%											
KKM	88	50%	p	33	9								
KKM	89	95%	P	42	42	NA		NA	UNK	NA	NA	NA	NA
KKM	90	100%	s	29	9			NA					
KKM	91	80%	P	40	13	NA		NA	UNK	NA	SHELTER ISLAND	05	2013
KKM	92	vacant											

Facility	Slip	% Year Occupying Slip	Vessel Type Power or Sail (P or S)	Vessel Length	Vessel Beam	Paint Brand Name	EPA REGISTRATION NUMBER	Product Number	Paint Type (Copper, Low, NON, UNK)	% Copper	Boatyard Where Paint Was Applied	Month Painted	Year Painted
KKM	93	75%	S	42	15	NA		NA	UNK	NA	SHELTER ISLAND	10	2013
KKM	94	75%	P	30	11	NA		NA	UNK	NA	SHELTER ISLAND	06	2012
KKM	95	100%	s	42	13.8	interlux ultra		3449f			shelter island	01	2019
KKM	96	50%	S	30	10	pettit hydracoat	60061-87-ZI	93-18406g	Non Copper	0%	NIELSON BEAUMONT	08	2016
KKM	97	vacant											
KKM	98	50%	S	29	10	NA		NA	LOW COPPER	NA	SHELTER ISLAND	05	2010
KKM	99	vacant											
KKM	100	90%	S	30	9	INTERLUX ULTRAKOTE		NA	UNK	NA	KOEHLER KRAFT	03	2016
KKM	101	100%	S	30	11	NA		NA	NON	0%	SHELTER ISLAND BOATYARD	01	2017
KKM	102	70%	S	27	9	NA		NA	UNK	NA	NA	NA	NA
KKM	103	85%	P	48	15	NA		NA	UNK	NA	NA	NA	NA
KKM	104	100%											
KKM	105	90%	P	42	14	NA		NA	UNK	NA	NA	NA	NA
KKM	106	100%	P	48	17	NA		NA	UNK	NA	SHELTER ISLAND BOATYARD	10	2017
KKM	107	88%	P	35	13	INTERLUX ULTRAKOTE	2693-119-ZD	117598	COPPER	76%	SHELTER ISLAND BOATYARD	09	2017
KKM	108	85%	P	60	15	INTERLUX		NA	COPPER	NA	Shelter Island Boatyard	03	2012
KKM	109	90%	P	30	10	NA		NA	LOW COPPER	NA	NA	12	2010
KKM	110	30%	P	60	10	NA		NA	UNK	NA	NA	NA	NA
KKM	111	95%	P	42	13	NA		NA	UNK	NA	NA	12	2012
KKM	112	80%	P	55	15	PETTIT		NA	LOW COPPER	NA	PORT TOWNSEND SHIPYARD	06	2013
KKM	113	95%	P	41	13.5	SUPER PRO GUARD		NA	LOW COPPER	NA	Neilsen Boatyard	07	2016
KKM	114	VACANT											
KKM	115	100%	p	12.6	35								
KKM	116	100%	P	57	15.5	interlux ultra	2693-212	3669F	UNK	NA	shelter island boatyard	04	2019
KKM	117	90%	S	42	14	INTERLUX ULTRA	2693-212-AA	3669F	copper	65%	SHELTER ISLAND BOAT YARD	07	2015
KKM	118	100%	P	50	15	pettit	60061-64	1871			SHELTER ISLAND	06	2019
KKM	119	95%	p	38	10	z spar	60061-49				SELF APPLIED	11	2017
KKM	120	100%	s	62	18.6	Pettet	60061-95	1088k1			jubens maryland	09	2018
KKM	121	100%	p	42	12	west marine pca gold	60061-117-66847						
KKM	122	60%	P	55	16	Z-SPAR		147	UNK	NA	Driscoll's Ship Yard	04	2016
KKM	123	40%	P	42	16	NA		NA	UNK	NA	SHELTER ISLAND BOAT YARD	07	2014
KKM	124	60%	S	54	14	NA		NA	UNK	NA	NA	NA	NA
KKM	125	100%	p	42	15	prettit	60061-135	1261g			shelter island	08	2019
KKM	126	95%	P	60	16.4	INTERLUX ULTRA	2693-212-AA	3669F	COPPER	55%	SHELTER ISLAND BOAT YARD	11	2012
KKM	127	70%	P	42	14	INTERLUX		NA	COPPER	NA	SHELTER ISLAND BOAT YARD	02	2014
KKM	128	99%	p	50	15.9	hydrocoat eco		NA	Non Copper	0%	NEWPORT	12	2015
KKM	129	100%	P	32	12	Interlux Ultra		3779f	unk	na	Shelter island boatyard	11	2019
KKM	130	20%	P	60	18	NA		NA	UNK	NA	NA	NA	NA
KKM	131	100%	P	45	15.9	interlux ultra	2693-212-AA	3779f	COPPER	NA	Shelter Island Boatyard	09	2018
KKM	132	70%	P	48	16	NA		NA	NA	NA	NA	NA	NA
KKM	133	80%	P	35	12	NA		NA	NA	NA	NA	NA	NA
KKM	134	80%	P	56	17	comex		NA	NON	NA	opequimar PV	09	2014
KKM	135	100%	p	31	9.5								
KKM	136	90%	S	52	16	INTERLUX ULTRA		NA	copper	67%	Shelter Island Boatyard	04	2014
KKM	137	25%	P	33	12	NA		NA	UNK	NA	Shelter Island Boatyard	10	2013
KKM	138	50%	p	61	18.7	sea hawk cukote		3400			cable marine	09	2019

Facility	Slip	% Year Occupying Slip	Vessel Type Power or Sail (P or S)	Vessel Length	Vessel Beam	Paint Brand Name	EPA REGISTRATION NUMBER	Product Number	Paint Type (Copper, Low, NON, UNK)	% Copper	Boatyard Where Paint Was Applied	Month Painted	Year Painted
KKM	139	95%	P	38	14	INTERLUX CSC	2693-132-ZV	319293	LOW COPPER	37%	Shelter Island Boatyard	05	2015
KKM	140	99%	P	57	16	interlux 3449F Red		3449	UNK	NA	Shelter Island Boatyard	02	2019
KKM	141	100%	s	43.5	14.3								
KKM	142	70%	P	59	15	INTERLUX ULTRA	2693-212-AA	3779F	LOW COPPER	NA	SHELTER ISLAND BOAT YARD	02	2011
KKM	143	100%	s	42	13	ZSPAR Bottom Pro Gold	60061-94-ZE	411187706				03	2017
KKM	144	80%	S	42	11	Z-SPAR bottom pro		bp91	COPPER	65%	DRISCOLL	03	2017
KKM	145	80%	P	43	15.2	INTERLUX 1088		168	NON	0%	Shelter Island Boatyard	04	2010
KKM	146	80%	P	38	13	Interlux Ultra	2693-212	3669F	UNK	NA	shelter island boatyard	07	2018
KKM	147	85%	P	51	15.5	INTERLUX ULTRA		3779f	COPPER	55%	SHELTER ISLAND BOAT YARD	07	2012
KKM	148	100%	P	48.8	16.5	interlux ultrakote	2693-212	NA	COPPER	NA	SHELTER ISLAND BOAT YARD	10	2018
KKM	149	100%	P	39	10	Interlux Ultra	2693-205	NA		NA	San Diego Boat Yard	07	2017
KKM	150	95%	P	52	15	PETIT trinidad PRO		1082	LOW	65%	Shelter Island Boatyard	10	2018
KKM	151	100%	s	40	13.9	Interlux-Ultra	117589	3669U	UNK	NA	Shelter Island	02	2018
KKM	152	90%	P	41	14	NA		NA	UNK	NA	NA	NA	NA
KKM	153	90%	S	40	12	NA		NA	UNK	NA	NA	NA	NA
KKM	154	95%	P	42.9	14.5	NA	593-4301-G	NA	LOW	NA	Neilsen Boatyard	11	2016
KKM	155	60%	S	40	14	NA		NA	UNK	NA	NA	NA	NA
KKM	156	60%	P	48	14	INTERLUX		NA	LOW	NA	SHELTER ISLAND BOAT YARD	05	2011
KKM	157	100%	s	44.5	13								
KKM	158	100%	P	43	15	bluewater	74681-2				NA	12	2017
KKM	159	80%	S	42	14	PROLINE	577-550-ZE	1088	unk	NA	shelter island	05	2016
KKM	160	100%	P	42	15	unk	Unknown	na	unk	NA	Shelter Island Boatyard	03	2016
KKM	161	100%	s	44	13								
KKM	162	40%	P	40	16	pettit ultima ssa	1881g	NA	LOW	NA	Basin Marine	NA	NA
KKM	163	90%	P	43	14	NA		NA	UNK	NA	NA	NA	NA
KKM	164	40%	S	44	12.8	NA		NA	UNK	NA	KNIGHT AND CARVER	06	2012
KKM	165	80%	S	42	12	INTERLUX ULTRAKOTE	2693-119-ZD	Y3669U/I	copper	76%	SHELTER ISLAND	03	2017
KKM	166	50%	p	45	14.7	Interlude Ultra		3669f			Shelter Island Boatyard	07	2018
KKM	167	100%	p	42	13.1	pettit trinidad	60061-64				shelter island	08	2019
KKM	168	80%	S	46	13	NA		NA	UNK	NA	NA	NA	NA
KKM	169	100%	s	36	11	Interlux Ultra	2693-212	3669F			Shelter Island Boatyard	05	2019
KKM	170	95%	P	43	16	NA		NA	copper	60%	south coast boat yard	06	2014
KKM	171	100%	p	37	13								
KKM	172	92%	P	43	14	NA		NA	UNK	NA	NA	NA	NA
KKM	173	70%	P	38	14	PROLINE		1088	UNK	NA	NA	NA	NA
KKM	174	100%	P	50	16	Interlux Ultra		3779U	UNK	NA	Shelter Island Boatyard	12	2016
KKM	175	80%	S	43	14	Interlux Ultra	2693-212-AA	3779f	Copper	55%	Shelter Island Boatyard	06	2015
KKM	176	75%	P	42	14	Micron		NA	NON	0%	Shelter Island Boatyard	MAR	2016
KKM	177	95%	S	43	12	NA		NA	LOW	NA	Shelter Island Boatyard	12	2008
KKM	178	100%	P	42	13	interlux micron csc		NA	copper	NA	NA	02	15
KKM	179	95%	S	38	13	INTERLUX ULTRA		NA	Copper	NA	SHELTER ISLAND	10	2017
KKM	180	100%	p	40	15								
KKM	181	95%	P	43	14	INTERLUX ULTRA		NA	UNK	NA	SHELTER ISLAND BOAT YARD	05	2014
KKM	182	80%	S	44	14	interlux ultra blue		3669f	copper	NA	Shelter Island Boatyard	12	2017
KKM	183	70%	p	40	12.9	hempel's mille xtra	10250-32	71100			nimbus sweden	05	2019
KKM	184	90%	S	49	15	Z-SPAR	60061-50-ZE	B-90	NON	66%	SHELTER ISLAND	04	2015

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KKM	185	100%	p	38.4	13								
KKM	186	95%	P	50	17	PETTIT TRINIDAD		NA	LOW	NA	Shelter Island Boatyard	01	2010
KKM	187	90%	P	38	13	INTERLUX		NA	NON	0%	DRISCOL	04	2011
KKM	188	100%	s	42	13.6	interlux		3779f			Shelter Island Boatyard	04	2018
KKM	189	100%	S	42	13	NA		NA	UNK	NA	NA	NA	NA
KKM	190	90%	P	50	17	INTERLUX ULTRA		NA	COPPER	55%	SHELTER ISLAND	04	2014
KKM	191	75%	P	55	16	NA		NA	UNK	NA	NA	NA	NA
KKM	192	70%	P	80	19.8	Iterlux Ultra	2693-212	3779F	LOW	55%	Shelter Island Boatyard	01	2019
KKM	193	75%	P	62.8	19.4	INTERLUX ULTRA		NA	COPPER	40%	Delta Marine Seattle	12	2016
KKM	194	90%	P	52.5	16	proline	577-550-ZE	1088	COPPER	66%	The boat yard, marina del rey	03	2015
KKM	195	100%	s	58	16								
KKM	196	40%	S	70	15	NA		NA	UNK	NA	DRISCOL	11	2014
KKM	197	90%	P	58	16	NA		4nk	UNK	40%	SHELTER ISLAND BOAT YARD	03	2014
KKM	198	95%	P	75.8	17.8	interlux ultra kote		NA	COPPER	NA	Shelter Island Boatyard	05	2016
KKM	199	100%	p	72	20	Pettit trinidad pro		1871			shelter island		
KKM	200	65%	P	86	22	PROLINE 1088c	577-550-ZE	168	LOW	40%	MARINE GROUP	09	2010
KKM	201	90%	P	57	14.5	INTERLUX			LOW	40%	Driscoll MB	03	2010
KKM	202	60%	P	57	16	NA		NA	UNK	NA	OXNARD	01	2012
KKM	203	100%	P	56	16	INTERLUX		NA	LOW	NA	SHELTER ISLAND	01	2014
KKM	204	90%	P	90	21	SHARKSKIN		NA	COPPER	NA	NA	01	2013
KKM	205	100%	p	67	21	SeaHawk Biocop	44891-15	tf 1205			shelter island	12	2019
KKM	206	100%	p	70	20								
KKM	207	100%	p	57	17.5	proline	4023800002	1088			shelter island boatyard	10	2018
KKM	208	90%	P	56	15	INTRULUX PACIFICA		yba163	LOW	40%	SHELTER ISLAND BOAT YARD	03	2016
KKM	209	100%	P	53	16.1		54329				Channel Islands	05	2018
KKM	210	60%	P	54	16	NA		NA	UNK	NA	NA	NA	NA
KKM	211	65%	P	55	17.6	Interluxe Ultra		160	LOW	65%	Shelter Island Boatyard	05	2010
KKM	212	75%	S	70	18	NA		NA	UNK	NA	NA	NA	NA
KKM	213	90%	P	65	19	pettit protector		b49	UNK	UKN	Driscol	11	2015
KKM	214	50%	p	50	15								
KKM	215	95%	P	57	17	INTERLUX ULTRA	2693-212	3779F	copper	65%	Shelter Island Boatyard	06	2014
KKM	216	90%	P	75	20	NA		NA	UNK	NA	NA	NA	NA
KKM	217	100%	P	65	17	Interlux Micron 66 Antifowling		YBA473	UNK	NA	Shelter Island Boatyard	08	2016
KKM	218	100%	P	90	20	PROLINE	60061-94-ZB	1088-6	LOW	NA	NA	02	2009
KKM	219	95%	P	60	18	PETTITT TRINIDAD SR		NA	LOW	65%	Shelter Island Boatyard	12	2013
KKM	220	100%	p	80	19	Trilux 33		yba063					
KKM	221	100%	P	59	16	PETTIT		1661g	LOW	NA	Shelter Island Boatyard	07	2011
KKM	222	70%	P	78.9	21.2	NA		NA	UNK	NA	NA	NA	NA
KKM	223	90%	P	50	16	INTERLUX ULTRAKOTE	2693-212	3779F	Copper	76%	SHELTER ISLAND	05	2017
KKM	224	90%	P	92	23	NA		NA	UNK	NA	Shelter Island Boatyard	12	2015
KKM	225	45%	P	78	21	NA		NA	LOW	NA	NA	10	2005
KKM	226	60%	P	60	15	NA		NA	UNK	NA	NA	NA	NA
KKM	227	90%	P	57	15.6	ppg abc antifoul	7313-18	ABC3	UNK	NA	canal boat yard	06	2017
KKM	228	100%	P	75	22	NA		NA	COPPER	50%	driscol	11	2014
KKM	229	60%	S	45	14	INTERLUX		NA	LOW	65%	SELF APPLIED	07	2011
KKM	230	70%	S	62	17	NA		NA	UNK	NA	NA	NA	NA

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KKM	231	75%	P	58	16	NA		NA	LOW	40%	SHELTER ISLAND BOAT YARD	02	2010
KKM	232	95%	P	58	18	Interlux Ultra		160	LOW	65%	Shelter Island Boatyard	05	2010
KKM	233	5%	P	50	17	NA		NA	LOW	NA	NA	NA	NA
KKM	234	95%	S	57	16	INTERLUX BOTTOM KOTE	23566-6-AA	79	LOW	NA	ENSENADA	07	2008
KKM	235	100%	P	54	16	Interlux		3779F	UNK	NA	Shelter Island Boatyard	10	2018
KKM	236	95%	P	70	18	PETTIT	60061-137-AA	1661g	NON	NA	Driscol	12	1013
KKM	237	50%	P	50	16	NA		NA	UNK	NA	NA	NA	NA
KKM	238	100%	p	64	16								
KKM	239	100%	P	58	16	interlux ultra		3779f					
KKM	240	65%	P	72	20	NA		NA	UNK	NA	Shelter Island Boatyard	10	2016
KKM	241	90%	P	48.8	16.8	unk		unk	unk	unk	Shelter Island Boatyard	02	2017
KKM	242	65%	P	70	18	Ultrokote		3779 U	UNK	NA	Shelter Island Boatyard	04	20917
KKM	243	100%	S	55	15.3	Interlux VC		56	LOW	0%	Driscoll MB	08	2016
KKM	244	80%	P	78	17	ULTRA COTE BLACK	2693-119-ZD	169	COPPER	55%	NEWPORT	02	2014
KKM	245	100%	s	54	15								
KKM	246	90%	P	57	17	NA		NA	UNK	NA	shelter island	05	2016
KKM	247	80%	S	52	14	VIVID		72	UNK	NA	Shelter Island Boatyard	05	2012
KKM	248	90%	S	44	9	INTERLUX ULTRAKOTE	2693-119-ZD	3449U	COPPER	76%	Driscoll MB	12	2017
KKM	249	95%	P	52	15.3	INTERLUX ULTRA		3779U	copper	55%	Shelter Island Boatyard	06	2016
KKM	250	95%	P	74	18.2	INTERLUX ULTRA	2693-212-AA	3779F	copper	65%	Shelter Island Boatyard	08	2015
KKM	251	100%	p	45	15								
KKM	252	95%	P	69	18	PROLINE	557-550-ZJ	1088/01	UNK	NA	SHELTER ISLAND BOAT YARD	06	2019
KKM	253	95%	S	47	13	WEST BOTTOM PRO		NA	LOW	40%	Shelter Island Boatyard	01	2015
KKM	254	90%	P	60	17	interlux ultra		y3779f	non Copper	0%	Shelter Island Boatyard	07	2017
KKM	255	45%	S	52	13	NA		NA	UNK	NA	NA	NA	NA
KKM	256	99%	p	68	17	INTERLUX ULTRA	2693-119	y3779f	UNK	NA	MARINE GROUP	06	2019
KKM	257	100%	P	28	9	NA		NA	UNK	NA	DRISCOLL	07	2015
KKM	258	50%	P	70	18.5	Pettit Trinidad	60061-64	1871	UNK	53%	Shelter Island Boatyard	08	2019
KKM	259	95%	P	43	14	NA		NA	UNK	NA	NA	NA	NA
KKM	260	95%	S	48	11	WEST BOTTOM PRO		NA	UNK	NA	KOEHLER	10	2013
KKM	261	100%	s	46.1	14								
KKM	262	95%	S	50	13	PETTIT Z-SPAR	60061-49-ZH	B94	UNK	60%	Shelter Island Boatyard	12	2012
KKM	263	90%	S	39	12	NA		NA	UNK	NA	NA	NA	NA
KKM	264	100%	s	31	10	PETTIT	60061-116-AA	1261	LOW	NA	Shelter Island Boatyard	04	2005
KKM	265	90%	P	52	15.6	Interlux Ultra		3779F	UNK	NA	Shelter Island Boatyard	08	2018
KKM	266	90%	S	28	12	NA		NA	UNK	NA	NA	NA	NA
KKM	267	100%	9	43	13.6	interlux ultra	z693-212	3779-f			shelter island boatyard	08	2018
KKM	268	90%	S	27	10	pettit trinidad Ho	60061-64	1871	UNK	NA	NA	NA	NA
KKM	269	100%	P	42	13	NA		NA	LOW	NA	NA	06	2002
KKM	270	vacant											
KKM	271	95%	S	45	14	ULTRAKOTE		NA	Copper	NA	JK3	10	2016
KKM	272	100%	p	26	8.9								
KKM	273	100%	P	44	13	NA		NA	UNK	NA	SHELTER ISLAND BOAT YARD	11	2013
KKM	274	80%	S	32	11.2	INTERLUX ULTRA		NA	UNK	NA	SHELTER ISLAND BOAT YARD	01	2014
KKM	275	100%	P	44	13.6	Interlux Ultra		NA	COPPER	NA	SHELTER ISLAND BOAT YARD	05	2015
KKM	276	50%	P	26	8.5	intrerlux		y3779f	UNK	NA	NA	04	2017

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KKM	277	100%	S	41	8	PETTIT	60061-49-ZG	B91	COPPER	53%	DRISCOLLS	07	2016
KKM	278	vacant											
KKM	279	50%	P	28	8.6	interlux	2693-226				SELF APPLIED	04	2018
KKM	280	90%	P	32.9	12	INTERLUX ULTRA		y3779f	COPPER	NA	DRISCOLL	08	2017
KKM	281	100%	p	45	10								
KKM	282	80%	P	28	10	ZSPAR		bp91	COPPER	66%	Bricks Marine	01	2018
KKM	283	95%	P	45	15	NA		NA	LOW	NA	NA	NA	NA
KKM	284	vacant											
KKM	285	90%	S	50	12	ZSPAR B94	60061-49-ZH	164	LOW	40%	Ventura Harbor Boat Yard	12	2011
KKM	286	vacant											
KKM	287	100%	P	47.3	15.1	zspar	60061-94-ze	411187706			driscoll	08	2018
KKM	288	100%	s	34	11								
KKM	289	95%	P	35	13	interlux ultrakote		Y3559U			Balboa Boatyard Newport	01	2016
KKM	290	vacant											
KKM	291	95%	P	34	12	NA		NA	LOW	NA	DRISCOLL	02	2011
KKM	292	30%	P	45	14	NA		NA	UNK	NA	NA	NA	NA
KKM	293	45%	S	42	14	NA		NA	UNK	NA	NA	NA	NA
KKM	294	95%	P	33	11	pettit trinidad hd		hd1271			shelter island	08	2019
KKM	295	90%	s	44.5	14	NA		NA	non Copper	0%	NA	10	17
KKM	296	100%	p	17	6.2		2693-212				SELF APPLIED	10	2018
KKM	297	98%	S	35	11	Interlux		NA	LOW	65%	Driscoll MB	10	2010
KKM	298	95%	P	41.3	15	interlux	1282999	3669f	UNK	NA	NA	11	2017
KKM	299	80%	P	38	13	SEAHAWK	44891-11-AA	6145	copper	45%	Neilsen Beaumont	09	2006
KKM	300	vacant											
KKM	301	95%	p	45.2	14.6	sea hawk	44891-12-aa	af-33			Pacific Marine Center	02	2018
KKM	302	95%	S	24	5	interlux ultra	3669f				shelter island	05	2018
KKM	303	85%	P	44	13.5	NA		NA	LOW	NA	NA	09	2004
KKM	304	25%	P	30	11	NA		NA	UNK	NA	NA	NA	NA
KKM	305	45%	S	46	14	PETTIT TRINIDAD		174	LOW	NA	Ventura Harbor Boat Yard	12	2011
KKM	306	90%	P	32	11	ULTRAKOTE		NA	UNK	NA	NA	06	2016
KKM	307	100%	p	45	15	interlux ultra	2693-212				driscoll mission bay	10	2018
KKM	308	100%	s	27	8								
KKM	309	100%	s	46	12								
KKM	310	100%	P	29	10.4	INTERLUX ULTRA		37794			Shelter Island Boatyard	03	2016
KKM	311	35%	P	43	14	PETTIT TRINIDAD		NA	LOW	NA	Shelter Island Boatyard	07	2011
KKM	312	88%	S	30	10	NA		NA	UNK	NA	NA	NA	NA
KKM	313	100%	s	38.7	12.8								
KKM	314	100%	P	29	10	No Bottom Paint		NA	NON	0%	NA	NA	NA
KKM	315	95%	P	42	14	Interlux ULTRAKOTE		NA	lOW	NA	Shelter Island Boatyard	05	2016
KKM	316	45%	S	30	10	NA		NA	UNK	NA	NA	NA	NA
KKM	317	100%	p	45	15.9								
KKM	318	85%	P	35	11.8	pettit vivid		1161			NA	10	2015
KKM	319	25%	P	47	12	NA		NA	UNK	NA	NA	NA	NA
KKM	320	100%	p	26	8								
KKM	321	15%	P	45	16	NA		NA	UNK	NA	NA	NA	NA
KKM	322	30%	S	35	11	NA		NA	UNK	NA	NA	NA	NA

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KKM	323	95%	P	45	10	Pettit Trinidad Pro			LOW	40%	SHELTER ISLAND	03	2016
KKM	324	vacant											
KKM	325	60%	S	45	13	PROLINE VINYL		NA	LOW	NA	SHELTER ISLAND	06	2008
KKM	326	vacant											
KKM	327	100%	s	47	12.4								
KKM	328	100%	s	30	11								
KKM	329	85%	P	43	14	NA		NA	UNK	NA	NA	NA	NA
KKM	330	75%	S	30	12	NA		NA	UNK	NA	NA	NA	NA
KKM	331	100%	p	43	15.2								
KKM	332	100%	s	36	13	Bottom Pro Gold	60061-117-zd				BASIN MARINE	01	2014
KKM	333	100%	P	45	14	interlux ultra		3779f				01	2019
KKM	334	45%	p	24	7		2693-212				Marine Group Boat Works	04	2019
KKM	335	100%	p	42	14.9	interlux ultra		3669F	UNK	NA	Shelter Island Boatyard	01	18
KKM	336	90%	P	32	11	Epoxy Modified		147	LOW	20%	Neilsen Beaumont	05	2007
KKM	337	100%	p	42	14								
KKM	338	vacant											
KKM	339	90%	P	38	14	interlux ultra blue		36695	copper	55%	shelter island boatyard	01	2018
KKM	340	vacant											
KKM	341	95%	p	46	15.5	Trinidad Pro Red	1108600	1086	UNK	NA	Bay Marine	02	2019
KKM	342	vacant											
KKM	343	100%	p	50	16.5								
KKM	344	95%	P	28	10	NA		NA	LOW	NA	NA	NA	NA
KKM	345	100%	p	31	10.5	zspar bottom gold	60061-49-2H		UNK	NA	driscoll boat yard	08	2019
KKM	346	vacant											
KKM	347	100%	HYDRAHOIST	30	12	NA		NA	UNK	NA	NA	NA	NA
KKM	348	vacant											
KKM	349	100%	S	35	19	INTERSLEEK 900		NA	NON	NA	DRISCOLL	NA	2009
KKM	350	40%	S	40	15	NA		NA	UNK	NA	SHELTER ISLAND	07	2013
KKM	351	98%	P	45	14	NA		NA	UNK	NA	HALES MARINE	06	2016
KKM	352	100%	P	38	14.6	Interlux Ultra		3779F	UNK	NA	Shelter Island Boatyard	01	2019
KKM	353	95%	S	32	8	NA		NA	UNK	NA	Shelter Island Boatyard	06	2012
KKM	354	92%	S	42	15	NA		NA	LOW	NA	Shelter Island Boatyard	11	2012
KKM	355	100%	P	40	12.6	INTERLUX ULTRA	2693-212-AA	3779F	COPPER	67%	SHELTER ISLAND BOATYARD	11	2012
KKM	356	100%	S	40	12.6	INTRULUX ULTRA	2693-212-AA	3779F	copper	NA	NA	NA	NA
KKM	357	vacant											
KKM	358	75%	P	42	14	Interlux Ultra		160	LOW	65%	Neilsen Beaumont	07	2011
KKM	359	vacant											
KKM	360	100%	p	40.7	10.3	Zspar Bottom pro gold black	60061-94-2E	411187706	UNK	NA	driscoll boat yard	09	2019
KKM	361	95%	P	33	12	NA		NA	UNK	NA	NA	NA	NA
KKM	362	90%	P	38	13	NA		NA	LOW	NA	DRISCOLL	08	2010
KKM	363	vacant											
KKM	364	30%	S	36	11	Pettit Trinidad Pro		174	copper	65%	Shelter Island Boatyard	09	2012
KKM	365	35%	S	36	11	NA		NA	UNK	NA	NA	NA	NA
KKM	366	95%	p	34	14.3	petite	4564	6546			chaneel islands	02	2017
KKM	367	95%	S	36	11	Interlux Ultrakote		36695	copper	NA	shelter island boatyard	02	2017
KKM	368	98%	P	38	13	NA		NA	UNK	NA	DRISCOLL	12	2013

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KKM	369	90%	P	39	13	interlux ultra black		NA	copper	NA	shelter island boatyard	11	2015
KKM	370	85%	P	33	13	INTRULUX ULTRA	2693-212-AA	3779F	COPPER	NA	shelter island boatyard	11	2017
KKM	371	70%	P	39	14	INTERLUX ULTRA		NA	LOW	67%	Neilsen Beaumont	07	2012
KKM	372	90%	P	38	13	NA		NA	UNK	NA	NA	NA	NA
KKM	373	100%	S	42	13	PROLINE	577-550-ZE	1088	COPPER	66%	SHELTER ISLAND	06	2017
KKM	374	100%	P	39	13	NA		NA	LOW	NA	NA	10	2009
KKM	375	99%	p	45.6	15.5	zspar bottom pro gold blue	60061-94-ze	41127706			Driscoll	02	2019
KKM	376	100%	s	36	12								
KKM	377	100%											
KKM	378	95%	P	35	12	interlux ultra		3669f	LOW	NA	NA	06	2017
KKM	379	90%	P	44	15	Proline	577-550	1088-01	copper	65%	Shelter Island Boatyard	05	2012
KKM	380	25%	S	37	12	NA		NA	UNK	NA	NA	NA	NA
KKM	381	100%	P	47	14	Interlux Ultra		3779F	UNK	NA	Shelter Island Boatyard	06	2016
KKM	382	100%	S	36	11	Interlux Ultra		3669F	UNK	NA	Shelter Island Boatyard	05	2019
KKM	383	35%	S	43	14	NA		NA	UNK	NA	NA	NA	NA
KKM	384	100%	p	36	13	interlux	3559F	6	LOW	NA	SHELTER ISLAND BOATYARD	09	2009
KKM	385	90%	P	45.6	15	ULTRAKOTE	2693-119-ZD	3779K	NA	NA	TIARA, HOLLAND MI	04	2016
KKM	386	85%	P	37	12	NA		NA	UNK	NA	SHELTER ISLAND BOATYARD	03	2014
KKM	387	100%	S	48	15	interlux ultrakote	2693-119-ZD	168	LOW	67%	Shelter Island Boatyard	08	2017
KKM	388	88%	P	38	14	NA		NA	UNK	NA	NA	NA	NA
KKM	389	50%	P	44	13.5	NA		NA	UNK	NA	NA	NA	NA
KKM	390	90%	S	38	11	NA		NA	UNK	NA	NA	NA	NA
KKM	391	10%	P	50	16.8	interlux	2693.212				Shelter Island Boatyard	02	2016
KKM	392	vacant											
KKM	393	100%	p	50	14.2	interlux ultra black	2693-212	3779f			shelter island boatyard	01	2019
KKM	394	90%	P	38	12	PETTIT TRINIDAD			LOW	NA	Shelter Island Boatyard	02	2010
KKM	395	100%	p	44	13	blue water	74681-2	8602				01	2016
KKM	396	50%	S	41	14	PETTIT TRINIDAD		NA	LOW	NA	ENSENADA	04	2008
KKM	397	100%	P	48	15	Interlux Ultra		3779F	non	0%	shelter island boatyard	06	2018
KKM	398	30%	S	36	13	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
KKM	399	85%	P	40	13.5	INTERLUX	2693-192-ZB	3669	copper	55%	NA	06	2012
KKM	400	vacant											
KKM	401	90%	P	40	16	PETTIT ULTIMA SSA		NA	LOW	NA	BASIN MARINE	04	2013
KKM	402	65%	P	38	12	NA		NA	UNK	NA	NA	NA	NA
KKM	403	100%	s	39	12.8	interlux ultra		3669F	UNK	NA	Shelter Island Boatyard	05	2019
KKM	404	90%	S	37	18	NA		NA	UNK	NA	NA	NA	NA
KKM	405	90%	P	38	13	NA		NA	UNK	NA	NA	NA	NA
KKM	406	35%	P	24	9	NA		NA	UNK	NA	NA	NA	NA
KKM	407	98%	P	36	13	NA		NA	UNK	NA	Shelter Island Boatyard	NA	NA
KKM	408	95%	S	36	12	EPOXY COPPERCOAT		NA	copper	NA	NA	06	2014
KKM	409	40%	P	37	14	NA		NA	UNK	NA	NA	NA	NA
KKM	410	85%	S	38	12	ZSPAR B94	60061-49-ZH	165	LOW	65%	self applied	01	2007
KKM	411	95%	S	38	11	Awlgrip SR			unk	unk	Shelter Island Boatyard	13	2016
KKM	412	100%	s	35.5	11.4	interlux ultracoat		3779u			shelter island		2016
KKM	413	20%	S	36.8	11.6	interlux ultracoat light		na	copper	55%	SHELTER ISLAND BOAT YARD	04	2017
KKM	414	100%	P	36	13	NA		NA	UNK	NA	SHELTER ISLAND BOAT YARD	08	2017

Facility	Slip	% Year Occupying Slip	Vessel Type Power or Sail (P or S)	Vessel Length	Vessel Beam	Paint Brand Name	EPA REGISTRATION NUMBER	Product Number	Paint Type (Copper, Low, NON, UNK)	% Copper	Boatyard Where Paint Was Applied	Month Painted	Year Painted
KKM	415	vacant											
KKM	416	90%	S	42	13	NA		NA	UNK	NA	NA	NA	NA
KKM	417	98%	p	40	15.9	na		na	unk	na	Hinkley, FL	09	2017
KKM	418	25%	S	36	11	NA		NA	UNK	NA	NA	NA	NA
KKM	419	60%	P	40	14	Interlux Ultra		160	copper	65%	Neilsen Beaumont	07	2012
KKM	420	85%	P	32	11	NA		NA	UNK	NA	NA	NA	NA
KKM	421	100%	S	37	11	NA		NA	UNK	NA	NA	NA	NA
KKM	422	90%	P	36	13	INTERSLEEK 900 BLACK		NA	UNK	NA	Shelter island	05	2013
KKM	423	90%	S	36	11	NA		NA	UNK	NA	NA	NA	NA
KKM	424	40%	S	39	12	NA		NA	LOW	NA	DRISCOLL	10	2010
KKM	425	90%	S	40	11	NA		NA	LOW	NA	Shelter Island Boatyard	12	2007
KKM	426	98%	S	42	13	INTERLUX ULTRA		NA	LOW	67%	Shelter Island Boatyard	06	2010
KKM	427	15%	S	36	11	Interlux Ultrakote		3669U	UNK	NA	Shelter Island Boatyard	11	2015
KKM	428	100%	p	40	13								
KKM	429	95%	S	35	11	NA		NA	UNK	NA	NA	NA	NA
KKM	430	98%	S	36	12	INTERLUX ULTRAKOTE	2693-119-ZD	3779U	LOW	40%	Shelter Island Boatyard	06	2017
KKM	431	100%	p	41	14	INTERLUX		YBA473	UNK	NA	West Marine	01	2018
KKM	432	90%	S	50	15	Pettit Trinidad	60061-64	1871	UNK	NA	SHELTER ISLAND BOATYARD	08	2019
KKM	433	100%											
KKM	434	90%	p	44	16	pettite	2693-192-AA	na	UNK	NA	KKMI Sausalito	05	2018
KKM	435	90%	P	43	10	NA		NA	UNK	NA	NA	NA	NA
KKM	436	100%											
KKM	437	95%	s	41.8	14	Interlux Ultra Kote				NA	SHELTER ISLAND	10	2017
KKM	438	60%	s	43	12	INTERLUX BOTTOM KOTE		NA	UNK	NA	self applied	05	2013
KKM	439	95%	P	47.2	14.3	interlux micron 66	yba473/1				SHELTER ISLAND	11	2018
KKM	440	100%	p	46	15								
KKM	441	100%	s	50	14.7	Micron CSCHS	unk	ybc583	unk	unk	unk	07	2016
KKM	442	93%	P	25	9	NA		NA	UNK	NA	NA	NA	NA
KKM	443	93%	P	43	16	Proline 1088	577-550-ZE	168	LOW	40%	Shelter Island Boatyard	11	2011
KKM	444	65%	P	48	16	NA		NA	UNK	NA	NA	NA	NA
KKM	445	100%	P	46	16	zspar	60061-94-28	41187706	UNK	NA	driscoll	03	2018
KKM	446	100%	p	43	12								
KKM	447	90%	P	48	15	NA		NA	LOW	NA	NA	NOV	2005
KKM	448	85%	P	44	15	PROLINE 1088-6		NA	LOW	NA	NA	03	2006
KKM	449	75%	P	48	16	NA		NA	UNK	NA	NA	NA	NA
KKM	450	95%	S	46	12.9	INTRULUX ULTRA	2693-211	3779f	UNK	NA	SHELTER ISLAND BOATYARD	JAN	2017
KKM	451	95%	p	47.4	15.4	interlux ultra	2693-212	3779f			SHELTER ISLAND BOATYARD	12	2017
KKM	452	90%	P	43	15	NA		NA	UNK	NA	DRISCOLL MB	11	2013
KKM	453	90%	P	50	16	NA		NA	LOW	40%	Shelter Island Boatyard	07	2013
KKM	454	100%	p	36	11	Interlux Ultra	2693-212	3669F	UNK	NA	Shelter Island Boatyard	06	2019
KKM	455	88%	P	43	15'10"	PROLINE LOLO	577-550-ZE	1088	LOW	NA	SHELTER ISLAND BOATYARD	07	2013
KKM	456	vacant											
KKM	457	92%	P	39	14	PROIINE 1088-6		NA	LOW	NA	Shelter Island Boatyard	10	2010
KKM	458	90%	S	34	12	2000E EPOXY PRIMER WH		164	LOW	65%	Driscoll MB	05	2011
KKM	459	100%	S	53	14	Interlux Micron CSC	2693-190	Y5582			Shelter Island Boatyard	06	2017
KKM	460	75%	P	34	12	Interlux Ultra	2693-212	3779f			Oceanside Marine Center	05	2019

Facility	Slip	% Year Occupying Slip	Vessel Type Power or Sail (P or S)	Vessel Length	Vessel Beam	Paint Brand Name	EPA REGISTRATION NUMBER	Product Number	Paint Type (Copper, Low, NON, UNK)	% Copper	Boatyard Where Paint Was Applied	Month Painted	Year Painted
KKM	461	100%	P	48	15	Interlux Ultra		3669U	copper	65%	Shelter Island Boatyard	08	2017
KKM	462	65%	S	36	11	TRINIDAD SR		NA	copper	NA	DRISCOLLS MB	05	2015
KKM	463	90%	P	47.8	15	PETTIT/TRINIDAD		NA	copper	67%	DRISCOLLS	05	2015
KKM	464	25%	P	46	16	NA		NA	UNK	NA	DRISCOLLS MB	11	2014
KKM	465	80%	P	46	14	trinidad		blue			shelter island boat yard	12	2019
KKM	466	100%	P	32	10		60061-50					09	2017
KKM	467	100%	p	50	16.9	pettit		1871			shelter island	09	2019
KKM	468	65%	S	35	12	NA		NA	UNK	NA	NA	NA	NA
KKM	469	20%	P	48	16	Interlux Ultra		160	copper	60%	Shelter Island Boatyard	12	2012
KKM	470	60%	P	27	9	interlux ultra kote		3779u				03	2015
KKM	471	85%	P	54	16	interlux ultra	2693-212-AA	3779f	copper	NA	Shelter Island Boatyard	07	2015
KKM	472	100%	P	35	13	proline		1051	UNK	NA	marine group	10	2018
KKM	473	95%	P	47	14	NA		NA	UNK	NA	NA	NA	NA
KKM	474	90%	P	32	12	NA		NA	UNK	NA	NA	NA	NA
KKM	475	98%	S	50	14	NA		NA	LOW	40%	SHELTER ISLAND	08	2002
KKM	476	100%	s	36	12	UNK	UNK	UNK	UNK	UNK	UNK	UNK	UNK
KKM	477	30%	s	48	14.6	Trinidad	60061-95	NA	UNK	NA	Harborview Marina, RI	08	2017
KKM	478	98%	P	49	15	NA		NA	LOW	NA	NA	12	2010
KKM	479	50%	S	34	12	NA		NA	UNK	NA	NA	NA	NA
KKM	480	95%	P	47	15	Z Spar	60061-50	NA	UNK	NA	DRISCOLLS	01	2018
KKM	481	vacant											
KKM	482	90%	S	44	14	INTERLUX ULTRAKOTE		NA	COPPER	76%	Shelter Island Boatyard	03	2016
KKM	483	40%	P	30	10	NA		NA	UNK	NA	NA	NA	NA
KKM	484	90%	P	47	15	Woolsey Defense CA	60061- 49-ZO	593-4301G	COPPER	65%	Nielson Beumont	06	2017
KKM	485	40%	S	41	14	VC PERF		NA	NON	NA	SHELTER ISLAND BOAT YARD	11	2013
KKM	486	98%	S	50	16	MISSION BAY BLUE		4002	LOW	NA	DRISCOLL	09	2007
KKM	487	100%	P	45.4	15	Interlux Ultra	2693-212	3669F	UNK	NA	Sheler Island Boatyard	03	2019
KKM	488	95%	P	43	15	Z Spar Gold		164	LOW	40%	Driscoll MB	02	2012
KKM	489	80%	P	49	15	INTERLUX KL-6		NA	LOW	NA	Shelter Island Boatyard	03	2007
KKM	490	98%	P	51	15	Blue Water 8601		NA	LOW	40%	Driscolll MB	10	2008
KKM	491	85%	S	50	13	Interlux Micro		NA	UNK	NA	Shelter Island Boatyard	03	2014
KKM	492	100%	s	54	16	interlux	2693-212	3669F	LOW	40%	shelter island boatyard	02	2017
KKM	493	100%	p	45	14.9	interlux micron csc		y5583			nielson Beaumount	05	2018
KKM	494	45%	P	47	15	NA		NA	UNK	NA	NA	NA	NA
KKM	495	100%	P	43	13.11	Interlux	PB0001495 A870	2693-212	unk	na	SHELTER ISLAND BOATYARD	04	2019
KKM	496	100%	p	43	15								
KKM	497	80%	S	48	14	SEA HAWK		NA	UNK	NA	BAJA NAVAL	02	2015
KKM	498	100%	P	50	17	NA		NA	NON	NA	SHELTER ISLAND	04	2015
KKM	499	100%	P	48	16	Interlux Micron 66 Antifowling		YBA473	UNK	NA	Marine Group Los Labos	07	2018
KKM	500	100%	p	47	14	Proline		1088	NON	NA	SHELTER ISLAND	08	2019
KKM	501	100%	p	52	15	ral petroleum							
KKM	502	80%	S	50	13	NA		NA	UNK	NA	NA	NA	NA
KKM	503	100%	p	44	14								
KKM	504	100%	P	48	16	NA		NA	UNK	NA			
KKM	505	100%	p	45	15	sherwinn williams proline	cq1088co2	1088			windward yacht club	06	2019
KKM	506	93%	P	48	15	NAUTICAL ABLATIVE		NA	LOW	40%	Nielson Beumont	03	2017

Facility	Slip	% Year Occupying Slip	Vessel Type Power or Sail (P or S)	Vessel Length	Vessel Beam	Paint Brand Name	EPA REGISTRATION NUMBER	Product Number	Paint Type (Copper, Low, NON, UNK)	% Copper	Boatyard Where Paint Was Applied	Month Painted	Year Painted
KKM	507	75%	S	45	14	Interlux Ultra	74681	8602				01	2016
KKM	508	90%	P	54	17	Blue Water		NA	UNK	NA	NA	NA	NA
KKM	509	100%	P	45	15	Interlux Ultra		3669F			Shelter Island Boatyard	06	2019
KKM	510	98%	P	44	16	Woolsey Defense CA	60061- 49-ZO	4501G	COPPER	45%	Neilsen Beaumont	04	2016
KKM	511	25%	P	41	14	NA		NA	UNK	NA	NA	NA	NA
KKM	512	90%	P	65	16	INTERLUX ULTRAKOTE		NA	COPPER	76%	SHELTER ISLAND	11	2016
KKM	513	60%	S	78	17	PETTIT TRINIDAD PRO		1082	copper	67%	DRISCOLLS	01	2018
KKM	514	80%	P	97.6	24.5	TRILUX	2693-226-AA	33	UNK	UKN	Marine Group	10	2016
KKM	515	88%	P	140	25	SEA HAWK SHARKSKIN		NA	Combo	0%	Marine Group	10	2015
KKM	516	40%	p	87	22		22165	11251			Seminole Marine	06	2019
KKM	517	100%	p	150	27.8								
KKM	518	45%	P	142	25	NA		NA	UNK	NA	NA	NA	NA
KKM	519	100%	p	120	25								
KKM	520	25%	p	90	18.6		2693-212	y3779f			marine group	03	2019
KKM	521	100%	p	70	17								
KKM	522	100%	p	60	29								
KKM	523	100%	p	149	35	None							
KKM	524	100%	p	65	16								
KKM	525	70%	S	40	16	NA		NA	UNK	NA	NA	NA	NA
KKM	526	65%	S	42	23	West Marine Bottom Shield	60061-129-AA	10175156	LOW	40%	Birkavitch La Paz MX	12	2016
KKM	527	10%	S	45	15	NA		NA	UNK	NA	NA	NA	NA
KKM	528	98%	m	45	25' 10"	Interlux Ultracoat		3779U			Shelter Island Boatyard	09	2017

Facility (Marina or Yacht Club)	Slip/Mooring Reference Number	Percent of Time Occupied	Vessel Type (Power or Sail)	Vessel Length	Vessel Beam	Paint Type (Copper, Low, or Non, No Paint)	Paint Product Name	Product Number	Boatyard Name or Purchase Date	Painting Date Month (mm)	Painting Date Year (yyyy)	% Copper	DPR Category I Registration Number
Crows Nest	1	100	Power	68	17.9	Low	Pettit	1161			2017	None	
Crows Nest	2	100	Power	60	17.2	Low	Pettit	1161			2015	None	
Crows Nest	3	100	Power	58		Low	Trinidad	1271			2018	Low	
Crows Nest	4	100	Power	35	14	Low	Pettit	1161			2015	None	
Crows Nest	5	100	Power	33	13	Low	Trinidad	1271			2015	Low	
Crows Nest	6	100	Power	36	13.8	Low	Pettit	1161			2017	None	

APPENDIX D

WATER QUALITY RESULTS

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AUGUST 19, 2019 FIELD DATA SHEETS

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PORT OF SAN DIEGO
SHELTER ISLAND YACHT BASIN TMDL MONITORING
2019

FIELD WATER QUALITY DATA SHEET

Station Identification: SIYB-1

Date: (mm/dd/yyyy) 08/19/2019

Time on Station: (hh:mm) 1445

Time Started: (hh:mm) 1510

Ended: (hh:mm) 1545

GPS: (WGS84) Lat. 32.71824 Long. -117.22592

Tide (ft): +3.4 ↓

Time of Slack High Tide: 1218

Water Depth (ft): 17

Weather conditions: sunny, breezy

Wind (mph): 10 mph WNW

Time of CTD Cast: 1545

Surface Water Conditions: calm, small ripples

Water Visibility (ft): 9.5

Time of Measurement	Temperature (°C)	Sp. Cond. (µS/cm)	Salinity (ppt)	pH	DO (mg/L)
Upon arrival on station	21.7	50932	33.48	7.85	7.25
During sample collection	21.6	50954	33.50	7.86	7.26
End of sample collection	21.8	50889	33.53	7.85	7.23
Average value	21.7	50925	33.50	7.85	7.25

*Water quality measured at the same depth as sample collection (i.e. within 1 meter from the surface).

Notes: topside cleaning ~ 20yds away

PORT OF SAN DIEGO
SHELTER ISLAND YACHT BASIN TMDL MONITORING
2019

FIELD WATER QUALITY DATA SHEET

Station Identification: SIYB-1 (REP)

Date: (mm/dd/yyyy) 08/19/2019

Time on Station: (hh:mm) 1545

Time Started: (hh:mm) 1550

Ended: (hh:mm) 1615

GPS: (WGS84) Lat. 32.71817

Long. -117.22606

Tide (ft): +2.9 ↓

Time of Slack High Tide: 1218

Water Depth (ft): 17

Weather conditions: Sunny, breezy

Wind (mph): 11 mph NW

Time of CTD Cast: 1610

Surface Water Conditions: ~~So~~ calm, small ripples

Water Visibility (ft): 9.5

Time of Measurement	Temperature (°C)	Sp. Cond. (µS/cm)	Salinity (ppt)	pH	DO (mg/L)
Upon arrival on station	21.9	50929	33.49	7.85	7.23
During sample collection	21.9	50962	33.44	7.85	7.23
End of sample collection	21.9	50971	33.50	7.85	7.17
Average value	21.9	50954	33.48	7.85	7.21

*Water quality measured at the same depth as sample collection (i.e. within 1 meter from the surface).

Notes: topside cleaning ~ 20 yd away

PORT OF SAN DIEGO
SHELTER ISLAND YACHT BASIN TMDL MONITORING
2019

FIELD WATER QUALITY DATA SHEET

Station Identification: SIYB-2

Date: (mm/dd/yyyy) 08/19/2019

Time on Station: (hh:mm) 1400

Time Started: (hh:mm) 1410

Ended: (hh:mm) 1440

GPS: (WGS84) Lat. 32.71414

Long. -117.22916

Tide (ft): +4.0 ↓

Time of Slack High Tide: 1218

Water Depth (ft): 15

Weather conditions: sunny, breezy

Wind (mph): 10mph WNW

Time of CTD Cast: 1435

Surface Water Conditions: calm, small ripples

Water Visibility (ft): 9

Time of Measurement	Temperature (°C)	Sp. Cond. (µS/cm)	Salinity (ppt)	pH	DO (mg/L)
Upon arrival on station	21.0	50915	33.45	7.88	7.50
During sample collection	21.0	50900	33.46	7.88	7.49
End of sample collection	20.9	50867	33.43	7.89	7.55
Average value	21.0	50894	33.45	7.88	7.51

*Water quality measured at the same depth as sample collection (i.e. within 1 meter from the surface).

Notes: topside cleaning ~ 10 yd from site

PORT OF SAN DIEGO
SHELTER ISLAND YACHT BASIN TMDL MONITORING
2019

FIELD WATER QUALITY DATA SHEET

Station Identification: SIYB-3

Date: (mm/dd/yyyy) 08/19/2019

Time on Station: (hh:mm) 12:45

Time Started: (hh:mm) 13:10

Ended: (hh:mm) 1345

GPS: (WGS84) Lat. 32. 42.930 Long. -117° 13.786

Tide (ft): +4.5 ↓

Time of Slack High Tide: 1218

Water Depth (ft): 21

Weather conditions: Sunny, breezy

Wind (mph): 11mph WNW

Time of CTD Cast: 1340

Surface Water Conditions: Calm, small ripples

Water Visibility (ft): 8.5

Time of Measurement	Temperature (°C)	Sp. Cond. (µS/cm)	Salinity (ppt)	pH	DO (mg/L)
Upon arrival on station	20.9	50870	33.43	7.88	7.59
During sample collection	21.1	50877	33.46	7.88	7.40
End of sample collection	21.0	50928	33.46	7.87	7.38
Average value	21.0	50892	33.45	7.88	7.46

*Water quality measured at the same depth as sample collection (i.e. within 1 meter from the surface).

Notes:

PORT OF SAN DIEGO
SHELTER ISLAND YACHT BASIN TMDL MONITORING
2019

FIELD WATER QUALITY DATA SHEET

Station Identification: SIYB-4

Date: (mm/dd/yyyy) 08/19/2019

Time on Station: (hh:mm) 1150

Time Started: (hh:mm) 1210

Ended: (hh:mm) 1235

GPS: (WGS84) Lat. 32.71685 Long. -117.23206

Tide (ft): +4.6 ↑

Time of Slack High Tide: 1218

Water Depth (ft): 16

Weather conditions: sunny, breezy

Wind (mph): 11mph WNW

Time of CTD Cast: 12:35

Surface Water Conditions: calm, small ripples

Water Visibility (ft): 8.5

Time of Measurement	**Temperature (°C)**	**Sp. Cond. (µS/cm)**	**Salinity (ppt)**	**pH**	**DO (mg/L)**
Upon arrival on station	20.9	50870	33.44	7.87	7.48
During sample collection	20.5	50863	33.47	7.89	7.49
End of sample collection	20.7	50889	33.41	7.89	7.61
Average value	20.7	50874	33.44	7.88	7.53

*Water quality measured at the same depth as sample collection (i.e. within 1 meter from the surface).

Notes: hull cleaner ~ 220yd away from site

PORT OF SAN DIEGO
SHELTER ISLAND YACHT BASIN TMDL MONITORING
2019

FIELD WATER QUALITY DATA SHEET

Station Identification: SIYB-5

Date: (mm/dd/yyyy) 08/19/2019

Time on Station: (hh:mm) 1050

Time Started: (hh:mm) 1100

Ended: (hh:mm) 1130

GPS: (WGS84) Lat. 32.71217 Long. -117.23295

Tide (ft): +4.1 ↑

Time of Slack High Tide: 1218

Water Depth (ft): 22

Weather conditions: sunny, breezy, warm

Wind (mph): 9mph W

Time of CTD Cast: 11:25

Surface Water Conditions: calm, small ripples

Water Visibility (ft): 8.5

Time of Measurement	Temperature (°C)	Sp. Cond. (µS/cm)	Salinity (ppt)	pH	DO (mg/L)
Upon arrival on station	20.6	50924	33.48	7.83	7.05
During sample collection	20.6	50967	33.49	7.84	7.06
End of sample collection	20.6	50925	33.48	7.83	7.06
Average value	20.6	50938	33.48	7.83	7.06

*Water quality measured at the same depth as sample collection (i.e. within 1 meter from the surface).

Notes:

PORT OF SAN DIEGO
SHELTER ISLAND YACHT BASIN TMDL MONITORING
2019

FIELD WATER QUALITY DATA SHEET

Station Identification: SIYB-6

Date: (mm/dd/yyyy) 08/19/2019

Time on Station: (hh:mm) 0940

Time Started: (hh:mm) 1000

Ended: (hh:mm) 1025

GPS: (WGS84) Lat. 32.70875 Long. -117.23515

Tide (ft): +3.2 ↑

Time of Slack High Tide: 1218

Water Depth (ft): 15

Weather conditions: partly cloudy, breezy

Wind (mph): 5 mph N

Time of CTD Cast: 1020

Surface Water Conditions: calm, small ripples

Water Visibility (ft): 8.5

Time of Measurement	**Temperature (°C)**	**Sp. Cond. (µS/cm)**	**Salinity (ppt)**	**pH**	**DO (mg/L)**
Upon arrival on station	19.7	50806	33.46	7.79	6.37
During sample collection	19.8	50830	33.41	7.79	6.49
End of sample collection	19.5	50848	33.46	7.79	6.37
Average value	19.7	50828	33.44	7.79	6.41

*Water quality measured at the same depth as sample collection (i.e. within 1 meter from the surface).

Notes:

PORT OF SAN DIEGO
SHELTER ISLAND YACHT BASIN TMDL MONITORING
2019

FIELD WATER QUALITY DATA SHEET

Station Identification: SIYB - REF

Date: (mm/dd/yyyy) 8/19/2019

Time on Station: (hh:mm) 0815

(COLLECTION 2)
Time Started: (hh:mm) 0900

Ended: (hh:mm) 0930

GPS: (WGS84) Lat. 32.70406

Long. -117.23225

Tide (ft): +2.3 ↑

Time of Slack High Tide: 1218

Water Depth (ft): 65

Weather conditions: breezy, overcast, and cool.

Wind (mph): breezy, 3 mph NNW

Time of CTD Cast: 0925

Surface Water Conditions: calm, small ripples and swell

Water Visibility (ft): 8.5

Time of Measurement	Temperature (°C)	Sp. Cond. (µS/cm)	Salinity (ppt)	pH	DO (mg/L)
Upon arrival on station	19.9	50165	32.92	7.77	6.86
During sample collection	19.9	50874	33.45	7.79	6.83
End of sample collection	19.4	50840	33.42	7.81	6.88
Average value	19.7	50626	33.26	7.71	6.86

*Water quality measured at the same depth as sample collection (i.e. within 1 meter from the surface).

Notes:

PORT OF SAN DIEGO
SHELTER ISLAND YACHT BASIN TMDL MONITORING
2019

FIELD WATER QUALITY DATA SHEET

Station Identification: SIYB-ER

Date: (mm/dd/yyyy) 08/19/2019

Time on Station: (hh:mm) 0700

Time Started: (hh:mm) [illegible] 0720

Ended: (hh:mm) 0730

GPS: (WGS84) Lat. NA

Long. NA

Tide (ft): NA

Time of Slack High Tide: NA

Water Depth (ft): NA

Weather conditions: overcast, calm, humid

Wind (mph): calm (< 2)

Time of CTD Cast: NA

Surface Water Conditions: NA

Water Visibility (ft): NA

Time of Measurement	Temperature (°C)	Sp. Cond. (µS/cm)	Salinity (ppt)	pH	DO (mg/L)
Upon arrival on station	NA	NA	NA	NA	NA
During sample collection					
End of sample collection					
Average value					

*Water quality measured at the same depth as sample collection (i.e. within 1 meter from the surface).

Notes:

PORT OF SAN DIEGO
SHELTER ISLAND YACHT BASIN TMDL MONITORING
2019

FIELD WATER QUALITY DATA SHEET

Station Identification: SIYB-FB

Date: (mm/dd/yyyy) 08/19/2019

Time on Station: (hh:mm) N/A

Time Started: (hh:mm) 1620

Ended: (hh:mm) 1635

GPS: (WGS84) Lat. N/A Long. N/A

Tide (ft): N/A

Time of Slack High Tide: N/A

Water Depth (ft): N/A

Weather conditions: N/A

Wind (mph): N/A

Time of CTD Cast: N/A

Surface Water Conditions: N/A

Water Visibility (ft): N/A

Time of Measurement	Temperature (°C)	Sp. Cond. (µS/cm)	Salinity (ppt)	pH	DO (mg/L)
Upon arrival on station	N/A	N/A	N/A	N/A	N/A
During sample collection	│	│	│	│	│
End of sample collection	│	│	│	│	│
Average value	│	│	│	│	│

*Water quality measured at the same depth as sample collection (i.e. within 1 meter from the surface).

Notes:

SEPTEMBER 9, 2019 FIELD DATA SHEETS

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PORT OF SAN DIEGO
SHELTER ISLAND YACHT BASIN TMDL MONITORING
2019

FIELD WATER QUALITY DATA SHEET

Station Identification: SIYB-4 resample

Date: (mm/dd/yyyy) 09/09/19

Time on Station: (hh:mm) 0745

Time Started: (hh:mm) 0815

Ended: (hh:mm) 0830

GPS: (WGS84) Lat. 32.71686

Long. -117. 23196

Tide (ft): +4.3 ft

Time of Slack High Tide: 0824 (4.4)

Water Depth (ft): 17.0

Weather conditions: overcast, breezy

Wind (mph): 8 SSE

Time of CTD Cast: NA

Surface Water Conditions: calm, small ripples

Water Visibility (ft): 9

Time of Measurement	**Temperature (°C)**	**Sp. Cond. (µS/cm)**	**Salinity (ppt)**	**pH**	**DO (mg/L)**
Upon arrival on station	22.3	51606	33.97	7.81	7.27
During sample collection	22.3	52038	34.28	7.85	7.32
End of sample collection	22.3	52038	34.28	7.87	7.42
Average value	22.3	51894	34.18	7.84	7.34

*Water quality measured at the same depth as sample collection (i.e. within 1 meter from the surface).

Notes: 17 boats at weekend anchorage

FIELD WATER QUALITY DATA SHEET

Station Identification: SIYB-REF resample

Date: (mm/dd/yyyy) 09/09/2019

Time on Station: (hh:mm) 0845

Time Started: (hh:mm) 0900

Ended: (hh:mm) 0915

GPS: (WGS84) Lat. 32.70404

Long. -117.23234

Tide (ft): 4.3 ↓

Time of Slack High Tide: 0824 (4.4)

Water Depth (ft): 69

Weather conditions: overcast, breezy

Wind (mph): 8 SSE

Time of CTD Cast: NA

Surface Water Conditions: calm, small ripples

Water Visibility (ft): 9

Time of Measurement	Temperature (°C)	Sp. Cond. (µS/cm)	Salinity (ppt)	pH	DO (mg/L)
Upon arrival on station	20.2	51795	34.13	7.95	7.87
During sample collection	20.2	51797	34.12	7.96	7.87
End of sample collection	20.1	51803	34.13	7.95	7.86
Average value	20.2	51798	34.13	7.95	7.87

*Water quality measured at the same depth as sample collection (i.e. within 1 meter from the surface).

Notes:

AUGUST 19, 2019 FIELD QA/QC

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PORT OF SAN DIEGO
SHELTER ISLAND YACHT BASIN TMDL MONITORING
2019

FIELD SAMPLING QA CHECKLIST

Station Location: Eq. Blank **Date/Time:** 8/19/19 7:15 a

Mark each box with Y, N, or NA

Field Procedures

1. Upon arriving at the sampling location, the following site observations are being recorded:

Port QA personnel has received a blank field sheet	✓
Vessel has been anchored (or tied off)	N/A
Station GPS coordinates (approx. ± 3 m) and station identification verified and recorded	N/A*
Tide recorded	N/A
Weather conditions recorded	✓
Surface water conditions (incl. currents) recorded (Including H_2O clarity by Secchi disk	N/A
Time of sampling recorded	Y
Water depth at sample site recorded	N/A
General site observations recorded	Y
Check for boat cleaning operations in the area – if active, move to a new station	Y

* at dock

2. Sampling procedures:

A. Water Samples

Field staff wearing fresh, powder free nitrile gloves	Y
Vessel engine has been shut off for 3-5 minutes prior to sampling	N/A
SWAMP protocols utilized to avoid sample contamination (i.e., clean hands/dirty hands technique)	Y
Sampling instrument given site water rinse prior to deployment	Y
Sample bottles correctly labeled and match the station identification	Y
Sample bottles correctly labeled with date and time in accordance with Table 10 in the QAPP	Y
Sample bottles are lab certified, contaminant free in accordance with Table 10 in the QAPP	Y
Sample bottles contain correct preservative in accordance with Table 10 in the QAPP	Y
Samples bottles and containers are the correct type in accordance with Table 10 in the QAPP	Y
Sampling depth delineated on sampling instrument with a clear marking (sampling must occur within 1 m of surface)	N/A
pH and salinity readings taken 3 times: when arriving on station, while water samples are collected and again while sample bottles are being filled	N/A
Sampling depth recorded	NA

PORT OF SAN DIEGO
SHELTER ISLAND YACHT BASIN TMDL MONITORING
2019

FIELD SAMPLING QA CHECKLIST

Sample bottles filled in the following order: metals, organics, toxicity	Y
Staff avoided contaminating samples at all times	Y
COC seals have been placed ~~over~~ individual sample bottles	Y
Equipment rinsate blank and [✓ field blank] have been collected (if applicable)	Y
Site replicate (i.e., duplicate) collected (if applicable)	N/A

3. Data Recording:

Water samples properly logged on COC form	Y
Proper persons have signed the COC	Y
Field notes have been recorded for this site before moving to the next	Y

4. Sample Storage:

Water samples properly stored on ice in a cooler	Y
Cooler and samples hand delivered to labs	Y
Completed COC included with courier to hand deliver to labs	Y

5. PPE properly removed and disposed of upon station completion Y

Additional Notes:

Signature of QA/QC Personnel: Barry J. Snyder **Date/Time** 8/19/19 1630

Print Name/Company: Barry Snyder / Wood

Kelly Sat 8/19/19 1640

PORT OF SAN DIEGO
SHELTER ISLAND YACHT BASIN TMDL MONITORING
2019

FIELD SAMPLING QA CHECKLIST

Station Location: SIYB - Ref **Date/Time:** 8/19/19 0900

Mark each box with Y, N, or NA

Field Procedures

1. Upon arriving at the sampling location, the following site observations are being recorded:

Port QA personnel has received a blank field sheet	Y
Vessel has been [✓ anchored] (or tied off)	Y
Station GPS coordinates (approx. ± 3 m) and station identification verified and recorded	Y
Tide recorded	Y ✓
Weather conditions recorded	Y
Surface water conditions (incl. currents) recorded (Including H_2O clarity by Secchi disk	Y
Time of sampling recorded	Y
Water depth at sample site recorded	Y
General site observations recorded	Y
Check for boat cleaning operations in the area – if active, move to a new station	Y

2. Sampling procedures:

A. Water Samples

Field staff wearing fresh, powder free nitrile gloves	Y
Vessel engine has been shut off for 3-5 minutes prior to sampling	Y
SWAMP protocols utilized to avoid sample contamination (i.e., clean hands/dirty hands technique)	Y
Sampling instrument given site water rinse prior to deployment	Y
Sample bottles correctly labeled and match the station identification	Y ✓
Sample bottles correctly labeled with date and time in accordance with Table 10 in the QAPP	Y ✓
Sample bottles are lab certified, contaminant free in accordance with Table 10 in the QAPP	Y
Sample bottles contain correct preservative in accordance with Table 10 in the QAPP	Y
Samples bottles and containers are the correct type in accordance with Table 10 in the QAPP	Y
Sampling depth delineated on sampling instrument with a clear marking (sampling must occur within 1 m of surface)	Y
pH and salinity readings taken 3 times: when arriving on station, while water samples are collected and again while sample bottles are being filled	Y
Sampling depth recorded	Y

FIELD SAMPLING QA CHECKLIST

Sample bottles filled in the following order: metals, organics, toxicity	Y
Staff avoided contaminating samples at all times	Y
COC seals have been placed over individual sample bottles	Y
Equipment rinsate blank and field blank have been collected (if applicable)	N/A
Site replicate (i.e., duplicate) collected (if applicable)	N/A

3. Data Recording:

Water samples properly logged on COC form	Y
Proper persons have signed the COC	Y
Field notes have been recorded for this site before moving to the next	Y

4. Sample Storage:

Water samples properly stored on ice in a cooler	Y
Cooler and samples hand delivered to labs	Y
Completed COC included with courier to hand deliver to labs	Y

5. PPE properly removed and disposed of upon station completion Y

Additional Notes:

Signature of QA/QC Personnel: Barry J. Snyder **Date/Time** 8/19/19 1630

Print Name/Company: Barry Snyder / Wood

Kelly Tait 8/19/19 1640

PORT OF SAN DIEGO
SHELTER ISLAND YACHT BASIN TMDL MONITORING
2019

FIELD SAMPLING QA CHECKLIST

Station Location: SIYB-6 **Date/Time:** 8/19/19 9:55

Mark each box with Y, N, or NA

Field Procedures

1. Upon arriving at the sampling location, the following site observations are being recorded:

Port QA personnel has received a blank field sheet	Y
Vessel has been anchored (or [✓ tied off])	Y
Station GPS coordinates (approx. ± 3 m) and station identification verified and recorded	Y
Tide recorded	Y
Weather conditions recorded	Y
Surface water conditions (incl. currents) recorded (Including H_2O clarity by Secchi disk	Y
Time of sampling recorded	Y
Water depth at sample site recorded	Y
General site observations recorded	Y
Check for boat cleaning operations in the area – if active, move to a new station	Y

2. Sampling procedures:

A. Water Samples

Field staff wearing fresh, powder free nitrile gloves	Y
Vessel engine has been shut off for 3-5 minutes prior to sampling	Y
SWAMP protocols utilized to avoid sample contamination (i.e., clean hands/dirty hands technique)	Y
Sampling instrument given site water rinse prior to deployment	Y
Sample bottles correctly labeled and match the station identification	Y
Sample bottles correctly labeled with date and time in accordance with Table 10 in the QAPP	Y
Sample bottles are lab certified, contaminant free in accordance with Table 10 in the QAPP	Y
Sample bottles contain correct preservative in accordance with Table 10 in the QAPP	Y
Samples bottles and containers are the correct type in accordance with Table 10 in the QAPP	Y
Sampling depth delineated on sampling instrument with a clear marking (sampling must occur within 1 m of surface)	Y
pH and salinity readings taken 3 times: when arriving on station, while water samples are collected and again while sample bottles are being filled	Y
Sampling depth recorded	Y

FIELD SAMPLING QA CHECKLIST

Sample bottles filled in the following order: metals, organics, toxicity	Y
Staff avoided contaminating samples at all times	Y
COC seals have been placed over individual sample bottles	Y
Equipment rinsate blank and field blank have been collected (if applicable)	N/A
Site replicate (i.e., duplicate) collected (if applicable)	N/A

3. Data Recording:

Water samples properly logged on COC form	Y
Proper persons have signed the COC	Y
Field notes have been recorded for this site before moving to the next	Y

4. Sample Storage:

Water samples properly stored on ice in a cooler	Y
Cooler and samples hand delivered to labs	Y
Completed COC included with courier to hand deliver to labs	Y

5. PPE properly removed and disposed of upon station completion Y

Additional Notes:

Signature of QA/QC Personnel: Barry J. Snyder **Date/Time** 8/19/19 1630

Print Name/Company: Barry Snyder / Wood

Kelly Tait 8/19/19 1640

PORT OF SAN DIEGO
SHELTER ISLAND YACHT BASIN TMDL MONITORING
2019

FIELD SAMPLING QA CHECKLIST

Station Location: SIYB-5 **Date/Time:** 8/19/19 10:55

Mark each box with Y, N, or NA

Field Procedures

1. Upon arriving at the sampling location, the following site observations are being recorded:

Port QA personnel has received a blank field sheet	Y
Vessel has been [✓ anchored] (or tied off)	Y
Station GPS coordinates (approx. ± 3 m) and station identification verified and recorded	Y
Tide recorded	Y
Weather conditions recorded	Y
Surface water conditions (incl. currents) recorded (Including H_2O clarity by Secchi disk	Y
Time of sampling recorded	Y
Water depth at sample site recorded	Y
General site observations recorded	Y
Check for boat cleaning operations in the area – if active, move to a new station	Y

2. Sampling procedures:

A. Water Samples

Field staff wearing fresh, powder free nitrile gloves	Y
Vessel engine has been shut off for 3-5 minutes prior to sampling	Y
SWAMP protocols utilized to avoid sample contamination (i.e., clean hands/dirty hands technique)	Y
Sampling instrument given site water rinse prior to deployment	Y
Sample bottles correctly labeled and match the station identification	Y
Sample bottles correctly labeled with date and time in accordance with Table 10 in the QAPP	Y
Sample bottles are lab certified, contaminant free in accordance with Table 10 in the QAPP	Y
Sample bottles contain correct preservative in accordance with Table 10 in the QAPP	Y
Samples bottles and containers are the correct type in accordance with Table 10 in the QAPP	Y
Sampling depth delineated on sampling instrument with a clear marking (sampling must occur within 1 m of surface)	Y
pH and salinity readings taken 3 times: when arriving on station, while water samples are collected and again while sample bottles are being filled	Y
Sampling depth recorded	Y

FIELD SAMPLING QA CHECKLIST

Sample bottles filled in the following order: metals, organics, toxicity	Y
Staff avoided contaminating samples at all times	Y
COC seals have been placed over individual sample bottles	Y
Equipment rinsate blank and field blank have been collected (if applicable)	N/A
Site replicate (i.e., duplicate) collected (if applicable)	N/A

3. Data Recording:

Water samples properly logged on COC form	Y
Proper persons have signed the COC	Y
Field notes have been recorded for this site before moving to the next	Y

4. Sample Storage:

Water samples properly stored on ice in a cooler	Y
Cooler and samples hand delivered to labs	Y
Completed COC included with courier to hand deliver to labs	Y

5. PPE properly removed and disposed of upon station completion Y

Additional Notes:

Signature of QA/QC Personnel: Barry J. Snyder **Date/Time** 8/19/19 1630

Print Name/Company: Barry Snyder Wood

Kelly Jaa 8/19/19 1640

PORT OF SAN DIEGO
SHELTER ISLAND YACHT BASIN TMDL MONITORING
2019

FIELD SAMPLING QA CHECKLIST

Station Location: SIYB-04 **Date/Time:** 8/19/19 1150

Mark each box with Y, N, or NA

Field Procedures

1. Upon arriving at the sampling location, the following site observations are being recorded:

Port QA personnel has received a blank field sheet	Y
Vessel has been [✓ anchored] (or tied off)	Y
Station GPS coordinates (approx. ± 3 m) and station identification verified and recorded	Y
Tide recorded	Y
Weather conditions recorded	Y
Surface water conditions (incl. currents) recorded (Including H_2O clarity by Secchi disk	Y
Time of sampling recorded	Y
Water depth at sample site recorded	Y
General site observations recorded	Y
Check for boat cleaning operations in the area – if active, move to a new station	Y

2. Sampling procedures:

A. Water Samples

Field staff wearing fresh, powder free nitrile gloves	Y
Vessel engine has been shut off for 3-5 minutes prior to sampling	Y
SWAMP protocols utilized to avoid sample contamination (i.e., clean hands/dirty hands technique)	Y
Sampling instrument given site water rinse prior to deployment	Y
Sample bottles correctly labeled and match the station identification	Y
Sample bottles correctly labeled with date and time in accordance with Table 10 in the QAPP	Y
Sample bottles are lab certified, contaminant free in accordance with Table 10 in the QAPP	Y
Sample bottles contain correct preservative in accordance with Table 10 in the QAPP	Y
Samples bottles and containers are the correct type in accordance with Table 10 in the QAPP	Y
Sampling depth delineated on sampling instrument with a clear marking (sampling must occur within 1 m of surface)	Y
pH and salinity readings taken 3 times: when arriving on station, while water samples are collected and again while sample bottles are being filled	Y
Sampling depth recorded	Y

FIELD SAMPLING QA CHECKLIST

Sample bottles filled in the following order: metals, organics, toxicity	Y
Staff avoided contaminating samples at all times	Y
COC seals have been placed over individual sample bottles	Y
Equipment rinsate blank and field blank have been collected (if applicable)	N/A
Site replicate (i.e., duplicate) collected (if applicable)	N/A

3. Data Recording:

Water samples properly logged on COC form	Y
Proper persons have signed the COC	Y
Field notes have been recorded for this site before moving to the next	Y

4. Sample Storage:

Water samples properly stored on ice in a cooler	Y
Cooler and samples hand delivered to labs	Y
Completed COC included with courier to hand deliver to labs	Y

5. PPE properly removed and disposed of upon station completion Y

Additional Notes:

Signature of QA/QC Personnel: Barry J. Snyder **Date/Time** 8/19/19 1630

Print Name/Company: Barry Snyder / Wood

Kelly Seo 8/19/19 1640

FIELD SAMPLING QA CHECKLIST

Station Location: SIYB-03 **Date/Time:** 8/19/19 1245

Mark each box with Y, N, or NA

Field Procedures

1. Upon arriving at the sampling location, the following site observations are being recorded:

Port QA personnel has received a blank field sheet	Y
Vessel has been anchored (or tied off)	Y
Station GPS coordinates (approx. ± 3 m) and station identification verified and recorded	Y
Tide recorded	Y
Weather conditions recorded	Y
Surface water conditions (incl. currents) recorded (Including H_2O clarity by Secchi disk	Y
Time of sampling recorded	Y
Water depth at sample site recorded	Y
General site observations recorded	Y
Check for boat cleaning operations in the area – if active, move to a new station	Y

2. Sampling procedures:

A. Water Samples

Field staff wearing fresh, powder free nitrile gloves	Y
Vessel engine has been shut off for 3-5 minutes prior to sampling	Y
SWAMP protocols utilized to avoid sample contamination (i.e., clean hands/dirty hands technique)	Y
Sampling instrument given site water rinse prior to deployment	Y
Sample bottles correctly labeled and match the station identification	Y
Sample bottles correctly labeled with date and time in accordance with Table 10 in the QAPP	Y
Sample bottles are lab certified, contaminant free in accordance with Table 10 in the QAPP	Y
Sample bottles contain correct preservative in accordance with Table 10 in the QAPP	Y
Samples bottles and containers are the correct type in accordance with Table 10 in the QAPP	Y
Sampling depth delineated on sampling instrument with a clear marking (sampling must occur within 1 m of surface)	Y
pH and salinity readings taken 3 times: when arriving on station, while water samples are collected and again while sample bottles are being filled	Y
Sampling depth recorded	Y

FIELD SAMPLING QA CHECKLIST

Sample bottles filled in the following order: metals, organics, toxicity	Y
Staff avoided contaminating samples at all times	Y
COC seals have been placed over individual sample bottles	Y
Equipment rinsate blank and field blank have been collected (if applicable)	N/A
Site replicate (i.e., duplicate) collected (if applicable)	N/A

3. Data Recording:

Water samples properly logged on COC form	Y
Proper persons have signed the COC	Y
Field notes have been recorded for this site before moving to the next	Y

4. Sample Storage:

Water samples properly stored on ice in a cooler	Y
Cooler and samples hand delivered to labs	Y
Completed COC included with courier to hand deliver to labs	Y

5. PPE properly removed and disposed of upon station completion Y

Additional Notes:

Signature of QA/QC Personnel: Barry J. Snyder **Date/Time** 8/19/19 1630

Print Name/Company: Barry Snyder / Wood

Kelly Dass 8/19/19 1640

PORT OF SAN DIEGO
SHELTER ISLAND YACHT BASIN TMDL MONITORING
2019

FIELD SAMPLING QA CHECKLIST

Station Location: SIYB-02 **Date/Time:** 8/19/19 14:00

Mark each box with Y, N, or NA

Field Procedures

1. Upon arriving at the sampling location, the following site observations are being recorded:

Port QA personnel has received a blank field sheet	Y
Vessel has been anchored (or [✓ tied off])	Y
Station GPS coordinates (approx. ± 3 m) and station identification verified and recorded	Y
Tide recorded	Y
Weather conditions recorded	Y
Surface water conditions (incl. currents) recorded (Including H_2O clarity by Secchi disk	Y
Time of sampling recorded	Y
Water depth at sample site recorded	Y
General site observations recorded	Y
Check for boat cleaning operations in the area – if active, move to a new station	Y

2. Sampling procedures:

A. Water Samples

Field staff wearing fresh, powder free nitrile gloves	Y
Vessel engine has been shut off for 3-5 minutes prior to sampling	Y
SWAMP protocols utilized to avoid sample contamination (i.e., clean hands/dirty hands technique)	Y
Sampling instrument given site water rinse prior to deployment	Y
Sample bottles correctly labeled and match the station identification	Y
Sample bottles correctly labeled with date and time in accordance with Table 10 in the QAPP	Y
Sample bottles are lab certified, contaminant free in accordance with Table 10 in the QAPP	Y
Sample bottles contain correct preservative in accordance with Table 10 in the QAPP	Y
Samples bottles and containers are the correct type in accordance with Table 10 in the QAPP	Y
Sampling depth delineated on sampling instrument with a clear marking (sampling must occur within 1 m of surface)	Y
pH and salinity readings taken 3 times: when arriving on station, while water samples are collected and again while sample bottles are being filled	Y
Sampling depth recorded	Y

FIELD SAMPLING QA CHECKLIST

Sample bottles filled in the following order: metals, organics, toxicity	Y
Staff avoided contaminating samples at all times	Y
COC seals have been placed over individual sample bottles	Y
Equipment rinsate blank and field blank have been collected (if applicable)	N/A
Site replicate (i.e., duplicate) collected (if applicable)	N/A

3. Data Recording:

Water samples properly logged on COC form	Y
Proper persons have signed the COC	Y
Field notes have been recorded for this site before moving to the next	Y

4. Sample Storage:

Water samples properly stored on ice in a cooler	Y
Cooler and samples hand delivered to labs	Y
Completed COC included with courier to hand deliver to labs	Y

5. PPE properly removed and disposed of upon station completion Y

Additional Notes:

Signature of QA/QC Personnel: Barry J. Snyder **Date/Time** 8/19/19 1630

Print Name/Company: Barry Snyder / Wood

Kelly Sears 8/19/19 1640

FIELD SAMPLING QA CHECKLIST

Station Location: SIYB-01 **Date/Time:** 8/19/19 14:45

Mark each box with Y, N, or NA

Field Procedures

1. Upon arriving at the sampling location, the following site observations are being recorded:

Port QA personnel has received a blank field sheet	Y
Vessel has been [✓ anchored] (or tied off)	Y
Station GPS coordinates (approx. ± 3 m) and station identification verified and recorded	Y
Tide recorded	Y
Weather conditions recorded	Y
Surface water conditions (incl. currents) recorded (Including H_2O clarity by Secchi disk	Y
Time of sampling recorded	Y
Water depth at sample site recorded	Y
General site observations recorded	Y
Check for boat cleaning operations in the area – if active, move to a new station	Y

2. Sampling procedures:

A. Water Samples

Field staff wearing fresh, powder free nitrile gloves	Y
Vessel engine has been shut off for 3-5 minutes prior to sampling	Y
SWAMP protocols utilized to avoid sample contamination (i.e., clean hands/dirty hands technique)	Y
Sampling instrument given site water rinse prior to deployment	Y
Sample bottles correctly labeled and match the station identification	Y
Sample bottles correctly labeled with date and time in accordance with Table 10 in the QAPP	Y
Sample bottles are lab certified, contaminant free in accordance with Table 10 in the QAPP	Y
Sample bottles contain correct preservative in accordance with Table 10 in the QAPP	Y
Samples bottles and containers are the correct type in accordance with Table 10 in the QAPP	Y
Sampling depth delineated on sampling instrument with a clear marking (sampling must occur within 1 m of surface)	Y
pH and salinity readings taken 3 times: when arriving on station, while water samples are collected and again while sample bottles are being filled	Y
Sampling depth recorded	Y

FIELD SAMPLING QA CHECKLIST

Sample bottles filled in the following order: metals, organics, toxicity	Y
Staff avoided contaminating samples at all times	Y
COC seals have been placed over individual sample bottles	Y
Equipment rinsate blank and [✓ field blank] have been collected (if applicable)	Y
Site replicate (i.e., duplicate) collected (if applicable)	Y

3. Data Recording:

Water samples properly logged on COC form	Y
Proper persons have signed the COC	Y
Field notes have been recorded for this site before moving to the next	Y

4. Sample Storage:

Water samples properly stored on ice in a cooler	Y
Cooler and samples ~~hand~~ delivered to labs — courier	Y
Completed COC included with courier to hand deliver to labs	Y

5. PPE properly removed and disposed of upon station completion Y

Additional Notes:

Signature of QA/QC Personnel: Barry J. Snyder **Date/Time** 8/19/19 1630

Print Name/Company: Barry Snyder / Wood

Kelly Jess 8/19/19 1640

FIELD SAMPLING QA CHECKLIST

Station Location: SIYB-01 Rep **Date/Time:** 8/19/19 15:50

Mark each box with Y, N, or NA

Field Procedures

1. Upon arriving at the sampling location, the following site observations are being recorded:

Port QA personnel has received a blank field sheet	Y
Vessel has been [✓ anchored] (or tied off)	Y
Station GPS coordinates (approx. ± 3 m) and station identification verified and recorded	Y
Tide recorded	Y
Weather conditions recorded	Y
Surface water conditions (incl. currents) recorded (Including H_2O clarity by Secchi disk	Y
Time of sampling recorded	Y
Water depth at sample site recorded	Y
General site observations recorded	Y
Check for boat cleaning operations in the area – if active, move to a new station	Y

2. Sampling procedures:

A. Water Samples

Field staff wearing fresh, powder free nitrile gloves	Y
Vessel engine has been shut off for 3-5 minutes prior to sampling	Y
SWAMP protocols utilized to avoid sample contamination (i.e., clean hands/dirty hands technique)	Y
Sampling instrument given site water rinse prior to deployment	Y
Sample bottles correctly labeled and match the station identification	Y
Sample bottles correctly labeled with date and time in accordance with Table 10 in the QAPP	Y
Sample bottles are lab certified, contaminant free in accordance with Table 10 in the QAPP	Y
Sample bottles contain correct preservative in accordance with Table 10 in the QAPP	Y
Samples bottles and containers are the correct type in accordance with Table 10 in the QAPP	Y
Sampling depth delineated on sampling instrument with a clear marking (sampling must occur within 1 m of surface)	Y
pH and salinity readings taken 3 times: when arriving on station, while water samples are collected and again while sample bottles are being filled	Y
Sampling depth recorded	Y

FIELD SAMPLING QA CHECKLIST

Sample bottles filled in the following order: metals, organics, toxicity	Y
Staff avoided contaminating samples at all times	Y
COC seals have been placed over individual sample bottles	Y
Equipment rinsate blank and [✓ field blank] have been collected (if applicable)	Y
Site replicate (i.e., duplicate) collected (if applicable)	~~Y~~ N/A

3. Data Recording:

Water samples properly logged on COC form	Y
Proper persons have signed the COC	Y
Field notes have been recorded for this site before moving to the next	Y

4. Sample Storage:

Water samples properly stored on ice in a cooler	Y
Cooler and samples hand delivered to labs	Y
Completed COC included with courier to hand deliver to labs	Y

5. PPE properly removed and disposed of upon station completion. Y

Additional Notes:

Signature of QA/QC Personnel: Barry J. Snyder **Date/Time** 8/19/19 1630

Print Name/Company: Barry Snyder / Wood

Kelly Saa 8/19/19 1640

FIELD SAMPLING QA CHECKLIST

Station Location: Field Blank **Date/Time:** 8/19/19 16:20

Mark each box with Y, N, or NA

Field Procedures

1. Upon arriving at the sampling location, the following site observations are being recorded:

Port QA personnel has received a blank field sheet	Y
Vessel has been anchored (or tied off)	N/A
Station GPS coordinates (approx. ± 3 m) and station identification verified and recorded	N/A
Tide recorded	N/A
Weather conditions recorded	Y
Surface water conditions (incl. currents) recorded (Including H_2O clarity by Secchi disk	N/A
Time of sampling recorded	Y
Water depth at sample site recorded	N/A
General site observations recorded	Y
Check for boat cleaning operations in the area – if active, move to a new station	N/A

2. Sampling procedures:

A. Water Samples

Field staff wearing fresh, powder free nitrile gloves	Y
Vessel engine has been shut off for 3-5 minutes prior to sampling	N/A
SWAMP protocols utilized to avoid sample contamination (i.e., clean hands/dirty hands technique)	Y
Sampling instrument given site water rinse prior to deployment	N/A
Sample bottles correctly labeled and match the station identification	Y
Sample bottles correctly labeled with date and time in accordance with Table 10 in the QAPP	Y
Sample bottles are lab certified, contaminant free in accordance with Table 10 in the QAPP	Y
Sample bottles contain correct preservative in accordance with Table 10 in the QAPP	Y
Samples bottles and containers are the correct type in accordance with Table 10 in the QAPP	Y
Sampling depth delineated on sampling instrument with a clear marking (sampling must occur within 1 m of surface)	N/A
pH and salinity readings taken 3 times: when arriving on station, while water samples are collected and again while sample bottles are being filled	N/A
Sampling depth recorded	N/A

FIELD SAMPLING QA CHECKLIST

Sample bottles filled in the following order: metals, organics, ~~toxicity~~	Y
Staff avoided contaminating samples at all times	Y
COC seals have been placed over individual sample bottles	Y
Equipment rinsate blank and [✓ field blank] have been collected (if applicable)	Y
Site replicate (i.e., duplicate) collected (if applicable)	N/A

3. Data Recording:

Water samples properly logged on COC form	~~N~~ Y BJS
Proper persons have signed the COC	Y
Field notes have been recorded for this site before moving to the next	Y

4. Sample Storage:

Water samples properly stored on ice in a cooler	Y
Cooler and samples hand delivered to labs	Y
Completed COC included with courier to hand deliver to labs	Y

5. PPE properly removed and disposed of upon station completion Y

Additional Notes:

Signature of QA/QC Personnel: Barry J. Snyder

Date/Time 8/19/19 1635

Print Name/Company: Wood

MOBILIZATION CHECKLIST

Date/Time: 8/19/19

Mark each box with Y, N, or NA

Prior to Field Operations:

Mobilization and equipment check list has been evaluated by Port staff	✓
Health and Safety Briefing occurred prior to departure	✓
Sampling instrument cleaned with soap and deionized water	✓
Vessel uses copper free hull paint	✓
Monitoring Plan and QAPP readily available to persons in the field	✓
Staff has received proper training prior to field activities	✓
Sample transport to the lab(s) has been arranged to meet holding times	✓
The YSI and ~~free copper instruments~~ have been properly calibrated	✓

B. Snyder 8/19/19

SEPTEMBER 9, 2019 FIELD QA/QC

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PORT OF SAN DIEGO
SHELTER ISLAND YACHT BASIN TMDL MONITORING
2019

FIELD SAMPLING QA CHECKLIST - RESAMPLE EVENT

Station Location: SIYB-4 **Date/Time:** 9/9/19 0815

Mark each box with Y, N, or NA

17 vessels in wknd anchorage

Field Procedures

1. Upon arriving at the sampling location, the following site observations are being recorded:

Port QA personnel has received a blank field sheet	Y
Vessel has been anchored (or tied off)	Y
Station GPS coordinates (approx. ± 3 m) and station identification verified and recorded	Y
Tide recorded	Y
Weather conditions recorded	Y
Surface water conditions (incl. currents) recorded (Including H_2O clarity by Secchi disk	Y
Time of sampling recorded	Y
Water depth at sample site recorded	Y
General site observations recorded	Y
Check for boat cleaning operations in the area – if active, move to a new station	Y

2. Sampling procedures:

A. Water Samples

Field staff wearing fresh, powder free nitrile gloves	Y
Vessel engine has been shut off for 3-5 minutes prior to sampling	Y
SWAMP protocols utilized to avoid sample contamination (i.e., clean hands/dirty hands technique)	Y
Sampling instrument given site water rinse prior to deployment	Y
Sample bottles correctly labeled and match the station identification	Y
Sample bottles correctly labeled with date and time in accordance with Table 10 in the QAPP	Y
Sample bottles are lab certified, contaminant free in accordance with Table 10 in the QAPP	Y
Sample bottles contain correct preservative in accordance with Table 10 in the QAPP	Y
Samples bottles and containers are the correct type in accordance with Table 10 in the QAPP	Y
Sampling depth delineated on sampling instrument with a clear marking (sampling must occur within 1 m of surface)	Y
pH and salinity readings taken 3 times: when arriving on station, while water samples are collected and again while sample bottles are being filled	Y
Sampling depth recorded	Y

FIELD SAMPLING QA CHECKLIST

Sample bottles filled in the following order: metals, organics, toxicity	Y
Staff avoided contaminating samples at all times	Y
COC seals have been placed over individual sample bottles	Y
Equipment rinsate blank and field blank have been collected (if applicable)	Y
Site replicate (i.e., duplicate) collected (if applicable)	Y

3. Data Recording:

Water samples properly logged on COC form	Y
Proper persons have signed the COC	Y
Field notes have been recorded for this site before moving to the next	Y

4. Sample Storage:

Water samples properly stored on ice in a cooler	Y
Cooler and samples hand delivered to labs	Y
Completed COC included with courier to hand deliver to labs	Y

5. PPE properly removed and disposed of upon station completion Y

Additional Notes:

17 vessels still moored in weekend anchorage

Signature of QA/QC Personnel: Kelly Tait **Date/Time** 9/9/19

Print Name/Company: Kelly Tait Port of San Diego 930

9/9/19 0930

PORT OF SAN DIEGO
SHELTER ISLAND YACHT BASIN TMDL MONITORING
2019

FIELD SAMPLING QA CHECKLIST -RESAMPLE EVENT

Station Location: SIYB - Ref **Date/Time:** 9/9/19 0900

Mark each box with Y, N, or NA

Field Procedures

1. Upon arriving at the sampling location, the following site observations are being recorded:

Port QA personnel has received a blank field sheet	Y
Vessel has been anchored (or tied off)	Y
Station GPS coordinates (approx. ± 3 m) and station identification verified and recorded	Y
Tide recorded	Y
Weather conditions recorded	Y
Surface water conditions (incl. currents) recorded (Including H_2O clarity by Secchi disk	Y
Time of sampling recorded	Y
Water depth at sample site recorded	Y
General site observations recorded	Y
Check for boat cleaning operations in the area – if active, move to a new station	Y

2. Sampling procedures:

A. Water Samples

Field staff wearing fresh, powder free nitrile gloves	Y
Vessel engine has been shut off for 3-5 minutes prior to sampling	Y
SWAMP protocols utilized to avoid sample contamination (i.e., clean hands/dirty hands technique)	Y
Sampling instrument given site water rinse prior to deployment	Y
Sample bottles correctly labeled and match the station identification	Y
Sample bottles correctly labeled with date and time in accordance with Table 10 in the QAPP	Y
Sample bottles are lab certified, contaminant free in accordance with Table 10 in the QAPP	Y
Sample bottles contain correct preservative in accordance with Table 10 in the QAPP	Y
Samples bottles and containers are the correct type in accordance with Table 10 in the QAPP	Y
Sampling depth delineated on sampling instrument with a clear marking (sampling must occur within 1 m of surface)	Y
pH and salinity readings taken 3 times: when arriving on station, while water samples are collected and again while sample bottles are being filled	Y
Sampling depth recorded	Y

FIELD SAMPLING QA CHECKLIST

Sample bottles filled in the following order: metals, organics, toxicity	Y
Staff avoided contaminating samples at all times	Y
COC seals have been placed over individual sample bottles	Y
Equipment rinsate blank and field blank have been collected (if applicable)	Y
Site replicate (i.e., duplicate) collected (if applicable)	Y

3. Data Recording:

Water samples properly logged on COC form	Y
Proper persons have signed the COC	Y
Field notes have been recorded for this site before moving to the next	Y

4. Sample Storage:

Water samples properly stored on ice in a cooler	Y
Cooler and samples hand delivered to labs	Y
Completed COC included with courier to hand deliver to labs	Y

5. PPE properly removed and disposed of upon station completion Y

Additional Notes:

Signature of QA/QC Personnel: Kelly Tait **Date/Time** 9/9/19 930

Print Name/Company: Kelly Tait Port of SD

9/9/19 0930

ANALYTICAL TESTING REPORTS

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WECK LABORATORIES
AUGUST 19, 2019 CHEMISTRY REPORT

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WECK LABORATORIES, INC.

Certificate of Analysis

FINAL REPORT

Work Orders: 9H20148

Project: Annual Shelter Island Yacht Basin TMDL Monitoring

Attn: Barry Snyder

Client: Wood - San Diego 2
9210 Sky Park Court, Suite 200
San Diego, CA 92123

Report Date: 9/26/2019
Received Date: 8/20/2019
Turnaround Time: Normal
Phones: (858) 300-4320
Fax: (858) 300-4301
P.O. #:
Billing Code:

ELAP-CA #1132 • EPA-UCMR #CA00211 • Guam-EPA #17-008R • HW-DOH # • ISO 17025 #L2457.01 • LACSD #10143 • NELAP-CA #04229CA • NELAP-OR #4047 • NJ-DEP #CA015 • NV-DEP #NAC 445A • SCAQMD #93LA1006

This is a complete final report. The information in this report applies to the samples analyzed in accordance with the chain-of-custody document. Weck Laboratories certifies that the test results meet all requirements of TNI unless noted by qualifiers or written in the Case Narrative. This analytical report must be reproduced in its entirety.

Dear Barry Snyder,

Enclosed are the results of analyses for samples received 8/20/19 with the Chain-of-Custody document. The samples were received in good condition, at 3.6 °C and on ice. All analyses met the method criteria except as noted in the case narrative or in the report with data qualifiers.

Reviewed by:

Chris Samatmanakit
Project Manager

Certificate of Analysis

FINAL REPORT

Wood - San Diego 2
9210 Sky Park Court, Suite 200
San Diego, CA 92123

Project Number: Annual Shelter Island Yacht Basin TMDL Monitoring

Project Manager: Barry Snyder

Reported: 09/26/2019 16:23

Sample Summary

Sample Name	Sampled By	Lab ID	Matrix	Sampled	Qualifiers
SIYB-1	Corey Sheredy/Marisa Swiderski	9H20148-01	Sea Water	08/19/19 15:10	
SIYB-1 (REP)	Corey Sheredy/Marisa Swiderski	9H20148-02	Sea Water	08/19/19 15:50	
SIYB-2	Corey Sheredy/Marisa Swiderski	9H20148-03	Sea Water	08/19/19 14:10	
SIYB-3	Corey Sheredy/Marisa Swiderski	9H20148-04	Sea Water	08/19/19 13:10	
SIYB-4	Corey Sheredy/Marisa Swiderski	9H20148-05	Sea Water	08/19/19 12:10	
SIYB-5	Corey Sheredy/Marisa Swiderski	9H20148-06	Sea Water	08/19/19 11:00	
SIYB-6	Corey Sheredy/Marisa Swiderski	9H20148-07	Sea Water	08/19/19 10:00	
SIYB-REF	Corey Sheredy/Marisa Swiderski	9H20148-08	Sea Water	08/19/19 09:00	
SIYB-ER	Corey Sheredy/Marisa Swiderski	9H20148-09	Water	08/19/19 07:20	
SIYB-FB	Corey Sheredy/Marisa Swiderski	9H20148-10	Water	08/19/19 16:20	

Sample Results

Sample: SIYB-1
9H20148-01 (Sea Water)
Sampled: 08/19/19 15:10 by Corey Sheredy/Marisa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D	**Batch ID:** W9H1242	**Instr:** _ANALYST	**Prepared:** 08/21/19 18:01			**Analyst:** ism	
Total Suspended Solids	**5**		5	mg/l	1	08/22/19 16:50	
Method: SM 5310B	**Batch ID:** W9H1277	**Instr:** TOC02	**Prepared:** 08/22/19 11:16			**Analyst:** jlp	
Total Organic Carbon (TOC)	**1.7**	0.0090	0.10	mg/l	1	08/22/19 12:35	
Method: SM 5310B	**Batch ID:** W9H1584	**Instr:** TOC02	**Prepared:** 08/28/19 08:58			**Analyst:** jlp	
Dissolved Organic Carbon	**1.6**	0.013	0.10	mg/l	1	08/28/19 10:08	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640	**Batch ID:** W9H1535	**Instr:** ICPMS03	**Prepared:** 08/27/19 13:07			**Analyst:** aln	
Copper, Total	**20**	0.038	0.10	ug/l	10	09/13/19 23:08	
Zinc, Total	**29**	0.36	2.0	ug/l	10	09/13/19 23:08	
Method: EPA 1640	**Batch ID:** W9H1537	**Instr:** ICPMS03	**Prepared:** 08/27/19 13:10			**Analyst:** aln	
Copper, Dissolved	**15**	0.019	0.050	ug/l	5	09/13/19 01:01	
Zinc, Dissolved	**37**	0.18	1.0	ug/l	5	09/13/19 01:01	

Sample: SIYB-1 (REP)
9H20148-02 (Sea Water)
Sampled: 08/19/19 15:50 by Corey Sheredy/Marisa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D	**Batch ID:** W9H1242	**Instr:** _ANALYST	**Prepared:** 08/21/19 18:01			**Analyst:** ism	
Total Suspended Solids	**4**		5	mg/l	1	08/22/19 16:50	J
Method: SM 5310B	**Batch ID:** W9H1277	**Instr:** TOC02	**Prepared:** 08/22/19 11:16			**Analyst:** jlp	
Total Organic Carbon (TOC)	**2.3**	0.0090	0.10	mg/l	1	08/22/19 12:35	
Method: SM 5310B	**Batch ID:** W9H1584	**Instr:** TOC02	**Prepared:** 08/28/19 08:58			**Analyst:** jlp	
Dissolved Organic Carbon	**2.1**	0.013	0.10	mg/l	1	08/28/19 10:08	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640	**Batch ID:** W9H1535	**Instr:** ICPMS03	**Prepared:** 08/27/19 13:07			**Analyst:** aln	
Copper, Total	**17**	0.038	0.10	ug/l	10	09/13/19 23:22	
Zinc, Total	**29**	0.36	2.0	ug/l	10	09/13/19 23:22	
Method: EPA 1640	**Batch ID:** W9H1537	**Instr:** ICPMS03	**Prepared:** 08/27/19 13:10			**Analyst:** aln	
Copper, Dissolved	**16**	0.019	0.050	ug/l	5	09/13/19 01:15	
Zinc, Dissolved	**40**	0.18	1.0	ug/l	5	09/13/19 01:15	

Wood - San Diego 2
9210 Sky Park Court, Suite 200
San Diego, CA 92123

Project Number: Annual Shelter Island Yacht Basin TMDL Monitoring

Project Manager: Barry Snyder

Reported: 09/26/2019 16:23

Sample Results

(Continued)

Sample: SIYB-2
9H20148-03 (Sea Water)

Sampled: 08/19/19 14:10 by Corey Sheredy/Marisa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9H1242 **Instr:** _ANALYST **Prepared:** 08/21/19 18:01 **Analyst:** ism							
Total Suspended Solids	**5**		5	mg/l	1	08/22/19 16:50	
Method: SM 5310B **Batch ID:** W9H1277 **Instr:** TOC02 **Prepared:** 08/22/19 11:16 **Analyst:** jlp							
Total Organic Carbon (TOC)	**1.7**	0.0090	0.10	mg/l	1	08/22/19 12:35	
Method: SM 5310B **Batch ID:** W9H1584 **Instr:** TOC02 **Prepared:** 08/28/19 08:58 **Analyst:** jlp							
Dissolved Organic Carbon	**2.2**	0.013	0.10	mg/l	1	08/28/19 10:08	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9H1535 **Instr:** ICPMS03 **Prepared:** 08/27/19 13:07 **Analyst:** aln							
Copper, Total	**8.7**	0.038	0.10	ug/l	10	09/13/19 23:35	
Zinc, Total	**21**	0.36	2.0	ug/l	10	09/13/19 23:35	
Method: EPA 1640 **Batch ID:** W9H1537 **Instr:** ICPMS03 **Prepared:** 08/27/19 13:10 **Analyst:** aln							
Copper, Dissolved	**8.1**	0.0076	0.020	ug/l	2	09/13/19 02:10	
Zinc, Dissolved	**19**	0.072	0.40	ug/l	2	09/13/19 02:10	

Sample: SIYB-3
9H20148-04 (Sea Water)

Sampled: 08/19/19 13:10 by Corey Sheredy/Marisa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9H1242 **Instr:** _ANALYST **Prepared:** 08/21/19 18:01 **Analyst:** ism							
Total Suspended Solids	**3**		5	mg/l	1	08/22/19 16:50	J
Method: SM 5310B **Batch ID:** W9H1277 **Instr:** TOC02 **Prepared:** 08/22/19 11:16 **Analyst:** jlp							
Total Organic Carbon (TOC)	**2.3**	0.0090	0.10	mg/l	1	08/22/19 12:35	
Method: SM 5310B **Batch ID:** W9H1584 **Instr:** TOC02 **Prepared:** 08/28/19 08:58 **Analyst:** jlp							
Dissolved Organic Carbon	**2.1**	0.013	0.10	mg/l	1	08/28/19 10:08	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9H1535 **Instr:** ICPMS03 **Prepared:** 08/27/19 13:07 **Analyst:** aln							
Copper, Total	**11**	0.038	0.10	ug/l	10	09/13/19 23:49	
Zinc, Total	**20**	0.36	2.0	ug/l	10	09/13/19 23:49	
Method: EPA 1640 **Batch ID:** W9H1537 **Instr:** ICPMS03 **Prepared:** 08/27/19 13:10 **Analyst:** aln							
Copper, Dissolved	**11**	0.019	0.050	ug/l	5	09/13/19 01:29	
Zinc, Dissolved	**27**	0.18	1.0	ug/l	5	09/13/19 01:29	

Sample Results

(Continued)

Sample: SIYB-4 Sampled: 08/19/19 12:10 by Corey Sheredy/Marisa Swiderski

9H20148-05 (Sea Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9H1242 **Instr:** _ANALYST **Prepared:** 08/21/19 18:01 **Analyst:** ism							
Total Suspended Solids	**5**		5	mg/l	1	08/22/19 16:50	
Method: SM 5310B **Batch ID:** W9H1277 **Instr:** TOC02 **Prepared:** 08/22/19 11:16 **Analyst:** jlp							
Total Organic Carbon (TOC)	**1.8**	0.0090	0.10	mg/l	1	08/22/19 12:35	
Method: SM 5310B **Batch ID:** W9H1584 **Instr:** TOC02 **Prepared:** 08/28/19 08:58 **Analyst:** jlp							
Dissolved Organic Carbon	**1.9**	0.013	0.10	mg/l	1	08/28/19 10:08	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9H1535 **Instr:** ICPMS03 **Prepared:** 08/27/19 13:07 **Analyst:** aln							
Copper, Total	**9.0**	0.038	0.10	ug/l	10	09/14/19 00:04	
Zinc, Total	**20**	0.36	2.0	ug/l	10	09/14/19 00:04	
Method: EPA 1640 **Batch ID:** W9H1537 **Instr:** ICPMS03 **Prepared:** 08/27/19 13:10 **Analyst:** aln							
Copper, Dissolved	**8.1**	0.0076	0.020	ug/l	2	09/13/19 02:38	
Zinc, Dissolved	**21**	0.072	0.40	ug/l	2	09/13/19 02:38	

Sample: SIYB-5 Sampled: 08/19/19 11:00 by Corey Sheredy/Marisa Swiderski

9H20148-06 (Sea Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9H1242 **Instr:** _ANALYST **Prepared:** 08/21/19 18:01 **Analyst:** ism							
Total Suspended Solids	**6**		5	mg/l	1	08/22/19 16:50	
Method: SM 5310B **Batch ID:** W9H1277 **Instr:** TOC02 **Prepared:** 08/22/19 11:16 **Analyst:** jlp							
Total Organic Carbon (TOC)	**1.5**	0.0090	0.10	mg/l	1	08/22/19 12:35	
Method: SM 5310B **Batch ID:** W9H1584 **Instr:** TOC02 **Prepared:** 08/28/19 08:58 **Analyst:** jlp							
Dissolved Organic Carbon	**2.3**	0.013	0.10	mg/l	1	08/28/19 10:08	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9H1535 **Instr:** ICPMS03 **Prepared:** 08/27/19 13:07 **Analyst:** aln							
Copper, Total	**5.5**	0.038	0.10	ug/l	10	09/14/19 00:18	
Zinc, Total	**11**	0.36	2.0	ug/l	10	09/14/19 00:18	
Method: EPA 1640 **Batch ID:** W9H1537 **Instr:** ICPMS03 **Prepared:** 08/27/19 13:10 **Analyst:** aln							
Copper, Dissolved	**4.9**	0.0076	0.020	ug/l	2	09/13/19 04:01	
Zinc, Dissolved	**13**	0.072	0.40	ug/l	2	09/13/19 04:01	

Sample Results

(Continued)

Sample: SIYB-6 Sampled: 08/19/19 10:00 by Corey Sheredy/Marisa Swiderski

9H20148-07 (Sea Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9H1242 **Instr:** _ANALYST **Prepared:** 08/21/19 18:01 **Analyst:** ism							
Total Suspended Solids	**4**		5	mg/l	1	08/22/19 16:50	J
Method: SM 5310B **Batch ID:** W9H1277 **Instr:** TOC02 **Prepared:** 08/22/19 11:16 **Analyst:** jlp							
Total Organic Carbon (TOC)	**1.6**	0.0090	0.10	mg/l	1	08/22/19 12:35	
Method: SM 5310B **Batch ID:** W9H1584 **Instr:** TOC02 **Prepared:** 08/28/19 08:58 **Analyst:** jlp							
Dissolved Organic Carbon	**2.8**	0.013	0.10	mg/l	1	08/28/19 10:08	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9H1535 **Instr:** ICPMS03 **Prepared:** 08/27/19 13:07 **Analyst:** aln							
Copper, Total	**5.6**	0.038	0.10	ug/l	10	09/14/19 00:32	
Zinc, Total	**11**	0.36	2.0	ug/l	10	09/14/19 00:32	
Method: EPA 1640 **Batch ID:** W9H1537 **Instr:** ICPMS03 **Prepared:** 08/27/19 13:10 **Analyst:** aln							
Copper, Dissolved	**4.1**	0.0038	0.010	ug/l	1	09/13/19 04:15	
Zinc, Dissolved	**11**	0.036	0.20	ug/l	1	09/13/19 04:15	

Sample: SIYB-REF Sampled: 08/19/19 9:00 by Corey Sheredy/Marisa Swiderski

9H20148-08 (Sea Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9H1242 **Instr:** _ANALYST **Prepared:** 08/21/19 18:01 **Analyst:** ism							
Total Suspended Solids	**5**		5	mg/l	1	08/22/19 16:50	
Method: SM 5310B **Batch ID:** W9H1277 **Instr:** TOC02 **Prepared:** 08/22/19 11:16 **Analyst:** jlp							
Total Organic Carbon (TOC)	**1.6**	0.0090	0.10	mg/l	1	08/22/19 12:35	
Method: SM 5310B **Batch ID:** W9H1584 **Instr:** TOC02 **Prepared:** 08/28/19 08:58 **Analyst:** jlp							
Dissolved Organic Carbon	**2.9**	0.013	0.10	mg/l	1	08/28/19 10:08	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9H1535 **Instr:** ICPMS03 **Prepared:** 08/27/19 13:07 **Analyst:** aln							
Copper, Total	**2.6**	0.038	0.10	ug/l	10	09/14/19 00:46	
Zinc, Total	**6.3**	0.36	2.0	ug/l	10	09/14/19 00:46	
Method: EPA 1640 **Batch ID:** W9H1537 **Instr:** ICPMS03 **Prepared:** 08/27/19 13:10 **Analyst:** aln							
Copper, Dissolved	**1.9**	0.0038	0.010	ug/l	1	09/13/19 04:29	
Zinc, Dissolved	**5.5**	0.036	0.20	ug/l	1	09/13/19 04:29	

Sample Results

(Continued)

Sample: SIYB-ER
9H20148-09 (Water)
Sampled: 08/19/19 7:20 by Corey Sheredy/Marisa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9H1242 **Instr:** _ANALYST **Prepared:** 08/21/19 18:01 **Analyst:** ism							
Total Suspended Solids	**2**		5	mg/l	1	08/22/19 16:50	J
Method: SM 5310B **Batch ID:** W9H1277 **Instr:** TOC02 **Prepared:** 08/22/19 11:16 **Analyst:** jlp							
Total Organic Carbon (TOC)	**0.40**	0.0090	0.10	mg/l	1	08/22/19 12:35	
Method: SM 5310B **Batch ID:** W9H1584 **Instr:** TOC02 **Prepared:** 08/28/19 08:58 **Analyst:** jlp							
Dissolved Organic Carbon	**1.3**	0.013	0.10	mg/l	1	08/28/19 10:08	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9H1535 **Instr:** ICPMS03 **Prepared:** 08/27/19 13:07 **Analyst:** aln							
Copper, Total	**0.086**	0.0038	0.010	ug/l	1	09/13/19 22:40	
Zinc, Total	**1.2**	0.036	0.20	ug/l	1	09/13/19 22:40	
Method: EPA 1640 **Batch ID:** W9H1537 **Instr:** ICPMS03 **Prepared:** 08/27/19 13:10 **Analyst:** aln							
Copper, Dissolved	**0.18**	0.0038	0.010	ug/l	1	09/13/19 00:34	
Zinc, Dissolved	**0.97**	0.036	0.20	ug/l	1	09/13/19 00:34	

Sample: SIYB-FB
9H20148-10 (Water)
Sampled: 08/19/19 16:20 by Corey Sheredy/Marisa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9H1242 **Instr:** _ANALYST **Prepared:** 08/21/19 18:01 **Analyst:** ism							
Total Suspended Solids	**0.2**		5	mg/l	1	08/22/19 16:50	J
Method: SM 5310B **Batch ID:** W9H1277 **Instr:** TOC02 **Prepared:** 08/22/19 11:16 **Analyst:** jlp							
Total Organic Carbon (TOC)	**0.30**	0.0090	0.10	mg/l	1	08/22/19 12:35	
Method: SM 5310B **Batch ID:** W9H1584 **Instr:** TOC02 **Prepared:** 08/28/19 08:58 **Analyst:** jlp							
Dissolved Organic Carbon	**0.38**	0.013	0.10	mg/l	1	08/28/19 10:08	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9H1535 **Instr:** ICPMS03 **Prepared:** 08/27/19 13:07 **Analyst:** aln							
Copper, Total	**0.041**	0.0038	0.010	ug/l	1	09/13/19 22:54	
Zinc, Total	ND	0.036	0.20	ug/l	1	09/13/19 22:54	
Method: EPA 1640 **Batch ID:** W9H1537 **Instr:** ICPMS03 **Prepared:** 08/27/19 13:10 **Analyst:** aln							
Copper, Dissolved	**0.076**	0.0038	0.010	ug/l	1	09/13/19 00:47	
Zinc, Dissolved	ND	0.036	0.20	ug/l	1	09/13/19 00:47	

Quality Control Results

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W9H1242 - SM 2540D											
Blank (W9H1242-BLK1)					**Prepared: 08/21/19 Analyzed: 08/22/19**						
Total Suspended Solids	ND		5	mg/l							
LCS (W9H1242-BS1)					**Prepared: 08/21/19 Analyzed: 08/22/19**						
Total Suspended Solids	68.2		5	mg/l	63.2		108	90-110			
Duplicate (W9H1242-DUP1)	**Source: 9H19099-01**				**Prepared: 08/21/19 Analyzed: 08/22/19**						
Total Suspended Solids	69.6		5	mg/l		69.8			0.3	20	
Duplicate (W9H1242-DUP2)	**Source: 9H19099-02**				**Prepared: 08/21/19 Analyzed: 08/22/19**						
Total Suspended Solids	57.2		5	mg/l		55.8			2	20	
Batch: W9H1277 - SM 5310B											
Blank (W9H1277-BLK1)					**Prepared & Analyzed: 08/22/19**						
Total Organic Carbon (TOC)	0.0121	0.0090	0.30	mg/l							J
LCS (W9H1277-BS1)					**Prepared & Analyzed: 08/22/19**						
Total Organic Carbon (TOC)	0.957	0.0090	0.30	mg/l	1.00		96	80-120		10	
Matrix Spike (W9H1277-MS1)	**Source: 9H20148-01**				**Prepared & Analyzed: 08/22/19**						
Total Organic Carbon (TOC)	3.62	0.0090	0.30	mg/l	2.00	1.70	96	80-120		10	
Matrix Spike Dup (W9H1277-MSD1)	**Source: 9H20148-01**				**Prepared & Analyzed: 08/22/19**						
Total Organic Carbon (TOC)	3.88	0.0090	0.30	mg/l	2.00	1.70	109	80-120	7	10	
Batch: W9H1584 - SM 5310B											
Blank (W9H1584-BLK1)					**Prepared & Analyzed: 08/28/19**						
Dissolved Organic Carbon	ND	0.013	0.30	mg/l							
LCS (W9H1584-BS1)					**Prepared & Analyzed: 08/28/19**						
Dissolved Organic Carbon	0.989	0.013	0.30	mg/l	1.00		99	80-120		20	
Matrix Spike (W9H1584-MS1)	**Source: 9H20148-01**				**Prepared & Analyzed: 08/28/19**						
Dissolved Organic Carbon	3.80	0.013	0.30	mg/l	2.00	1.55	112	80-120		20	
Matrix Spike Dup (W9H1584-MSD1)	**Source: 9H20148-01**				**Prepared & Analyzed: 08/28/19**						
Dissolved Organic Carbon	3.85	0.013	0.30	mg/l	2.00	1.55	115	80-120	1	20	

Quality Control Results

(Continued)

Metals - Low Level by 1600 Series Methods

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W9H1535 - EPA 1640											
Blank (W9H1535-BLK1)					**Prepared: 08/27/19**	**Analyzed: 09/13/19**					
Copper, Total	ND	0.0038	0.010	ug/l							
Zinc, Total	ND	0.036	0.20	ug/l							
LCS (W9H1535-BS1)					**Prepared: 08/27/19**	**Analyzed: 09/13/19**					
Copper, Total	9.84	0.0038	0.010	ug/l	10.0		98	73-122			
Zinc, Total	30.5	0.036	0.20	ug/l	30.0		102	75-127			
Matrix Spike (W9H1535-MS1)	**Source: 9H20148-01**				**Prepared: 08/27/19**	**Analyzed: 09/13/19**					
Copper, Total	25.5	0.038	0.10	ug/l	10.0	19.7	58	60-138			MS-02
Zinc, Total	58.5	0.36	2.0	ug/l	30.0	29.0	98	68-132			
Matrix Spike Dup (W9H1535-MSD1)	**Source: 9H20148-01**				**Prepared: 08/27/19**	**Analyzed: 09/13/19**					
Copper, Total	25.7	0.038	0.10	ug/l	10.0	19.7	60	60-138	0.7	30	
Zinc, Total	54.4	0.36	2.0	ug/l	30.0	29.0	85	68-132	7	30	
Batch: W9H1537 - EPA 1640											
Blank (W9H1537-BLK1)					**Prepared: 08/27/19**	**Analyzed: 09/12/19**					
Copper, Dissolved	ND	0.0038	0.010	ug/l							
Zinc, Dissolved	ND	0.036	0.20	ug/l							
LCS (W9H1537-BS1)					**Prepared: 08/27/19**	**Analyzed: 09/12/19**					
Copper, Dissolved	10.5	0.0038	0.010	ug/l	10.0		105	70-130			
Zinc, Dissolved	31.4	0.036	0.20	ug/l	30.0		105	75-127			
Matrix Spike (W9H1537-MS1)	**Source: 9H20148-01**				**Prepared: 08/27/19**	**Analyzed: 09/12/19**					
Copper, Dissolved	25.7	0.019	0.050	ug/l	10.0	15.2	104	70-130			
Zinc, Dissolved	70.6	0.18	1.0	ug/l	30.0	36.8	113	68-132			
Matrix Spike Dup (W9H1537-MSD1)	**Source: 9H20148-01**				**Prepared: 08/27/19**	**Analyzed: 09/12/19**					
Copper, Dissolved	25.6	0.019	0.050	ug/l	10.0	15.2	104	70-130	0.3	30	
Zinc, Dissolved	71.4	0.18	1.0	ug/l	30.0	36.8	115	68-132	1	30	

Notes and Definitions

Item	Definition
J	Estimated conc. detected <MRL and >MDL.
MS-02	The RPD and/or percent recovery for this QC spike sample cannot be accurately calculated due to the high concentration of analyte inherent in the sample.
% Rec	Percent Recovery
Dil	Dilution
dry	Sample results reported on a dry weight basis
MDA	Minimum Detectable Activity
MDL	Method Detection Limit
MRL	The minimum levels, concentrations, or quantities of a target variable (e.g., target analyte) that can be reported with a specified degree of confidence. The MRL is also known as Limit of Quantitation (LOQ) and Detection Limit for Reporting (DLR)
ND	NOT DETECTED at or above the Method Reporting Limit (MRL). If Method Detection Limit (MDL) is reported, then ND means not detected at or above the MDL.
NR	Not Reportable
RPD	Relative Percent Difference
Source	Sample that was matrix spiked or duplicated.
TIC	Tentatively Identified Compound (TIC) using mass spectrometry. The reported concentration is relative concentration based on the nearest internal standard. If the library search produces no matches at, or above 85%, the compound is reported as unknown.

Any remaining sample(s) will be disposed of one month from the final report date unless other arrangements are made in advance.

An Absence of Total Coliform meets the drinking water standards as established by the California State Water Resources Control Board (SWRCB)

All results are expressed on wet weight basis unless otherwise specified.

All samples collected by Weck Laboratories have been sampled in accordance to laboratory SOP Number MIS002.

WECK LABORATORIES
SEPTEMBER 9, 2019 CHEMISTRY REPORT

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WECK LABORATORIES, INC.

Certificate of Analysis

FINAL REPORT

Work Orders:	9I09109	**Report Date:**	10/17/2019
		Received Date:	9/9/2019
Project:	Annual Shelter Island Yacht Basin TMDL Monitoring	**Turnaround Time:**	Normal
		Phones:	(858) 300-4320
		Fax:	(858) 300-4301
Attn:	Barry Snyder	**P.O. #:**	
Client:	Wood - San Diego 2 9210 Sky Park Court, Suite 200 San Diego, CA 92123	**Billing Code:**	

ELAP-CA #1132 • EPA-UCMR #CA00211 • Guam-EPA #17-008R • HW-DOH # • ISO 17025 #L2457.01 • LACSD #10143 • NELAP-CA #04229CA • NELAP-OR #4047 • NJ-DEP #CA015 • NV-DEP #NAC 445A • SCAQMD #93LA1006

This is a complete final report. The information in this report applies to the samples analyzed in accordance with the chain-of-custody document. Weck Laboratories certifies that the test results meet all requirements of TNI unless noted by qualifiers or written in the Case Narrative. This analytical report must be reproduced in its entirety.

Dear Barry Snyder,

Enclosed are the results of analyses for samples received 9/09/19 with the Chain-of-Custody document. The samples were received in good condition, at 3.7 °C and on ice. All analyses met the method criteria except as noted in the case narrative or in the report with data qualifiers.

Reviewed by:

Chris Samatmanakit
Project Manager

Certificate of Analysis

FINAL REPORT

Wood - San Diego 2
9210 Sky Park Court, Suite 200
San Diego, CA 92123

Project Number: Annual Shelter Island Yacht Basin TMDL Monitoring

Project Manager: Barry Snyder

Reported: 10/17/2019 18:11

Sample Summary

Sample Name	Sampled By	Lab ID	Matrix	Sampled	Qualifiers
SIYB-4	Corey Sheredy/Marisa Swiderski	9I09109-01	Water	09/09/19 08:15	
SIYB-REF	Corey Sheredy/Marisa Swiderski	9I09109-02	Water	09/09/19 09:00	

Wood - San Diego 2
9210 Sky Park Court, Suite 200
San Diego, CA 92123

Project Number: Annual Shelter Island Yacht Basin TMDL Monitoring
Project Manager: Barry Snyder

Reported: 10/17/2019 18:11

Sample Results

Sample: SIYB-4
9I09109-01 (Water)
Sampled: 09/09/19 8:15 by Corey Sheredy/Marisa Swiderski

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

Method: SM 2540D **Batch ID:** W9I0534 **Instr:** OVEN11 **Prepared:** 09/10/19 11:51 **Analyst:** ism

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Total Suspended Solids	**23**		5	mg/l	1	09/10/19 15:00	

Metals - Low Level by 1600 Series Methods

Method: EPA 1640 **Batch ID:** W9J0494 **Instr:** ICPMS03 **Prepared:** 10/08/19 12:26 **Analyst:** aln

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Copper, Total	**11**	0.038	0.10	ug/l	10	10/09/19 00:30	
Zinc, Total	**32**	0.36	2.0	ug/l	10	10/09/19 00:30	

Method: EPA 1640 **Batch ID:** W9J0495 **Instr:** ICPMS03 **Prepared:** 10/08/19 12:30 **Analyst:** aln

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Copper, Dissolved	**9.5**	0.019	0.050	ug/l	5	10/09/19 23:41	
Zinc, Dissolved	**26**	0.18	1.0	ug/l	5	10/09/19 23:41	

Sample: SIYB-REF
9I09109-02 (Water)
Sampled: 09/09/19 9:00 by Corey Sheredy/Marisa Swiderski

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

Method: SM 2540D **Batch ID:** W9I0534 **Instr:** OVEN11 **Prepared:** 09/10/19 11:51 **Analyst:** ism

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Total Suspended Solids	**22**		5	mg/l	1	09/10/19 15:00	

Metals - Low Level by 1600 Series Methods

Method: EPA 1640 **Batch ID:** W9J0494 **Instr:** ICPMS03 **Prepared:** 10/08/19 12:26 **Analyst:** aln

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Copper, Total	**0.43**	0.0038	0.010	ug/l	1	10/09/19 01:39	
Zinc, Total	**1.0**	0.036	0.20	ug/l	1	10/09/19 01:39	

Method: EPA 1640 **Batch ID:** W9J0495 **Instr:** ICPMS03 **Prepared:** 10/08/19 12:30 **Analyst:** ALN

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Copper, Dissolved	**0.42**	0.0038	0.010	ug/l	1	10/10/19 00:36	
Zinc, Dissolved	**0.74**	0.036	0.20	ug/l	1	10/10/19 00:36	

Quality Control Results

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W9I0534 - SM 2540D											
Blank (W9I0534-BLK1)					**Prepared & Analyzed: 09/10/19**						
Total Suspended Solids	ND		5	mg/l							
LCS (W9I0534-BS1)					**Prepared & Analyzed: 09/10/19**						
Total Suspended Solids	56.2		5	mg/l	60.8		92	90-110			
Duplicate (W9I0534-DUP1)	**Source: 9I04110-02**				**Prepared & Analyzed: 09/10/19**						
Total Suspended Solids	146		5	mg/l		138			6	20	
Duplicate (W9I0534-DUP2)	**Source: 9I06068-01**				**Prepared & Analyzed: 09/10/19**						
Total Suspended Solids	47.0		5	mg/l		55.5			17	20	

Quality Control Results

Metals - Low Level by 1600 Series Methods

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W9J0494 - EPA 1640											
Blank (W9J0494-BLK1)					**Prepared & Analyzed: 10/08/19**						
Copper, Total	0.00448	0.0038	0.010	ug/l							B-07, J
Zinc, Total	ND	0.036	0.20	ug/l							
Blank (W9J0494-BLK2)					**Prepared: 10/08/19 Analyzed: 10/10/19**						
Copper, Total	ND	0.0038	0.010	ug/l							
Zinc, Total	ND	0.036	0.20	ug/l							
LCS (W9J0494-BS1)					**Prepared & Analyzed: 10/08/19**						
Copper, Total	2.05	0.0038	0.010	ug/l	2.00		103	83-109		25	
Zinc, Total	10.2	0.036	0.20	ug/l	10.0		102	80-118		25	
LCS (W9J0494-BS2)					**Prepared & Analyzed: 10/08/19**						
Copper, Total	10.2	0.0038	0.010	ug/l	10.0		102	83-109		25	
Zinc, Total	31.0	0.036	0.20	ug/l	30.0		103	80-118		25	
Matrix Spike (W9J0494-MS1)	**Source: 9I09109-01**				**Prepared & Analyzed: 10/08/19**						
Copper, Total	20.6	0.038	0.10	ug/l	10.0	10.9	97	83-109		25	
Zinc, Total	59.0	0.36	2.0	ug/l	30.0	31.9	90	80-118		25	
Matrix Spike (W9J0494-MS2)	**Source: 9I09109-01**				**Prepared: 10/08/19 Analyzed: 10/10/19**						
Copper, Total	21.0	0.038	0.10	ug/l	10.0	10.9	102	83-109		25	
Zinc, Total	59.5	0.36	2.0	ug/l	30.0	31.9	92	80-118		25	
Matrix Spike Dup (W9J0494-MSD1)	**Source: 9I09109-01**				**Prepared & Analyzed: 10/08/19**						
Copper, Total	20.9	0.038	0.10	ug/l	10.0	10.9	100	83-109	1	25	
Zinc, Total	57.0	0.36	2.0	ug/l	30.0	31.9	84	80-118	3	25	
Matrix Spike Dup (W9J0494-MSD2)	**Source: 9I09109-01**				**Prepared: 10/08/19 Analyzed: 10/10/19**						
Copper, Total	21.5	0.038	0.10	ug/l	10.0	10.9	106	83-109	2	25	
Zinc, Total	57.1	0.36	2.0	ug/l	30.0	31.9	84	80-118	4	25	
Batch: W9J0495 - EPA 1640											

Quality Control Results

(Continued)

Metals - Low Level by 1600 Series Methods (Continued)

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W9J0495 - EPA 1640 (Continued)											
Blank (W9J0495-BLK1)					**Prepared: 10/08/19 Analyzed: 10/09/19**						
Copper, Dissolved	ND	0.0038	0.010	ug/l							
Zinc, Dissolved	ND	0.036	0.20	ug/l							
LCS (W9J0495-BS1)					**Prepared: 10/08/19 Analyzed: 10/09/19**						
Copper, Dissolved	2.08	0.0038	0.010	ug/l	2.00		104	83-109		25	
Zinc, Dissolved	10.4	0.036	0.20	ug/l	10.0		104	80-118		25	
LCS (W9J0495-BS2)					**Prepared: 10/08/19 Analyzed: 10/09/19**						
Copper, Dissolved	10.3	0.0038	0.010	ug/l	10.0		103	83-109		25	
Zinc, Dissolved	31.2	0.036	0.20	ug/l	30.0		104	80-118		25	
LCS (W9J0495-BS3)					**Prepared: 10/08/19 Analyzed: 10/11/19**						
Copper, Dissolved	2.11	0.0038	0.010	ug/l	2.00		105	83-109		25	
Zinc, Dissolved	10.4	0.036	0.20	ug/l	10.0		104	80-118		25	
Matrix Spike (W9J0495-MS1)	**Source: 9I09109-01**				**Prepared: 10/08/19 Analyzed: 10/09/19**						
Copper, Dissolved	19.3	0.038	0.10	ug/l	10.0	9.54	97	83-109		25	
Zinc, Dissolved	57.2	0.36	2.0	ug/l	30.0	25.8	105	80-118		25	
Matrix Spike (W9J0495-MS2)	**Source: 9I09109-01**				**Prepared: 10/08/19 Analyzed: 10/11/19**						
Copper, Dissolved	20.4	0.038	0.10	ug/l	10.0	9.54	108	83-109		25	
Zinc, Dissolved	55.5	0.36	2.0	ug/l	30.0	25.8	99	80-118		25	
Matrix Spike Dup (W9J0495-MSD1)	**Source: 9I09109-01**				**Prepared: 10/08/19 Analyzed: 10/09/19**						
Copper, Dissolved	19.6	0.038	0.10	ug/l	10.0	9.54	101	83-109	2	25	
Zinc, Dissolved	55.9	0.36	2.0	ug/l	30.0	25.8	100	80-118	2	25	
Matrix Spike Dup (W9J0495-MSD2)	**Source: 9I09109-01**				**Prepared: 10/08/19 Analyzed: 10/11/19**						
Copper, Dissolved	20.1	0.038	0.10	ug/l	10.0	9.54	105	83-109	1	25	
Zinc, Dissolved	56.6	0.36	2.0	ug/l	30.0	25.8	103	80-118	2	25	

Notes and Definitions

Item	Definition
B-07	This analyte was found in the method blank at levels above the MDL but below the reporting limit.
J	Estimated conc. detected <MRL and >MDL.
% Rec	Percent Recovery
Dil	Dilution
dry	Sample results reported on a dry weight basis
MDA	Minimum Detectable Activity
MDL	Method Detection Limit
MRL	The minimum levels, concentrations, or quantities of a target variable (e.g., target analyte) that can be reported with a specified degree of confidence. The MRL is also known as Limit of Quantitation (LOQ)
ND	NOT DETECTED at or above the Method Reporting Limit (MRL). If Method Detection Limit (MDL) is reported, then ND means not detected at or above the MDL.
NR	Not Reportable
RPD	Relative Percent Difference
Source	Sample that was matrix spiked or duplicated.
TIC	Tentatively Identified Compound (TIC) using mass spectrometry. The reported concentration is relative concentration based on the nearest internal standard. If the library search produces no matches at, or above 85%, the compound is reported as unknown.

Any remaining sample(s) will be disposed of one month from the final report date unless other arrangements are made in advance.

An Absence of Total Coliform meets the drinking water standards as established by the California State Water Resources Control Board (SWRCB)

All results are expressed on wet weight basis unless otherwise specified.

All samples collected by Weck Laboratories have been sampled in accordance to laboratory SOP Number MIS002.

NAUTILUS ENVIRONMENTAL TOXICITY REPORT

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NAUTILUS ENVIRONMENTAL
TOXICITY LABORATORY & CONSULTING

Toxicity Testing Results for the Shelter Island Yacht Basin Total Maximum Daily Load Monitoring Plan

Monitoring Period: August/September 2019

Prepared for:	Wood Environment & Infrastructure Solutions, Inc. 9210 Sky Park Court, Suite 200 San Diego, CA 92123
Prepared by:	Nautilus Environmental 4340 Vandever Avenue San Diego, CA 92120 (858) 587-7333
Report Submitted:	October 16, 2019

Data Quality Assurance:

- Nautilus Environmental is accredited in accordance with NELAP by the State of Oregon Environmental Laboratory Accreditation Program (Certificate No. 4053). It is also certified by the State of California Water Resources Control Board Environmental Laboratory Accreditation Program (Certificate No. 1802) and the State of Washington Department of Ecology (Lab ID C552). Specific fields of testing applicable to each accreditation are available upon request. All data have been reviewed and verified.
- All data have been reviewed and verified.
- All test results have met minimum test acceptability criteria under their respective EPA protocols, unless otherwise noted in this report.
- All test results have met internal Quality Assurance Program requirements.

Results verified by: Adrienne Cibor

Introduction

Ambient receiving water samples were collected in the Shelter Island Yacht Basin (SIYB), San Diego, California, in August and September 2019 to fulfill annual monitoring requirements for the SIYB Dissolved Copper Total Maximum Daily Load (TMDL) program. Samples were collected by Wood Environment & Infrastructure Solutions, Inc. (Wood) [formerly Amec Foster Wheeler] staff and delivered to the Nautilus laboratory for toxicity testing. Six samples were collected at previously monitored locations, from the outer basin area nearest to the mouth of San Diego Bay (SIYB-6) inward toward the closed end of the yacht basin that receives the least amount of tidal flushing (SIYB-1). A reference sample (SIYB-REF) was also collected inside San Diego Bay, just outside of the SIYB. Samples were tested using a marine larval fish acute survival toxicity test and a bivalve larvae chronic survival and development test.

Materials and Methods

Sample Information

Client:	Wood/Port of San Diego
Sample ID (Sample Collection Date; Time):	1. SIYB-1 (8/19/19; 15:10)
	2. SIYB-2 (8/19/19; 14:10)
	3. SIYB-3 (8/19/19; 13:10)
	4. SIYB-4[a] (8/19/19; 12:10)
	5. SIYB-5 (8/19/19; 11:00)
	6. SIYB-6 (8/19/19; 10:00)
	7. SIYB-REF[a] (8/19/19; 09:00)
Sample Receipt Date; Time:	8/19/19; 17:40
Sample Material (sample type):	Ambient Water (grab samples)

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[a] Samples were also collected from SIYB-4 (collected 9/9/19, 08:15) and SIYB-REF (9/9/19, 09:00) for follow-up testing with the Pacific Topsmelt acute survival toxicity test; both samples were received on 9/9/19 at 11:00.

Bivalve Larvae Chronic Survival and Development Test Specifications

Test Period:	8/20/19; 14:15 – 8/22/19; 12:25
Test Organism, Age:	*Mytilus galloprovincialis* (Mediterranean mussel), newly fertilized embryos
Test Organism Source:	Mission Bay (San Diego, CA)
Control and Dilution Water:	Natural seawater from Scripps Institution of Oceanography inlet, 20 micron (μm)-filtered, 34 ± 2 parts per thousand (ppt). All replicates from each sample were randomized within in a single vial tray, each with its own separate lab control.
Additional Control:	A 0.45 μm-filtered method control was also tested (one filtered method control for all sites).
Test Concentrations:	100, 50, 25, 12.5 and 6.25 percent of each sample. A 100 percent sub-sample from each site was also tested after 0.45 μm filtration for the bivalve test to remove native algae that may interfere with test organisms.
Number of Organisms/Replicates:	~150 embryos per rep/ 5 replicates per concentration
Test Temperature:	15 ± 1 degrees Celsius (°C)
Test Acceptability Criteria:	Lab control mean percent survival must be 50 percent, and 90 percent of surviving organisms must have normal shell development. The percent minimum significant difference (PMSD) in the test must be less than 25.
Concurrent Reference Toxicant Test:	Copper chloride
Protocol Used:	USEPA West Coast Manual, 1995 (EPA/600/R-95/136), ASTM 1998, PTI 1995

Pacific Topsmelt Acute Survival Test Specifications (8/19/19 Sample Collection)

Test Periods:	8/19/19[a]; 18:25 to 19:25 – 8/23/19; 16:25 to 17:25 8/22/19[b]; 15:45 – 8/26/19; 14:20
Test Organism, Age:	*Atherinops affinis* (Pacific topsmelt); 8/19/19 test: 15 days old, 8/22/19 test: 11 days old
Test Organism Source:	Aquatic BioSystems (Fort Collins, CO)
Control and Dilution Water:	Natural Seawater from Scripps Institution of Oceanography inlet 20 µm-filtered, at 34 ± 2 ppt. Samples were arranged on multip shelves within an environmental chamber, each shelf containing its own lab control.
Test Concentrations:	8/19/19 test: 100, 50, and 25 percent sample 8/22/19 test: 100 percent only
Number of Organisms/Replicates:	5 fish per rep/ 6 replicates per concentration
Test Temperature:	21 ± 1°C
Test Acceptability Criterion:	Mean survival in the laboratory control must be ≥ 90 percent
Concurrent Reference Toxicant Test:	Copper chloride
Protocol Used:	USEPA Acute Manual, 2002 (EPA/821/R-02/012)

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[a] The lab controls for the Pacific topsmelt test initiated 8/19/19 did not meet test acceptability criteria (see QA section for details).

[b] Samples were re-tested on 8/22/19 out of holding time using a different batch of fish (see results and QA sections for details). Due to a statistically significant reduction in survival in the re-test of SIYB-4, an additional sample was collected 9/9/19 for follow-up testing (see following table).

Pacific Topsmelt Acute Survival Test Specifications (9/9/19 Sample Collection)

Test Periods:	9/10/19; 10:25 – 9/14/19; 09:30
Test Organism:	*Atherinops affinis* (Pacific topsmelt; 15 days old)
Test Organism Source:	Aquatic BioSystems (Fort Collins, CO)
Control and Dilution Water:	Natural Seawater from Scripps Institution of Oceanography inlet, 20 µm-filtered, at 34 ± 2 ppt.
Additional Control:	A 0.2 µm -filtered method control was also tested.
Test Concentrations:	100 percent of sites SIYB-4 and SIYB-REF. A 100 percent sub-sample from SIYB-4 was also tested after 0.2 µm filtration to remove potential native algae or bacteria that may interfere with test organisms.
Number of Organisms/Replicates:	5 fish per rep/ 6 replicates per concentration
Test Temperature:	21 ± 1°C
Test Acceptability Criterion:	Mean survival in the laboratory control must be ≥ 90 percent
Concurrent Reference Toxicant Test:	Copper chloride
Protocol Used:	USEPA Acute Manual, 2002 (EPA/821/R-02/012)

The mussel test was scored by counting all larvae in each test vial using an inverted compound microscope under 100x magnification; each larva was scored as normal or abnormal, and the total number of larvae is compared to the initial density to calculate survival. Mussels exhibiting normal 48-hour development are D-shaped prodissoconch larvae with clearly defined edges. Embryos and larvae that exhibited an effect, had developmental patterns differing from those in control replicates, or did not reach the straight hinge D-shape stage at test termination, were counted as abnormal.

An additional metric was added to the SIYB monitoring Quality Assurance Project Plan (QAPP) (Wood 2019) in order to provide information regarding the magnitude of effect in the development endpoint for the mussel test. If observed in the samples as in previous years, curve-hinged bivalve larvae are to be enumerated. Therefore, there were three development categories enumerated for 2019: (1) fully developed shell with a straight-hinge D-shape, (2) partially developed larvae with a concave or curved hinge, and (3) larvae that fail to develop a shell or that display severe morphological defects. For data analysis and reporting purposes, if observed, larvae with curved hinges are reported in the abnormal category. A separate table has been included in the report, which summarizes the proportion of larvae in all three categories. Example photographs of the three types of larvae were taken by laboratory staff during the counting process.

Toxicity test responses were evaluated statistically using the Comprehensive Environmental Toxicity Information System™ (CETIS) software by Tidepool Scientific according to flowchart specifications provided in method guidance (USEPA 1995 and 2002). Organism performance in each sample was compared to that observed in concurrent laboratory control exposures. The filtration control was compared to the SIYB-1 lab control to ensure no adverse effects were observed due to the filtration procedure itself. A No Observed Effect Concentration (NOEC), Lowest Observed Effect Concentration (LOEC), median effect concentration (EC_{50}), and percent effect relative to the lab control were calculated for all samples.

Additionally, data were analyzed using the Test of Significant Toxicity (TST) t-test approach specified in National Pollutant Discharge Elimination System Test of Significant Toxicity Implementation Document (USEPA 2010). The TST applies a modified t-test that considers both the statistical power of the test and magnitude of biological effects in determining the presence of a response; results are reported as "Pass" if a sample is considered non-toxic according to the TST calculation, or "Fail" if considered toxic according to TST.

Results and Discussion

Raw test data and statistical analyses for both species can be found in Appendix A. Sample receipt information is provided in Appendix B, and a copy of the chain-of-custody form is in Appendix C.

Bivalve Larvae Chronic Survival and Development Test

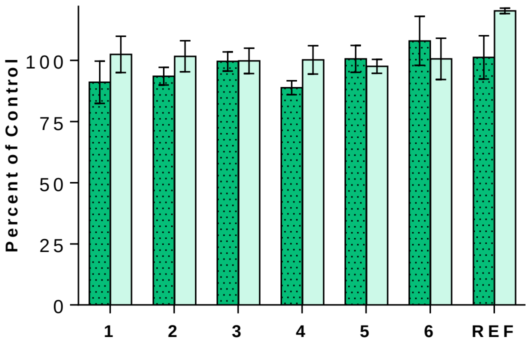
All lab controls met test acceptability criteria (TAC) for the mussel test, ranging from 94.4 to 98.3 percent combined survival and normal development. Results indicated there were no statistically significant differences in the majority of the SIYB samples (Figure 1). Samples were tested unmanipulated and serially diluted per method directions. In addition, an aliquot of each undiluted (i.e., 100 percent only) sample was tested after filtration through a 0.45-μm nylon filter for comparison purposes, as described in the 2019 QAPP for this monitoring event. This step was performed due to interference from native organisms and potentially harmful algae, a confounding factor identified in previous years. Statistical results for the mussel tests are summarized in Table 1, and mean test results are summarized in Table 2.

There was not statistically reduced survival of larvae in any of the samples compared to the lab control. The 100 percent, unfiltered SIYB-1 sample resulted in an adverse effect for the combined survival and development endpoint (Figures 1 and 2; Tables 1 and 2), as the normal development rate of larvae was reduced compared to the lab control (27 percent of larvae exposed to the 100 percent unfiltered SIYB-1 sample developed normally, a 73 percent effect relative to the lab control). The result for the 100 percent SIYB-1 sample filtered through a 0.45-μm screen was similar, with 22 percent mean combined development in the sample, a 78 percent effect from the associated lab control. The mussel larvae test results for the SIYB-1 sample (both unfiltered and filtered) were statistically significant using both the EPA 1995 flow-chart statistical approach and the TST analysis.

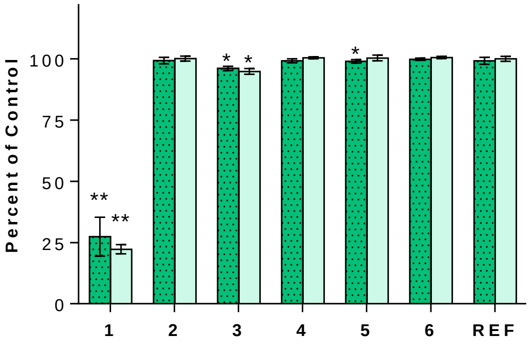
Using the EPA 1995 flow-chart statistical approach, there was a significant difference in normal development rate in the 100 percent, unfiltered SIYB-3 and SIYB-5 samples, but not in the combined survival and normal development endpoint. Neither of these results was significant using the TST analysis (3.9 percent effect for SIYB-3 and 1.0 percent effect for SIYB-5). There was also a significant difference in normal development rate in the undiluted, 0.45-μm filtered, SIYB-3 sample using the EPA 1995 flow-chart statistical approach but not the TST analysis (5.9 percent effect). However, due to the low percent minimum significant difference (PMSD) values associated with these tests (PMSD 1.1 for SIYB-3 development, and PMSD 0.89 for SIYB-5 development), the effects may not be biologically relevant. None of the other test concentrations from sites SIYB-3, SIYB-4, SIYB-6, or SIYB-REF resulted in reduced normal development compared to the lab control.

Approximately 1.4 to 3.0 percent of the total number of larvae in the 100 percent, unfiltered SIYB-1 and SIYB-3 samples were partially developed, but did not possess a straight hinge (Table 3); this response was observed in 0.1 percent of the SIYB-1 control replicates. The fraction of embryos with curved hinges was generally observed in the highest concentrations, with a few larvae exhibiting this effect in the lower concentrations of unfiltered samples from sites SIYB-1 and SIYB-3. The undiluted samples from sites SIYB-1 and SIYB-3 that were filtered through a 0.45-μm screen prior to testing resulted in 2.3 to 3.7 percent of the larvae with curved hinges, suggesting that this effect was not reduced by filtration. The proportion of curved hinges observed in the SIYB-1 sample is lower than that observed in the 2018 monitoring event; however, the total number of grossly abnormal larvae increased, indicating that the overall magnitude of effect in the sample increased from the previous year. There were no curved hinges observed in any test concentrations of the SIYB-2, SIYB-4, SIYB-5, SIYB-6, or SIYB-REF sites. Additionally, there were no statistically significant effects detected in any of the test concentrations for the SIYB-2, SIYB-3, SIYB-4, SIYB-5, SIYB-6, or SIYB-REF samples with regard to the combined development rate endpoint in the bivalve test.

a) Survival



b) Normal Development



c) Combined Survival and Development

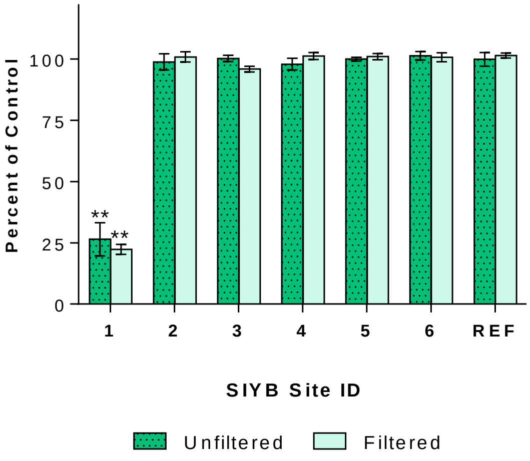
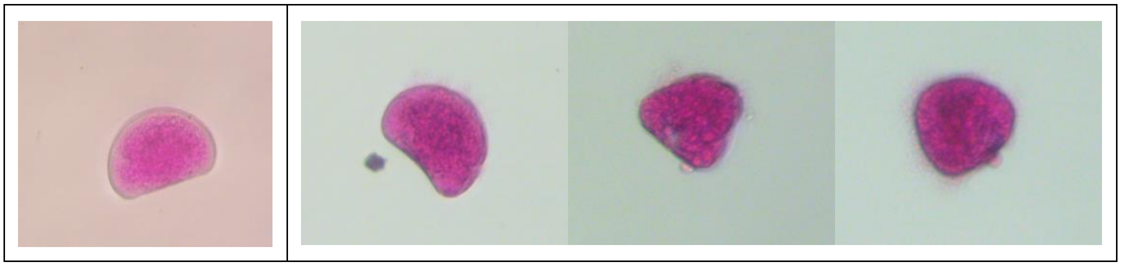


Figure 1. Results of the 48-hour larval bivalve survival and development test for each undiluted sample, a) survival, b) normal development, c) combined survival and normal development; presented as the mean result (± one standard deviation) normalized to the control. Note: all three endpoints are displayed separately here for additional information, but only the combined endpoint is used for NOEC/LOEC determination and TST pass/fail calculations. A single asterisk (*) indicates a significant decrease compared to control using the traditional EPA flow chart statistical methods, a double asterisk (**) indicates a significant decrease with both EPA flow chart methods and the TST.



a) Lab Control b) SIYB-1

Figure 2. Examples of a) normal mussel larvae development in the lab control, and b) varying degrees of abnormal development observed in the SIYB-1 sample. Note: 1.4 percent of the larvae counted as abnormal in the unfiltered SIYB-1 sample had curved hinges (see Table 3); the remaining larvae (approx. 72 percent of total) counted as abnormal had severe abnormalities.

Table 1. Statistical Results Summary - Bivalve 48-hr Combined Survival and Development

Sample ID		NOEC (% sample)	EC$_{50}$ (% sample)	TU$_c$ value	TST (Pass/Fail)	Percent Effect
SIYB-1	Unfiltered	50	83.1	2.0	Fail	73
	Filtered	<100	<100	>1.0	Fail	78
SIYB-2	Unfiltered	100	> 100	1.0	Pass	1.2
	Filtered	100	> 100	1.0	Pass	-0.9
SIYB-3	Unfiltered	100	> 100	1.0	Pass	-0.2
	Filtered	100	> 100	1.0	Pass	1.3
SIYB-4	Unfiltered	100	> 100	1.0	Pass	2.1
	Filtered	100	> 100	1.0	Pass	-1.2
SIYB-5	Unfiltered	100	> 100	1.0	Pass	0.0
	Filtered	100	> 100	1.0	Pass	-0.2
SIYB-6	Unfiltered	100	> 100	1.0	Pass	-1.3
	Filtered	100	> 100	1.0	Pass	-1.8
SIYB-REF	Unfiltered	100	> 100	1.0	Pass	0.2
	Filtered	100	> 100	1.0	Pass	-1.4

NOEC: the highest concentration tested resulting in no observed effect using the EPA 1995 statistical approach

EC$_{50}$: concentration expected to cause an adverse effect to 50 percent of the organisms

TU$_c$: (Chronic Toxic Unit) = 100 ÷ NOEC. A TU$_c$ value of 1.0 indicates no toxicity.

TST: Pass = sample is non-toxic according to the TST analysis; Fail = sample is toxic according to the TST analysis

Percent effect (PE) from control is calculated as: PE= ((mean response in control-mean response in undiluted sample)/mean response in control) *100. A negative PE results when organism performance in the sample is greater than that in the control.

Table 2. Bivalve 48-hr Development Test Detailed Summary

Test Concentration (% sample)	**Mean Combined Survival and Normal Development (%)**						
	Sample ID						
	SIYB-1	SIYB-2	SIYB-3	SIYB-4	SIYB-5	SIYB-6	SIYB-REF
Lab Control	98.3	97.1	94.4	97.2	98.0	96.1	97.2
6.25	96.0	98.7	96.5	96.4	98.4	98.4	96.7
12.5	99.4	98.5	98.3	96.9	95.8	98.6	96.8
25	95.7	97.7	97.4	97.7	98.7	96.3	98.0
50	94.6	98.0	98.7	98.3	99.0	97.3	98.5
100	**26.0****	96.0	94.6	95.2	97.9	97.3	97.0
Filter Control	97.2	97.2	97.2	97.2	97.2	97.2	97.2
100 (filtered)	**21.7****	98.0	93.2	98.4	98.1	97.8	98.6

** Two bold asterisks indicate a statistically significant decrease compared to the lab control using both the traditional EPA flow-chart statistical methods and the TST analysis.

Table 3. Bivalve 48-hr Development Summary of Percentage of Curved Hinges

Test Concentration (% sample)	**Mean Number of Curved Hinges (%)**						
	Sample ID						
	SIYB-1	SIYB-2	SIYB-3	SIYB-4	SIYB-5	SIYB-6	SIYB-REF
Lab Control	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Filter Control	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6.25	0.1	0.0	0.1	0.0	0.0	0.0	0.0
12.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50	1.8	0.0	0.1	0.0	0.0	0.0	0.0
100	1.4	0.0	3.0	0.0	0.0	0.0	0.0
100 (filtered)	2.3	0.0	3.7	0.0	0.0	0.0	0.0

Note: percentage curved expressed as percent of total number counted.

Pacific Topsmelt Acute Survival Test (8/19/2019)

There was no statistically significant reduction in survival of Pacific topsmelt in any of the concentrations tested for any of the SIYB sites using the EPA 1995 statistical methods. However, the lab controls did not meet all TAC; see QA section. All undiluted samples passed using the TST, but a significant decrease in topsmelt survival was observed in SIYB-5 (50% concentration) and SIYB-REF (25% concentration) relative to the control using the TST. Statistical results for the topsmelt tests are summarized in Table 4, and mean test results are summarized in Table 5.

Table 4. Statistical Results Summary – Pacific Topsmelt 96-hour Survival - 8/19/19 Test[a]

Sample ID	NOEC (% sample)	LC_{50} (% sample)	TU_a value	TST (Pass/Fail)
SIYB-1	100	> 100	0.72	Pass
SIYB-2	100	> 100	0.80	Pass
SIYB-3	100	> 100	0.77	Pass
SIYB-4	100	> 100	0.66	Pass
SIYB-5	100	> 100	0.72	Pass
SIYB-6	100	> 100	0.84	Pass
SIYB-REF	100	> 100	0.80	Pass

[a] The lab controls for this test did not meet minimum test acceptability criteria; see QA section.

NOEC: the highest concentration tested resulting in no observed effect using the EPA 1995 statistical approach

LC_{50}: concentration expected to cause a lethal effect to 50 percent of the organisms

TU_a: (Acute Toxic Unit) = 100 ÷ LC_{50}; or Log (100 - %survival) ÷ 1.7, if LC_{50} is >100%. TU_a = 0 if 100% survival in the undiluted sample

TST: Pass = undiluted sample is non-toxic according to the TST analysis; Fail = undiluted sample is toxic according to the TST analysis

Table 5. Pacific Topsmelt 96-hr Acute Survival Test Detailed Summary – 8/19/19 Test[a]

Test Concentration (% sample)	Mean Survival (%)						
	Sample ID						
	SIYB-1	SIYB-2	SIYB-3	SIYB-4	SIYB-5	SIYB-6	SIYB-REF
Lab Control	73.3[a]	73.3[a]	73.3[a]	83.3[a]	83.3[a]	83.3[a]	76.7 [a]
25	90.0	73.3	80.0	83.3	80.0	83.3	**70.0***
50	80.0	83.3	90.0	96.7	**70.0***	76.7	76.7
100	83.3	76.7	80.0	86.7	83.3	73.3	76.7

[a] The lab controls did not meet the minimum test acceptability criterion of 90 percent mean survival (see QA section); therefore, the 100 percent samples were re-tested on 8/22/2019 using a different batch of fish.

*Values with a bold asterisk indicate a statistically significant decrease compared to the lab control using the TST. No significant decreases were detected using the traditional EPA flow-chart statistics.

Pacific Topsmelt Acute Survival Test (8/22/2019)

Due to poor results in the lab controls and overall variability in the topsmelt tests conducted on 8/19/19, the samples were re-tested out of holding time on 8/22/19 using a different batch of fish (Note: due to the number of fish available, only the undiluted sample from each site was re-tested). There were no statistically significant effects to Pacific topsmelt in sites SIYB-1, SIYB-2, SIYB-3, SIYB-5, SIYB-6, or SIYB-REF. A significant decrease in topsmelt survival was observed in the SIYB-4 sample relative to the control (14.3 percent effect) using both the TST and EPA 1995 statistics. Statistical results for the topsmelt tests are summarized in Table 6, and mean test results are summarized in Table 7.

Table 6. Statistical Results Summary – Pacific Topsmelt 96-hour Survival – 8/22/19 Test

Sample ID	NOEC (% sample)	TU_a value	TST (Pass/Fail)
SIYB-1	100	0.59	Pass
SIYB-2	100	0.49	Pass
SIYB-3	100	0.31	Pass
SIYB-4	<100	0.77	Fail
SIYB-5	100	0.31	Pass
SIYB-6	100	0.49	Pass
SIYB-REF	100	0.31	Pass

NOEC: the highest concentration tested resulting in no observed effect using the EPA 1995 statistical approach

LC_{50}: concentration expected to cause a lethal effect to 50 percent of the organisms

TU_a: (Acute Toxic Unit) = 100 ÷ LC_{50}; or Log (100 - %survival) ÷ 1.7, if LC_{50} is >100%. TU_a = 0 if 100% survival in the undiluted sample

TST: Pass = undiluted sample is non-toxic according to the TST analysis; Fail = undiluted sample is toxic according to the TST analysis

Table 7. Pacific Topsmelt 96-hr Acute Survival Test Detailed Summary – 8/22/19 Test

Test Concentration (% sample)	Mean Survival (%)						
	Sample ID						
	SIYB-1	SIYB-2	SIYB-3	SIYB-4	SIYB-5	SIYB-6	SIYB-REF
Lab Control	93.3	93.3	93.3	93.3	93.3	93.3	93.3
100	90.0	93.3	96.7	**80.0****	96.7	93.3	96.7

** Two bold asterisks indicate a statistically significant decrease compared to the lab control using both the traditional EPA flow-chart statistical methods and the TST analysis.

Pacific Topsmelt Acute Survival Test (9/10/2019)

There was no statistically significant reduction in Pacific topsmelt survival in sites SIYB-4 and SIYB-REF compared to control. Statistical results for the topsmelt tests are summarized in Table 8, and mean test results are summarized in Table 9.

Table 8. Statistical Results Summary – Pacific Topsmelt 96-hour Survival – 9/10/19 Test

Sample ID	NOEC (% sample)	TU_a value	TST (Pass/Fail)
SIYB-4	100	0.0	Pass
SIYB-REF	100	0.31	Pass

NOEC: the highest concentration tested resulting in no observed effect using the EPA 1995 statistical approach

LC_{50}: concentration expected to cause a lethal effect to 50 percent of the organisms

TU_a: (Acute Toxic Unit) = 100 ÷ LC_{50}; or Log (100 - %survival) ÷ 1.7, if LC_{50} is >100%. TU_a = 0 if 100% survival in the undiluted sample

TST: Pass = sample is non-toxic according to the TST analysis; Fail = sample is toxic according to the TST analysis

Table 9. Pacific Topsmelt 96-hr Acute Survival Test Detailed Summary – 9/10/19 Test

Test Concentration (% sample)	Mean Survival (%)	
	Sample ID	
	SIYB-4	SIYB-REF
Lab Control	100	100
0.2-µm Filter Control	93.3	NT
100 Unfiltered	100	96.7
100 0.2-µm Filtered	100	NT

NT = not tested

Quality Assurance

All SIYB samples were delivered on ice and were received at the laboratory in good condition on the same day as collected. The mussel test and the topsmelt tests from 8/19/19 and 9/10/19 were initiated within the 36-hour holding time requirement. The samples collected 8/19/19 were re-tested outside of the 36-hour holding time period for the 8/22/19 topsmelt re-test (73 to 79 hours past collection). The mussel test met all TAC as set by US EPA and ASTM, as well as internal QA Program requirements.

As discussed earlier, none of the lab controls met TAC for the first topsmelt acute survival test that was initiated on 8/19/19. Mean percent survival in all lab controls ranged from 73 to 83 percent, which is below the 90 percent criterion for the 96-hour acute survival test. Additionally, within concentration variability was observed throughout the test, with some replicates of the same concentration having two surviving fish and others with five. This suggests that the batch of topsmelt used for testing was not of optimal quality. The fish were received at the lab by overnight shipment on 8/17/19 and acclimated to lab conditions for two days prior to testing. Water quality parameters measured upon receipt were within appropriate ranges and mortality during holding and acclimation was 11.6 percent, which is typical (if not low) for this species. There was no indication at the time of testing that the fish were unhealthy. However, occasional issues with poor topsmelt batch performance can occur, as there is only one culturing facility in the U.S. that supplies larval topsmelt for bioassays.

The samples were re-tested on 8/22/19 with a different batch of fish that were received on 8/20/19, intended for a different test that was cancelled. Due to the limited number of fish in this batch, only the 100 percent concentration of each sample was tested and one lab control was shared among all samples. The lab control for this test met TAC with 93.3 mean percent survival. For comparison, total mortality of this batch was 14 percent in holding/acclimation. The lab control for the third topsmelt test, initiated on 9/10/19, resulted in 100 percent survival.

Any minor QA/QC issues that were not likely to have any bearing on the test results, such as slight temperature deviations, are noted on the data sheets, and a list of data qualifier codes is available in Appendix D.

The reference toxicant test results for both species are summarized in Table 10 and presented in full in Appendix E. The controls for the bivalve larvae test and the topsmelt acute survival test from 9/10/19 met the minimum test acceptability criteria. The controls for the acute topsmelt tests initiated on 8/19/19 and 8/22/19 did not meet the minimum test acceptability criteria. The calculated EC_{50} values for all of the reference toxicant tests fell within two standard deviations (SD) of the laboratory historical means, indicating that the organisms used for testing were of typical sensitivity to copper.

Table 10. Reference Toxicant Test Results

Species & Endpoint	**EC_{50}/LC_{50} (µg/L copper)**	**Historical Mean ±2 SD (µg/L copper)**	**CV (%)**
Bivalve: Combined Survival and Development: 8/20/19	10.9	7.85 ± 4.28	27.2
Pacific Topsmelt: 8/19/19 96-hr Survival	159	153 ± 136	44.4
Pacific Topsmelt: 8/22/19 96-hr Survival	232	154 ± 136	44.1
Pacific Topsmelt: 9/10/19 96-hr Survival	246	156 ± 140	44.6

EC_{50}/LC_{50}: concentration expected to cause an adverse or lethal effect to 50 percent of the test organisms

Historical Mean = the mean EC_{50} or LC_{50} value for previous reference toxicant tests performed by the laboratory, plus or minus two standard deviations

References

ASTM. 1998. Standard Guide for Conducting Static Acute Toxicity Tests Starting with Embryos of Four Species of Saltwater Bivalve Molluscs. ASTM E 724 – 98.

PTI Environmental Services for USEPA Region 10, Office of Puget Sound. Recommended Guidelines for Conducting Laboratory Bioassays on Puget Sound Sediments. July 1995.

Tidepool Scientific Software. 2000-2013. CETIS Comprehensive Environmental Toxicity Information System Software, Version 1.8.7.20.

US EPA. 1995. Short-Term Method for Estimating the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine and Estuarine Organisms (EPA/600/R-95/136). Office of Research and Development, Washington DC. US EPA, 2002. Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms, Fifth Edition (EPA/821/R-02/012). Office of Water, Washington DC.

USEPA. 2010. National Pollutant Discharge Elimination System Test of Significant Toxicity Implementation Document. EPA/833/R-10/003. June 2010.

Wood. 2019. Final Quality Assurance Project Plan for Shelter Island Yacht Basin Total Maximum Daily Load Monitoring Plan. August 2019.

Appendix A

Test Data and Statistical Analyses

Bivalve Survival and Development Test

CETIS Summary Report

Report Date: 03 Oct-19 13:45 (p 1 of 4)
Test Code: 1908-S084 | 16-5980-1454

Bivalve Larval Survival and Development Test — **Nautilus Environmental (CA)**

Batch ID:	15-8473-1235	**Test Type:**	Development-Survival	**Analyst:**	
Start Date:	20 Aug-19 14:15	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater
Ending Date:	22 Aug-19 12:25	**Species:**	Mytilus galloprovincialis	**Brine:**	Not Applicable
Duration:	46h	**Source:**	Mission Bay	**Age:**	

Sample ID:	07-4901-7133	**Code:**	19-0917	**Client:**	Wood Environment & Infrastructure
Sample Date:	19 Aug-19 15:10	**Material:**	Ambient Water	**Project:**	POSD - SIYB TMDL Monitoring
Receive Date:	19 Aug-19 17:40	**Source:**	Shelter Island Yacht Basin		
Sample Age:	23h (7.5 °C)	**Station:**	SIYB-1		

Batch Note: 101= 100% sample filtered to 0.45um

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
02-9336-2445	Combined Development Ra	50	100	70.71	3.58%	2	Dunnett Multiple Comparison Test
02-3549-1270	Development Rate	25	50	35.36	2.57%	4	Dunnett Multiple Comparison Test
20-1707-6619	Survival Rate	100	>100	NA	2.26%	1	Steel Many-One Rank Sum Test

Point Estimate Summary

Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method
06-9250-3058	Combined Development Ra	EC25	65.23	62.91	67.59	1.533	Linear Interpolation (ICPIN)
		EC50	83.1	80.07	87.2	1.203	
13-5937-4129	Development Rate	EC25	65.16	62.8	68.37	1.535	Linear Interpolation (ICPIN)
		EC50	83.31	79.98	88.87	1.2	
08-4022-2048	Survival Rate	EC25	>100	N/A	N/A	<1	Linear Interpolation (ICPIN)
		EC50	>100	N/A	N/A	<1	

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits	Overlap	Decision
02-3549-1270	Development Rate	Control Resp	0.9827	0.9 - NL	Yes	Passes Acceptability Criteria
13-5937-4129	Development Rate	Control Resp	0.9827	0.9 - NL	Yes	Passes Acceptability Criteria
08-4022-2048	Survival Rate	Control Resp	1	0.5 - NL	Yes	Passes Acceptability Criteria
20-1707-6619	Survival Rate	Control Resp	1	0.5 - NL	Yes	Passes Acceptability Criteria
02-9336-2445	Combined Development Ra	PMSD	0.03584	NL - 0.25	No	Passes Acceptability Criteria

Analyst: JCL/AC QA: AC 10/3/19

Bivalve Larval Survival and Development Test **Nautilus Environmental (CA)**

Combined Development Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Filter Control	5	0.9719	0.9533	0.9905	0.9545	0.9913	0.006697	0.01497	1.54%	0.0%
0	Lab Control	5	0.9827	0.9755	0.9899	0.9765	0.9903	0.002581	0.005771	0.59%	-1.11%
6.25		5	0.9599	0.9315	0.9883	0.9293	0.9854	0.01023	0.02288	2.38%	1.24%
12.5		5	0.9935	0.9885	0.9986	0.9862	0.9955	0.001819	0.004067	0.41%	-2.22%
25		5	0.9569	0.9064	1	0.904	1	0.0182	0.0407	4.25%	1.55%
50		5	0.9461	0.9085	0.9837	0.9024	0.9803	0.01354	0.03028	3.2%	2.65%
100		5	0.26	0.1776	0.3425	0.2121	0.3687	0.0297	0.06642	25.54%	73.25%
101		5	0.2171	0.1931	0.2411	0.1928	0.2423	0.008649	0.01934	8.91%	77.66%

Development Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Filter Control	5	0.9838	0.973	0.9947	0.9742	0.9913	0.003908	0.008738	0.89%	0.0%
0	Lab Control	5	0.9827	0.9755	0.9899	0.9765	0.9903	0.002581	0.005771	0.59%	0.12%
6.25		5	0.9848	0.9763	0.9932	0.9756	0.9948	0.003047	0.006813	0.69%	-0.1%
12.5		5	0.9935	0.9885	0.9986	0.9862	0.9955	0.001819	0.004067	0.41%	-0.98%
25		5	0.9858	0.9742	0.9973	0.9758	1	0.00417	0.009324	0.95%	-0.2%
50		5	0.9461	0.9085	0.9837	0.9024	0.9803	0.01354	0.03028	3.2%	3.84%
100		5	0.2696	0.1729	0.3663	0.2132	0.3989	0.03483	0.07789	28.89%	72.6%
101		5	0.2188	0.1958	0.2419	0.1928	0.2423	0.008313	0.01859	8.49%	77.76%

Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Filter Control	5	0.9879	0.9698	1	0.9646	1	0.006507	0.01455	1.47%	0.0%
0	Lab Control	5	1	1	1	1	1	0	0	0.0%	-1.23%
6.25		5	0.9747	0.944	1	0.9444	1	0.01107	0.02474	2.54%	1.33%
12.5		5	1	1	1	1	1	0	0	0.0%	-1.23%
25		5	0.9707	0.9205	1	0.9192	1	0.0181	0.04047	4.17%	1.74%
50		5	1	1	1	1	1	0	0	0.0%	-1.23%
100		5	0.9707	0.9332	1	0.9242	1	0.0135	0.03018	3.11%	1.74%
101		5	0.9919	0.9695	1	0.9596	1	0.008081	0.01807	1.82%	-0.41%

Analyst: JCL/AC QA: AC 10/3/19

Combined Development Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Filter Control	0.9913	0.9742	0.9545	0.9596	0.9798
0	Lab Control	0.9817	0.9903	0.9868	0.9765	0.9783
6.25		0.9756	0.9854	0.9293	0.9646	0.9444
12.5		0.9952	0.9953	0.9953	0.9955	0.9862
25		0.9758	0.9242	0.904	1	0.9803
50		0.9303	0.9024	0.9623	0.9803	0.9552
100		0.2778	0.2121	0.2294	0.3687	0.2121
101		0.2136	0.2423	0.2297	0.1928	0.2071

Development Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Filter Control	0.9913	0.9742	0.9895	0.9744	0.9898
0	Lab Control	0.9817	0.9903	0.9868	0.9765	0.9783
6.25		0.9756	0.9854	0.984	0.9948	0.9842
12.5		0.9952	0.9953	0.9953	0.9955	0.9862
25		0.9758	0.9892	0.9835	1	0.9803
50		0.9303	0.9024	0.9623	0.9803	0.9552
100		0.2865	0.2199	0.2294	0.3989	0.2132
101		0.2136	0.2423	0.2297	0.1928	0.2158

Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Filter Control	1	1	0.9646	0.9848	0.9899
0	Lab Control	1	1	1	1	1
6.25		1	1	0.9444	0.9697	0.9596
12.5		1	1	1	1	1
25		1	0.9343	0.9192	1	1
50		1	1	1	1	1
100		0.9697	0.9646	1	0.9242	0.9949
101		1	1	1	1	0.9596

Analyst: JCL/AC QA: AC 10/3/19

CETIS Summary Report

Bivalve Larval Survival and Development Test — **Nautilus Environmental (CA)**

Combined Development Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Filter Control	228/230	227/233	189/198	190/198	194/198
0	Lab Control	214/218	204/206	224/227	208/213	225/230
6.25		200/205	202/205	184/198	191/198	187/198
12.5		209/210	210/211	213/214	221/222	215/218
25		202/207	183/198	179/198	203/203	199/203
50		187/201	185/205	204/212	199/203	213/223
100		55/198	42/198	53/231	73/198	42/198
101		44/206	55/227	51/222	43/223	41/198

Development Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Filter Control	228/230	227/233	189/191	190/195	194/196
0	Lab Control	214/218	204/206	224/227	208/213	225/230
6.25		200/205	202/205	184/187	191/192	187/190
12.5		209/210	210/211	213/214	221/222	215/218
25		202/207	183/185	179/182	203/203	199/203
50		187/201	185/205	204/212	199/203	213/223
100		55/192	42/191	53/231	73/183	42/197
101		44/206	55/227	51/222	43/223	41/190

Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Filter Control	198/198	198/198	191/198	195/198	196/198
0	Lab Control	198/198	198/198	198/198	198/198	198/198
6.25		198/198	198/198	187/198	192/198	190/198
12.5		198/198	198/198	198/198	198/198	198/198
25		198/198	185/198	182/198	198/198	198/198
50		198/198	198/198	198/198	198/198	198/198
100		192/198	191/198	198/198	183/198	197/198
101		198/198	198/198	198/198	198/198	190/198

Analyst: JCL/AC QA: AC10/3/19

CETIS Analytical Report

Report Date:	11 Sep-19 08:59 (p 1 of 8)
Test Code:	1908-S084 | 16-5980-1454

Bivalve Larval Survival and Development Test | **Nautilus Environmental (CA)**

Analysis ID:	02-9336-2445	**Endpoint:**	Combined Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 Sep-19 8:58	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C > T	NA	NA	3.58%	50	100	70.71	2

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		6.25	1.511	2.362	0.101	8	0.2205	CDF	Non-Significant Effect
		12.5	-1.219	2.362	0.101	8	0.9911	CDF	Non-Significant Effect
		25	1.284	2.362	0.101	8	0.3011	CDF	Non-Significant Effect
		50	2.26	2.362	0.101	8	0.0610	CDF	Non-Significant Effect
		100*	21.24	2.362	0.101	8	<0.0001	CDF	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.258017	0.6516033	5	142.8	<0.0001	Significant Effect
Error	0.1095212	0.004563382	24			
Total	3.367538		29			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	12.49	15.09	0.0287	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9785	0.9031	0.7836	Normal Distribution

Combined Development Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	0.9827	0.9755	0.9899	0.9817	0.9765	0.9903	0.002581	0.59%	0.0%
6.25		5	0.9599	0.9315	0.9883	0.9646	0.9293	0.9854	0.01023	2.38%	2.32%
12.5		5	0.9935	0.9885	0.9986	0.9953	0.9862	0.9955	0.001818	0.41%	-1.1%
25		5	0.9569	0.9064	1	0.9758	0.904	1	0.0182	4.25%	2.63%
50		5	0.9461	0.9085	0.9837	0.9552	0.9024	0.9803	0.01354	3.2%	3.73%
100		5	0.26	0.1776	0.3425	0.2294	0.2121	0.3687	0.0297	25.54%	73.54%

Angular (Corrected) Transformed Summary

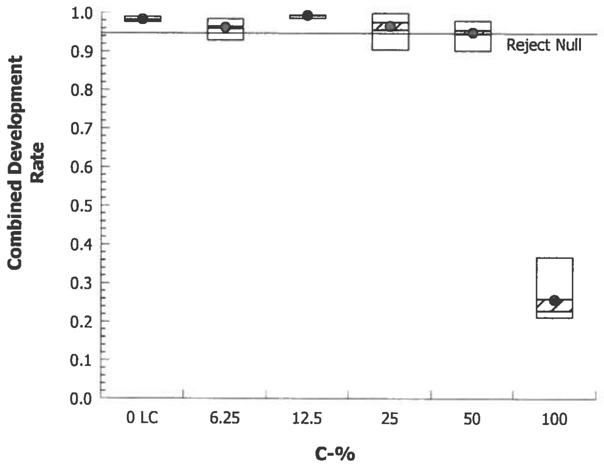
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	1.44	1.412	1.469	1.435	1.417	1.472	0.0103	1.6%	0.0%
6.25		5	1.376	1.302	1.45	1.382	1.302	1.45	0.02671	4.34%	4.48%
12.5		5	1.493	1.465	1.52	1.502	1.453	1.504	0.009845	1.48%	-3.62%
25		5	1.386	1.246	1.526	1.415	1.256	1.536	0.05047	8.15%	3.81%
50		5	1.344	1.26	1.428	1.357	1.253	1.43	0.03035	5.05%	6.7%
100		5	0.5329	0.4412	0.6246	0.4995	0.4786	0.6525	0.03302	13.86%	63.01%

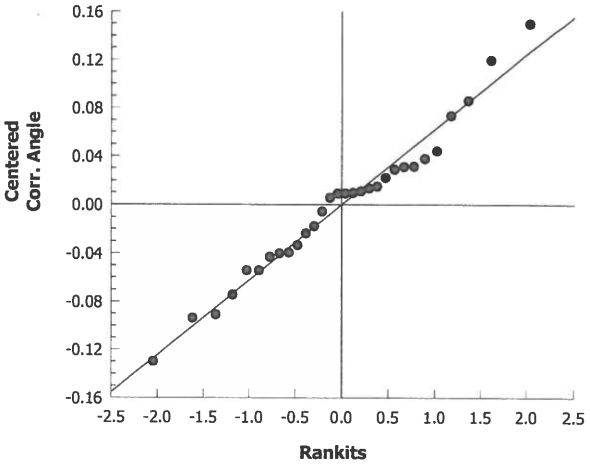
Analyst: JCL QA: AC 10/3/19

Bivalve Larval Survival and Development Test			**Nautilus Environmental (CA)**

Analysis ID:	02-9336-2445	**Endpoint:**	Combined Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 Sep-19 8:58	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Graphics





Analyst: JC QA: AC 10/3/19

CETIS Analytical Report

TST

Report Date:	11 Sep-19 08:59 (p 3 of 8)
Test Code:	1908-S084 | 16-5980-1454

Bivalve Larval Survival and Development Test **Nautilus Environmental (CA)**

Analysis ID:	11-2008-8919	**Endpoint:**	Combined Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 Sep-19 8:59	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	TST b	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C*b < T	NA	NA	0.75	2.36%	50	100	70.71	2

TST-Welch's t Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		6.25*	10.63	2.132	0.059	4	0.0002	CDF	Non-Significant Effect
		12.5*	32.94	1.895	0.024	7	<0.0001	CDF	Non-Significant Effect
		25*	5.979	2.132	0.109	4	0.0020	CDF	Non-Significant Effect
		50*	8.414	2.132	0.067	4	0.0005	CDF	Non-Significant Effect
		100	-16.14	2.132	0.072	4	1.0000	CDF	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.258017	0.6516033	5	142.8	<0.0001	Significant Effect
Error	0.1095212	0.004563382	24			
Total	3.367538		29			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	12.49	15.09	0.0287	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9785	0.9031	0.7836	Normal Distribution

Combined Development Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	0.9827	0.9755	0.9899	0.9817	0.9765	0.9903	0.002581	0.59%	0.0%
6.25		5	0.9599	0.9315	0.9883	0.9646	0.9293	0.9854	0.01023	2.38%	2.32%
12.5		5	0.9935	0.9885	0.9986	0.9953	0.9862	0.9955	0.001818	0.41%	-1.1%
25		5	0.9569	0.9064	1	0.9758	0.904	1	0.0182	4.25%	2.63%
50		5	0.9461	0.9085	0.9837	0.9552	0.9024	0.9803	0.01354	3.2%	3.73%
100		5	0.26	0.1776	0.3425	0.2294	0.2121	0.3687	0.0297	25.54%	73.54%

Angular (Corrected) Transformed Summary

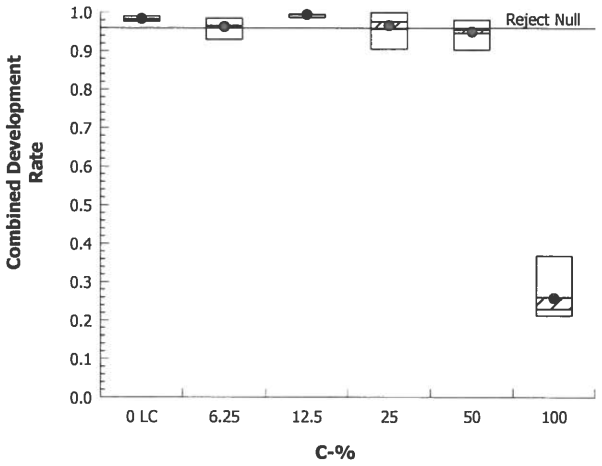
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	1.44	1.412	1.469	1.435	1.417	1.472	0.0103	1.6%	0.0%
6.25		5	1.376	1.302	1.45	1.382	1.302	1.45	0.02671	4.34%	4.48%
12.5		5	1.493	1.465	1.52	1.502	1.453	1.504	0.009845	1.48%	-3.62%
25		5	1.386	1.246	1.526	1.415	1.256	1.536	0.05047	8.15%	3.81%
50		5	1.344	1.26	1.428	1.357	1.253	1.43	0.03035	5.05%	6.7%
100		5	0.5329	0.4412	0.6246	0.4995	0.4786	0.6525	0.03302	13.86%	63.01%

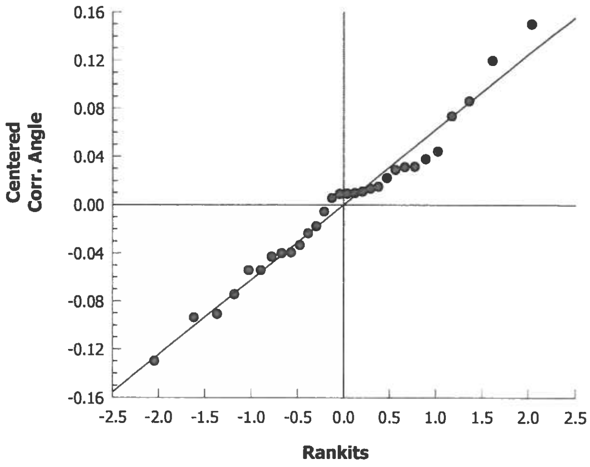
Analyst: JCL QA: AC 10/3/19

Bivalve Larval Survival and Development Test **Nautilus Environmental (CA)**

Analysis ID:	11-2008-8919	**Endpoint:**	Combined Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 Sep-19 8:59	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Graphics





Analyst: JCL QA: AC 10/3/19

CETIS Analytical Report

Report Date:	13 Sep-19 09:38 (p 1 of 2)
Test Code:	1908-S084 | 16-5980-1454

Bivalve Larval Survival and Development Test — **Nautilus Environmental (CA)**

Analysis ID:	04-4147-0443	**Endpoint:**	Combined Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	13 Sep-19 9:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch Note: 101= 100% sample filtered to 0.45um

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	0.75%	Fails combined development rate

Equal Variance t Two-Sample Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		101*	65.03	1.86	0.027	8	<0.0001	CDF	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2.285236	2.285236	1	4228	<0.0001	Significant Effect
Error	0.004323516	0.0005404394	8			
Total	2.289559		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.036	23.15	0.9734	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9297	0.7411	0.4449	Normal Distribution

Combined Development Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	0.9827	0.9755	0.9899	0.9817	0.9765	0.9903	0.002581	0.59%	0.0%
101	100% filtered	5	0.2171	0.1931	0.2411	0.2136	0.1928	0.2423	0.008649	8.91%	77.91%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	1.44	1.412	1.469	1.435	1.417	1.472	0.0103	1.6%	0.0%
101	100% filtered	5	0.4844	0.4553	0.5135	0.4804	0.4546	0.5147	0.01049	4.84%	66.37%

Analyst: JC QA: AC 10/3/19

CETIS Analytical Report TST

Report Date:	13 Sep-19 09:38 (p 2 of 2)
Test Code:	1908-S084 | 16-5980-1454

Bivalve Larval Survival and Development Test — **Nautilus Environmental (CA)**

Analysis ID:	12-8261-2804	**Endpoint:**	Combined Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	13 Sep-19 9:34	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Batch Note: 101= 100% sample filtered to 0.45um

Data Transform	Zeta	Alt Hyp	Trials	Seed	TST b	PMSD	Test Result
Angular (Corrected)	NA	C*b < T	NA	NA	0.75	0.67%	Fails combined development rate

TST-Welch's t Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		101	-45.75	1.895	0.025	7	1.0000	CDF	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2.285236	2.285236	1	4228	<0.0001	Significant Effect
Error	0.004323516	0.0005404394	8			
Total	2.289559		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.036	23.15	0.9734	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9297	0.7411	0.4449	Normal Distribution

Combined Development Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	0.9827	0.9755	0.9899	0.9817	0.9765	0.9903	0.002581	0.59%	0.0%
101	100 filt.	5	0.2171	0.1931	0.2411	0.2136	0.1928	0.2423	0.008649	8.91%	77.91%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	1.44	1.412	1.469	1.435	1.417	1.472	0.0103	1.6%	0.0%
101	100 filt.	5	0.4844	0.4553	0.5135	0.4804	0.4546	0.5147	0.01049	4.84%	66.37%

Analyst: JR QA: AC 10/3/19

Bivalve Larval Survival and Development Test	**Nautilus Environmental (CA)**

Analysis ID:	02-3549-1270	**Endpoint:**	Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 Sep-19 8:58	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C > T	NA	NA	2.57%	25	50	35.36	4

Dunnett Multiple Comparison Test

Control	vs C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control	6.25	-0.2948	2.362	0.077	8	0.9058	CDF	Non-Significant Effect
	12.5	-1.591	2.362	0.077	8	0.9972	CDF	Non-Significant Effect
	25	-0.5294	2.362	0.077	8	0.9440	CDF	Non-Significant Effect
	50*	2.949	2.362	0.077	8	0.0143	CDF	Significant Effect
	100*	27.4	2.362	0.077	8	<0.0001	CDF	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.390529	0.6781058	5	252.9	<0.0001	Significant Effect
Error	0.06435986	0.002681661	24			
Total	3.454889		29			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	11.02	15.09	0.0510	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9469	0.9031	0.1398	Normal Distribution

Development Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	0.9827	0.9755	0.9899	0.9817	0.9765	0.9903	0.002581	0.59%	0.0%
6.25		5	0.9848	0.9763	0.9932	0.9842	0.9756	0.9948	0.003047	0.69%	-0.21%
12.5		5	0.9935	0.9885	0.9986	0.9953	0.9862	0.9955	0.001818	0.41%	-1.1%
25		5	0.9858	0.9742	0.9973	0.9835	0.9758	1	0.00417	0.95%	-0.31%
50		5	0.9461	0.9085	0.9837	0.9552	0.9024	0.9803	0.01354	3.2%	3.73%
100		5	0.2696	0.1729	0.3663	0.2294	0.2132	0.3989	0.03483	28.89%	72.57%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	1.44	1.412	1.469	1.435	1.417	1.472	0.0103	1.6%	0.0%
6.25		5	1.45	1.412	1.488	1.445	1.414	1.499	0.01364	2.1%	-0.67%
12.5		5	1.493	1.465	1.52	1.502	1.453	1.504	0.009845	1.48%	-3.62%
25		5	1.458	1.399	1.517	1.442	1.415	1.536	0.02124	3.26%	-1.2%
50		5	1.344	1.26	1.428	1.357	1.253	1.43	0.03035	5.05%	6.7%
100		5	0.5432	0.4372	0.6491	0.4995	0.4799	0.6836	0.03816	15.71%	62.29%

Analyst: JCL QA: AC 10/3/19

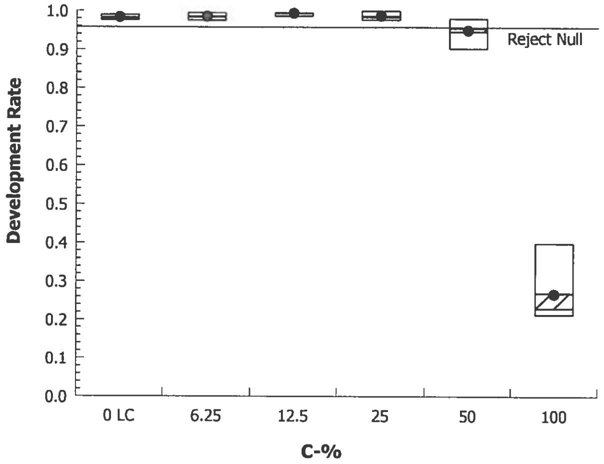
CETIS Analytical Report

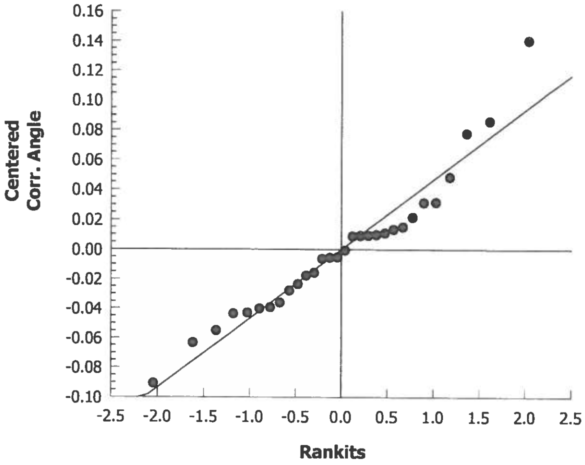
Report Date: 11 Sep-19 08:59 (p 6 of 8)
Test Code: 1908-S084 | 16-5980-1454

Bivalve Larval Survival and Development Test **Nautilus Environmental (CA)**

Analysis ID:	02-3549-1270	**Endpoint:**	Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 Sep-19 8:58	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Graphics





Analyst: JC QA: AC 10/3/19

CETIS Analytical Report

Report Date:	13 Sep-19 09:45 (p 1 of 2)
Test Code:	1908-S084 | 16-5980-1454

Bivalve Larval Survival and Development Test — **Nautilus Environmental (CA)**

Analysis ID:	12-4280-1137	**Endpoint:**	Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	13 Sep-19 9:45	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch Note: 101= 100% sample filtered to 0.45um

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	0.73%	Fails development rate

Equal Variance t Two-Sample Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		101*	66.15	1.86	0.027	8	<0.0001	CDF	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2.275039	2.275039	1	4376	<0.0001	Significant Effect
Error	0.004159145	0.0005198931	8			
Total	2.279199		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.043	23.15	0.9684	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9521	0.7411	0.6937	Normal Distribution

Development Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	0.9827	0.9755	0.9899	0.9817	0.9765	0.9903	0.002581	0.59%	0.0%
101	100 filt.	5	0.2188	0.1958	0.2419	0.2158	0.1928	0.2423	0.008313	8.49%	77.73%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	1.44	1.412	1.469	1.435	1.417	1.472	0.0103	1.6%	0.0%
101	100 filt.	5	0.4865	0.4585	0.5145	0.4831	0.4546	0.5147	0.01009	4.64%	66.22%

Analyst: JCL QA: AC 10/3/19

CETIS Analytical Report

TST

Report Date:	13 Sep-19 09:45 (p 2 of 2)
Test Code:	1908-S084 | 16-5980-1454

Bivalve Larval Survival and Development Test **Nautilus Environmental (CA)**

Analysis ID:	08-4227-5048	**Endpoint:**	Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	13 Sep-19 9:45	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Batch Note: 101= 100% sample filtered to 0.45um

Data Transform	Zeta	Alt Hyp	Trials	Seed	TST b	PMSD	Test Result
Angular (Corrected)	NA	C*b < T	NA	NA	0.75	0.65%	Fails development rate

TST-Welch's t Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		101	-46.73	1.895	0.024	7	1.0000	CDF	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2.275039	2.275039	1	4376	<0.0001	Significant Effect
Error	0.004159145	0.0005198931	8			
Total	2.279199		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.043	23.15	0.9684	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9521	0.7411	0.6937	Normal Distribution

Development Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	0.9827	0.9755	0.9899	0.9817	0.9765	0.9903	0.002581	0.59%	0.0%
101	100 filt.	5	0.2188	0.1958	0.2419	0.2158	0.1928	0.2423	0.008313	8.49%	77.73%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	1.44	1.412	1.469	1.435	1.417	1.472	0.0103	1.6%	0.0%
101	100 filt.	5	0.4865	0.4585	0.5145	0.4831	0.4546	0.5147	0.01009	4.64%	66.22%

Analyst: JU QA: 10/3/19

CETIS Analytical Report

Bivalve Larval Survival and Development Test	**Nautilus Environmental (CA)**

Analysis ID:	20-1707-6619	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 Sep-19 8:58	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C > T	NA	NA	2.26%	100	>100	NA	1

Steel Many-One Rank Sum Test

Control	vs C-%	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Lab Control	6.25	20	16	1	8	0.1899	Asymp	Non-Significant Effect
	12.5	27.5	16	1	8	0.8333	Asymp	Non-Significant Effect
	25	22.5	16	1	8	0.3937	Asymp	Non-Significant Effect
	50	27.5	16	1	8	0.8333	Asymp	Non-Significant Effect
	100	17.5	16	1	8	0.0695	Asymp	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.08174262	0.01634852	5	2.743	0.0426	Significant Effect
Error	0.14305	0.005960417	24			
Total	0.2247926		29			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	325.9	15.09	<0.0001	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.8793	0.9031	0.0027	Non-normal Distribution

Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	1	1	1	1	1	1	0	0.0%	0.0%
6.25		5	0.9747	0.944	1	0.9697	0.9444	1	0.01107	2.54%	2.53%
12.5		5	1	1	1	1	1	1	0	0.0%	0.0%
25		5	0.9707	0.9205	1	1	0.9192	1	0.0181	4.17%	2.93%
50		5	1	1	1	1	1	1	0	0.0%	0.0%
100		5	0.9707	0.9332	1	0.9697	0.9242	1	0.0135	3.11%	2.93%

Angular (Corrected) Transformed Summary

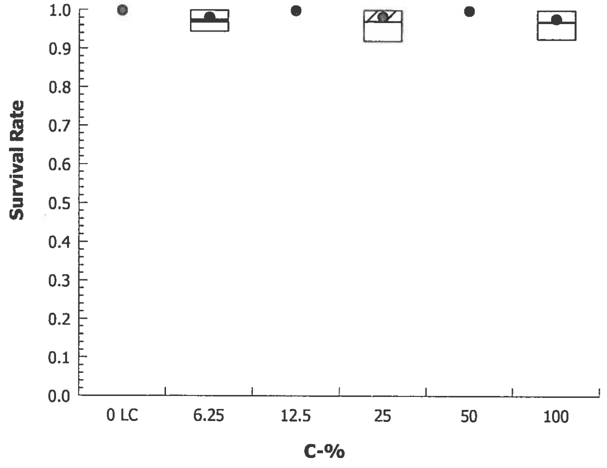
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	1.535	1.535	1.536	1.535	1.535	1.535	0	0.0%	0.0%
6.25		5	1.434	1.315	1.552	1.396	1.333	1.535	0.04272	6.66%	6.63%
12.5		5	1.535	1.535	1.536	1.535	1.535	1.535	0	0.0%	0.0%
25		5	1.44	1.278	1.602	1.535	1.283	1.535	0.05851	9.09%	6.21%
50		5	1.535	1.535	1.536	1.535	1.535	1.535	0	0.0%	0.0%
100		5	1.421	1.3	1.542	1.396	1.292	1.535	0.04363	6.87%	7.45%

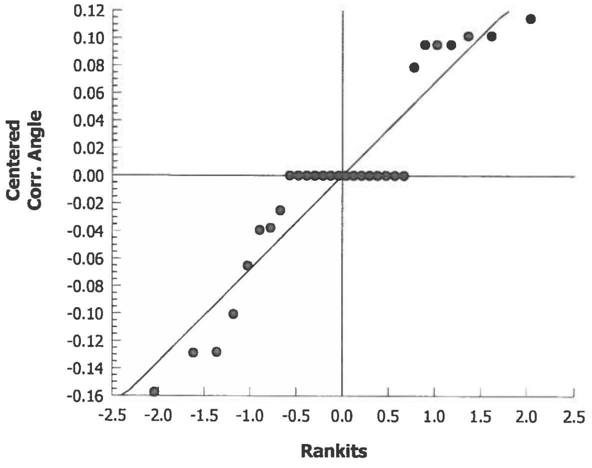
Analyst: JCL QA: AC10/3/19

Bivalve Larval Survival and Development Test — **Nautilus Environmental (CA)**

Analysis ID:	20-1707-6619	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 Sep-19 8:58	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Graphics





Analyst: JC QA: AC 10/3/19

CETIS Analytical Report

Report Date: 11 Sep-19 08:59 (p 1 of 3)
Test Code: 1908-S084 | 16-5980-1454

Bivalve Larval Survival and Development Test

Nautilus Environmental (CA)

Analysis ID:	06-9250-3058	**Endpoint:**	Combined Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 Sep-19 8:58	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	269638	1000	Yes	Two-Point Interpolation

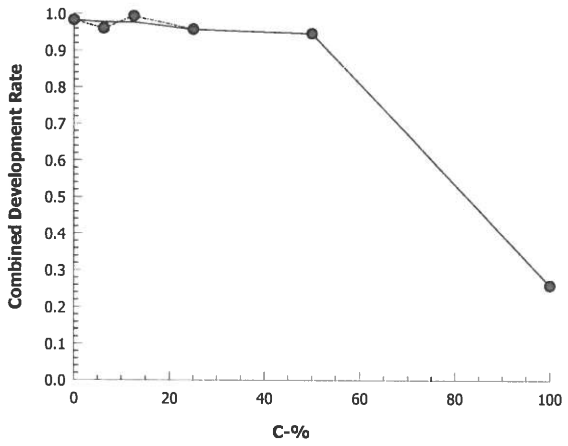
Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC25	65.23	62.91	67.59	1.533	1.479	1.589
EC50	83.1	80.07	87.2	1.203	1.147	1.249

Combined Development Rate Summary

			Calculated Variate(A/B)								
C-%	**Control Type**	**Count**	**Mean**	**Min**	**Max**	**Std Err**	**Std Dev**	**CV%**	**%Effect**	**A**	**B**
0	Lab Control	5	0.9827	0.9765	0.9903	0.002581	0.00577	0.59%	0.0%	1075	1094
6.25		5	0.9599	0.9293	0.9854	0.01023	0.02288	2.38%	2.32%	964	1004
12.5		5	0.9935	0.9862	0.9955	0.001818	0.004065	0.41%	-1.1%	1068	1075
25		5	0.9569	0.904	1	0.0182	0.0407	4.25%	2.63%	966	1009
50		5	0.9461	0.9024	0.9803	0.01354	0.03028	3.2%	3.73%	988	1044
100		5	0.26	0.2121	0.3687	0.0297	0.06642	25.54%	73.54%	265	1023

Graphics



Analyst: JCL QA: AC 10/3/19

CETIS Analytical Report

Report Date:	11 Sep-19 08:59 (p 2 of 3)
Test Code:	1908-S084 | 16-5980-1454

Bivalve Larval Survival and Development Test **Nautilus Environmental (CA)**

Analysis ID:	13-5937-4129	**Endpoint:**	Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 Sep-19 8:58	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	1563130	1000	Yes	Two-Point Interpolation

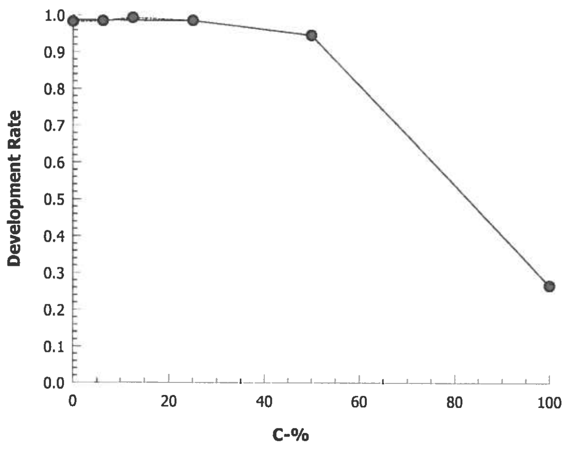
Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC25	65.16	62.8	68.37	1.535	1.463	1.592
EC50	83.31	79.98	88.87	1.2	1.125	1.25

Development Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Lab Control	5	0.9827	0.9765	0.9903	0.002581	0.00577	0.59%	0.0%	1075	1094
6.25		5	0.9848	0.9756	0.9948	0.003047	0.006813	0.69%	-0.21%	964	979
12.5		5	0.9935	0.9862	0.9955	0.001818	0.004065	0.41%	-1.1%	1068	1075
25		5	0.9858	0.9758	1	0.00417	0.009324	0.95%	-0.31%	966	980
50		5	0.9461	0.9024	0.9803	0.01354	0.03028	3.2%	3.73%	988	1044
100		5	0.2696	0.2132	0.3989	0.03483	0.07789	28.89%	72.57%	265	994

Graphics



Analyst: JCL QA: AL 10/3/19

CETIS Analytical Report

Report Date: 11 Sep-19 08:59 (p 3 of 3)
Test Code: 1908-S084 | 16-5980-1454

Bivalve Larval Survival and Development Test — **Nautilus Environmental (CA)**

Analysis ID:	08-4022-2048	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 Sep-19 8:58	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	262643	1000	Yes	Two-Point Interpolation

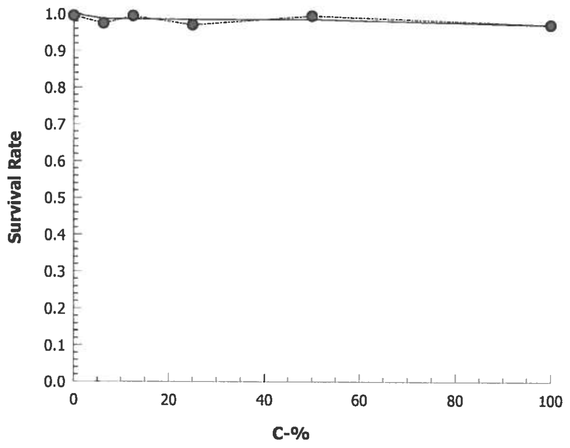
Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC25	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Lab Control	5	1	1	1	0	0	0.0%	0.0%	990	990
6.25		5	0.9747	0.9444	1	0.01107	0.02474	2.54%	2.53%	965	990
12.5		5	1	1	1	0	0	0.0%	0.0%	990	990
25		5	0.9707	0.9192	1	0.0181	0.04047	4.17%	2.93%	961	990
50		5	1	1	1	0	0	0.0%	0.0%	990	990
100		5	0.9707	0.9242	1	0.0135	0.03018	3.11%	2.93%	961	990

Graphics



Analyst: JC QA: AC 10/3/19

Embryo Larval Bioassay **48-hour Development**

Client: Wood/POSD

Sample ID: SIYB-1

Test ID: 1908-S084

Test Species: *M. galloprovincialis*

Start Date/Time: 8/20/2019 1415

End Date/Time: 8/22/2019 1225

Random #	Number Normal	Number Abnormal		Total Number Counted	Intials/Date
		Number Curved Shell	All other abnormal		
31	214	1	3	218	JCL 8/30/19
32	199	3	1	203	
33	221	0	1	222	
34	44	3	159	206	
35	208	0	5	213	
36	215	0	3	218	
37	202	0	5	207	
38	42	4	151	197	
39	225	0	5	230	
40	204	0	2	206	
41	228	0	2	230	JCL 9/13/19
42	202	0	3	205	
43	55	7	165	227	
44	41	4	145	Ⓐ ~~153~~ 190	
45	224	0	3	227	
46	227	0	6	233	
47	Ⓐ ~~15~~ 51	5	166	222	
48	185	10	10	205	
49	209	0	1	210	
50	43	6	174	223	
51	203	0	0	203	
52	73	2	108	183	
53	189	0	2	191	
54	199	0	4	203	
55	200	1	4	205	
56	194	Ⓐ ~~0~~ 0	2	196	
57	210	0	1	211	
58	187	0	3	190	
59	42	4	145	191	
60	190	0	5	195	
61	183	0	2	185	
62	204	0	8	Ⓐ ~~22~~ 212	
63	55	3	134	192	
64	213	0	1	214	
65	191	0	Ⓐ ~~192~~ 1	192	
66	213	3	7	223	
67	184	0	3	187	
68	179	0	3	182	
69	187	3	11	201	
70	Ⓐ ~~1~~ 53	1	177	231	

Comments: Ⓐ QR JCL 9/13/19

QC Check: AC 9/10/19

Final Review: S 10/11/19

CETIS Test Data Worksheet

Report Date: 16 Aug-19 12:38 (p 1 of 1)
Test Code: 1908-S084 16-5980-1454/62EE8F6E

Bivalve Larval Survival and Development Test **Nautilus Environmental (CA)**

Start Date:	20 Aug-19	**Species:**	Mytilus galloprovincialis	**Sample Code:**	19-0917
End Date:	22 Aug-19	**Protocol:**	EPA/600/R-95/136 (1995)	**Sample Source:**	Shelter Island Yacht Basin
Sample Date:	19 Aug-19	**Material:**	Ambient Water	**Sample Station:**	SIYB-1

C-%	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
0	FC	1	41			224	223	BO 8/22/19
0	FC	2	46					
0	FC	3	53					
0	FC	4	60					
0	FC	5	56					
0	LC	1	31					
0	LC	2	40					
0	LC	3	45			213	211	BO 8/22/19
0	LC	4	35					
0	LC	5	39					
6.25		1	55					
6.25		2	42					
6.25		3	67					
6.25		4	65					
6.25		5	58			199	197	BO 8/22/19
12.5		1	49					
12.5		2	57					
12.5		3	64					
12.5		4	33					
12.5		5	36			217	214	BO 8/22/19
25		1	37					
25		2	61					
25		3	68					
25		4	51			208	206	BO 8/22/19
25		5	54					
50		1	69					
50		2	48					
50		3	62			212	194	9 curved shells BO 8/22/19
50		4	32					
50		5	66					
100		1	63					
100		2	59					
100		3	70					
100		4	52			191	58	6 curved shells Bo 8/22/19
100		5	38					
~~101~~		1	34					
~~101~~		2	43					
~~101~~ @		3	47					
~~101~~		4	50					
~~101~~		5	44			199	37	7 curved shells Bo 8/22/19

100% Filtered

QC: EG

@Φ18 Bo 8/22/19

Analyst: BO QA: AC 9/10/19

Marine Chronic Bioassay

DM-014

Water Quality Measurements

Client: Wood/POSD
Sample ID: SIYB-1
Sample Log No.: 19-0917
Test No.: 1908-084

Test Species: *M. galloprovincialis*
Start Date/Time: 8/20/2019 1415
End Date/Time: 8/22/2019 1225

Concentration (%)	Salinity (ppt)			Temperature (°C)			Dissolved Oxygen (mg/L)			pH (pH units)		
	0	24	48	0	24	48	0	24	48	0	24	48
Lab Control	34.1	34.0	34.2	14.8	15.4	15.0	8.2	8.1	8.3	8.03	7.97	7.99
Filtration Control	33.9	34.2	34.0	15.3	15.0	14.8	7.9	8.4	8.4	8.00	7.99	8.00
6.25	34.2	34.3	34.4	14.8	15.0	14.8	8.2	8.4	8.4	8.02	7.99	8.01
12.5	34.2	34.3	34.4	14.9	15.0	15.0	8.2	8.4	8.4	8.02	7.98	8.01
25	34.2	34.4	34.3	15.0	15.1	15.0	8.1	8.4	8.4	8.02	7.98	8.01
50	34.2	34.4	34.3	15.0	15.0	15.1	8.2	8.4	8.4	8.01	7.98	8.01
100	34.3	34.3	34.4	14.8	15.0	14.9	8.3	8.4	8.5	8.01	7.97	8.00
100 Filtered	34.2	34.2	34.3	15.1	14.9	14.9	7.3	83	8.3	8.01	7.99	8.02

Technician Initials:

	0	24	48
WQ Readings:	BO	RT	BO
Dilutions made by:	AC/EG		

Environmental Chamber: D.

Comments:
0 hrs:
24 hrs:
48 hrs:

QC Check: AC 9/10/19

Final Review: 10/11/19

Enthalpy Analytical. 4340 Vandever Avenue. San Diego, CA 92120.

Marine Chronic Bioassay
DM-013

Larval Development Worksheet

Client: Wood/POSD SIYB-1
Test No.: 1908-S084
Test Species: Mytilus galloprovincialis
Animal Source: Mission Bay
Date Received: 7/1/19
Test Chambers: 30mL glass shell vials
Sample Volume: 10mL

Start Date/Time: 8/20/2019 1415
End Date/Time: 8/22/2019 1225
Technician Initials: BO

Spawn Information

First Gamete Release Time: 1100

Sex	Number Spawning
Male	5
Female	4

Gamete Selection

Sex	Beaker Number(s)	Condition (sperm motility, egg density, color, shape, etc.)
Male	2,3,4	good motility, average density
Female 1	1	lightyellow color, great shape, great density
Female 2	3	white, good shape, good density
Female 3	—	—

Egg Fertilization Time: 1200

Embryo Stock Selection

Stock Number	% of embryos at 2-cell division stage
Female 1	100
Female 2	100
Female 3	—

Stock(s) chosen for testing: 1

Embryo Inoculum Preparation

Target count on Sedgwick-Rafter slide for desired density is 6 embryos

Number Counted:

6	13
12	13
10	10
10	10
10	12

Mean: 10.6

Mean 10.6 X 50 = 530 embryos/ml

Initial Density: 530 / Desired Final Density: 300 (to inoculate with 0.5 ml) = 1.77 (dilution factor)

Prepare the embryo inoculum according to the calculated dilution factor. For example, if the dilution factor is 2.25, use 100 ml of existing stock (1 part) and 125 ml of dilution water (1.25 parts).

Time Zero Control Counts

Rand. No.	No. Dividing	Total	% Dividing	Mean % Dividing
T01	218	218	100	100
T02	198	198	100	
T03	183	183	100	
T04	203	203	100	
T05	187	187	100	

48-h QC: 224/227 = 98.6%

Comments: $\bar{x}$ = 198

QC Check: AC 9/10/19

Final Review: 10/11/19

CETIS Summary Report

Report Date: 03 Oct-19 13:46 (p 1 of 4)
Test Code: 1908-S085 | 04-4737-2380

Bivalve Larval Survival and Development Test **Nautilus Environmental (CA)**

Batch ID:	00-9598-7263	**Test Type:**	Development-Survival	**Analyst:**	
Start Date:	20 Aug-19 14:15	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater
Ending Date:	22 Aug-19 12:25	**Species:**	Mytilus galloprovincialis	**Brine:**	Not Applicable
Duration:	46h	**Source:**	Mission Bay	**Age:**	

Sample ID:	05-2183-9620	**Code:**	19-0918	**Client:**	Wood Environment & Infrastructure
Sample Date:	19 Aug-19 14:10	**Material:**	Ambient Water	**Project:**	POSD - SIYB TMDL Monitoring
Receive Date:	19 Aug-19 17:40	**Source:**	Shelter Island Yacht Basin		
Sample Age:	24h (4 °C)	**Station:**	SIYB-2		

Test Note: 101 = 100% sample filtered to 0.45um

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
03-1560-4826	Combined Development Ra	100	>100	NA	3.36%	1	Dunnett Multiple Comparison Test
02-7706-1414	Development Rate	100	>100	NA	1.9%	1	Dunnett Multiple Comparison Test
06-8516-6856	Survival Rate	100	>100	NA	2.04%	1	Steel Many-One Rank Sum Test

Point Estimate Summary

Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method
19-9637-3993	Combined Development Ra	EC25	>100	N/A	N/A	<1	Linear Interpolation (ICPIN)
		EC50	>100	N/A	N/A	<1	
12-9810-8296	Development Rate	EC25	>100	N/A	N/A	<1	Linear Interpolation (ICPIN)
		EC50	>100	N/A	N/A	<1	
09-9059-5744	Survival Rate	EC25	>100	N/A	N/A	<1	Linear Interpolation (ICPIN)
		EC50	>100	N/A	N/A	<1	

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits	Overlap	Decision
02-7706-1414	Development Rate	Control Resp	0.9812	0.9 - NL	Yes	Passes Acceptability Criteria
12-9810-8296	Development Rate	Control Resp	0.9812	0.9 - NL	Yes	Passes Acceptability Criteria
06-8516-6856	Survival Rate	Control Resp	0.9899	0.5 - NL	Yes	Passes Acceptability Criteria
09-9059-5744	Survival Rate	Control Resp	0.9899	0.5 - NL	Yes	Passes Acceptability Criteria
03-1560-4826	Combined Development Ra	PMSD	0.03365	NL - 0.25	No	Passes Acceptability Criteria

Analyst: JCL/AC QA: AC 10/3/19

Bivalve Larval Survival and Development Test **Nautilus Environmental (CA)**

Combined Development Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Control	5	0.9713	0.9546	0.988	0.9545	0.9912	0.006025	0.01347	1.39%	0.0%
6.25		5	0.9872	0.9702	1	0.9646	1	0.006113	0.01367	1.39%	-1.63%
12.5		5	0.9847	0.9712	0.9983	0.9697	0.9956	0.004881	0.01091	1.11%	-1.38%
25		5	0.9767	0.9512	1	0.9444	0.9953	0.009185	0.02054	2.1%	-0.56%
50		5	0.9803	0.9637	0.9968	0.9605	0.9916	0.005964	0.01334	1.36%	-0.92%
100		5	0.96	0.9206	0.9993	0.904	0.9798	0.01417	0.03169	3.3%	1.17%
101		5	0.9798	0.9546	1	0.9444	0.9953	0.009093	0.02033	2.08%	-0.88%

Development Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Control	5	0.9812	0.9714	0.9911	0.9725	0.9912	0.003555	0.00795	0.81%	0.0%
6.25		5	0.9901	0.9802	1	0.9795	1	0.00357	0.007984	0.81%	-0.91%
12.5		5	0.9867	0.9768	0.9967	0.9796	0.9956	0.003586	0.008018	0.81%	-0.56%
25		5	0.9897	0.984	0.9954	0.9826	0.9953	0.002057	0.004599	0.46%	-0.86%
50		5	0.9803	0.9637	0.9968	0.9605	0.9916	0.005964	0.01334	1.36%	0.1%
100		5	0.9736	0.9562	0.9911	0.9572	0.9949	0.00628	0.01404	1.44%	0.78%
101		5	0.9847	0.9723	0.9971	0.9689	0.9953	0.004482	0.01002	1.02%	-0.35%

Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Control	5	0.9899	0.9722	1	0.9697	1	0.006388	0.01428	1.44%	0.0%
6.25		5	0.997	0.9886	1	0.9848	1	0.00303	0.006776	0.68%	-0.71%
12.5		5	0.998	0.9924	1	0.9899	1	0.00202	0.004517	0.45%	-0.82%
25		5	0.9869	0.9619	1	0.9545	1	0.008978	0.02008	2.03%	0.31%
50		5	1	1	1	1	1	0	0	0.0%	-1.02%
100		5	0.9859	0.956	1	0.9444	1	0.01076	0.02406	2.44%	0.41%
101		5	0.9949	0.9809	1	0.9747	1	0.005051	0.01129	1.14%	-0.51%

Bivalve Larval Survival and Development Test **Nautilus Environmental (CA)**

Combined Development Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Control	0.9545	0.9646	0.9912	0.9737	0.9725
6.25		1	0.986	0.9646	0.9899	0.9953
12.5		0.9956	0.9697	0.9803	0.9952	0.9829
25		0.9826	0.9697	0.9444	0.9915	0.9953
50		0.9904	0.9605	0.9916	0.9861	0.9727
100		0.9798	0.9747	0.904	0.9756	0.9657
101		0.9862	0.9826	0.9953	0.9906	0.9444

Development Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Control	0.9844	0.9845	0.9912	0.9737	0.9725
6.25		1	0.986	0.9795	0.9899	0.9953
12.5		0.9956	0.9796	0.9803	0.9952	0.9829
25		0.9826	0.9897	0.9894	0.9915	0.9953
50		0.9904	0.9605	0.9916	0.9861	0.9727
100		0.9949	0.9747	0.9572	0.9756	0.9657
101		0.9862	0.9826	0.9953	0.9906	0.9689

Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Control	0.9697	0.9798	1	1	1
6.25		1	1	0.9848	1	1
12.5		1	0.9899	1	1	1
25		1	0.9798	0.9545	1	1
50		1	1	1	1	1
100		0.9848	1	0.9444	1	1
101		1	1	1	1	0.9747

Analyst: JCU/AC QA: AC 10/3/19

Bivalve Larval Survival and Development Test **Nautilus Environmental (CA)**

Combined Development Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Control	189/198	191/198	224/226	222/228	212/218
6.25		209/209	211/214	191/198	196/198	213/214
12.5		227/228	192/198	199/203	206/207	230/234
25		226/230	192/198	187/198	232/234	211/212
50		206/208	219/228	236/238	213/216	214/220
100		194/198	193/198	179/198	200/205	197/204
101		214/217	226/230	210/211	210/212	187/198

Development Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Control	189/192	191/194	224/226	222/228	212/218
6.25		209/209	211/214	191/195	196/198	213/214
12.5		227/228	192/196	199/203	206/207	230/234
25		226/230	192/194	187/189	232/234	211/212
50		206/208	219/228	236/238	213/216	214/220
100		194/195	193/198	179/187	200/205	197/204
101		214/217	226/230	210/211	210/212	187/193

Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Control	192/198	194/198	198/198	198/198	198/198
6.25		198/198	198/198	195/198	198/198	198/198
12.5		198/198	196/198	198/198	198/198	198/198
25		198/198	194/198	189/198	198/198	198/198
50		198/198	198/198	198/198	198/198	198/198
100		195/198	198/198	187/198	198/198	198/198
101		198/198	198/198	198/198	198/198	193/198

Analyst: JCL/AC QA: AC 10/3/19

CETIS Analytical Report

Report Date: 11 Sep-19 09:16 (p 1 of 8)
Test Code: 1908-S085 | 04-4737-2380

Bivalve Larval Survival and Development Test — **Nautilus Environmental (CA)**

Analysis ID:	03-1560-4826	**Endpoint:**	Combined Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 Sep-19 9:13	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Test Note: 101 = 100% sample filtered to 0.45um

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C > T	NA	NA	3.36%	100	>100	NA	1

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		6.25	-1.762	2.362	0.085	8	0.9984	CDF	Non-Significant Effect
		12.5	-1.365	2.362	0.085	8	0.9943	CDF	Non-Significant Effect
		25	-0.6759	2.362	0.085	8	0.9607	CDF	Non-Significant Effect
		50	-0.8566	2.362	0.085	8	0.9754	CDF	Non-Significant Effect
		100	0.7379	2.362	0.085	8	0.5396	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0266838	0.00533676	5	1.656	0.1836	Non-Significant Effect
Error	0.07733886	0.003222452	24			
Total	0.1040227		29			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	1.453	15.09	0.9185	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9506	0.9031	0.1758	Normal Distribution

Combined Development Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	0.9713	0.9546	0.988	0.9725	0.9545	0.9912	0.006025	1.39%	0.0%
6.25		5	0.9872	0.9702	1	0.9899	0.9646	1	0.006113	1.39%	-1.63%
12.5		5	0.9847	0.9712	0.9983	0.9829	0.9697	0.9956	0.004881	1.11%	-1.38%
25		5	0.9767	0.9512	1	0.9826	0.9444	0.9953	0.009185	2.1%	-0.56%
50		5	0.9803	0.9637	0.9968	0.9861	0.9605	0.9916	0.005964	1.36%	-0.92%
100		5	0.96	0.9206	0.9993	0.9747	0.904	0.9798	0.01417	3.3%	1.17%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	1.405	1.349	1.461	1.404	1.356	1.477	0.02011	3.2%	0.0%
6.25		5	1.468	1.396	1.541	1.47	1.382	1.536	0.02603	3.96%	-4.5%
12.5		5	1.454	1.396	1.513	1.44	1.396	1.505	0.02115	3.25%	-3.49%
25		5	1.429	1.346	1.513	1.439	1.333	1.502	0.03016	4.72%	-1.73%
50		5	1.436	1.378	1.494	1.453	1.371	1.479	0.02084	3.25%	-2.19%
100		5	1.379	1.291	1.466	1.411	1.256	1.428	0.03153	5.11%	1.89%

Analyst: JC QA: AC 10/3/19

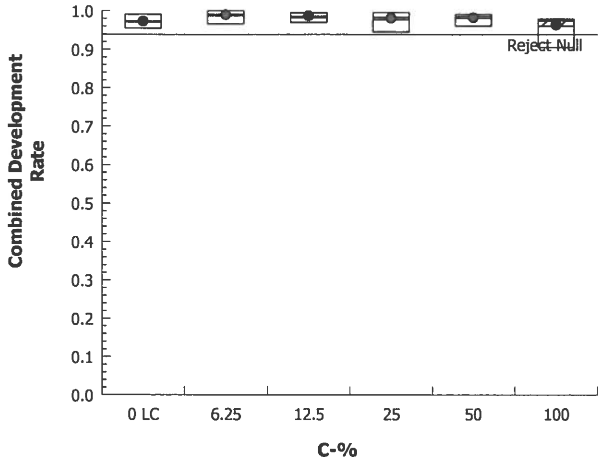
CETIS Analytical Report

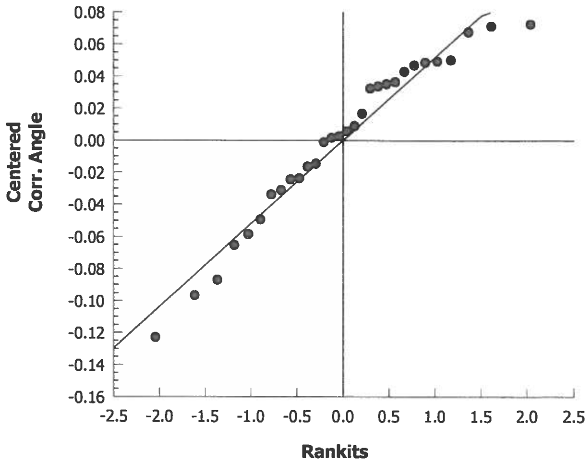
Report Date: 11 Sep-19 09:16 (p 2 of 8)
Test Code: 1908-S085 | 04-4737-2380

Bivalve Larval Survival and Development Test	**Nautilus Environmental (CA)**

Analysis ID:	03-1560-4826	**Endpoint:**	Combined Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 Sep-19 9:13	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Graphics





Analyst: JU QA: AC 10/3/19

CETIS Analytical Report

TST

Report Date:	11 Sep-19 09:16 (p 3 of 8)
Test Code:	1908-S085 | 04-4737-2380

Bivalve Larval Survival and Development Test | **Nautilus Environmental (CA)**

Analysis ID:	17-9982-3247	**Endpoint:**	Combined Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 Sep-19 9:14	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Test Note: 101 = 100% sample filtered to 0.45um

Data Transform	Zeta	Alt Hyp	Trials	Seed	TST b	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C*b < T	NA	NA	0.75	2.67%	100	>100	NA	1

TST-Welch's t Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		6.25*	13.78	1.943	0.058	6	<0.0001	CDF	Non-Significant Effect
		12.5*	15.41	1.895	0.049	7	<0.0001	CDF	Non-Significant Effect
		25*	11.14	2.015	0.068	5	<0.0001	CDF	Non-Significant Effect
		50*	14.85	1.895	0.049	7	<0.0001	CDF	Non-Significant Effect
		100*	9.295	2.015	0.070	5	0.0001	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0266838	0.00533676	5	1.656	0.1836	Non-Significant Effect
Error	0.07733886	0.003222452	24			
Total	0.1040227		29			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	1.453	15.09	0.9185	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9506	0.9031	0.1758	Normal Distribution

Combined Development Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	0.9713	0.9546	0.988	0.9725	0.9545	0.9912	0.006025	1.39%	0.0%
6.25		5	0.9872	0.9702	1	0.9899	0.9646	1	0.006113	1.39%	-1.63%
12.5		5	0.9847	0.9712	0.9983	0.9829	0.9697	0.9956	0.004881	1.11%	-1.38%
25		5	0.9767	0.9512	1	0.9826	0.9444	0.9953	0.009185	2.1%	-0.56%
50		5	0.9803	0.9637	0.9968	0.9861	0.9605	0.9916	0.005964	1.36%	-0.92%
100		5	0.96	0.9206	0.9993	0.9747	0.904	0.9798	0.01417	3.3%	1.17%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	1.405	1.349	1.461	1.404	1.356	1.477	0.02011	3.2%	0.0%
6.25		5	1.468	1.396	1.541	1.47	1.382	1.536	0.02603	3.96%	-4.5%
12.5		5	1.454	1.396	1.513	1.44	1.396	1.505	0.02115	3.25%	-3.49%
25		5	1.429	1.346	1.513	1.439	1.333	1.502	0.03016	4.72%	-1.73%
50		5	1.436	1.378	1.494	1.453	1.371	1.479	0.02084	3.25%	-2.19%
100		5	1.379	1.291	1.466	1.411	1.256	1.428	0.03153	5.11%	1.89%

Analyst: JC QA: AC 10/3/19

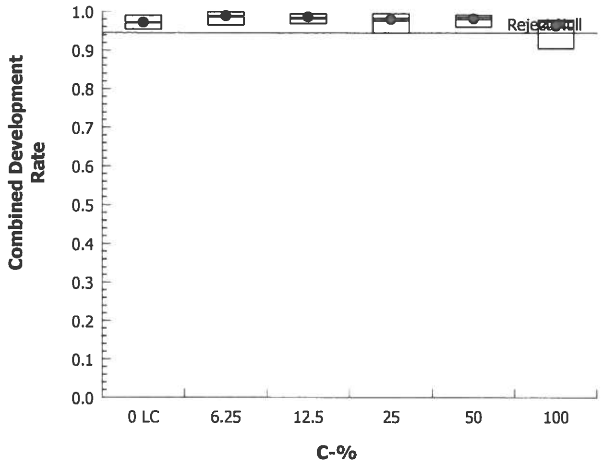
CETIS Analytical Report TST

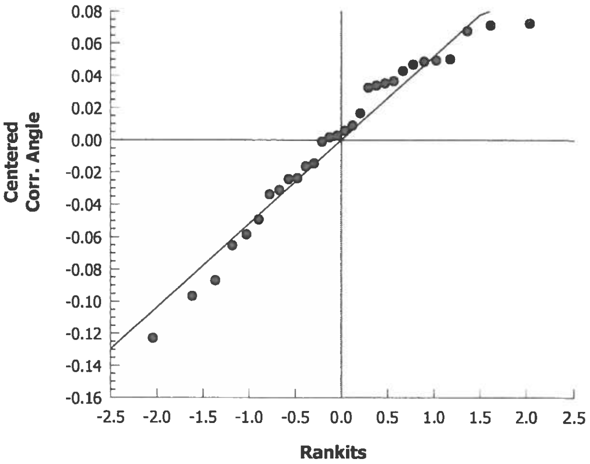
Report Date: 11 Sep-19 09:16 (p 4 of 8)
Test Code: 1908-S085 | 04-4737-2380

Bivalve Larval Survival and Development Test | **Nautilus Environmental (CA)**

Analysis ID:	17-9982-3247	**Endpoint:**	Combined Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 Sep-19 9:14	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Graphics





CETIS Analytical Report

Report Date: 13 Sep-19 09:49 (p 1 of 4)
Test Code: 1908-S085 | 04-4737-2380

Bivalve Larval Survival and Development Test — **Nautilus Environmental (CA)**

Analysis ID:	07-4201-3747	**Endpoint:**	Combined Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	13 Sep-19 9:48	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Test Note: 101 = 100% sample filtered to 0.45um

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	2.44%	Passes combined development rate

Equal Variance t Two-Sample Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		101	-0.9881	1.86	0.065	8	0.8240	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.003013393	0.003013393	1	0.9764	0.3520	Non-Significant Effect
Error	0.02468915	0.003086143	8			
Total	0.02770254		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	2.054	23.15	0.5029	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9499	0.7411	0.6672	Normal Distribution

Combined Development Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	0.9713	0.9546	0.988	0.9725	0.9545	0.9912	0.006025	1.39%	0.0%
101		5	0.9798	0.9546	1	0.9862	0.9444	0.9953	0.009093	2.08%	-0.88%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	1.405	1.349	1.461	1.404	1.356	1.477	0.02011	3.2%	0.0%
101		5	1.44	1.36	1.52	1.453	1.333	1.502	0.02881	4.47%	-2.47%

Analyst: JCL QA: AC 10/3/19

CETIS Analytical Report TST

Report Date:	13 Sep-19 09:49 (p 2 of 4)
Test Code:	1908-S085 | 04-4737-2380

Bivalve Larval Survival and Development Test **Nautilus Environmental (CA)**

Analysis ID:	13-8701-6955	**Endpoint:**	Combined Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	13 Sep-19 9:49	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Test Note: 101 = 100% sample filtered to 0.45um

Data Transform	Zeta	Alt Hyp	Trials	Seed	TST b	PMSD	Test Result
Angular (Corrected)	NA	C*b < T	NA	NA	0.75	2.34%	Passes combined development rate

TST-Welch's t Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		101*	11.87	1.943	0.063	6	<0.0001	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.003013393	0.003013393	1	0.9764	0.3520	Non-Significant Effect
Error	0.02468915	0.003086143	8			
Total	0.02770254		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	2.054	23.15	0.5029	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9499	0.7411	0.6672	Normal Distribution

Combined Development Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	0.9713	0.9546	0.988	0.9725	0.9545	0.9912	0.006025	1.39%	0.0%
101		5	0.9798	0.9546	1	0.9862	0.9444	0.9953	0.009093	2.08%	-0.88%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	1.405	1.349	1.461	1.404	1.356	1.477	0.02011	3.2%	0.0%
101		5	1.44	1.36	1.52	1.453	1.333	1.502	0.02881	4.47%	-2.47%

Analyst: JA QA: AC 10/3/19

Bivalve Larval Survival and Development Test	**Nautilus Environmental (CA)**

Analysis ID:	02-7706-1414	**Endpoint:**	Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 Sep-19 9:14	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Test Note: 101 = 100% sample filtered to 0.45um

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C > T	NA	NA	1.9%	100	>100	NA	1

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		6.25	-1.639	2.362	0.06	8	0.9976	CDF	Non-Significant Effect
		12.5	-0.9679	2.362	0.06	8	0.9818	CDF	Non-Significant Effect
		25	-1.384	2.362	0.06	8	0.9946	CDF	Non-Significant Effect
		50	0.001792	2.362	0.06	8	0.8328	CDF	Non-Significant Effect
		100	0.8591	2.362	0.06	8	0.4837	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.01492563	0.002985126	5	1.858	0.1395	Non-Significant Effect
Error	0.03856164	0.001606735	24			
Total	0.05348727		29			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	2.934	15.09	0.7101	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9679	0.9031	0.4829	Normal Distribution

Development Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	0.9812	0.9714	0.9911	0.9844	0.9725	0.9912	0.003555	0.81%	0.0%
6.25		5	0.9901	0.9802	1	0.9899	0.9795	1	0.00357	0.81%	-0.91%
12.5		5	0.9867	0.9768	0.9967	0.9829	0.9796	0.9956	0.003586	0.81%	-0.56%
25		5	0.9897	0.984	0.9954	0.9897	0.9826	0.9953	0.002057	0.46%	-0.86%
50		5	0.9803	0.9637	0.9968	0.9861	0.9605	0.9916	0.005964	1.36%	0.1%
100		5	0.9736	0.9562	0.9911	0.9747	0.9572	0.9949	0.00628	1.44%	0.78%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	1.436	1.399	1.474	1.445	1.404	1.477	0.0135	2.1%	0.0%
6.25		5	1.478	1.425	1.531	1.47	1.427	1.536	0.01911	2.89%	-2.89%
12.5		5	1.461	1.412	1.509	1.44	1.427	1.505	0.0174	2.66%	-1.71%
25		5	1.471	1.443	1.499	1.469	1.439	1.502	0.01021	1.55%	-2.44%
50		5	1.436	1.378	1.494	1.453	1.371	1.479	0.02084	3.25%	0.0%
100		5	1.414	1.35	1.479	1.411	1.362	1.499	0.02322	3.67%	1.52%

Analyst: JC QA: AC 10/3/19

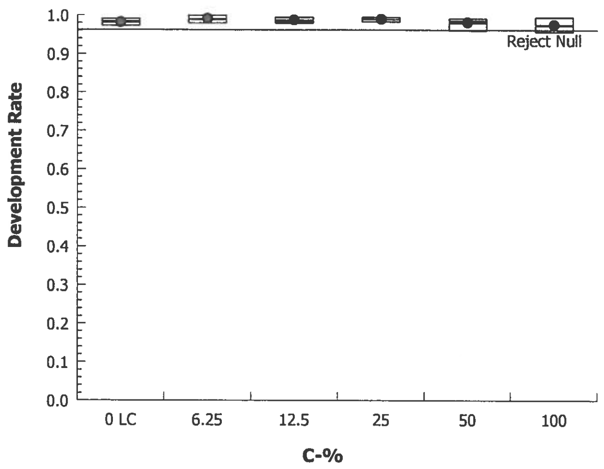
CETIS Analytical Report

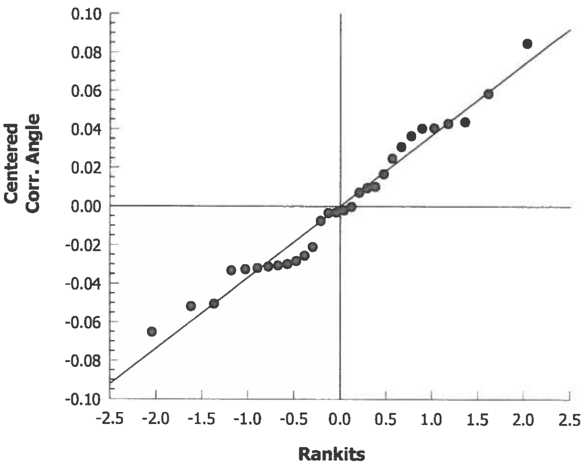
Report Date: 11 Sep-19 09:16 (p 6 of 8)
Test Code: 1908-S085 | 04-4737-2380

Bivalve Larval Survival and Development Test	**Nautilus Environmental (CA)**

Analysis ID:	02-7706-1414	**Endpoint:**	Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 Sep-19 9:14	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Graphics





Analyst: JCL QA: AC 10/3/19

CETIS Analytical Report

Report Date:	13 Sep-19 09:49 (p 3 of 4)
Test Code:	1908-S085 | 04-4737-2380

Bivalve Larval Survival and Development Test — **Nautilus Environmental (CA)**

Analysis ID:	15-9845-6411	**Endpoint:**	Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	13 Sep-19 9:49	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Test Note: 101 = 100% sample filtered to 0.45um

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	1.24%	Passes development rate

Equal Variance t Two-Sample Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		101	-0.7111	1.86	0.042	8	0.7514	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0006446671	0.0006446671	1	0.5057	0.4972	Non-Significant Effect
Error	0.01019849	0.001274811	8			
Total	0.01084315		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.796	23.15	0.5844	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9781	0.7411	0.9543	Normal Distribution

Development Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	0.9812	0.9714	0.9911	0.9844	0.9725	0.9912	0.003555	0.81%	0.0%
101		5	0.9847	0.9723	0.9971	0.9862	0.9689	0.9953	0.004482	1.02%	-0.35%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	1.436	1.399	1.474	1.445	1.404	1.477	0.0135	2.1%	0.0%
101		5	1.452	1.402	1.502	1.453	1.394	1.502	0.0181	2.79%	-1.12%

Analyst: JCL QA: AC 10/3/19

CETIS Analytical Report

TST

Report Date: 13 Sep-19 09:49 (p 4 of 4)
Test Code: 1908-S085 | 04-4737-2380

Bivalve Larval Survival and Development Test **Nautilus Environmental (CA)**

Analysis ID:	04-0496-9794	**Endpoint:**	Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	13 Sep-19 9:49	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Test Note: 101 = 100% sample filtered to 0.45um

Data Transform	Zeta	Alt Hyp	Trials	Seed	TST b	PMSD	Test Result
Angular (Corrected)	NA	C*b < T	NA	NA	0.75	1.18%	Passes development rate

TST-Welch's t Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		101*	18.08	1.943	0.040	6	<0.0001	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0006446671	0.0006446671	1	0.5057	0.4972	Non-Significant Effect
Error	0.01019849	0.001274811	8			
Total	0.01084315		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.796	23.15	0.5844	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9781	0.7411	0.9543	Normal Distribution

Development Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	0.9812	0.9714	0.9911	0.9844	0.9725	0.9912	0.003555	0.81%	0.0%
101		5	0.9847	0.9723	0.9971	0.9862	0.9689	0.9953	0.004482	1.02%	-0.35%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	1.436	1.399	1.474	1.445	1.404	1.477	0.0135	2.1%	0.0%
101		5	1.452	1.402	1.502	1.453	1.394	1.502	0.0181	2.79%	-1.12%

Analyst: JCA QA: AC 10/3/19

Bivalve Larval Survival and Development Test — **Nautilus Environmental (CA)**

Analysis ID: 06-8516-6856 **Endpoint:** Survival Rate **CETIS Version:** CETISv1.8.7
Analyzed: 11 Sep-19 9:14 **Analysis:** Nonparametric-Control vs Treatments **Official Results:** Yes

Test Note: 101 = 100% sample filtered to 0.45um

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C > T	NA	NA	2.04%	100	>100	NA	1

Steel Many-One Rank Sum Test

Control	vs C-%	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Lab Control	6.25	31	16	1	8	0.9676	Asymp	Non-Significant Effect
	12.5	31	16	1	8	0.9676	Asymp	Non-Significant Effect
	25	27	16	2	8	0.8003	Asymp	Non-Significant Effect
	50	32.5	16	1	8	0.9870	Asymp	Non-Significant Effect
	100	27.5	16	1	8	0.8333	Asymp	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.01603693	0.003207386	5	0.881	0.5088	Non-Significant Effect
Error	0.08737133	0.003640472	24			
Total	0.1034083		29			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	111.6	15.09	<0.0001	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.8735	0.9031	0.0020	Non-normal Distribution

Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	0.9899	0.9722	1	1	0.9697	1	0.006388	1.44%	0.0%
6.25		5	0.997	0.9886	1	1	0.9848	1	0.003031	0.68%	-0.71%
12.5		5	0.998	0.9924	1	1	0.9899	1	0.00202	0.45%	-0.82%
25		5	0.9869	0.9619	1	1	0.9545	1	0.008978	2.03%	0.31%
50		5	1	1	1	1	1	1	0	0.0%	-1.02%
100		5	0.9859	0.956	1	1	0.9444	1	0.01076	2.44%	0.41%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	1.486	1.401	1.571	1.535	1.396	1.535	0.03062	4.61%	0.0%
6.25		5	1.518	1.469	1.566	1.535	1.447	1.535	0.01757	2.59%	-2.14%
12.5		5	1.522	1.486	1.558	1.535	1.47	1.535	0.01303	1.91%	-2.44%
25		5	1.478	1.376	1.58	1.535	1.356	1.535	0.03689	5.58%	0.54%
50		5	1.535	1.535	1.536	1.535	1.535	1.535	0	0.0%	-3.32%
100		5	1.477	1.366	1.588	1.535	1.333	1.535	0.0399	6.04%	0.59%

Analyst: QA: AC 10/3/19

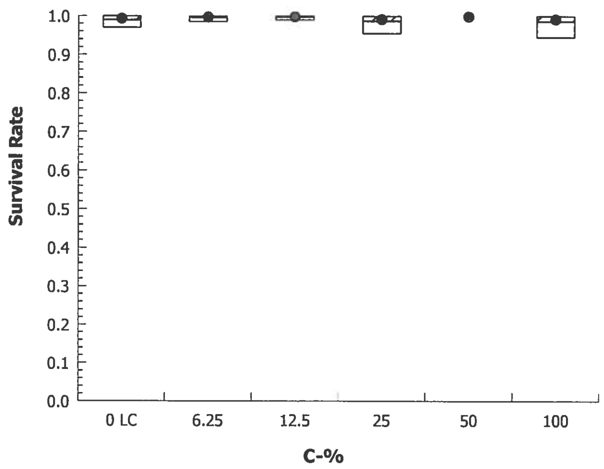
CETIS Analytical Report

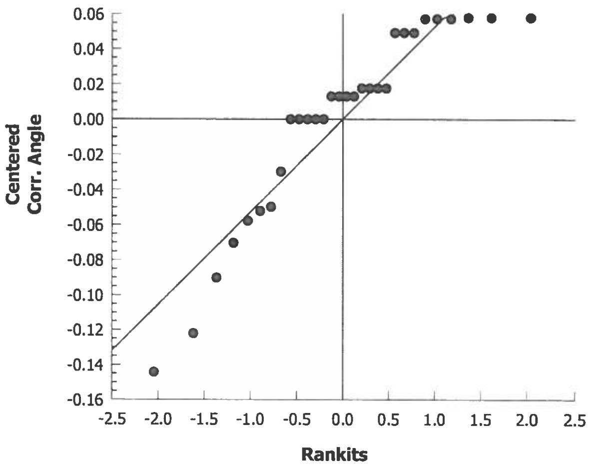
Report Date: 11 Sep-19 09:16 (p 8 of 8)
Test Code: 1908-S085 | 04-4737-2380

Bivalve Larval Survival and Development Test	**Nautilus Environmental (CA)**

Analysis ID:	06-8516-6856	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 Sep-19 9:14	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Graphics





Analyst: JU QA: AC 10/3/19

CETIS Analytical Report

Report Date: 11 Sep-19 09:16 (p 1 of 3)
Test Code: 1908-S085 | 04-4737-2380

Bivalve Larval Survival and Development Test — **Nautilus Environmental (CA)**

Analysis ID:	19-9637-3993	**Endpoint:**	Combined Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 Sep-19 9:14	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Test Note: 101 = 100% sample filtered to 0.45um

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	510775	1000	Yes	Two-Point Interpolation

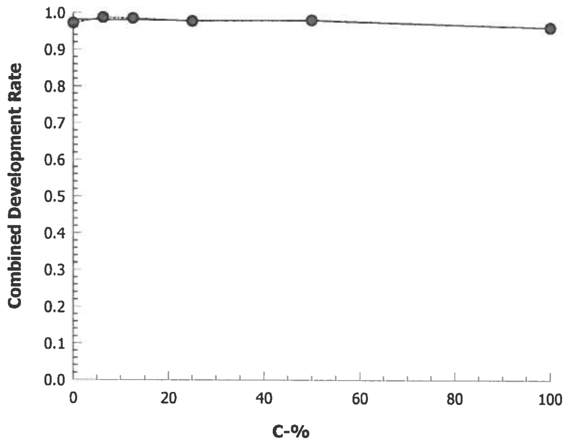
Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC25	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Combined Development Rate Summary — **Calculated Variate(A/B)**

C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Lab Control	5	0.9713	0.9545	0.9912	0.006025	0.01347	1.39%	0.0%	1038	1068
6.25		5	0.9872	0.9646	1	0.006113	0.01367	1.39%	-1.63%	1020	1033
12.5		5	0.9847	0.9697	0.9956	0.004881	0.01091	1.11%	-1.38%	1054	1070
25		5	0.9767	0.9444	0.9953	0.009185	0.02054	2.1%	-0.56%	1048	1072
50		5	0.9803	0.9605	0.9916	0.005964	0.01334	1.36%	-0.92%	1088	1110
100		5	0.96	0.904	0.9798	0.01417	0.03169	3.3%	1.17%	963	1003

Graphics



Analyst: JCL QA: AC 10/3/19

CETIS Analytical Report

Report Date: 11 Sep-19 09:16 (p 2 of 3)
Test Code: 1908-S085 | 04-4737-2380

Bivalve Larval Survival and Development Test — **Nautilus Environmental (CA)**

Analysis ID:	12-9810-8296	**Endpoint:**	Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 Sep-19 9:14	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Test Note: 101 = 100% sample filtered to 0.45um

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	1420474	1000	Yes	Two-Point Interpolation

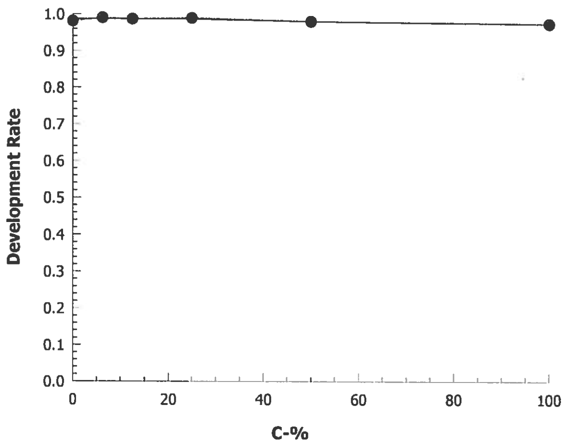
Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC25	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Development Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Lab Control	5	0.9812	0.9725	0.9912	0.003555	0.00795	0.81%	0.0%	1038	1058
6.25		5	0.9901	0.9795	1	0.00357	0.007983	0.81%	-0.91%	1020	1030
12.5		5	0.9867	0.9796	0.9956	0.003586	0.008018	0.81%	-0.56%	1054	1068
25		5	0.9897	0.9826	0.9953	0.002057	0.004599	0.46%	-0.86%	1048	1059
50		5	0.9803	0.9605	0.9916	0.005964	0.01334	1.36%	0.1%	1088	1110
100		5	0.9736	0.9572	0.9949	0.00628	0.01404	1.44%	0.78%	963	989

Graphics



Analyst: JU QA: AC 10/3/19

CETIS Analytical Report

Report Date: 11 Sep-19 09:16 (p 3 of 3)
Test Code: 1908-S085 | 04-4737-2380

Bivalve Larval Survival and Development Test	**Nautilus Environmental (CA)**

Analysis ID:	09-9059-5744	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 Sep-19 9:14	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Test Note: 101 = 100% sample filtered to 0.45um

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	289664	1000	Yes	Two-Point Interpolation

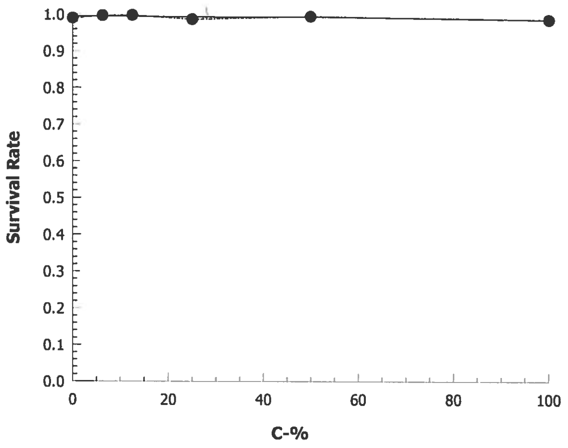
Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC25	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Survival Rate Summary

			Calculated Variate(A/B)								
C-%	**Control Type**	**Count**	**Mean**	**Min**	**Max**	**Std Err**	**Std Dev**	**CV%**	**%Effect**	**A**	**B**
0	Lab Control	5	0.9899	0.9697	1	0.006388	0.01428	1.44%	0.0%	980	990
6.25		5	0.997	0.9848	1	0.003031	0.006776	0.68%	-0.71%	987	990
12.5		5	0.998	0.9899	1	0.00202	0.004518	0.45%	-0.82%	988	990
25		5	0.9869	0.9545	1	0.008978	0.02008	2.03%	0.31%	977	990
50		5	1	1	1	0	0	0.0%	-1.02%	990	990
100		5	0.9859	0.9444	1	0.01076	0.02406	2.44%	0.41%	976	990

Graphics



Analyst: JU QA: AC 10/3/19

Embryo Larval Bioassay **48-hour Development**

Client: Wood/POSD
Test Species: *M. galloprovincialis*
Sample ID: SIYB-2
Start Date/Time: 8/20/2019 1415
Test ID: 1908-S085
End Date/Time: 8/22/2019 1225

Random #	Number Normal	Number Abnormal		Total Number Counted	Intials/Date
		Number Curved Shell	All other abnormal		
71	227	0	1	228	JCL/ Ⓐ ~~8~~ 9/13/19
72	210	0	1	211	
73	211	0	1	212	
74	197	0	7	204	
75	179	0	Ⓐ ~~1~~8	187	
76	187	0	2	189	
77	211	0	3	214	
78	187	0	6	193	
79	192	0	4	196	
80	189	0	3	192	
81	226	0	4	230	
82	191	0	3	194	
83	213	0	1	214	
84	209	0	0	209	
85	193	0	5	198	
86	213	0	3	216	
87	236	0	2	238	
88	214	0	Ⓐ ~~21~~ 3	217	
89	210	0	2	212	
90	219	0	9	228	
91	199	0	4	203	
92	206	0	2	208	
93	224	0	2	226	
94	226	0	4	230	
95	196	0	2	198	
96	212	0	6	218	
97	200	0	5	205	
98	214	0	6	220	
99	230	0	4	234	
100	206	0	1	207	
101	232	0	2	234	
102	222	0	6	228	
103	192	0	Ⓐ ~~10~~ 2	194	
104	194	0	1	195	
105	191	0	4	195	

Comments: Ⓐ Q18 JCL 9/13/19

QC Check: AC 9/10/19
Final Review: G 10/11/19

CETIS Test Data Worksheet

Report Date: 16 Aug-19 12:40 (p 1 of 1)
Test Code: 1908-S085 04-4737-2380/1AAA5C5C

Bivalve Larval Survival and Development Test

Nautilus Environmental (CA)

Start Date:	20 Aug-19	**Species:**	Mytilus galloprovincialis	**Sample Code:**	19-0918
End Date:	22 Aug-19	**Protocol:**	EPA/600/R-95/136 (1995)	**Sample Source:**	Shelter Island Yacht Basin
Sample Date:	19 Aug-19	**Material:**	Ambient Water	**Sample Station:**	SIYB-2

C-%	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
0	LC	1	80			193	190	KS 8/22/19
0	LC	2	82					
0	LC	3	93					
0	LC	4	102					
0	LC	5	96					
6.25		1	84			210	209	KS 8/22/19
6.25		2	77					
6.25		3	105					
6.25		4	95					
6.25		5	83					
12.5		1	71			223	222	KS 8/22/19
12.5		2	79					
12.5		3	91					
12.5		4	100					
12.5		5	99					
25		1	94			223	220	KS 8/22/19 1 sm copepod
25		2	103					
25		3	76					
25		4	101					
25		5	73					
50		1	92			204	202	KS 8/22/19 3 sm copepods
50		2	90					
50		3	87					
50		4	86					
50		5	98					
100		1	104			195	193	KS 8/22/19 2 sm copepods
100		2	85					
100		3	75					
100		4	97					
100		5	74					
~~101~~		1	88			218	215	KS 8/22/19
100% Filtered ~~101~~		2	81					
~~101~~ @		3	72					
~~101~~		4	89					
~~101~~		5	78					

QC EG

@Q18 BO 8/22/19

Analyst: BO QA: AC 9/10/19

Marine Chronic Bioassay

DM-014

Water Quality Measurements

Client: Wood/POSD
Sample ID: SIYB-2
Sample Log No.: 19-0918
Test No.: 1908-S085

Test Species: *M. galloprovincialis*
Start Date/Time: 8/20/2019 1415
End Date/Time: 8/22/2019 1225

Concentration (%)	Salinity (ppt)			Temperature (°C)			Dissolved Oxygen (mg/L)			pH (pH units)		
	0	24	48	0	24	48	0	24	48	0	24	48
Lab Control	34.0	34.0	34.2	14.9	15.8	15.3	8.3	8.0	8.3	8.02	7.98	7.99
6.25	34.1	34.2	34.3	14.8	15.6	15.1	8.3	8.2	8.3	8.01	7.98	8.00
12.5	34.2	34.3	34.3	14.8	15.8	15.1	8.3	8.0	8.4	8.01	7.97	8.01
25	34.2	34.3	34.4	15.0	15.7	15.2	8.2	8.2	8.3	8.01	7.97	8.01
50	34.2	34.3	34.4	14.9	15.8	15.2	8.3	8.1	8.3	8.01	7.97	8.01
100	34.6	34.5	34.6	14.7	15.7	15.1	8.4	8.3	8.2	8.02	7.98	8.00
100 filtered	34.3	34.3	34.4	15.0	15.8	15.2	7.3	7.9	8.1	8.04	8.00	8.02

Technician Initials:

	0	24	48
WQ Readings:	BO	RT	BO
Dilutions made by:	AC/EG		

Environmental Chamber: D.

Comments:
0 hrs:
24 hrs:
48 hrs:

QC Check: AC 9/10/19

Final Review: WMM

Enthalpy Analytical. 4340 Vandever Avenue. San Diego, CA 92120.

Marine Chronic Bioassay
DM-013

Larval Development Worksheet

Client: Wood/ POSD S14B-2
Test No.: 1908-S085
Test Species: Mytilus galloprovincialis
Animal Source: Mission Bay
Date Received: 7/1/19
Test Chambers: 30mL glass shell vials
Sample Volume: 10mL

Start Date/Time: 8/20/2019 1415
End Date/Time: 8/22/2019 1225
Technician Initials: BO

Spawn Information

First Gamete Release Time: 1100

Sex	Number Spawning
Male	5
Female	4

Gamete Selection

Sex	Beaker Number(s)	Condition (sperm motility, egg density, color, shape, etc.)
Male	2,3,4	good motility, average density
Female 1	1	light yellow color, great shape, great density
Female 2	3	white, good shape, good density
Female 3	—	—

Egg Fertilization Time: 1200

Embryo Stock Selection

Stock Number	% of embryos at 2-cell division stage
Female 1	100
Female 2	100
Female 3	—

Stock(s) chosen for testing: 1

Embryo Inoculum Preparation

Target count on Sedgwick-Rafter slide for desired density is 6 embryos

Number Counted:

6	13
12	13
10	10
10	10
10	12

Mean: 10.6

Mean 10.6 X 50 = 530 embryos/ml

Initial Density: 530 = 1.77 (dilution factor)
Desired Final Density: 300
(to inoculate with 0.5 ml)

Prepare the embryo inoculum according to the calculated dilution factor. For example, if the dilution factor is 2.25, use 100 ml of existing stock (1 part) and 125 ml of dilution water (1.25 parts).

Time Zero Control Counts

Rand. No.	No. Dividing	Total	% Dividing	Mean % Dividing
T01	218	218	100	100
T02	198	198	100	
T03	183	183	100	
T04	203	203	100	
T05	187	187	100	

48-h QC: 224/227 = 98.6%

Comments: x̄ = 198

QC Check: AC 9/10/19

Final Review: bo 10/11/19

Enthalpy Analytical. 4340 Vandever Avenue. San Diego, CA 92120.

CETIS Summary Report

Report Date:	19 Sep-19 14:47 (p 1 of 4)
Test Code:	1908-S086 | 05-2803-1866

Bivalve Larval Survival and Development Test **Nautilus Environmental (CA)**

Batch ID:	20-8260-6331	**Test Type:**	Development-Survival	**Analyst:**	
Start Date:	20 Aug-19 14:15	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater
Ending Date:	22 Aug-19 12:25	**Species:**	Mytilus galloprovincialis	**Brine:**	Not Applicable
Duration:	46h	**Source:**	Mission Bay	**Age:**	

Sample ID:	15-6473-6706	**Code:**	19-0919	**Client:**	Wood Environment & Infrastructure
Sample Date:	19 Aug-19 13:10	**Material:**	Ambient Water	**Project:**	
Receive Date:	19 Aug-19 17:40	**Source:**	Shelter Island Yacht Basin		
Sample Age:	25h (9 °C)	**Station:**	SIYB-3		

Batch Note: 101 = 100% sample filtered to 0.45um

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
15-8302-2539	Combined Development Ra	100	>100	NA	5.1%	1	Steel Many-One Rank Sum Test
01-0747-1498	Development Rate	50	100	70.71	1.05%	2	Dunnett Multiple Comparison Test
17-4052-7782	Survival Rate	100	>100	NA	5.1%	1	Steel Many-One Rank Sum Test

Point Estimate Summary

Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method
02-3501-0865	Combined Development Ra	EC25	>100	N/A	N/A	<1	Linear Interpolation (ICPIN)
		EC50	>100	N/A	N/A	<1	
05-6468-0810	Development Rate	EC25	>100	N/A	N/A	<1	Linear Interpolation (ICPIN)
		EC50	>100	N/A	N/A	<1	
20-4101-9471	Survival Rate	EC25	>100	N/A	N/A	<1	Linear Interpolation (ICPIN)
		EC50	>100	N/A	N/A	<1	

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits	Overlap	Decision
01-0747-1498	Development Rate	Control Resp	0.991	0.9 - NL	Yes	Passes Acceptability Criteria
05-6468-0810	Development Rate	Control Resp	0.991	0.9 - NL	Yes	Passes Acceptability Criteria
17-4052-7782	Survival Rate	Control Resp	0.9525	0.5 - NL	Yes	Passes Acceptability Criteria
20-4101-9471	Survival Rate	Control Resp	0.9525	0.5 - NL	Yes	Passes Acceptability Criteria
15-8302-2539	Combined Development Ra	PMSD	0.051	NL - 0.25	No	Passes Acceptability Criteria

Analyst: AC QA: KFP 10/14/19

Bivalve Larval Survival and Development Test — **Nautilus Environmental (CA)**

Combined Development Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Control	5	0.9442	0.843	1	0.803	0.9953	0.03646	0.08154	8.64%	0.0%
6.25		5	0.9652	0.9284	1	0.9242	0.9953	0.01327	0.02966	3.07%	-2.22%
12.5		5	0.9833	0.9747	0.9918	0.9747	0.9904	0.003079	0.006884	0.7%	-4.13%
25		5	0.974	0.9246	1	0.904	1	0.0178	0.0398	4.09%	-3.15%
50		5	0.9865	0.9785	0.9946	0.9799	0.9955	0.002904	0.006494	0.66%	-4.48%
100		5	0.9462	0.9312	0.9611	0.9293	0.9604	0.005391	0.01206	1.27%	-0.21%
101		5	0.932	0.9186	0.9454	0.9139	0.9409	0.004839	0.01082	1.16%	1.3%

Development Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Control	5	0.991	0.9822	0.9998	0.9815	1	0.003175	0.007099	0.72%	0.0%
6.25		5	0.9883	0.9796	0.9969	0.9808	0.9953	0.003122	0.006981	0.71%	0.28%
12.5		5	0.9883	0.9815	0.995	0.981	0.9949	0.00242	0.005412	0.55%	0.28%
25		5	0.9932	0.9827	1	0.9799	1	0.003757	0.008401	0.85%	-0.22%
50		5	0.9865	0.9785	0.9946	0.9799	0.9955	0.002904	0.006494	0.66%	0.45%
100		5	0.952	0.9417	0.9623	0.9393	0.9604	0.003709	0.008294	0.87%	3.94%
101		5	0.933	0.919	0.947	0.9139	0.9409	0.005042	0.01127	1.21%	5.86%

Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Control	5	0.9525	0.8546	1	0.8182	1	0.03527	0.07886	8.28%	0.0%
6.25		5	0.9768	0.9367	1	0.9343	1	0.01443	0.03226	3.3%	-2.55%
12.5		5	0.9949	0.9861	1	0.9848	1	0.003194	0.007142	0.72%	-4.45%
25		5	0.9808	0.9275	1	0.904	1	0.01919	0.04291	4.38%	-2.97%
50		5	1	1	1	1	1	0	0	0.0%	-4.98%
100		5	0.9939	0.9771	1	0.9697	1	0.006061	0.01355	1.36%	-4.35%
101		5	0.999	0.9962	1	0.9949	1	0.00101	0.002259	0.23%	-4.88%

Analyst: AC QA: KFP 10/14/19

Combined Development Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Control	0.9877	0.9907	0.803	0.9953	0.9444
6.25		0.9444	0.9953	0.9814	0.9808	0.9242
12.5		0.9798	0.9904	0.981	0.9902	0.9747
25		0.9955	0.9799	0.9904	1	0.904
50		0.9799	0.9848	0.9955	0.9817	0.9908
100		0.951	0.9604	0.9393	0.951	0.9293
101		0.9315	0.9394	0.9139	0.9343	0.9409

Development Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Control	0.9877	0.9907	0.9815	0.9953	1
6.25		0.9947	0.9953	0.9814	0.9808	0.9892
12.5		0.9949	0.9904	0.981	0.9902	0.9847
25		0.9955	0.9799	0.9904	1	1
50		0.9799	0.9848	0.9955	0.9817	0.9908
100		0.951	0.9604	0.9393	0.951	0.9583
101		0.9315	0.9394	0.9139	0.9391	0.9409

Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Control	1	1	0.8182	1	0.9444
6.25		0.9495	1	1	1	0.9343
12.5		0.9848	1	1	1	0.9899
25		1	1	1	1	0.904
50		1	1	1	1	1
100		1	1	1	1	0.9697
101		1	1	1	0.9949	1

Analyst: AC QA: KFP 10/14/19

CETIS Summary Report

Bivalve Larval Survival and Development Test | **Nautilus Environmental (CA)**

Combined Development Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Control	240/243	213/215	159/198	213/214	187/198
6.25		187/198	212/213	211/215	204/208	183/198
12.5		194/198	207/209	207/211	203/205	193/198
25		221/222	195/199	207/209	198/198	179/198
50		195/199	195/198	220/221	214/218	215/217
100		194/204	194/202	201/214	194/204	184/198
101		204/219	186/198	191/209	185/198	207/220

Development Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Control	240/243	213/215	159/162	213/214	187/187
6.25		187/188	212/213	211/215	204/208	183/185
12.5		194/195	207/209	207/211	203/205	193/196
25		221/222	195/199	207/209	198/198	179/179
50		195/199	195/198	220/221	214/218	215/217
100		194/204	194/202	201/214	194/204	184/192
101		204/219	186/198	191/209	185/197	207/220

Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Control	198/198	198/198	162/198	198/198	187/198
6.25		188/198	198/198	198/198	198/198	185/198
12.5		195/198	198/198	198/198	198/198	196/198
25		198/198	198/198	198/198	198/198	179/198
50		198/198	198/198	198/198	198/198	198/198
100		198/198	198/198	198/198	198/198	192/198
101		198/198	198/198	198/198	197/198	198/198

Analyst: AC QA: KFP 10/14/19

CETIS Analytical Report

Report Date: 19 Sep-19 14:47 (p 1 of 6)
Test Code: 1908-S086 | 05-2803-1866

Bivalve Larval Survival and Development Test — **Nautilus Environmental (CA)**

Analysis ID:	15-8302-2539	**Endpoint:**	Combined Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	19 Sep-19 14:47	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Batch Note: 101 = 100% sample filtered to 0.45um

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C > T	NA	NA	5.1%	100	>100	NA	1

Steel Many-One Rank Sum Test

Control	vs	C-%	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		6.25	25.5	16	1	8	0.6807	Asymp	Non-Significant Effect
		12.5	27	16	0	8	0.8003	Asymp	Non-Significant Effect
		25	31	16	0	8	0.9676	Asymp	Non-Significant Effect
		50	30	16	0	8	0.9446	Asymp	Non-Significant Effect
		100	23	16	0	8	0.4416	Asymp	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0537255	0.0107451	5	1.347	0.2789	Non-Significant Effect
Error	0.1914514	0.007977142	24			
Total	0.2451769		29			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	19.63	15.09	0.0015	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.8908	0.9031	0.0050	Non-normal Distribution

Combined Development Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	0.9442	0.843	1	0.9877	0.803	0.9953	0.03646	8.64%	0.0%
6.25		5	0.9652	0.9284	1	0.9808	0.9242	0.9953	0.01327	3.07%	-2.22%
12.5		5	0.9833	0.9747	0.9918	0.981	0.9747	0.9904	0.003078	0.7%	-4.13%
25		5	0.974	0.9246	1	0.9904	0.904	1	0.0178	4.09%	-3.15%
50		5	0.9865	0.9785	0.9946	0.9848	0.9799	0.9955	0.002904	0.66%	-4.48%
100		5	0.9462	0.9312	0.9611	0.951	0.9293	0.9604	0.005392	1.27%	-0.21%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	1.376	1.175	1.577	1.459	1.111	1.502	0.07235	11.76%	0.0%
6.25		5	1.399	1.293	1.504	1.432	1.292	1.502	0.03793	6.07%	-1.64%
12.5		5	1.443	1.409	1.478	1.433	1.411	1.473	0.01237	1.92%	-4.9%
25		5	1.439	1.303	1.576	1.473	1.256	1.535	0.04911	7.63%	-4.6%
50		5	1.458	1.419	1.496	1.447	1.429	1.503	0.01389	2.13%	-5.95%
100		5	1.338	1.305	1.371	1.348	1.302	1.37	0.01187	1.99%	2.78%

Analyst: AC QA: KFP 10/14/19

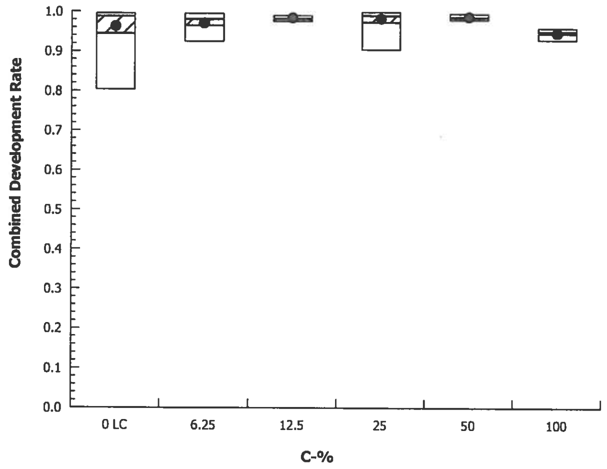
CETIS Analytical Report

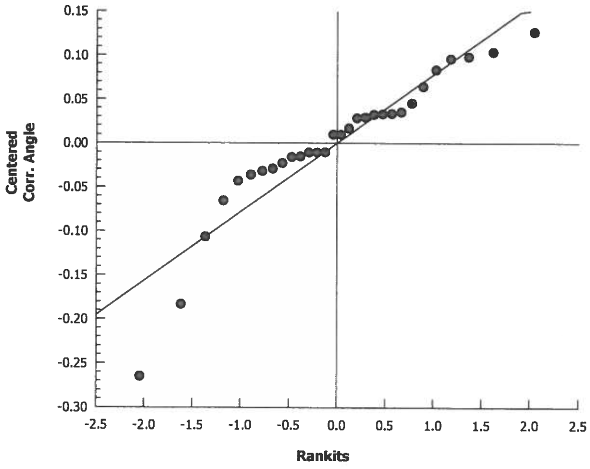
Report Date: 19 Sep-19 14:47 (p 2 of 6)
Test Code: 1908-S086 | 05-2803-1866

Bivalve Larval Survival and Development Test **Nautilus Environmental (CA)**

Analysis ID:	15-8302-2539	**Endpoint:**	Combined Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	19 Sep-19 14:47	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Graphics





Analyst: AC QA: KFP 10/14/19

CETIS Analytical Report

Report Date: 19 Sep-19 14:47 (p 3 of 6)
Test Code: 1908-S086 | 05-2803-1866

Bivalve Larval Survival and Development Test — **Nautilus Environmental (CA)**

Analysis ID:	01-0747-1498	**Endpoint:**	Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	19 Sep-19 14:47	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Batch Note: 101 = 100% sample filtered to 0.45um

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C > T	NA	NA	1.05%	50	100	70.71	2

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		6.25	0.6869	2.362	0.05	8	0.5630	CDF	Non-Significant Effect
		12.5	0.7731	2.362	0.05	8	0.5234	CDF	Non-Significant Effect
		25	-0.657	2.362	0.05	8	0.9588	CDF	Non-Significant Effect
		50	1.099	2.362	0.05	8	0.3767	CDF	Non-Significant Effect
		100*	6.199	2.362	0.05	8	<0.0001	CDF	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.06682085	0.01336417	5	12.08	<0.0001	Significant Effect
Error	0.02655492	0.001106455	24			
Total	0.09337576		29			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	3.042	15.09	0.6934	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9756	0.9031	0.7002	Normal Distribution

Development Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	0.991	0.9822	0.9998	0.9907	0.9815	1	0.003175	0.72%	0.0%
6.25		5	0.9883	0.9796	0.9969	0.9892	0.9808	0.9953	0.003123	0.71%	0.28%
12.5		5	0.9883	0.9815	0.995	0.9902	0.981	0.9949	0.00242	0.55%	0.28%
25		5	0.9932	0.9827	1	0.9955	0.9799	1	0.003757	0.85%	-0.22%
50		5	0.9865	0.9785	0.9946	0.9848	0.9799	0.9955	0.002904	0.66%	0.45%
100		5	0.952	0.9417	0.9623	0.951	0.9393	0.9604	0.003709	0.87%	3.94%

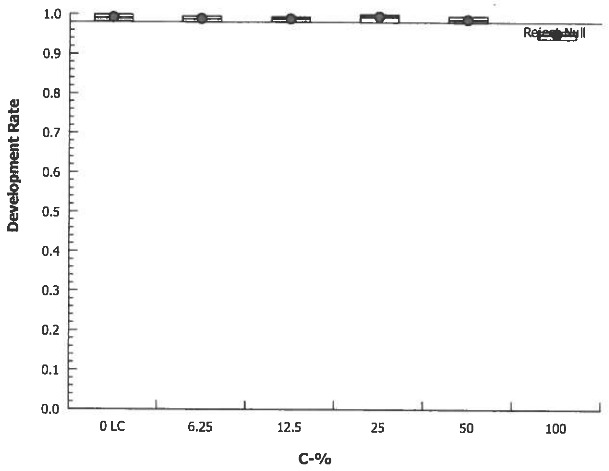
Angular (Corrected) Transformed Summary

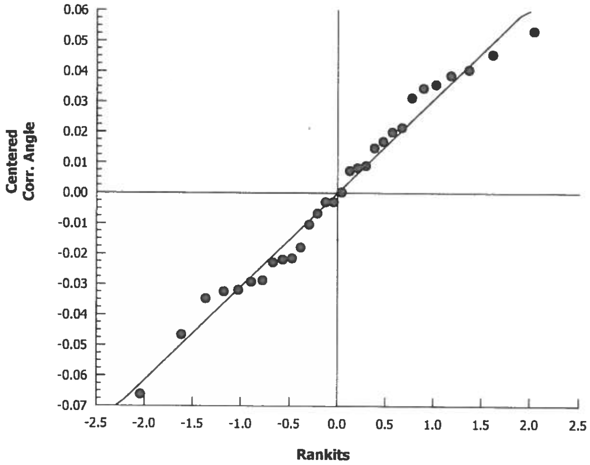
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	1.481	1.433	1.529	1.474	1.434	1.534	0.01729	2.61%	0.0%
6.25		5	1.466	1.425	1.508	1.467	1.432	1.502	0.01504	2.29%	0.98%
12.5		5	1.465	1.433	1.497	1.472	1.433	1.499	0.01151	1.76%	1.1%
25		5	1.495	1.439	1.551	1.504	1.429	1.535	0.0201	3.01%	-0.93%
50		5	1.458	1.419	1.496	1.447	1.429	1.503	0.01389	2.13%	1.56%
100		5	1.351	1.327	1.374	1.348	1.322	1.37	0.008539	1.41%	8.81%

Analyst: AC QA: KFP 10/14/19

Bivalve Larval Survival and Development Test					**Nautilus Environmental (CA)**
Analysis ID:	01-0747-1498	**Endpoint:**	Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	19 Sep-19 14:47	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Graphics





Analyst: AC QA: KFP 10/14/19

CETIS Analytical Report

Report Date: 19 Sep-19 14:47 (p 5 of 6)
Test Code: 1908-S086 | 05-2803-1866

Bivalve Larval Survival and Development Test — **Nautilus Environmental (CA)**

Analysis ID:	17-4052-7782	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	19 Sep-19 14:47	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Batch Note: 101 = 100% sample filtered to 0.45um

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C > T	NA	NA	5.1%	100	>100	NA	1

Steel Many-One Rank Sum Test

Control	vs	C-%	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		6.25	28.5	16	1	8	0.8883	Asymp	Non-Significant Effect
		12.5	29.5	16	1	8	0.9290	Asymp	Non-Significant Effect
		25	30	16	1	8	0.9446	Asymp	Non-Significant Effect
		50	32.5	16	1	8	0.9870	Asymp	Non-Significant Effect
		100	31	16	1	8	0.9676	Asymp	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.04767489	0.009534978	5	0.852	0.5270	Non-Significant Effect
Error	0.2686	0.01119167	24			
Total	0.3162749		29			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	118.1	15.09	<0.0001	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.8796	0.9031	0.0028	Non-normal Distribution

Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	0.9525	0.8546	1	1	0.8182	1	0.03527	8.28%	0.0%
6.25		5	0.9768	0.9367	1	1	0.9343	1	0.01443	3.3%	-2.55%
12.5		5	0.9949	0.9861	1	1	0.9848	1	0.003195	0.72%	-4.45%
25		5	0.9808	0.9275	1	1	0.904	1	0.01919	4.38%	-2.97%
50		5	1	1	1	1	1	1	0	0.0%	-4.98%
100		5	0.9939	0.9771	1	1	0.9697	1	0.006061	1.36%	-4.35%

Angular (Corrected) Transformed Summary

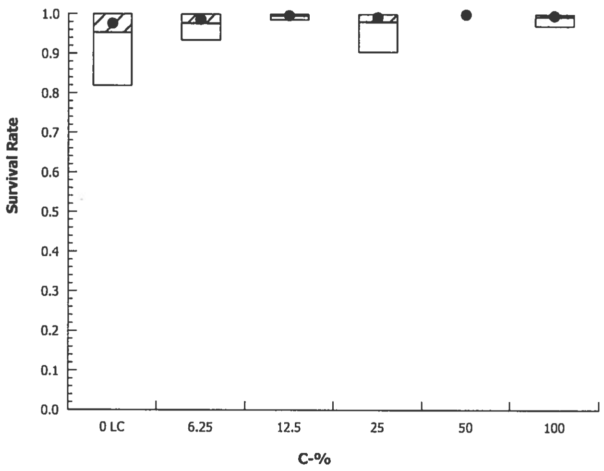
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	1.414	1.189	1.639	1.535	1.13	1.535	0.08099	12.81%	0.0%
6.25		5	1.452	1.311	1.594	1.535	1.312	1.535	0.05105	7.86%	-2.73%
12.5		5	1.505	1.452	1.558	1.535	1.447	1.535	0.01908	2.84%	-6.43%
25		5	1.479	1.324	1.635	1.535	1.256	1.535	0.05588	8.45%	-4.64%
50		5	1.535	1.535	1.536	1.535	1.535	1.535	0	0.0%	-8.59%
100		5	1.507	1.43	1.585	1.535	1.396	1.535	0.02789	4.14%	-6.62%

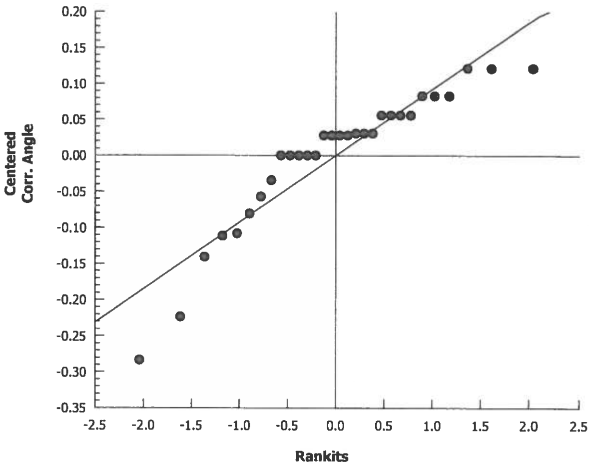
Analyst: AC QA: KFP 10/14/19

Bivalve Larval Survival and Development Test **Nautilus Environmental (CA)**

Analysis ID: 17-4052-7782 **Endpoint:** Survival Rate **CETIS Version:** CETISv1.8.7
Analyzed: 19 Sep-19 14:47 **Analysis:** Nonparametric-Control vs Treatments **Official Results:** Yes

Graphics





Analyst: AC QA: KFP 10/14/19

CETIS Analytical Report

Report Date: 19 Sep-19 14:47 (p 1 of 3)
Test Code: 1908-S086 | 05-2803-1866

Bivalve Larval Survival and Development Test — **Nautilus Environmental (CA)**

Analysis ID:	02-3501-0865	**Endpoint:**	Combined Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	19 Sep-19 14:47	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Batch Note: 101 = 100% sample filtered to 0.45um

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	1536170	1000	Yes	Two-Point Interpolation

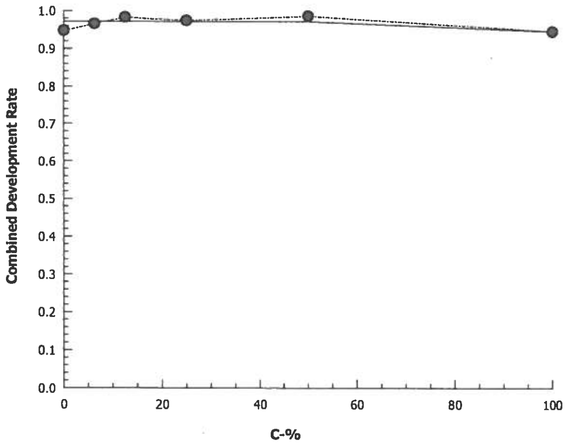
Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC25	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Combined Development Rate Summary

			Calculated Variate(A/B)								
C-%	**Control Type**	**Count**	**Mean**	**Min**	**Max**	**Std Err**	**Std Dev**	**CV%**	**%Effect**	**A**	**B**
0	Lab Control	5	0.9442	0.803	0.9953	0.03646	0.08154	8.64%	0.0%	1012	1068
6.25		5	0.9652	0.9242	0.9953	0.01327	0.02966	3.07%	-2.22%	997	1032
12.5		5	0.9833	0.9747	0.9904	0.003078	0.006884	0.7%	-4.13%	1004	1021
25		5	0.974	0.904	1	0.0178	0.0398	4.09%	-3.15%	1000	1026
50		5	0.9865	0.9799	0.9955	0.002904	0.006494	0.66%	-4.48%	1039	1053
100		5	0.9462	0.9293	0.9604	0.005392	0.01206	1.27%	-0.21%	967	1022

Graphics



Analyst: AC QA: KFP 10/14/19

CETIS Analytical Report

Report Date: 19 Sep-19 14:47 (p 2 of 3)
Test Code: 1908-S086 | 05-2803-1866

Bivalve Larval Survival and Development Test — **Nautilus Environmental (CA)**

Analysis ID:	05-6468-0810	**Endpoint:**	Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	19 Sep-19 14:47	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Batch Note: 101 = 100% sample filtered to 0.45um

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	689203	1000	Yes	Two-Point Interpolation

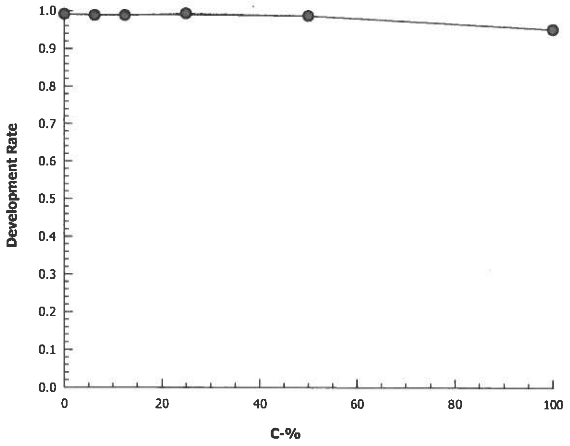
Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC25	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Development Rate Summary

			Calculated Variate(A/B)								
C-%	**Control Type**	**Count**	**Mean**	**Min**	**Max**	**Std Err**	**Std Dev**	**CV%**	**%Effect**	**A**	**B**
0	Lab Control	5	0.991	0.9815	1	0.003175	0.007099	0.72%	0.0%	1012	1021
6.25		5	0.9883	0.9808	0.9953	0.003123	0.006982	0.71%	0.28%	997	1009
12.5		5	0.9883	0.981	0.9949	0.00242	0.005412	0.55%	0.28%	1004	1016
25		5	0.9932	0.9799	1	0.003757	0.0084	0.85%	-0.22%	1000	1007
50		5	0.9865	0.9799	0.9955	0.002904	0.006494	0.66%	0.45%	1039	1053
100		5	0.952	0.9393	0.9604	0.003709	0.008294	0.87%	3.94%	967	1016

Graphics



Analyst: AC QA: KFP 10/14/19

CETIS Analytical Report

Report Date:	19 Sep-19 14:47 (p 3 of 3)
Test Code:	1908-S086 | 05-2803-1866

Bivalve Larval Survival and Development Test — **Nautilus Environmental (CA)**

Analysis ID:	20-4101-9471	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	19 Sep-19 14:47	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Batch Note: 101 = 100% sample filtered to 0.45um

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	1553608	1000	Yes	Two-Point Interpolation

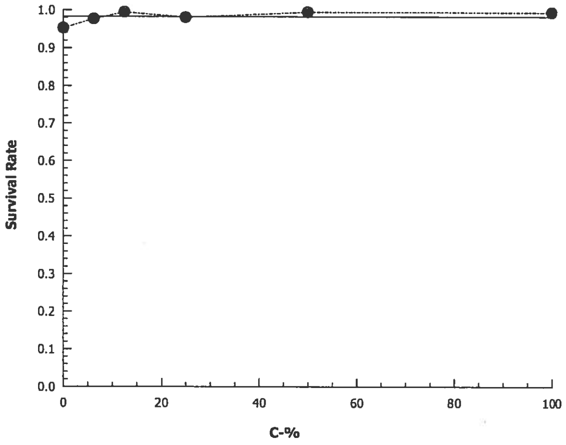
Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC25	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Lab Control	5	0.9525	0.8182	1	0.03527	0.07886	8.28%	0.0%	943	990
6.25		5	0.9768	0.9343	1	0.01443	0.03226	3.3%	-2.55%	967	990
12.5		5	0.9949	0.9848	1	0.003195	0.007143	0.72%	-4.45%	985	990
25		5	0.9808	0.904	1	0.01919	0.04291	4.38%	-2.97%	971	990
50		5	1	1	1	0	0	0.0%	-4.98%	990	990
100		5	0.9939	0.9697	1	0.006061	0.01355	1.36%	-4.35%	984	990

Graphics



Analyst: AC QA: KFP 10/14/19

CETIS Analytical Report

TST

Report Date:	19 Sep-19 14:53 (p 1 of 1)
Test Code:	1908-S086 | 05-2803-1866

Bivalve Larval Survival and Development Test **Nautilus Environmental (CA)**

Analysis ID:	12-0426-5062	**Endpoint:**	Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	19 Sep-19 14:52	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Batch Note: 101 = 100% sample filtered to 0.45um

Data Transform	Zeta	Alt Hyp	Trials	Seed	TST b	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C*b < T	NA	NA	0.75	0.56%	101	>101	NA	0.9901

TST-Welch's t Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		6.25*	17.91	1.895	0.038	7	<0.0001	CDF	Non-Significant Effect
		12.5*	20.41	1.895	0.033	7	<0.0001	CDF	Non-Significant Effect
		25*	16.05	1.943	0.046	6	<0.0001	CDF	Non-Significant Effect
		50*	18.27	1.895	0.036	7	<0.0001	CDF	Non-Significant Effect
		100*	15.44	1.943	0.030	6	<0.0001	CDF	Non-Significant Effect
		101*	12.26	1.895	0.031	7	<0.0001	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.1544299	0.02573831	6	25.33	<0.0001	Significant Effect
Error	0.02845127	0.001016117	28			
Total	0.1828811		34			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	3.966	16.81	0.6813	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9803	0.9146	0.7681	Normal Distribution

Development Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	0.991	0.9822	0.9998	0.9907	0.9815	1	0.003175	0.72%	0.0%
6.25		5	0.9883	0.9796	0.9969	0.9892	0.9808	0.9953	0.003123	0.71%	0.28%
12.5		5	0.9883	0.9815	0.995	0.9902	0.981	0.9949	0.00242	0.55%	0.28%
25		5	0.9932	0.9827	1	0.9955	0.9799	1	0.003757	0.85%	-0.22%
50		5	0.9865	0.9785	0.9946	0.9848	0.9799	0.9955	0.002904	0.66%	0.45%
100		5	0.952	0.9417	0.9623	0.951	0.9393	0.9604	0.003709	0.87%	3.94%
101		5	0.933	0.919	0.947	0.9391	0.9139	0.9409	0.005042	1.21%	5.86%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	1.481	1.433	1.529	1.474	1.434	1.534	0.01729	2.61%	0.0%
6.25		5	1.466	1.425	1.508	1.467	1.432	1.502	0.01504	2.29%	0.98%
12.5		5	1.465	1.433	1.497	1.472	1.433	1.499	0.01151	1.76%	1.1%
25		5	1.495	1.439	1.551	1.504	1.429	1.535	0.0201	3.01%	-0.93%
50		5	1.458	1.419	1.496	1.447	1.429	1.503	0.01389	2.13%	1.56%
100		5	1.351	1.327	1.374	1.348	1.322	1.37	0.008539	1.41%	8.81%
101		5	1.31	1.282	1.337	1.321	1.273	1.325	0.009738	1.66%	11.57%

Analyst: AC QA: KFP 10/14/19

CETIS Analytical Report

TST

Report Date: 19 Sep-19 14:51 (p 1 of 1)
Test Code: 1908-S086 | 05-2803-1866

Bivalve Larval Survival and Development Test **Nautilus Environmental (CA)**

Analysis ID:	10-7262-2176	**Endpoint:**	Combined Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	19 Sep-19 14:51	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Batch Note: 101 = 100% sample filtered to 0.45um

Data Transform	Zeta	Alt Hyp	Trials	Seed	TST b	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C*b < T	NA	NA	0.75	4.09%	101	>101	NA	0.9901

TST-Welch's t Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		6.25*	5.537	1.895	0.125	7	0.0004	CDF	Non-Significant Effect
		12.5*	7.391	2.132	0.119	4	0.0009	CDF	Non-Significant Effect
		25*	5.564	1.895	0.139	7	0.0004	CDF	Non-Significant Effect
		50*	7.602	2.132	0.119	4	0.0008	CDF	Non-Significant Effect
		100*	5.505	2.132	0.118	4	0.0027	CDF	Non-Significant Effect
		101*	5.006	2.132	0.117	4	0.0037	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.09761006	0.01626834	6	2.358	0.0572	Non-Significant Effect
Error	0.1931922	0.006899722	28			
Total	0.2908023		34			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	26.58	16.81	0.0002	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.8787	0.9146	0.0011	Non-normal Distribution

Combined Development Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	0.9442	0.843	1	0.9877	0.803	0.9953	0.03646	8.64%	0.0%
6.25		5	0.9652	0.9284	1	0.9808	0.9242	0.9953	0.01327	3.07%	-2.22%
12.5		5	0.9833	0.9747	0.9918	0.981	0.9747	0.9904	0.003078	0.7%	-4.13%
25		5	0.974	0.9246	1	0.9904	0.904	1	0.0178	4.09%	-3.15%
50		5	0.9865	0.9785	0.9946	0.9848	0.9799	0.9955	0.002904	0.66%	-4.48%
100		5	0.9462	0.9312	0.9611	0.951	0.9293	0.9604	0.005392	1.27%	-0.21%
101		5	0.932	0.9186	0.9454	0.9343	0.9139	0.9409	0.004839	1.16%	1.3%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	1.376	1.175	1.577	1.459	1.111	1.502	0.07235	11.76%	0.0%
6.25		5	1.399	1.293	1.504	1.432	1.292	1.502	0.03793	6.07%	-1.64%
12.5		5	1.443	1.409	1.478	1.433	1.411	1.473	0.01237	1.92%	-4.9%
25		5	1.439	1.303	1.576	1.473	1.256	1.535	0.04911	7.63%	-4.6%
50		5	1.458	1.419	1.496	1.447	1.429	1.503	0.01389	2.13%	-5.95%
100		5	1.338	1.305	1.371	1.348	1.302	1.37	0.01187	1.99%	2.78%
101		5	1.308	1.282	1.333	1.312	1.273	1.325	0.00933	1.6%	4.97%

Analyst: AC QA: KTP 10/14/19

CETIS Analytical Report

Report Date: 19 Sep-19 14:54 (p 1 of 1)
Test Code: 1908-S086 | 05-2803-1866

Bivalve Larval Survival and Development Test

Nautilus Environmental (CA)

Analysis ID:	10-4758-8258	**Endpoint:**	Combined Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	19 Sep-19 14:54	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch Note: 101 = 100% sample filtered to 0.45um

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	6.57%	Passes combined development rate

Unequal Variance t Two-Sample Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		101	0.9374	2.132	0.156	4	0.2008	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.01169092	0.01169092	1	0.8787	0.3760	Non-Significant Effect
Error	0.1064357	0.01330446	8			
Total	0.1181266		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	60.14	23.15	0.0016	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.8409	0.7411	0.0453	Normal Distribution

Combined Development Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	0.9442	0.843	1	0.9877	0.803	0.9953	0.03646	8.64%	0.0%
101		5	0.932	0.9186	0.9454	0.9343	0.9139	0.9409	0.004839	1.16%	1.3%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	1.376	1.175	1.577	1.459	1.111	1.502	0.07235	11.76%	0.0%
101		5	1.308	1.282	1.333	1.312	1.273	1.325	0.00933	1.6%	4.97%

Analyst: AC QA: KPP 10/14/19

CETIS Analytical Report

Report Date: 19 Sep-19 14:54 (p 1 of 1)
Test Code: 1908-S086 | 05-2803-1866

Bivalve Larval Survival and Development Test

Nautilus Environmental (CA)

Analysis ID:	15-3184-1019	**Endpoint:**	Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	19 Sep-19 14:54	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch Note: 101 = 100% sample filtered to 0.45um

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	0.71%	Fails development rate

Equal Variance t Two-Sample Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		101*	8.635	1.86	0.037	8	<0.0001	CDF	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.07342609	0.07342609	1	74.56	<0.0001	Significant Effect
Error	0.007878723	0.0009848403	8			
Total	0.08130481		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	3.155	23.15	0.2918	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9692	0.7411	0.8830	Normal Distribution

Development Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	0.991	0.9822	0.9998	0.9907	0.9815	1	0.003175	0.72%	0.0%
101		5	0.933	0.919	0.947	0.9391	0.9139	0.9409	0.005042	1.21%	5.86%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	1.481	1.433	1.529	1.474	1.434	1.534	0.01729	2.61%	0.0%
101		5	1.31	1.282	1.337	1.321	1.273	1.325	0.009738	1.66%	11.57%

Analyst: AC QA: KFP 10/14/19

Embryo Larval Bioassay **48-hour Development**

Client: Wood/POSD
Test Species: *M. galloprovincialis*
Sample ID: SIYB-3
Start Date/Time: 8/20/2019 1415
Test ID: 1908-S 086
End Date/Time: 8/22/2019 1225

Random #	Number Normal	Number Abnormal		Total Number Counted	Intials/Date
		Number Curved Shell	All other abnormal		
106	204	7	8	219	ACS 9/10/19
107	194	4	6	204	
108	184	6	2	192	
109	214	0	4	218	
110	204	0	4	208	
111	220	0	1	221	
112	207	10	3	220	
113	212	0	1	213	
114	187	0	0	187	
115	215	0	2	217	
116	195	1	2	198	
117	201	10	3	214	
118	194	0	1	195	
119	159	0	3	162	
120	213	0	2	215	
121	221	0	1	222	
122	187	0	1	188	
123	198	0	0	198	
124	186	5	7	198	
125	194	6	4	204	
126	195	0	4	199	
127	211	1	3	215	
128	203	0	2	205	
129	240	0	3	243	
130	194	5	3	202	
131	179	0	0	179	
132	195	0	4	199	
133	185	11	1	197	
134	213	0	1	214	
135	207	0	2	209	
136	207	0	2	209	
137	183	0	2	185	
138	193	0	3	196	
139	191	6	12	209	
140	207	0	4	~~214~~ 211	
				Q18 AC 10/14	

Comments:

QC Check: AC 10/14/19

Final Review: KFP 10/14/19

CETIS Test Data Worksheet

Report Date: 16 Aug-19 12:41 (p 1 of 1)
Test Code: 1908-S086 05-2803-1866/1F79207A

Bivalve Larval Survival and Development Test

Nautilus Environmental (CA)

Start Date: 20 Aug-19
End Date: 22 Aug-19
Sample Date: 19 Aug-19
Species: Mytilus galloprovincialis
Protocol: EPA/600/R-95/136 (1995)
Material: Ambient Water
Sample Code: 19- 0919
Sample Source: Shelter Island Yacht Basin
Sample Station: SIYB-3

C-%	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
0	LC	1	129			250	246	KS 8/22/19
0	LC	2	120					
0	LC	3	119					
0	LC	4	134					
0	LC	5	114					
6.25		1	122			188	187	KS 8/22/19
6.25		2	113					
6.25		3	127					
6.25		4	110					
6.25		5	137					
12.5		1	118			195	194	KS 8/22/19
12.5		2	136					
12.5		3	140					
12.5		4	128					
12.5		5	138					
25		1	121			226	225	KS 8/22/19
25		2	132					
25		3	135					
25		4	123					
25		5	131					
50		1	126			206	202	KS 8/22/19
50		2	116					
50		3	111					
50		4	109					
50		5	115					
100		1	107			195	187	KS 8/22/19 1 lg. copepod 2 sm. copepod 2 curved
100		2	130					
100		3	117					
100		4	125					
100		5	108					
~~101~~		1	106			219	206	KS 8/22/19 3 curved
~~101~~		2	124					
~~101~~ @		3	139					
~~101~~		4	133					
~~101~~		5	112					

100% filtered

QC: EG

@ Q8 BO 8/22/19

Analyst: BO QA: KS 10/11/19

Marine Chronic Bioassay

DM-014

Water Quality Measurements

Client: Wood/POSD
Sample ID: SIYB-3
Sample Log No.: 19-0919
Test No.: 1908-S086

Test Species: *M. galloprovincialis*
Start Date/Time: 8/20/2019 1415
End Date/Time: 8/22/2019 1225

Concentration (%)	Salinity (ppt)			Temperature (°C)			Dissolved Oxygen (mg/L)			pH (pH units)		
	0	24	48	0	24	48	0	24	48	0	24	48
Lab Control	33.9	34.0	34.1	15.1	14.9	14.9	8.3	8.4	8.3	8.01	7.96	8.00
6.25	34.2	34.3	34.4	15.0	14.7	14.8	8.3	8.4	8.3	8.00	7.96	8.00
12.5	34.2	34.3	34.4	15.0	14.7	14.8	8.4	8.5	8.3	8.00	7.98	8.00
25	34.3	34.4	34.4	15.0	14.6	14.8	8.4	8.4	8.4	7.99	7.97	8.00
50	34.3	34.3	34.4	15.3	14.9	14.9	8.3	8.4	8.3	8.01	7.98	8.01
100	34.4	34.3	34.4	15.2	14.8	14.8	8.3	8.4	8.3	8.01	7.97	8.00
100 filtered	34.2	34.3	34.4	15.3	14.8	14.8	7.2	8.1	8.3	8.02	8.00	8.01

Technician Initials:

	0	24	48
WQ Readings:	BO	RT	BO
Dilutions made by:	AC/EG	▨	▨

Environmental Chamber: D.

Comments:
0 hrs:
24 hrs:
48 hrs:

QC Check: AC 9/10/19

Final Review: vg 10/11/19

Enthalpy Analytical. 4340 Vandever Avenue. San Diego, CA 92120.

Marine Chronic Bioassay
DM-013

Larval Development Worksheet

Client: Wood/POSD S14B-3
Test No.: 1908-S086
Test Species: Mytilus galloprovincialis
Animal Source: Mission Bay
Date Received: 7/1/19
Test Chambers: 30mL glass shell vials
Sample Volume: 10mL

Start Date/Time: 8/20/2019 1415
End Date/Time: 8/22/2019 1225
Technician Initials: BO

Spawn Information

First Gamete Release Time: 1100

Sex	Number Spawning
Male	5
Female	4

Gamete Selection

Sex	Beaker Number(s)	Condition (sperm motility, egg density, color, shape, etc.)
Male	2,3,4	good motility, average density
Female 1	1	light yellow color, great shape, great density
Female 2	3	white, good shape, good density
Female 3	—	—

Egg Fertilization Time: 1200

Embryo Stock Selection

Stock Number	% of embryos at 2-cell division stage
Female 1	100
Female 2	100
Female 3	—

Stock(s) chosen for testing: 1

Embryo Inoculum Preparation

Target count on Sedgwick-Rafter slide for desired density is 6 embryos

Number Counted:

6	13
12	13
10	10
10	10
10	12

Mean: 10.6

Mean 10.6 X 50 = 530 embryos/ml

Initial Density: 530
Desired Final Density: 300
(to inoculate with 0.5 ml)
= 1.77 (dilution factor)

Prepare the embryo inoculum according to the calculated dilution factor. For example, if the dilution factor is 2.25, use 100 ml of existing stock (1 part) and 125 ml of dilution water (1.25 parts).

Time Zero Control Counts

Rand. No.	No. Dividing	Total	% Dividing	Mean % Dividing
T01	218	218	100	100
T02	198	198	100	
T03	183	183	100	
T04	203	203	100	
T05	187	187	100	

48-h QC: 224/227 = 98.6%

Comments: $\bar{x} = 198$

QC Check: AC 9/10/19

Final Review: 10/11/19

Enthalpy Analytical. 4340 Vandever Avenue. San Diego, CA 92120.

CETIS Summary Report

Report Date: 14 Oct-19 13:02 (p 1 of 4)
Test Code: 1908-S087 | 21-3519-8392

Bivalve Larval Survival and Development Test **Nautilus Environmental (CA)**

Batch ID:	16-8153-2769	**Test Type:**	Development-Survival	**Analyst:**	
Start Date:	20 Aug-19 14:15	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater
Ending Date:	22 Aug-19 12:25	**Species:**	Mytilus galloprovincialis	**Brine:**	Not Applicable
Duration:	46h	**Source:**	Mission Bay	**Age:**	

Sample ID:	03-8375-5845	**Code:**	19-0920	**Client:**	Wood Environment & Infrastructure
Sample Date:	19 Aug-19 12:10	**Material:**	Ambient Water	**Project:**	POSD - SIYB TMDL Monitoring
Receive Date:	19 Aug-19 17:40	**Source:**	Shelter Island Yacht Basin		
Sample Age:	26h (3.5 °C)	**Station:**	SIYB-4		

Batch Note: 101 = 100% sample filtered to 0.45um

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
00-1584-1008	Combined Development Ra	100	>100	NA	3.01%	1	Dunnett Multiple Comparison Test
16-0399-6966	Development Rate	100	>100	NA	1.45%	1	Dunnett Multiple Comparison Test
15-4424-9565	Survival Rate	100	>100	NA	2.68%	1	Steel Many-One Rank Sum Test

Point Estimate Summary

Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method
14-3803-5769	Combined Development Ra	EC25	>100	N/A	N/A	<1	Linear Interpolation (ICPIN)
		EC50	>100	N/A	N/A	<1	
01-1474-1649	Development Rate	EC25	>100	N/A	N/A	<1	Linear Interpolation (ICPIN)
		EC50	>100	N/A	N/A	<1	
00-3174-8290	Survival Rate	EC25	>100	N/A	N/A	<1	Linear Interpolation (ICPIN)
		EC50	>100	N/A	N/A	<1	

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits	Overlap	Decision
01-1474-1649	Development Rate	Control Resp	0.9859	0.9 - NL	Yes	Passes Acceptability Criteria
16-0399-6966	Development Rate	Control Resp	0.9859	0.9 - NL	Yes	Passes Acceptability Criteria
00-3174-8290	Survival Rate	Control Resp	0.9859	0.5 - NL	Yes	Passes Acceptability Criteria
15-4424-9565	Survival Rate	Control Resp	0.9859	0.5 - NL	Yes	Passes Acceptability Criteria
00-1584-1008	Combined Development Ra	PMSD	0.03008	NL - 0.25	No	Passes Acceptability Criteria

Analyst: TC QA: KFP 10/14/19

Bivalve Larval Survival and Development Test **Nautilus Environmental (CA)**

Combined Development Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Control	5	0.9721	0.9262	1	0.9091	0.9956	0.01651	0.03693	3.8%	0.0%
6.25		5	0.9642	0.9287	0.9997	0.9242	0.9899	0.01279	0.0286	2.97%	0.81%
12.5		5	0.9688	0.9415	0.9961	0.9394	0.9951	0.009837	0.022	2.27%	0.34%
25		5	0.9772	0.9701	0.9842	0.9697	0.9848	0.002527	0.005652	0.58%	-0.52%
50		5	0.9833	0.9694	0.9971	0.9713	0.9953	0.004983	0.01114	1.13%	-1.15%
100		5	0.9516	0.9226	0.9807	0.9141	0.9701	0.01046	0.0234	2.46%	2.11%
101		5	0.9835	0.9662	1	0.9596	0.9953	0.00622	0.01391	1.41%	-1.18%

Development Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Control	5	0.9859	0.9711	1	0.9688	0.9956	0.00533	0.01192	1.21%	0.0%
6.25		5	0.9893	0.9791	0.9995	0.9763	0.9949	0.003659	0.008182	0.83%	-0.34%
12.5		5	0.9817	0.9665	0.997	0.9644	0.9951	0.005492	0.01228	1.25%	0.42%
25		5	0.9821	0.9732	0.9911	0.9747	0.9898	0.003227	0.007216	0.73%	0.38%
50		5	0.9833	0.9694	0.9971	0.9713	0.9953	0.004983	0.01114	1.13%	0.27%
100		5	0.9794	0.9723	0.9865	0.9701	0.9846	0.002563	0.00573	0.59%	0.66%
101		5	0.9885	0.983	0.994	0.9845	0.9953	0.001985	0.004438	0.45%	-0.26%

Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Control	5	0.9859	0.9466	1	0.9293	1	0.01414	0.03162	3.21%	0.0%
6.25		5	0.9747	0.9336	1	0.9293	1	0.01481	0.03312	3.4%	1.13%
12.5		5	0.9869	0.9597	1	0.9495	1	0.009793	0.0219	2.22%	-0.1%
25		5	0.9949	0.9887	1	0.9899	1	0.002259	0.005051	0.51%	-0.92%
50		5	1	1	1	1	1	0	0	0.0%	-1.43%
100		5	0.9717	0.9384	1	0.9293	1	0.01202	0.02687	2.77%	1.43%
101		5	0.9949	0.9809	1	0.9747	1	0.005051	0.01129	1.14%	-0.92%

Analyst: AC QA: KFP 10/14/19

Bivalve Larval Survival and Development Test **Nautilus Environmental (CA)**

Combined Development Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Control	0.9916	0.9688	0.9091	0.9954	0.9956
6.25		0.9763	0.9242	0.986	0.9444	0.9899
12.5		0.9854	0.9394	0.9644	0.9951	0.9596
25		0.9767	0.9747	0.9848	0.9697	0.9798
50		0.987	0.9911	0.9717	0.9953	0.9713
100		0.9701	0.9444	0.9697	0.9141	0.9596
101		0.9596	0.9867	0.9953	0.9855	0.9904

Development Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Control	0.9916	0.9688	0.9783	0.9954	0.9956
6.25		0.9763	0.9946	0.986	0.9947	0.9949
12.5		0.9854	0.9894	0.9644	0.9951	0.9744
25		0.9767	0.9747	0.9898	0.9796	0.9898
50		0.987	0.9911	0.9717	0.9953	0.9713
100		0.9701	0.9791	0.9846	0.9837	0.9794
101		0.9845	0.9867	0.9953	0.9855	0.9904

Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Control	1	1	0.9293	1	1
6.25		1	0.9293	1	0.9495	0.9949
12.5		1	0.9495	1	1	0.9848
25		1	1	0.9949	0.9899	0.9899
50		1	1	1	1	1
100		1	0.9646	0.9848	0.9293	0.9798
101		0.9747	1	1	1	1

Analyst: AC QA: KFP 10/14/19

Combined Development Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Control	236/238	217/224	180/198	215/216	225/226
6.25		206/211	183/198	212/215	187/198	196/198
12.5		203/206	186/198	217/225	202/203	190/198
25		210/215	193/198	195/198	192/198	194/198
50		227/230	222/224	206/212	212/213	203/209
100		195/201	187/198	192/198	181/198	190/198
101		190/198	223/226	213/214	204/207	207/209

Development Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Control	236/238	217/224	180/184	215/216	225/226
6.25		206/211	183/184	212/215	187/188	196/197
12.5		203/206	186/188	217/225	202/203	190/195
25		210/215	193/198	195/197	192/196	194/196
50		227/230	222/224	206/212	212/213	203/209
100		195/201	187/191	192/195	181/184	190/194
101		190/193	223/226	213/214	204/207	207/209

Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Control	198/198	198/198	184/198	198/198	198/198
6.25		198/198	184/198	198/198	188/198	197/198
12.5		198/198	188/198	198/198	198/198	195/198
25		198/198	198/198	197/198	196/198	196/198
50		198/198	198/198	198/198	198/198	198/198
100		198/198	191/198	195/198	184/198	194/198
101		193/198	198/198	198/198	198/198	198/198

Analyst: Ac QA: VFP 10/14/19

CETIS Analytical Report

Report Date: 14 Oct-19 13:02 (p 1 of 6)
Test Code: 1908-S087 | 21-3519-8392

Bivalve Larval Survival and Development Test — **Nautilus Environmental (CA)**

Analysis ID:	00-1584-1008	**Endpoint:**	Combined Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 Oct-19 13:00	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Batch Note: 101 = 100% sample filtered to 0.45um

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C > T	NA	NA	3.01%	100	>100	NA	1

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		6.25	0.8557	2.362	0.099	8	0.4853	CDF	Non-Significant Effect
		12.5	0.5782	2.362	0.099	8	0.6123	CDF	Non-Significant Effect
		25	0.2055	2.362	0.099	8	0.7655	CDF	Non-Significant Effect
		50	-0.4446	2.362	0.099	8	0.9320	CDF	Non-Significant Effect
		100	1.787	2.362	0.099	8	0.1433	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.02670126	0.005340252	5	1.208	0.3357	Non-Significant Effect
Error	0.1061394	0.004422473	24			
Total	0.1328406		29			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	8.985	15.09	0.1097	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9639	0.9031	0.3879	Normal Distribution

Combined Development Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	0.9721	0.9262	1	0.9916	0.9091	0.9956	0.01651	3.8%	0.0%
6.25		5	0.9642	0.9287	0.9997	0.9763	0.9242	0.9899	0.01279	2.97%	0.81%
12.5		5	0.9688	0.9415	0.9961	0.9644	0.9394	0.9951	0.009837	2.27%	0.34%
25		5	0.9772	0.9701	0.9842	0.9767	0.9697	0.9848	0.002528	0.58%	-0.52%
50		5	0.9833	0.9694	0.9971	0.987	0.9713	0.9953	0.004983	1.13%	-1.15%
100		5	0.9516	0.9226	0.9807	0.9596	0.9141	0.9701	0.01046	2.46%	2.11%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	1.429	1.302	1.556	1.479	1.265	1.504	0.04579	7.17%	0.0%
6.25		5	1.393	1.297	1.489	1.416	1.292	1.47	0.03453	5.54%	2.52%
12.5		5	1.404	1.317	1.492	1.381	1.322	1.501	0.03157	5.03%	1.7%
25		5	1.42	1.396	1.444	1.418	1.396	1.447	0.008614	1.36%	0.61%
50		5	1.447	1.391	1.504	1.456	1.401	1.502	0.02024	3.13%	-1.31%
100		5	1.354	1.289	1.418	1.368	1.273	1.397	0.02319	3.83%	5.26%

Analyst: AC QA: KFP 10/14/19

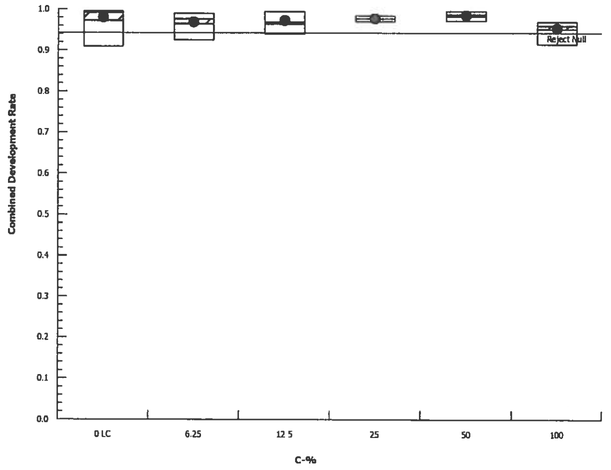
CETIS Analytical Report

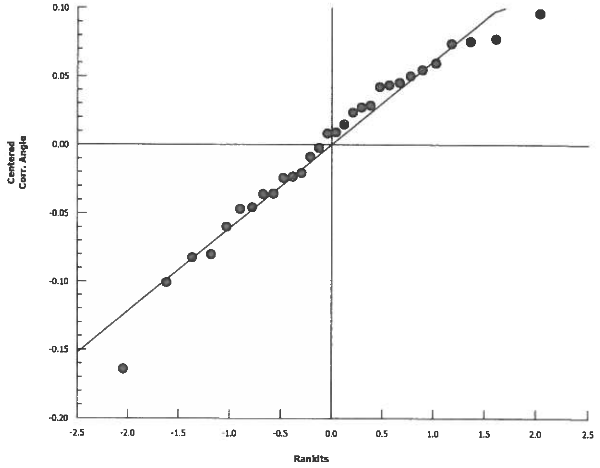
Report Date: 14 Oct-19 13:02 (p 2 of 6)
Test Code: 1908-S087 | 21-3519-8392

Bivalve Larval Survival and Development Test **Nautilus Environmental (CA)**

Analysis ID:	00-1584-1008	**Endpoint:**	Combined Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 Oct-19 13:00	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Graphics





Analyst: AC QA: KFP 10/14/19

Bivalve Larval Survival and Development Test	**Nautilus Environmental (CA)**

Analysis ID:	16-0399-6966	**Endpoint:**	Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 Oct-19 13:00	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Batch Note: 101 = 100% sample filtered to 0.45um

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C > T	NA	NA	1.45%	100	>100	NA	1

Dunnett Multiple Comparison Test

Control	vs C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control	6.25	-0.4897	2.362	0.059	8	0.9386	CDF	Non-Significant Effect
	12.5	0.7446	2.362	0.059	8	0.5365	CDF	Non-Significant Effect
	25	0.8495	2.362	0.059	8	0.4882	CDF	Non-Significant Effect
	50	0.5193	2.362	0.059	8	0.6385	CDF	Non-Significant Effect
	100	1.308	2.362	0.059	8	0.2918	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.006426602	0.00128532	5	0.8255	0.5439	Non-Significant Effect
Error	0.03736797	0.001556999	24			
Total	0.04379457		29			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	3.934	15.09	0.5589	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9514	0.9031	0.1839	Normal Distribution

Development Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	0.9859	0.9711	1	0.9916	0.9688	0.9956	0.00533	1.21%	0.0%
6.25		5	0.9893	0.9791	0.9995	0.9946	0.9763	0.9949	0.00366	0.83%	-0.34%
12.5		5	0.9817	0.9665	0.997	0.9854	0.9644	0.9951	0.005492	1.25%	0.42%
25		5	0.9821	0.9732	0.9911	0.9796	0.9747	0.9898	0.003228	0.73%	0.38%
50		5	0.9833	0.9694	0.9971	0.987	0.9713	0.9953	0.004983	1.13%	0.27%
100		5	0.9794	0.9723	0.9865	0.9794	0.9701	0.9846	0.002563	0.59%	0.66%

Angular (Corrected) Transformed Summary

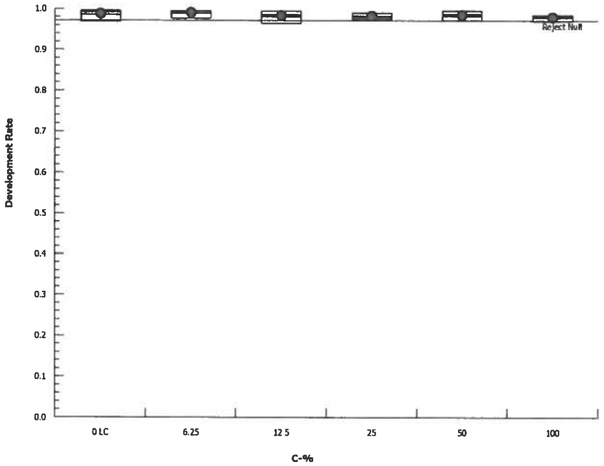
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	1.46	1.398	1.522	1.479	1.393	1.504	0.02236	3.42%	0.0%
6.25		5	1.473	1.426	1.519	1.497	1.416	1.499	0.01664	2.53%	-0.84%
12.5		5	1.442	1.383	1.5	1.45	1.381	1.501	0.02106	3.27%	1.27%
25		5	1.439	1.404	1.475	1.427	1.411	1.47	0.01275	1.98%	1.45%
50		5	1.447	1.391	1.504	1.456	1.401	1.502	0.02024	3.13%	0.89%
100		5	1.428	1.404	1.452	1.427	1.397	1.446	0.008708	1.36%	2.24%

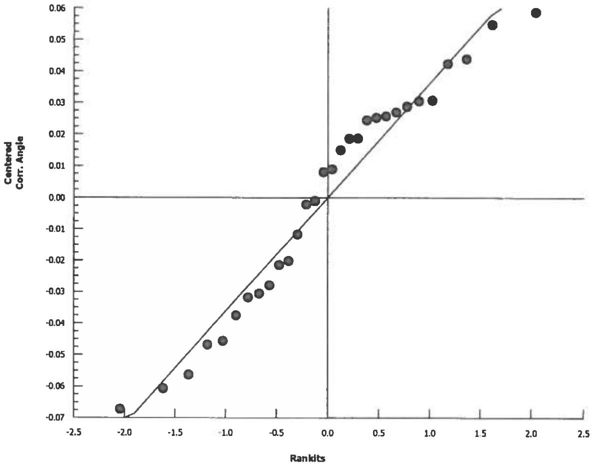
Analyst: AC QA: KFP 10/14/19

Bivalve Larval Survival and Development Test	**Nautilus Environmental (CA)**

Analysis ID:	16-0399-6966	**Endpoint:**	Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 Oct-19 13:00	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Graphics





Analyst: AC QA: KFP 10/14/19

CETIS Analytical Report

Report Date: 14 Oct-19 13:02 (p 5 of 6)
Test Code: 1908-S087 | 21-3519-8392

Bivalve Larval Survival and Development Test — **Nautilus Environmental (CA)**

Analysis ID:	15-4424-9565	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 Oct-19 13:00	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Batch Note: 101 = 100% sample filtered to 0.45um

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C > T	NA	NA	2.68%	100	>100	NA	1

Steel Many-One Rank Sum Test

Control	vs C-%	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Lab Control	6.25	23.5	16	2	8	0.4903	Asymp	Non-Significant Effect
	12.5	26	16	1	8	0.7237	Asymp	Non-Significant Effect
	25	24	16	1	8	0.5394	Asymp	Non-Significant Effect
	50	30	16	1	8	0.9446	Asymp	Non-Significant Effect
	100	21.5	16	2	8	0.3036	Asymp	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.04342332	0.008684664	5	1.335	0.2835	Non-Significant Effect
Error	0.15615	0.006506249	24			
Total	0.1995733		29			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	112.9	15.09	<0.0001	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.9122	0.9031	0.0169	Normal Distribution

Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	0.9859	0.9466	1	1	0.9293	1	0.01414	3.21%	0.0%
6.25		5	0.9747	0.9336	1	0.9949	0.9293	1	0.01481	3.4%	1.13%
12.5		5	0.9869	0.9597	1	1	0.9495	1	0.009793	2.22%	-0.1%
25		5	0.9949	0.9887	1	0.9949	0.9899	1	0.002259	0.51%	-0.92%
50		5	1	1	1	1	1	1	0	0.0%	-1.43%
100		5	0.9717	0.9384	1	0.9798	0.9293	1	0.01202	2.77%	1.43%

Angular (Corrected) Transformed Summary

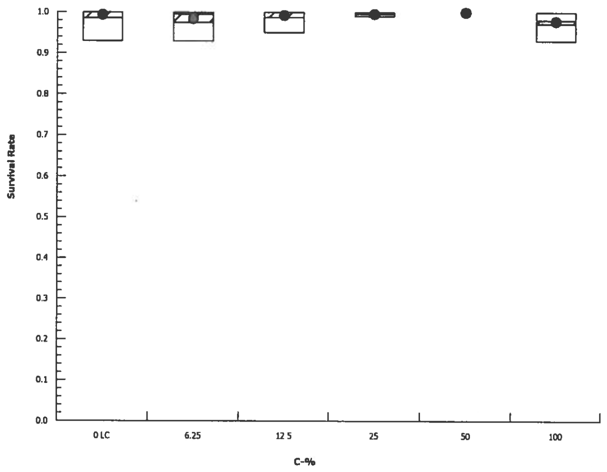
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	1.489	1.359	1.618	1.535	1.302	1.535	0.04672	7.02%	0.0%
6.25		5	1.443	1.304	1.582	1.5	1.302	1.535	0.04999	7.75%	3.05%
12.5		5	1.479	1.374	1.585	1.535	1.344	1.535	0.03787	5.72%	0.61%
25		5	1.502	1.462	1.543	1.5	1.47	1.535	0.01458	2.17%	-0.91%
50		5	1.535	1.535	1.536	1.535	1.535	1.535	0	0.0%	-3.14%
100		5	1.419	1.312	1.526	1.428	1.302	1.535	0.03845	6.06%	4.68%

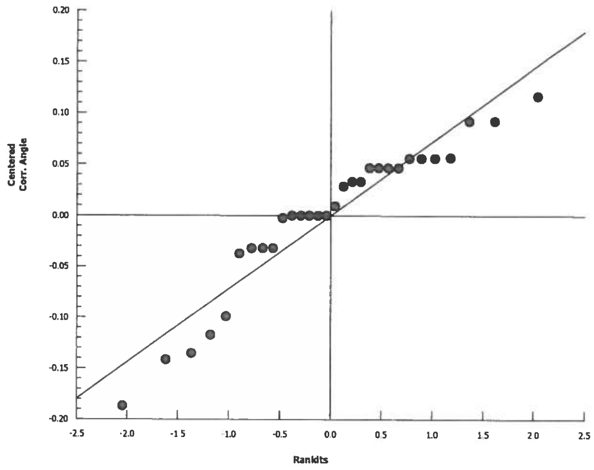
Analyst: AC QA: KFP 10/14/19

Bivalve Larval Survival and Development Test	**Nautilus Environmental (CA)**

Analysis ID:	15-4424-9565	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 Oct-19 13:00	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Graphics





Analyst: AC QA: KFP 10/14/19

CETIS Analytical Report

Report Date: 14 Oct-19 13:02 (p 1 of 3)
Test Code: 1908-S087 | 21-3519-8392

Bivalve Larval Survival and Development Test **Nautilus Environmental (CA)**

Analysis ID: 14-3803-5769 **Endpoint:** Combined Development Rate **CETIS Version:** CETISv1.8.7
Analyzed: 14 Oct-19 13:00 **Analysis:** Linear Interpolation (ICPIN) **Official Results:** Yes

Batch Note: 101 = 100% sample filtered to 0.45um

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	516173	1000	Yes	Two-Point Interpolation

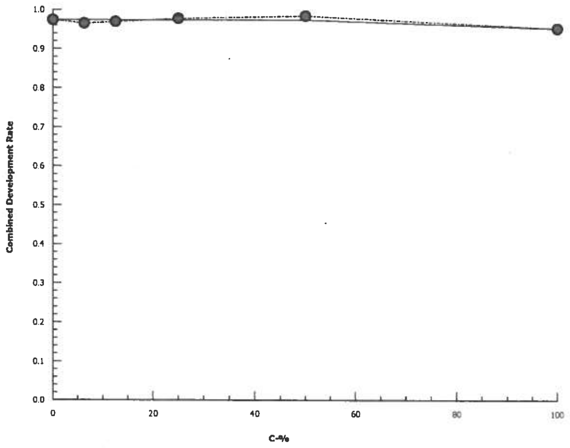
Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC25	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Combined Development Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Lab Control	5	0.9721	0.9091	0.9956	0.01651	0.03693	3.8%	0.0%	1073	1102
6.25		5	0.9642	0.9242	0.9899	0.01279	0.0286	2.97%	0.81%	984	1020
12.5		5	0.9688	0.9394	0.9951	0.009837	0.022	2.27%	0.34%	998	1030
25		5	0.9772	0.9697	0.9848	0.002528	0.005653	0.58%	-0.52%	984	1007
50		5	0.9833	0.9713	0.9953	0.004983	0.01114	1.13%	-1.15%	1070	1088
100		5	0.9516	0.9141	0.9701	0.01046	0.0234	2.46%	2.11%	945	993

Graphics



Analyst: AC QA: KTP 10/14/19

CETIS Analytical Report

Report Date: 14 Oct-19 13:02 (p 2 of 3)
Test Code: 1908-S087 | 21-3519-8392

Bivalve Larval Survival and Development Test — **Nautilus Environmental (CA)**

Analysis ID:	01-1474-1649	**Endpoint:**	Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 Oct-19 13:00	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Batch Note: 101 = 100% sample filtered to 0.45um

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	1699606	1000	Yes	Two-Point Interpolation

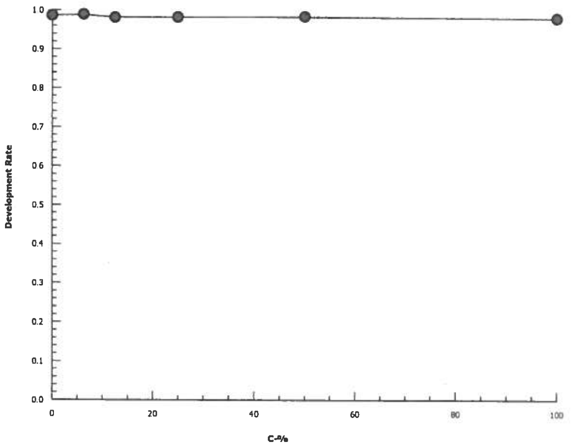
Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC25	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Development Rate Summary

			Calculated Variate(A/B)								
C-%	**Control Type**	**Count**	**Mean**	**Min**	**Max**	**Std Err**	**Std Dev**	**CV%**	**%Effect**	**A**	**B**
0	Lab Control	5	0.9859	0.9688	0.9956	0.00533	0.01192	1.21%	0.0%	1073	1088
6.25		5	0.9893	0.9763	0.9949	0.00366	0.008183	0.83%	-0.34%	984	995
12.5		5	0.9817	0.9644	0.9951	0.005492	0.01228	1.25%	0.42%	998	1017
25		5	0.9821	0.9747	0.9898	0.003228	0.007217	0.73%	0.38%	984	1002
50		5	0.9833	0.9713	0.9953	0.004983	0.01114	1.13%	0.27%	1070	1088
100		5	0.9794	0.9701	0.9846	0.002563	0.00573	0.59%	0.66%	945	965

Graphics



Analyst: AC QA: KFP 10/14/19

CETIS Analytical Report

Report Date:	14 Oct-19 13:02 (p 3 of 3)
Test Code:	1908-S087 | 21-3519-8392

Bivalve Larval Survival and Development Test **Nautilus Environmental (CA)**

Analysis ID:	00-3174-8290	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 Oct-19 13:00	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Batch Note: 101 = 100% sample filtered to 0.45um

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	1481241	1000	Yes	Two-Point Interpolation

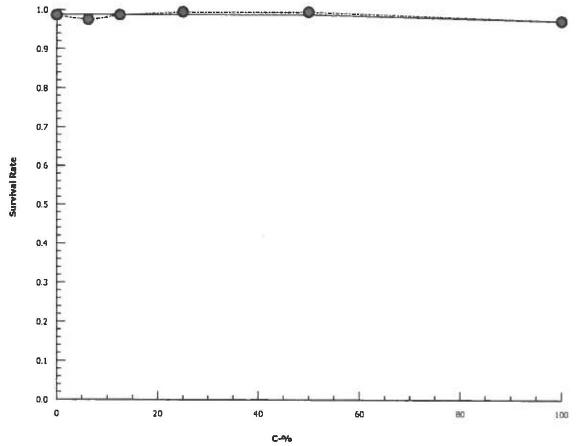
Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC25	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Lab Control	5	0.9859	0.9293	1	0.01414	0.03162	3.21%	0.0%	976	990
6.25		5	0.9747	0.9293	1	0.01481	0.03312	3.4%	1.13%	965	990
12.5		5	0.9869	0.9495	1	0.009793	0.0219	2.22%	-0.1%	977	990
25		5	0.9949	0.9899	1	0.002259	0.005051	0.51%	-0.92%	985	990
50		5	1	1	1	0	0	0.0%	-1.43%	990	990
100		5	0.9717	0.9293	1	0.01202	0.02687	2.77%	1.43%	962	990

Graphics



Analyst: AC QA: KFP 10/14/19

CETIS Analytical Report

TST

Report Date: 14 Oct-19 13:05 (p 1 of 1)
Test Code: 1908-S087 | 21-3519-8392

Bivalve Larval Survival and Development Test — **Nautilus Environmental (CA)**

Analysis ID:	11-2911-5368	**Endpoint:**	Combined Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 Oct-19 13:05	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Batch Note: 101 = 100% sample filtered to 0.45um

Data Transform	Zeta	Alt Hyp	Trials	Seed	TST b	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C*b < T	NA	NA	0.75	2.1%	101	>101	NA	0.9901

TST-Welch's t Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		6.25*	6.595	1.895	0.092	7	0.0002	CDF	Non-Significant Effect
		12.5*	7.136	1.895	0.088	7	<0.0001	CDF	Non-Significant Effect
		25*	9.844	2.132	0.075	4	0.0003	CDF	Non-Significant Effect
		50*	9.429	1.943	0.077	6	<0.0001	CDF	Non-Significant Effect
		100*	6.805	1.895	0.079	7	0.0001	CDF	Non-Significant Effect
		101*	9.238	1.943	0.08	6	<0.0001	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.03426464	0.005710773	6	1.377	0.2581	Non-Significant Effect
Error	0.1160892	0.004146043	28			
Total	0.1503538		34			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	9.453	16.81	0.1497	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9637	0.9146	0.2945	Normal Distribution

Combined Development Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	0.9721	0.9262	1	0.9916	0.9091	0.9956	0.01651	3.8%	0.0%
6.25		5	0.9642	0.9287	0.9997	0.9763	0.9242	0.9899	0.01279	2.97%	0.81%
12.5		5	0.9688	0.9415	0.9961	0.9644	0.9394	0.9951	0.009837	2.27%	0.34%
25		5	0.9772	0.9701	0.9842	0.9767	0.9697	0.9848	0.002528	0.58%	-0.52%
50		5	0.9833	0.9694	0.9971	0.987	0.9713	0.9953	0.004983	1.13%	-1.15%
100		5	0.9516	0.9226	0.9807	0.9596	0.9141	0.9701	0.01046	2.46%	2.11%
101		5	0.9835	0.9662	1	0.9867	0.9596	0.9953	0.00622	1.41%	-1.18%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	1.429	1.302	1.556	1.479	1.265	1.504	0.04579	7.17%	0.0%
6.25		5	1.393	1.297	1.489	1.416	1.292	1.47	0.03453	5.54%	2.52%
12.5		5	1.404	1.317	1.492	1.381	1.322	1.501	0.03157	5.03%	1.7%
25		5	1.42	1.396	1.444	1.418	1.396	1.447	0.008614	1.36%	0.61%
50		5	1.447	1.391	1.504	1.456	1.401	1.502	0.02024	3.13%	-1.31%
100		5	1.354	1.289	1.418	1.368	1.273	1.397	0.02319	3.83%	5.26%
101		5	1.45	1.388	1.512	1.455	1.368	1.502	0.0223	3.44%	-1.48%

Analyst: AC QA: KFP 10/14/19

CETIS Analytical Report

TST

Report Date: 14 Oct-19 13:05 (p 1 of 1)
Test Code: 1908-S087 | 21-3519-8392

Bivalve Larval Survival and Development Test — **Nautilus Environmental (CA)**

Analysis ID:	18-0378-0504	**Endpoint:**	Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 Oct-19 13:05	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Batch Note: 101 = 100% sample filtered to 0.45um

Data Transform	Zeta	Alt Hyp	Trials	Seed	TST b	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C*b < T	NA	NA	0.75	0.8%	101	>101	NA	0.9901

TST-Welch's t Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		6.25*	15.97	1.895	0.045	7	<0.0001	CDF	Non-Significant Effect
		12.5*	12.87	1.895	0.051	7	<0.0001	CDF	Non-Significant Effect
		25*	16.33	1.895	0.04	7	<0.0001	CDF	Non-Significant Effect
		50*	13.4	1.895	0.05	7	<0.0001	CDF	Non-Significant Effect
		100*	17.59	1.943	0.037	6	<0.0001	CDF	Non-Significant Effect
		101*	18.78	1.943	0.038	6	<0.0001	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.007682042	0.00128034	6	0.9074	0.5038	Non-Significant Effect
Error	0.03951014	0.001411077	28			
Total	0.04719218		34			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	5.323	16.81	0.5031	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9673	0.9146	0.3727	Normal Distribution

Development Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	0.9859	0.9711	1	0.9916	0.9688	0.9956	0.00533	1.21%	0.0%
6.25		5	0.9893	0.9791	0.9995	0.9946	0.9763	0.9949	0.00366	0.83%	-0.34%
12.5		5	0.9817	0.9665	0.997	0.9854	0.9644	0.9951	0.005492	1.25%	0.42%
25		5	0.9821	0.9732	0.9911	0.9796	0.9747	0.9898	0.003228	0.73%	0.38%
50		5	0.9833	0.9694	0.9971	0.987	0.9713	0.9953	0.004983	1.13%	0.27%
100		5	0.9794	0.9723	0.9865	0.9794	0.9701	0.9846	0.002563	0.59%	0.66%
101		5	0.9885	0.983	0.994	0.9867	0.9845	0.9953	0.001984	0.45%	-0.26%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	1.46	1.398	1.522	1.479	1.393	1.504	0.02236	3.42%	0.0%
6.25		5	1.473	1.426	1.519	1.497	1.416	1.499	0.01664	2.53%	-0.84%
12.5		5	1.442	1.383	1.5	1.45	1.381	1.501	0.02106	3.27%	1.27%
25		5	1.439	1.404	1.475	1.427	1.411	1.47	0.01275	1.98%	1.45%
50		5	1.447	1.391	1.504	1.456	1.401	1.502	0.02024	3.13%	0.89%
100		5	1.428	1.404	1.452	1.427	1.397	1.446	0.008708	1.36%	2.24%
101		5	1.465	1.437	1.494	1.455	1.446	1.502	0.01035	1.58%	-0.34%

Analyst: AC QA: KFP 10/14/19

CETIS Analytical Report

Report Date: 14 Oct-19 13:06 (p 1 of 1)
Test Code: 1908-S087 | 21-3519-8392

Bivalve Larval Survival and Development Test — **Nautilus Environmental (CA)**

Analysis ID:	10-3715-3925	**Endpoint:**	Combined Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 Oct-19 13:06	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch Note: 101 = 100% sample filtered to 0.45um

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	2.79%	Passes combined development rate

Equal Variance t Two-Sample Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		101	-0.4143	1.86	0.095	8	0.6552	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.001113476	0.001113476	1	0.1717	0.6895	Non-Significant Effect
Error	0.05188433	0.006485542	8			
Total	0.05299781		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	4.215	23.15	0.1924	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8859	0.7411	0.1523	Normal Distribution

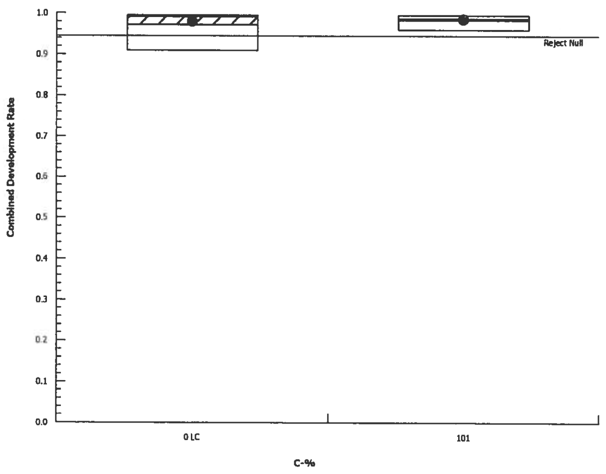
Combined Development Rate Summary

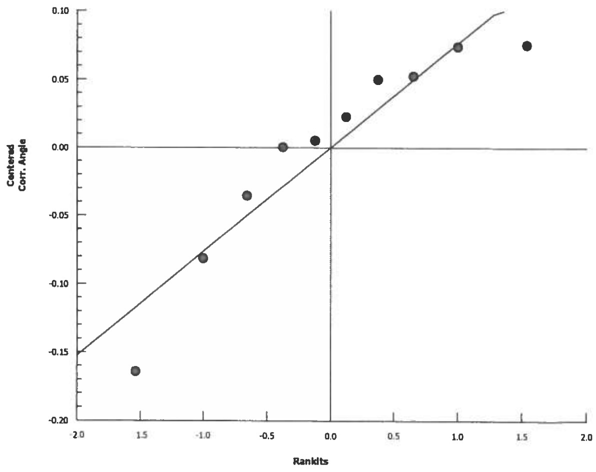
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	0.9721	0.9262	1	0.9916	0.9091	0.9956	0.01651	3.8%	0.0%
101		5	0.9835	0.9662	1	0.9867	0.9596	0.9953	0.00622	1.41%	-1.18%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	1.429	1.302	1.556	1.479	1.265	1.504	0.04579	7.17%	0.0%
101		5	1.45	1.388	1.512	1.455	1.368	1.502	0.0223	3.44%	-1.48%

Graphics





Analyst: AC QA: KFP 10/14/19

CETIS Analytical Report

Report Date: 14 Oct-19 13:06 (p 1 of 1)
Test Code: 1908-S087 | 21-3519-8392

Bivalve Larval Survival and Development Test **Nautilus Environmental (CA)**

Analysis ID:	15-6663-4657	**Endpoint:**	Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 Oct-19 13:06	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch Note: 101 = 100% sample filtered to 0.45um

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	1.03%	Passes development rate

Equal Variance t Two-Sample Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		101	-0.1998	1.86	0.046	8	0.5767	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	6.056913E-05	6.056913E-05	1	0.03991	0.8466	Non-Significant Effect
Error	0.01214228	0.001517785	8			
Total	0.01220285		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	4.668	23.15	0.1648	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9434	0.7411	0.5910	Normal Distribution

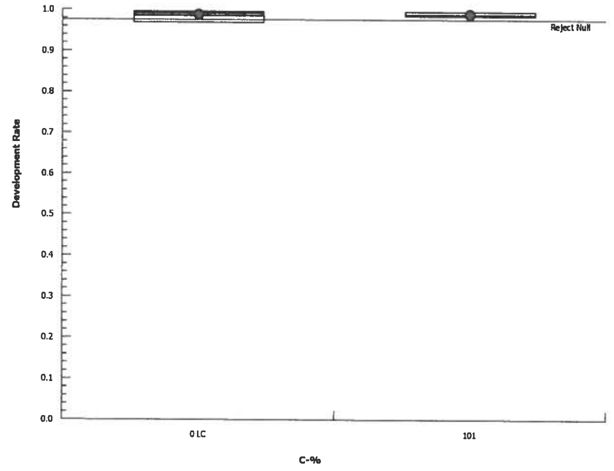
Development Rate Summary

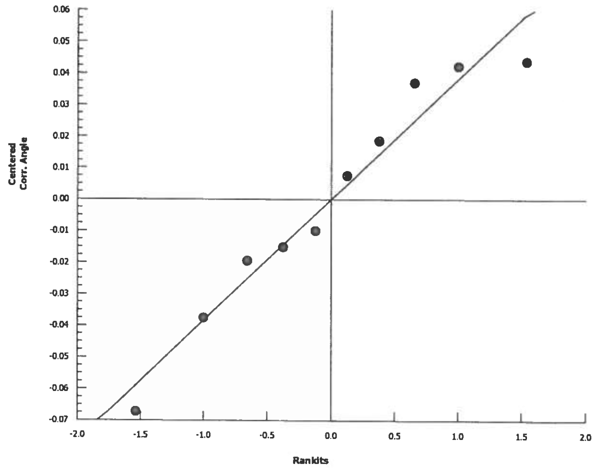
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	0.9859	0.9711	1	0.9916	0.9688	0.9956	0.00533	1.21%	0.0%
101		5	0.9885	0.983	0.994	0.9867	0.9845	0.9953	0.001984	0.45%	-0.26%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	1.46	1.398	1.522	1.479	1.393	1.504	0.02236	3.42%	0.0%
101		5	1.465	1.437	1.494	1.455	1.446	1.502	0.01035	1.58%	-0.34%

Graphics





Analyst: AC QA: KP 10/14/19

CETIS Analytical Report

Report Date: 14 Oct-19 13:06 (p 1 of 1)
Test Code: 1908-S087 | 21-3519-8392

Bivalve Larval Survival and Development Test — **Nautilus Environmental (CA)**

Analysis ID:	15-7799-1581	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 Oct-19 13:06	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Batch Note: 101 = 100% sample filtered to 0.45um

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	1.84%	Passes survival rate

Wilcoxon Rank Sum Two-Sample Test

Control	vs	C-%	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		101	28	NA	1	8	0.7778	Exact	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.001200312	0.001200312	1	0.1716	0.6896	Non-Significant Effect
Error	0.05596689	0.006995861	8			
Total	0.0571672		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	3.546	23.15	0.2477	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.6411	0.7411	0.0002	Non-normal Distribution

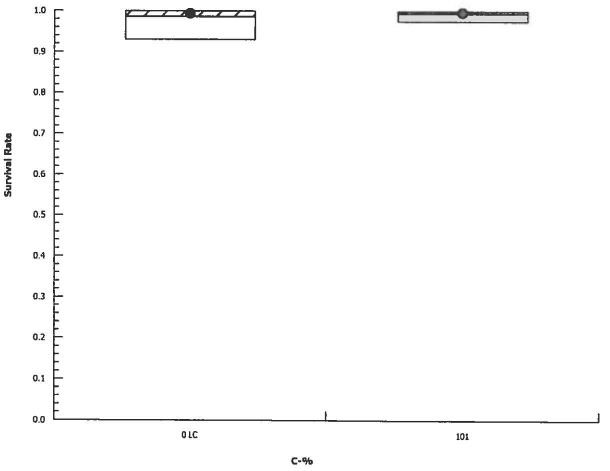
Survival Rate Summary

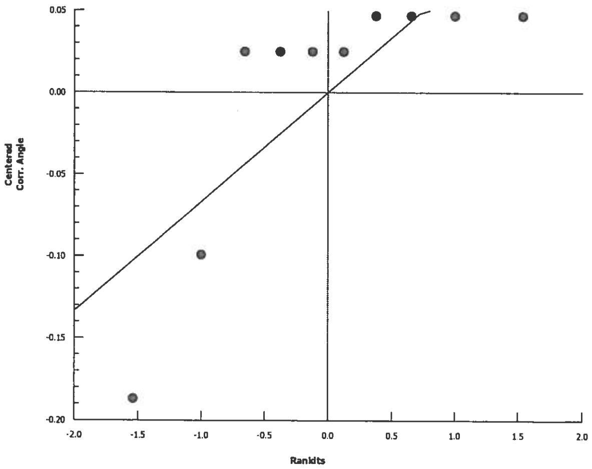
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	0.9859	0.9466	1	1	0.9293	1	0.01414	3.21%	0.0%
101		5	0.9949	0.9809	1	1	0.9747	1	0.005051	1.14%	-0.92%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	1.489	1.359	1.618	1.535	1.302	1.535	0.04672	7.02%	0.0%
101		5	1.51	1.442	1.579	1.535	1.411	1.535	0.02481	3.67%	-1.47%

Graphics





Analyst: AC QA: KFP 10/14/19

Embryo Larval Bioassay

48-hour Development

Client: Wood/POSD

Test Species: *M. galloprovincialis*

Sample ID: SIYB-4

Start Date/Time: 8/20/2019 1415

Test ID: 1908-S087

End Date/Time: 8/22/2019 1225

Random #	Number Normal	Number Abnormal		Total Number Counted	Intials/Date
		Number Curved Shell	All other abnormal		
141	212	ejs 9/10/19 ~~N/A~~ 0	3	215	DM/9/3/19
142	192	0	3	195	
143	203	0	6	209	
144	190	0	5	195	
145	225	0	1	226	DM/9/4/19
146	210	0	5	215	
147	187	0	4	191	
148	195	0	6	201	
149	186	0	2	188	
150	217	0	8	225	
151	187	0	1	188	
152	207	0	2	209	
153	202	0	1	203	
154	236	0	2	238	DM/9/5/19
155	183	0	1	184	
156	195	0	2	197	
157	181	0	3	184	
158	223	0	3	226	
159	206	0	5	211	
160	196	0	1	197	
161	215	0	1	216	
162	206	0	6	212	
163	190	0	3	193	
164	222	0	2	ejs 9/10/19 ~~227~~ 224	
165	213	0	1	214	
166	192	0	4	196	
167	193	0	5	198	
168	227	0	3	230	
169	203	0	3	206	
170	180	0	4	184	
171	190	0	4	194	
172	212	0	1	213	
173	217	0	7	224	
174	194	0	2	196	
175	204	0	3	207	

Comments:

QC Check: AC 9/10/19

Final Review:

CETIS Test Data Worksheet

Report Date: 16 Aug-19 12:44 (p 1 of 1)
Test Code: 1908-S087 21-3519-8392/7F448AB8

Bivalve Larval Survival and Development Test — **Nautilus Environmental (CA)**

Start Date: 20 Aug-19
End Date: 22 Aug-19
Sample Date: 19 Aug-19
Species: Mytilus galloprovincialis
Protocol: EPA/600/R-95/136 (1995)
Material: Ambient Water
Sample Code: 19-0920
Sample Source: Shelter Island Yacht Basin
Sample Station: SIYB-4

C-%	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
0	LC	1	154					
0	LC	2	173					
0	LC	3	170			206	205	RT 8/22/19
0	LC	4	161					
0	LC	5	145					
6.25		1	159					
6.25		2	155					
6.25		3	141			234	233	RT
6.25		4	151					
6.25		5	160					
12.5		1	169					
12.5		2	149					
12.5		3	150			225	218	RT
12.5		4	153					
12.5		5	144					
25		1	146					
25		2	167					
25		3	156			194	194	RT
25		4	166					
25		5	174					
50		1	168					
50		2	164					
50		3	162			221	217	RT
50		4	172					
50		5	143					
100		1	148					
100		2	147					
100		3	142			186	184	RT
100		4	157					
100		5	171					
~~101~~		1	163					
100% ~~101~~		2	158					
filtered ~~101~~ @		3	165			207	204	RT
~~101~~		4	175					
~~101~~		5	152					

QC: EG

@Q18 BO 8/22/19

Analyst: BO QA: AC 9/10/19

Marine Chronic Bioassay

DM-014

Water Quality Measurements

Client: Wood/POSD
Sample ID: SIYB-4
Sample Log No.: 19-0920
Test No.: 1908-S087

Test Species: *M. galloprovincialis*
Start Date/Time: 8/20/2019 1415
End Date/Time: 8/22/2019 1225

Concentration (%)	Salinity (ppt)			Temperature (°C)			Dissolved Oxygen (mg/L)			pH (pH units)		
	0	24	48	0	24	48	0	24	48	0	24	48
Lab Control	34.2	34.2	34.2	15.2	15.2	15.3	8.3	8.4	8.4	8.02	8.01	7.98
6.25	34.2	34.4	34.3	15.0	15.1	14.9	8.4	8.4	8.3	8.02	8.00	7.97
12.5	34.2	34.4	34.4	15.1	15.6	14.9	8.4	8.4	8.3	8.02	8.00	7.97
25	34.2	34.2	34.4	15.0	15.0	14.9	8.3	8.4	8.3	8.03	7.98	7.98
50	34.4	34.5	34.5	15.1	15.2	15.1	8.4	8.3	8.2	8.03	8.00	7.96
100	34.4	34.5	34.6	15.0	15.0	15.0	8.3	8.3	8.2	8.02	7.98	7.96
100 filtered	34.3	34.4	34.4	15.1	15.0	15.0	7.2	8.0	8.1	8.04	8.01	7.98

Technician Initials:

	0	24	48
WQ Readings:	BO	RT	BO
Dilutions made by:	AC/EG		

Environmental Chamber: D

Comments:
0 hrs:
24 hrs:
48 hrs:

QC Check: AC 9/10/19

Final Review: 10/11/19

Enthalpy Analytical. 4340 Vandever Avenue. San Diego, CA 92120.

Marine Chronic Bioassay
DM-013

Larval Development Worksheet

Client: Wood / POSD S14B-4
Test No.: 1908-S087
Test Species: Mytilus galloprovincialis
Animal Source: Mission Bay
Date Received: 7/1/19
Test Chambers: 30mL glass shell vials
Sample Volume: 10mL

Start Date/Time: 8/20/2019 1415
End Date/Time: 8/22/2019 1225
Technician Initials: BO

Spawn Information

First Gamete Release Time: 1100

Sex	Number Spawning
Male	5
Female	4

Gamete Selection

Sex	Beaker Number(s)	Condition (sperm motility, egg density, color, shape, etc.)
Male	2,3,4	good motility, average density
Female 1	1	light yellow color, great shape, great density
Female 2	3	white, good shape, good density
Female 3	—	—

Egg Fertilization Time: 1200

Embryo Stock Selection

Stock Number	% of embryos at 2-cell division stage
Female 1	100
Female 2	100
Female 3	—

Stock(s) chosen for testing: 1

Embryo Inoculum Preparation

Target count on Sedgwick-Rafter slide for desired density is 6 embryos

Number Counted:

6	13
17	13
10	10
10	10
10	12

Mean: 10.6

Mean 10.6 X 50 = 530 embryos/ml

Initial Density: 530
Desired Final Density: 300
(to inoculate with 0.5 ml)
= 1.77 (dilution factor)

Prepare the embryo inoculum according to the calculated dilution factor. For example, if the dilution factor is 2.25, use 100 ml of existing stock (1 part) and 125 ml of dilution water (1.25 parts).

Time Zero Control Counts

Rand. No.	No. Dividing	Total	% Dividing	Mean % Dividing
T01	218	218	100	100
T02	198	198	100	
T03	183	183	100	
T04	203	203	100	
T05	187	187	100	

48-h QC: 224/227 = 98.6%

Comments: $\bar{x} = 198$

QC Check: AC 9/10/19

Final Review: 9/10/19 KK

Enthalpy Analytical. 4340 Vandever Avenue. San Diego, CA 92120.

CETIS Summary Report

Report Date:	11 Sep-19 10:03 (p 1 of 4)
Test Code:	1908-S088 | 16-1593-2810

Bivalve Larval Survival and Development Test **Nautilus Environmental (CA)**

Batch ID:	08-1136-5082	**Test Type:**	Development-Survival	**Analyst:**	
Start Date:	20 Aug-19 14:15	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater
Ending Date:	22 Aug-19 12:25	**Species:**	Mytilus galloprovincialis	**Brine:**	Not Applicable
Duration:	46h	**Source:**	Mission Bay	**Age:**	

Sample ID:	15-2047-2687	**Code:**	19-0921	**Client:**	Wood Environment & Infrastructure
Sample Date:	19 Aug-19 11:00	**Material:**	Ambient Water	**Project:**	
Receive Date:	19 Aug-19 17:40	**Source:**	Shelter Island Yacht Basin		
Sample Age:	27h (8.5 °C)	**Station:**	SIYB-5		

Batch Note: 101 = 100% sample filtered to 0.45um

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
05-7313-5417	Combined Development Ra	100	>100	NA	2.17%	1	Steel Many-One Rank Sum Test
10-8494-9744	Development Rate	50	100	70.71	0.89%	2	Dunnett Multiple Comparison Test
00-3208-5136	Survival Rate	100	>100	NA	1.75%	1	Steel Many-One Rank Sum Test

Point Estimate Summary

Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method
10-5291-6788	Combined Development Ra	EC25	>100	N/A	N/A	<1	Linear Interpolation (ICPIN)
		EC50	>100	N/A	N/A	<1	
01-7199-9239	Development Rate	EC25	>100	N/A	N/A	<1	Linear Interpolation (ICPIN)
		EC50	>100	N/A	N/A	<1	
10-2928-2017	Survival Rate	EC25	>100	N/A	N/A	<1	Linear Interpolation (ICPIN)
		EC50	>100	N/A	N/A	<1	

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits	Overlap	Decision
01-7199-9239	Development Rate	Control Resp	0.9896	0.9 - NL	Yes	Passes Acceptability Criteria
10-8494-9744	Development Rate	Control Resp	0.9896	0.9 - NL	Yes	Passes Acceptability Criteria
00-3208-5136	Survival Rate	Control Resp	0.9899	0.5 - NL	Yes	Passes Acceptability Criteria
10-2928-2017	Survival Rate	Control Resp	0.9899	0.5 - NL	Yes	Passes Acceptability Criteria
05-7313-5417	Combined Development Ra	PMSD	0.0217	NL - 0.25	No	Passes Acceptability Criteria

Bivalve Larval Survival and Development Test **Nautilus Environmental (CA)**

Combined Development Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Control	5	0.9796	0.9478	1	0.9343	0.9953	0.01148	0.02568	2.62%	0.0%
6.25		5	0.984	0.973	0.995	0.9731	0.9952	0.00396	0.008856	0.9%	-0.45%
12.5		5	0.9584	0.9218	0.9949	0.9091	0.9829	0.01316	0.02942	3.07%	2.17%
25		5	0.9865	0.9677	1	0.9596	0.9951	0.006777	0.01515	1.54%	-0.7%
50		5	0.9903	0.9814	0.9992	0.9798	0.9954	0.003203	0.007162	0.72%	-1.09%
100		5	0.9793	0.97	0.9885	0.9663	0.9854	0.003335	0.007457	0.76%	0.04%
101		5	0.9812	0.9657	0.9967	0.9697	1	0.00558	0.01248	1.27%	-0.16%

Development Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Control	5	0.9896	0.983	0.9961	0.984	0.9953	0.002363	0.005285	0.53%	0.0%
6.25		5	0.984	0.973	0.995	0.9731	0.9952	0.00396	0.008856	0.9%	0.56%
12.5		5	0.9823	0.9735	0.991	0.9706	0.9895	0.00314	0.007022	0.71%	0.74%
25		5	0.9925	0.9894	0.9956	0.9896	0.9951	0.001102	0.002463	0.25%	-0.3%
50		5	0.9923	0.9869	0.9977	0.9858	0.9954	0.001942	0.004343	0.44%	-0.27%
100		5	0.9793	0.97	0.9885	0.9663	0.9854	0.003335	0.007457	0.76%	1.04%
101		5	0.9852	0.9716	0.9989	0.9703	1	0.004904	0.01097	1.11%	0.44%

Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Control	5	0.9899	0.9619	1	0.9495	1	0.0101	0.02259	2.28%	0.0%
6.25		5	1	1	1	1	1	0	0	0.0%	-1.02%
12.5		5	0.9758	0.9358	1	0.9242	1	0.01441	0.03222	3.3%	1.43%
25		5	0.9939	0.9771	1	0.9697	1	0.006061	0.01355	1.36%	-0.41%
50		5	0.998	0.9924	1	0.9899	1	0.00202	0.004517	0.45%	-0.82%
100		5	1	1	1	1	1	0	0	0.0%	-1.02%
101		5	0.996	0.9847	1	0.9798	1	0.00404	0.009035	0.91%	-0.61%

Analyst: JC QA: 10/11/19

CETIS Summary Report

Report Date: 11 Sep-19 10:03 (p 3 of 4)
Test Code: 1908-S088 | 16-1593-2810

Bivalve Larval Survival and Development Test — **Nautilus Environmental (CA)**

Combined Development Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Control	0.9861	0.9953	0.9343	0.9873	0.9952
6.25		0.9797	0.9907	0.9816	0.9952	0.9731
12.5		0.9706	0.9091	0.9545	0.9829	0.9747
25		0.9914	0.9951	0.9914	0.995	0.9596
50		0.9798	0.9954	0.9952	0.9858	0.9952
100		0.9812	0.9663	0.9828	0.9806	0.9854
101		0.9697	1	0.9703	0.9854	0.9808

Development Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Control	0.9861	0.9953	0.984	0.9873	0.9952
6.25		0.9797	0.9907	0.9816	0.9952	0.9731
12.5		0.9706	0.9836	0.9895	0.9829	0.9847
25		0.9914	0.9951	0.9914	0.995	0.9896
50		0.9898	0.9954	0.9952	0.9858	0.9952
100		0.9812	0.9663	0.9828	0.9806	0.9854
101		0.9897	1	0.9703	0.9854	0.9808

Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Control	1	1	0.9495	1	1
6.25		1	1	1	1	1
12.5		1	0.9242	0.9646	1	0.9899
25		1	1	1	1	0.9697
50		0.9899	1	1	1	1
100		1	1	1	1	1
101		0.9798	1	1	1	1

Analyst: JC QA:

Bivalve Larval Survival and Development Test **Nautilus Environmental (CA)**

Combined Development Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Control	213/216	211/212	185/198	233/236	206/207
6.25		241/246	213/215	213/217	207/208	217/223
12.5		198/204	180/198	189/198	230/234	193/198
25		230/232	203/204	230/232	201/202	190/198
50		194/198	218/219	208/209	208/211	207/208
100		209/213	201/208	229/233	202/206	202/205
101		192/198	207/207	196/202	203/206	204/208

Development Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Control	213/216	211/212	185/188	233/236	206/207
6.25		241/246	213/215	213/217	207/208	217/223
12.5		198/204	180/183	189/191	230/234	193/196
25		230/232	203/204	230/232	201/202	190/192
50		194/196	218/219	208/209	208/211	207/208
100		209/213	201/208	229/233	202/206	202/205
101		192/194	207/207	196/202	203/206	204/208

Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Control	198/198	198/198	188/198	198/198	198/198
6.25		198/198	198/198	198/198	198/198	198/198
12.5		198/198	183/198	191/198	198/198	196/198
25		198/198	198/198	198/198	198/198	192/198
50		196/198	198/198	198/198	198/198	198/198
100		198/198	198/198	198/198	198/198	198/198
101		194/198	198/198	198/198	198/198	198/198

Analyst: JC QA: b 10/11/19

CETIS Analytical Report

Report Date: 11 Sep-19 10:02 (p 1 of 8)
Test Code: 1908-S088 | 16-1593-2810

Bivalve Larval Survival and Development Test — **Nautilus Environmental (CA)**

Analysis ID:	05-7313-5417	**Endpoint:**	Combined Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 Sep-19 10:01	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Batch Note: 101 = 100% sample filtered to 0.45um

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C > T	NA	NA	2.17%	100	>100	NA	1

Steel Many-One Rank Sum Test

Control	vs	C-%	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		6.25	25	16	0	8	0.6353	Asymp	Non-Significant Effect
		12.5	19	16	0	8	0.1314	Asymp	Non-Significant Effect
		25	28	16	0	8	0.8627	Asymp	Non-Significant Effect
		50	30	16	0	8	0.9446	Asymp	Non-Significant Effect
		100	20	16	0	8	0.1899	Asymp	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0330716	0.00661432	5	2.321	0.0745	Non-Significant Effect
Error	0.06839726	0.002849886	24			
Total	0.1014689		29			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	6.386	15.09	0.2705	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8887	0.9031	0.0045	Non-normal Distribution

Combined Development Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	0.9796	0.9478	1	0.9873	0.9343	0.9953	0.01148	2.62%	0.0%
6.25		5	0.984	0.973	0.995	0.9816	0.9731	0.9952	0.003961	0.9%	-0.45%
12.5		5	0.9584	0.9218	0.9949	0.9706	0.9091	0.9829	0.01316	3.07%	2.17%
25		5	0.9865	0.9677	1	0.9914	0.9596	0.9951	0.006777	1.54%	-0.7%
50		5	0.9903	0.9814	0.9992	0.9952	0.9798	0.9954	0.003203	0.72%	-1.09%
100		5	0.9793	0.97	0.9885	0.9812	0.9663	0.9854	0.003335	0.76%	0.04%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	1.445	1.348	1.542	1.458	1.312	1.502	0.03494	5.41%	0.0%
6.25		5	1.449	1.401	1.496	1.435	1.406	1.501	0.01716	2.65%	-0.26%
12.5		5	1.374	1.289	1.459	1.398	1.265	1.44	0.0305	4.96%	4.92%
25		5	1.465	1.396	1.534	1.478	1.368	1.501	0.02468	3.77%	-1.38%
50		5	1.477	1.434	1.521	1.501	1.428	1.503	0.0157	2.38%	-2.22%
100		5	1.428	1.398	1.458	1.433	1.386	1.45	0.01088	1.7%	1.19%

Analyst: JCL QA: 10/11/19

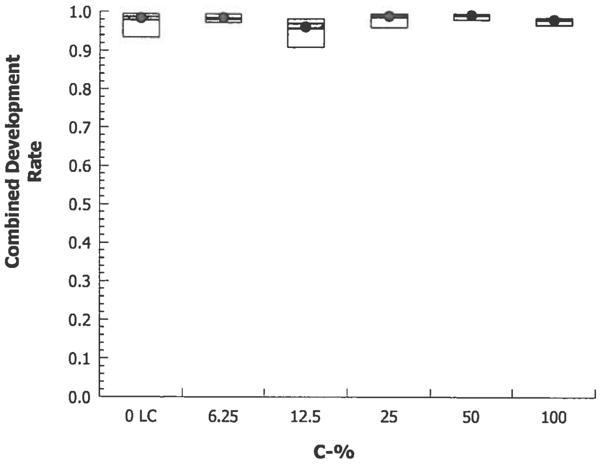
CETIS Analytical Report

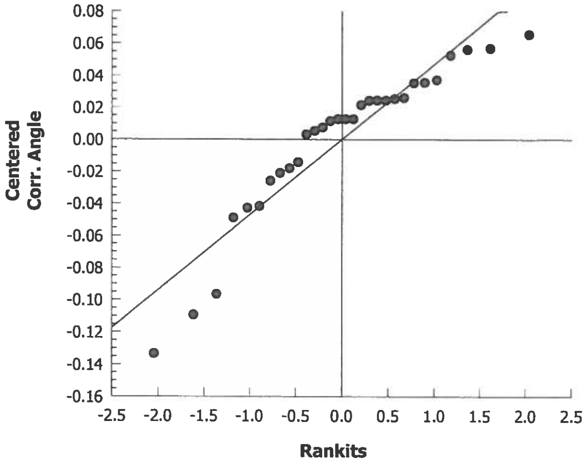
Report Date: 11 Sep-19 10:02 (p 2 of 8)
Test Code: 1908-S088 | 16-1593-2810

Bivalve Larval Survival and Development Test **Nautilus Environmental (CA)**

Analysis ID:	05-7313-5417	**Endpoint:**	Combined Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 Sep-19 10:01	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Graphics





Analyst: JC QA: 10/1/19

CETIS Analytical Report

TSt

Report Date: 11 Sep-19 10:02 (p 3 of 8)
Test Code: 1908-S088 | 16-1593-2810

Bivalve Larval Survival and Development Test — **Nautilus Environmental (CA)**

Analysis ID:	02-9154-0760	**Endpoint:**	Combined Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 Sep-19 10:01	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Batch Note: 101 = 100% sample filtered to 0.45um

Data Transform	Zeta	Alt Hyp	Trials	Seed	TST b	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C*b < T	NA	NA	0.75	1.3%	100	>100	NA	1

TST-Welch's t Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		6.25*	11.65	1.943	0.061	6	<0.0001	CDF	Non-Significant Effect
		12.5*	7.215	1.895	0.076	7	<0.0001	CDF	Non-Significant Effect
		25*	10.59	1.895	0.068	7	<0.0001	CDF	Non-Significant Effect
		50*	12.87	1.943	0.059	6	<0.0001	CDF	Non-Significant Effect
		100*	12.13	2.015	0.057	5	<0.0001	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0330716	0.00661432	5	2.321	0.0745	Non-Significant Effect
Error	0.06839726	0.002849886	24			
Total	0.1014689		29			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	6.386	15.09	0.2705	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8887	0.9031	0.0045	Non-normal Distribution

Combined Development Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	0.9796	0.9478	1	0.9873	0.9343	0.9953	0.01148	2.62%	0.0%
6.25		5	0.984	0.973	0.995	0.9816	0.9731	0.9952	0.003961	0.9%	-0.45%
12.5		5	0.9584	0.9218	0.9949	0.9706	0.9091	0.9829	0.01316	3.07%	2.17%
25		5	0.9865	0.9677	1	0.9914	0.9596	0.9951	0.006777	1.54%	-0.7%
50		5	0.9903	0.9814	0.9992	0.9952	0.9798	0.9954	0.003203	0.72%	-1.09%
100		5	0.9793	0.97	0.9885	0.9812	0.9663	0.9854	0.003335	0.76%	0.04%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	1.445	1.348	1.542	1.458	1.312	1.502	0.03494	5.41%	0.0%
6.25		5	1.449	1.401	1.496	1.435	1.406	1.501	0.01716	2.65%	-0.26%
12.5		5	1.374	1.289	1.459	1.398	1.265	1.44	0.0305	4.96%	4.92%
25		5	1.465	1.396	1.534	1.478	1.368	1.501	0.02468	3.77%	-1.38%
50		5	1.477	1.434	1.521	1.501	1.428	1.503	0.0157	2.38%	-2.22%
100		5	1.428	1.398	1.458	1.433	1.386	1.45	0.01088	1.7%	1.19%

Analyst: JC QA: G 10/11/19

CETIS Analytical Report

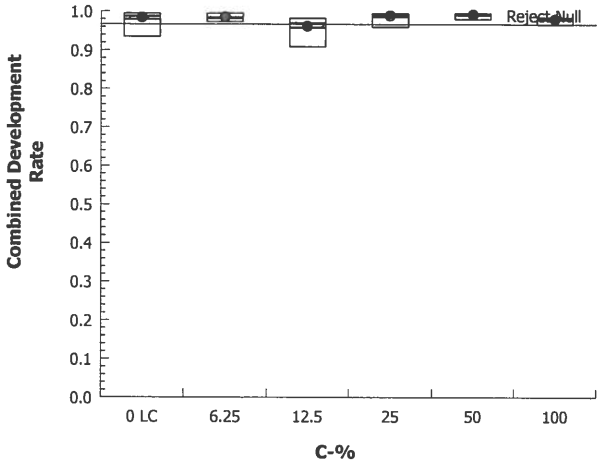
TST

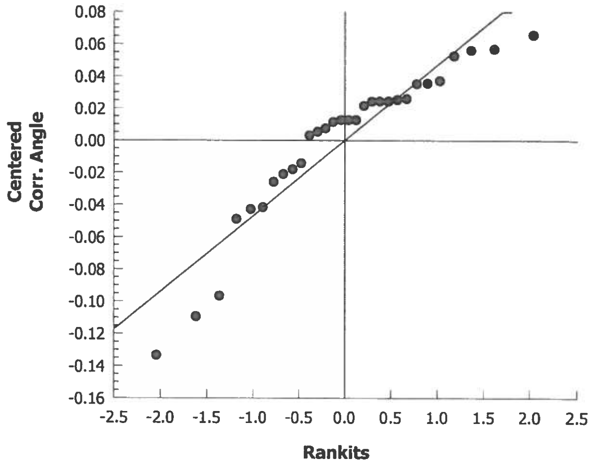
Report Date:	11 Sep-19 10:02 (p 4 of 8)
Test Code:	1908-S088 | 16-1593-2810

Bivalve Larval Survival and Development Test **Nautilus Environmental (CA)**

Analysis ID:	02-9154-0760	**Endpoint:**	Combined Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 Sep-19 10:01	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Graphics





Analyst: Ja QA: B 10/11/19

CETIS Analytical Report

Report Date:	13 Sep-19 10:05 (p 1 of 4)
Test Code:	1908-S088 | 16-1593-2810

Bivalve Larval Survival and Development Test **Nautilus Environmental (CA)**

Analysis ID:	18-5565-7639	**Endpoint:**	Combined Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	13 Sep-19 10:05	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch Note: 101 = 100% sample filtered to 0.45um

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	2.2%	Passes combined development rate

Equal Variance t Two-Sample Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		101	0.06695	1.86	0.081	8	0.4741	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2.102817E-05	2.102817E-05	1	0.004482	0.9483	Non-Significant Effect
Error	0.03753318	0.004691648	8			
Total	0.03755421		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.862	23.15	0.5619	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.95	0.7411	0.6687	Normal Distribution

Combined Development Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	0.9796	0.9478	1	0.9873	0.9343	0.9953	0.01148	2.62%	0.0%
101		5	0.9812	0.9657	0.9967	0.9808	0.9697	1	0.00558	1.27%	-0.16%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	1.445	1.348	1.542	1.458	1.312	1.502	0.03494	5.41%	0.0%
101		5	1.442	1.371	1.513	1.432	1.396	1.536	0.02561	3.97%	0.2%

TST

Bivalve Larval Survival and Development Test | **Nautilus Environmental (CA)**

Analysis ID: 21-0838-3209
Analyzed: 13 Sep-19 10:05
Endpoint: Combined Development Rate
Analysis: Parametric Bioequivalence-Two Sample
CETIS Version: CETISv1.8.7
Official Results: Yes

Batch Note: 101 = 100% sample filtered to 0.45um

Data Transform	Zeta	Alt Hyp	Trials	Seed	TST b	PMSD	Test Result
Angular (Corrected)	NA	C*b < T	NA	NA	0.75	1.76%	Passes combined development rate

TST-Welch's t Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		101*	9.781	1.895	0.069	7	<0.0001	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2.102817E-05	2.102817E-05	1	0.004482	0.9483	Non-Significant Effect
Error	0.03753318	0.004691648	8			
Total	0.03755421		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.862	23.15	0.5619	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.95	0.7411	0.6687	Normal Distribution

Combined Development Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	0.9796	0.9478	1	0.9873	0.9343	0.9953	0.01148	2.62%	0.0%
101		5	0.9812	0.9657	0.9967	0.9808	0.9697	1	0.00558	1.27%	-0.16%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	1.445	1.348	1.542	1.458	1.312	1.502	0.03494	5.41%	0.0%
101		5	1.442	1.371	1.513	1.432	1.396	1.536	0.02561	3.97%	0.2%

Analyst: JCL QA: 10/11/19

CETIS Analytical Report

Report Date: 11 Sep-19 10:02 (p 5 of 8)
Test Code: 1908-S088 | 16-1593-2810

Bivalve Larval Survival and Development Test — **Nautilus Environmental (CA)**

Analysis ID:	10-8494-9744	**Endpoint:**	Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 Sep-19 10:01	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Batch Note: 101 = 100% sample filtered to 0.45um

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C > T	NA	NA	0.89%	50	100	70.71	2

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		6.25	1.352	2.362	0.04	8	0.2753	CDF	Non-Significant Effect
		12.5	1.926	2.362	0.04	8	0.1132	CDF	Non-Significant Effect
		25	-0.7995	2.362	0.04	8	0.9713	CDF	Non-Significant Effect
		50	-0.8201	2.362	0.04	8	0.9729	CDF	Non-Significant Effect
		100*	2.591	2.362	0.04	8	0.0312	CDF	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.01499133	0.002998266	5	4.222	0.0068	Significant Effect
Error	0.01704478	0.0007101992	24			
Total	0.03203611		29			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	3.256	15.09	0.6605	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9706	0.9031	0.5550	Normal Distribution

Development Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	0.9896	0.983	0.9961	0.9873	0.984	0.9953	0.002363	0.53%	0.0%
6.25		5	0.984	0.973	0.995	0.9816	0.9731	0.9952	0.003961	0.9%	0.56%
12.5		5	0.9823	0.9735	0.991	0.9836	0.9706	0.9895	0.00314	0.71%	0.74%
25		5	0.9925	0.9894	0.9956	0.9914	0.9896	0.9951	0.001101	0.25%	-0.3%
50		5	0.9923	0.9869	0.9977	0.9952	0.9858	0.9954	0.001943	0.44%	-0.27%
100		5	0.9793	0.97	0.9885	0.9812	0.9663	0.9854	0.003335	0.76%	1.04%

Angular (Corrected) Transformed Summary

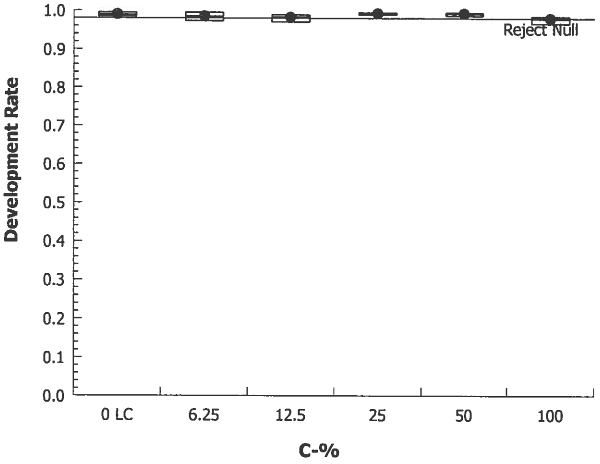
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	1.472	1.437	1.506	1.458	1.444	1.502	0.01247	1.89%	0.0%
6.25		5	1.449	1.401	1.496	1.435	1.406	1.501	0.01716	2.65%	1.55%
12.5		5	1.439	1.408	1.471	1.442	1.398	1.468	0.01135	1.76%	2.21%
25		5	1.485	1.467	1.503	1.478	1.469	1.501	0.006548	0.99%	-0.92%
50		5	1.485	1.456	1.515	1.501	1.451	1.503	0.0106	1.6%	-0.94%
100		5	1.428	1.398	1.458	1.433	1.386	1.45	0.01088	1.7%	2.97%

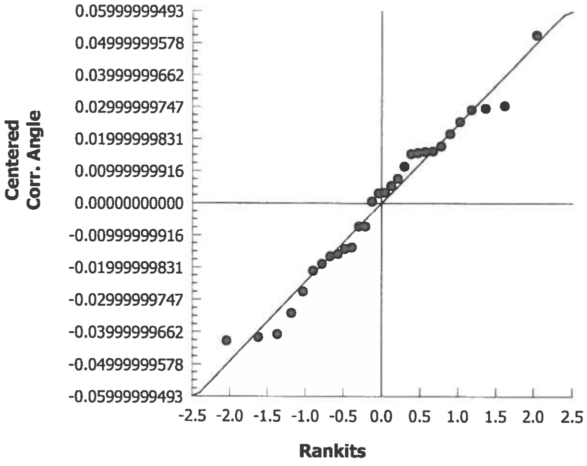
Analyst: JCL QA:

Bivalve Larval Survival and Development Test	**Nautilus Environmental (CA)**

Analysis ID:	10-8494-9744	**Endpoint:**	Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 Sep-19 10:01	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Graphics





CETIS Analytical Report

Report Date: 13 Sep-19 10:05 (p 3 of 4)
Test Code: 1908-S088 | 16-1593-2810

Bivalve Larval Survival and Development Test — **Nautilus Environmental (CA)**

Analysis ID:	13-4517-2489	**Endpoint:**	Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	13 Sep-19 10:05	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch Note: 101 = 100% sample filtered to 0.45um

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	1.14%	Passes development rate

Equal Variance t Two-Sample Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		101	0.5627	1.86	0.049	8	0.2945	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0005432615	0.0005432615	1	0.3167	0.5890	Non-Significant Effect
Error	0.01372478	0.001715598	8			
Total	0.01426805		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	3.415	23.15	0.2614	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9525	0.7411	0.6978	Normal Distribution

Development Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	0.9896	0.983	0.9961	0.9873	0.984	0.9953	0.002363	0.53%	0.0%
101		5	0.9852	0.9716	0.9989	0.9854	0.9703	1	0.004904	1.11%	0.44%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	1.472	1.437	1.506	1.458	1.444	1.502	0.01247	1.89%	0.0%
101		5	1.457	1.393	1.521	1.45	1.398	1.536	0.02304	3.54%	1.0%

Analyst: JC QA:

CETIS Analytical Report

TST

Report Date: 13 Sep-19 10:05 (p 4 of 4)
Test Code: 1908-S088 | 16-1593-2810

Bivalve Larval Survival and Development Test			**Nautilus Environmental (CA)**
Analysis ID: 16-7012-0852	**Endpoint:** Development Rate	**CETIS Version:** CETISv1.8.7	
Analyzed: 13 Sep-19 10:05	**Analysis:** Parametric Bioequivalence-Two Sample	**Official Results:** Yes	

Batch Note: 101 = 100% sample filtered to 0.45um

Data Transform	Zeta	Alt Hyp	Trials	Seed	TST b	PMSD	Test Result
Angular (Corrected)	NA	C*b < T	NA	NA	0.75	1.18%	Passes development rate

TST-Welch's t Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		101*	14.2	2.015	0.050	5	<0.0001	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0005432615	0.0005432615	1	0.3167	0.5890	Non-Significant Effect
Error	0.01372478	0.001715598	8			
Total	0.01426805		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	3.415	23.15	0.2614	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9525	0.7411	0.6978	Normal Distribution

Development Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	0.9896	0.983	0.9961	0.9873	0.984	0.9953	0.002363	0.53%	0.0%
101		5	0.9852	0.9716	0.9989	0.9854	0.9703	1	0.004904	1.11%	0.44%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	1.472	1.437	1.506	1.458	1.444	1.502	0.01247	1.89%	0.0%
101		5	1.457	1.393	1.521	1.45	1.398	1.536	0.02304	3.54%	1.0%

Analyst: JC QA: lw 10/11/19

Bivalve Larval Survival and Development Test — **Nautilus Environmental (CA)**

Analysis ID:	00-3208-5136	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 Sep-19 10:01	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Batch Note: 101 = 100% sample filtered to 0.45um

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C > T	NA	NA	1.75%	100	>100	NA	1

Steel Many-One Rank Sum Test

Control	vs C-%	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Lab Control	6.25	30	16	1	8	0.9446	Asymp	Non-Significant Effect
	12.5	23	16	1	8	0.4416	Asymp	Non-Significant Effect
	25	28	16	1	8	0.8627	Asymp	Non-Significant Effect
	50	28	16	1	8	0.8627	Asymp	Non-Significant Effect
	100	30	16	1	8	0.9446	Asymp	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0302157	0.006043141	5	1.568	0.2070	Non-Significant Effect
Error	0.09250638	0.003854432	24			
Total	0.1227221		29			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	218.2	15.09	<0.0001	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.8111	0.9031	0.0001	Non-normal Distribution

Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	0.9899	0.9619	1	1	0.9495	1	0.0101	2.28%	0.0%
6.25		5	1	1	1	1	1	1	0	0.0%	-1.02%
12.5		5	0.9758	0.9358	1	0.9899	0.9242	1	0.01441	3.3%	1.43%
25		5	0.9939	0.9771	1	1	0.9697	1	0.006061	1.36%	-0.41%
50		5	0.998	0.9924	1	1	0.9899	1	0.00202	0.45%	-0.82%
100		5	1	1	1	1	1	1	0	0.0%	-1.02%

Angular (Corrected) Transformed Summary

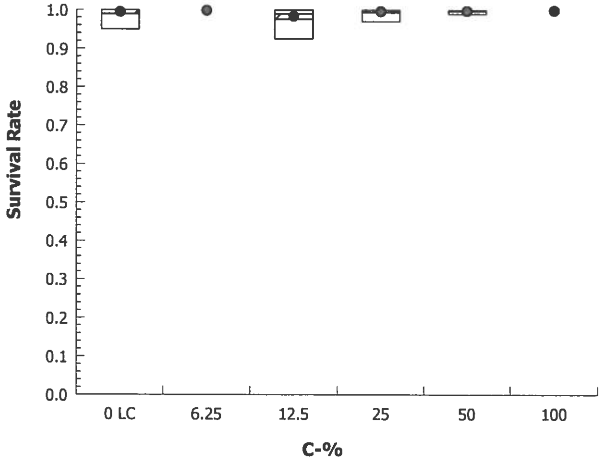
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	1.497	1.391	1.603	1.535	1.344	1.535	0.03823	5.71%	0.0%
6.25		5	1.535	1.535	1.536	1.535	1.535	1.535	0	0.0%	-2.55%
12.5		5	1.443	1.312	1.574	1.47	1.292	1.535	0.04708	7.3%	3.62%
25		5	1.507	1.43	1.585	1.535	1.396	1.535	0.02789	4.14%	-0.69%
50		5	1.522	1.486	1.558	1.535	1.47	1.535	0.01303	1.91%	-1.68%
100		5	1.535	1.535	1.536	1.535	1.535	1.535	0	0.0%	-2.55%

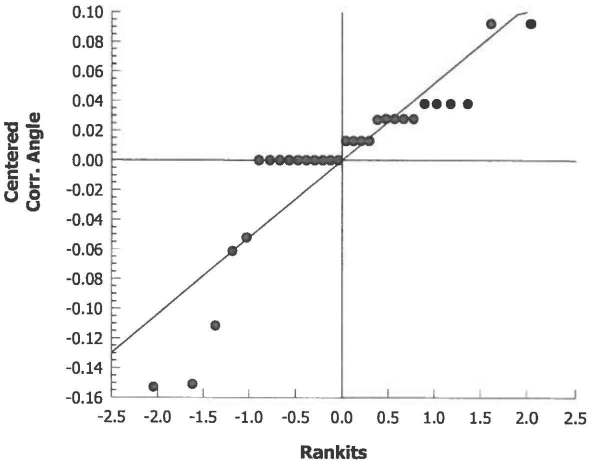
Analyst: JC QA: cg 10/11/19

Bivalve Larval Survival and Development Test **Nautilus Environmental (CA)**

Analysis ID:	00-3208-5136	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 Sep-19 10:01	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Graphics





Analyst: JC QA: [illegible]

CETIS Analytical Report

Bivalve Larval Survival and Development Test **Nautilus Environmental (CA)**

Analysis ID:	10-5291-6788	**Endpoint:**	Combined Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 Sep-19 10:01	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Batch Note: 101 = 100% sample filtered to 0.45um

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	709207	1000	Yes	Two-Point Interpolation

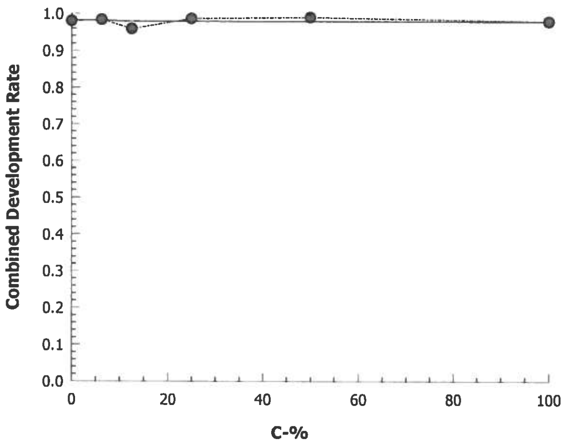
Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC25	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Combined Development Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Lab Control	5	0.9796	0.9343	0.9953	0.01148	0.02568	2.62%	0.0%	1048	1069
6.25		5	0.984	0.9731	0.9952	0.003961	0.008856	0.9%	-0.45%	1091	1109
12.5		5	0.9584	0.9091	0.9829	0.01316	0.02942	3.07%	2.17%	990	1032
25		5	0.9865	0.9596	0.9951	0.006777	0.01515	1.54%	-0.7%	1054	1068
50		5	0.9903	0.9798	0.9954	0.003203	0.007162	0.72%	-1.09%	1035	1045
100		5	0.9793	0.9663	0.9854	0.003335	0.007458	0.76%	0.04%	1043	1065

Graphics



Analyst: JC QA: [illegible]

Bivalve Larval Survival and Development Test	**Nautilus Environmental (CA)**

Analysis ID:	01-7199-9239	**Endpoint:**	Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 Sep-19 10:01	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Batch Note: 101 = 100% sample filtered to 0.45um

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	2100215	1000	Yes	Two-Point Interpolation

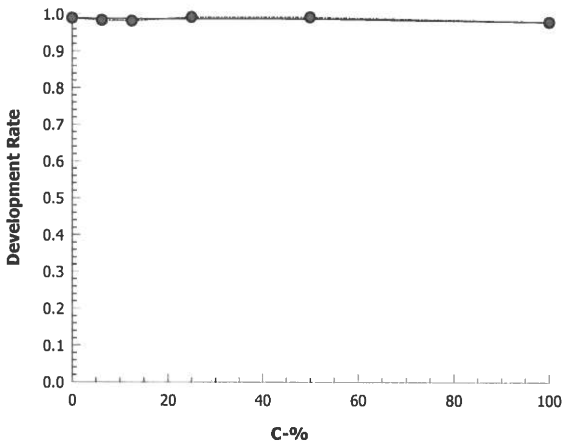
Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC25	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Development Rate Summary

			Calculated Variate(A/B)								
C-%	**Control Type**	**Count**	**Mean**	**Min**	**Max**	**Std Err**	**Std Dev**	**CV%**	**%Effect**	**A**	**B**
0	Lab Control	5	0.9896	0.984	0.9953	0.002363	0.005284	0.53%	0.0%	1048	1059
6.25		5	0.984	0.9731	0.9952	0.003961	0.008856	0.9%	0.56%	1091	1109
12.5		5	0.9823	0.9706	0.9895	0.00314	0.007022	0.71%	0.74%	990	1008
25		5	0.9925	0.9896	0.9951	0.001101	0.002462	0.25%	-0.3%	1054	1062
50		5	0.9923	0.9858	0.9954	0.001943	0.004344	0.44%	-0.27%	1035	1043
100		5	0.9793	0.9663	0.9854	0.003335	0.007458	0.76%	1.04%	1043	1065

Graphics



Analyst: JU QA:

Bivalve Larval Survival and Development Test	**Nautilus Environmental (CA)**

Analysis ID:	10-2928-2017	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 Sep-19 10:01	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Batch Note: 101 = 100% sample filtered to 0.45um

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	2001058	1000	Yes	Two-Point Interpolation

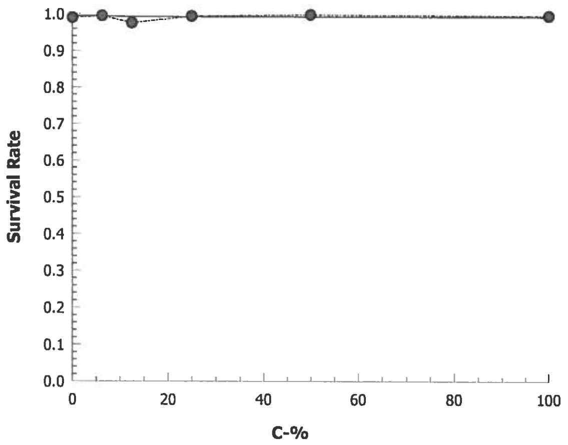
Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC25	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Survival Rate Summary

			Calculated Variate(A/B)								
C-%	**Control Type**	**Count**	**Mean**	**Min**	**Max**	**Std Err**	**Std Dev**	**CV%**	**%Effect**	**A**	**B**
0	Lab Control	5	0.9899	0.9495	1	0.0101	0.02259	2.28%	0.0%	980	990
6.25		5	1	1	1	0	0	0.0%	-1.02%	990	990
12.5		5	0.9758	0.9242	1	0.01441	0.03222	3.3%	1.43%	966	990
25		5	0.9939	0.9697	1	0.006061	0.01355	1.36%	-0.41%	984	990
50		5	0.998	0.9899	1	0.00202	0.004518	0.45%	-0.82%	988	990
100		5	1	1	1	0	0	0.0%	-1.02%	990	990

Graphics



Analyst: JCA QA: 10/11/19

Embryo Larval Bioassay **48-hour Development**

Client: Wood/POSD
Test Species: *M. galloprovincialis*
Sample ID: SIYB-5
Start Date/Time: 8/20/2019 1415
Test ID: 1908-S088
End Date/Time: 8/22/2019 1225

Random #	Number Normal	Number Abnormal		Total Number Counted	Intials/Date
		Number Curved Shell	All other abnormal		
176	207	0	1	208	JCL 9/4/19
177	206	0	1	207	
178	209	0	4	213	
179	202	0	3	205	
180	196	0	Ⓐ ~~202~~ 6	202	
181	198	0	6	204	
182	180	0	3	183	
183	233	0	3	236	
184	230	0	4	234	
185	213	0	4	217	
186	203	0	Ⓐ ~~206~~ 3	206	
187	193	0	3	196	
188	230	0	2	232	
189	217	0	6	223	
190	202	0	4	206	
191	190	0	Ⓐ ~~19~~ 2	192	
192	194	0	2	196	
193	185	0	3	188	
194	201	0	1	202	
195	213	0	3	216	
196	241	0	5	246	
197	204	0	4	208	
198	203	0	1	204	
199	213	0	2	215	
200	230	0	2	232	
201	211	0	1	212	
202	208	0	1	209	
203	218	0	1	219	
204	207	0	1	208	
205	207	0	0	207	
206	192	0	2	194	
207	229	0	4	233	
208	189	0	2	191	
209	201	0	7	208	
210	208	0	3	211	

Comments: Ⓐ Q18 JCL 9/4/16

QC Check: AC 9/10/19

Final Review:

CETIS Test Data Worksheet

Report Date: 16 Aug-19 12:46 (p 1 of 1)
Test Code: 1908-S088 16-1593-2810/60512D8A

Bivalve Larval Survival and Development Test | **Nautilus Environmental (CA)**

Start Date:	20 Aug-19	**Species:**	Mytilus galloprovincialis	**Sample Code:**	19-0921
End Date:	22 Aug-19	**Protocol:**	EPA/600/R-95/136 (1995)	**Sample Source:**	Shelter Island Yacht Basin
Sample Date:	19 Aug-19	**Material:**	Ambient Water	**Sample Station:**	SIYB-5

C-%	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
0	LC	1	195					
0	LC	2	201					
0	LC	3	193			179	177	RT 8/22/19
0	LC	4	183					
0	LC	5	177					
6.25		1	196					
6.25		2	199					
6.25		3	185			213	210	RT
6.25		4	176					
6.25		5	189					
12.5		1	181					
12.5		2	182					
12.5		3	208			191	190	RT
12.5		4	184					
12.5		5	187					
25		1	200					
25		2	198					
25		3	188					
25		4	194			206	205	RT
25		5	191					
50		1	192					
50		2	203					
50		3	202			212	212	RT
50		4	210					
50		5	204					
100		1	178					
100		2	209					
100		3	207			220	218	RT
100		4	190					
100		5	179					
~~101~~		1	206					
~~101~~		2	205					
~~101~~	@	3	180			188	185	RT
~~101~~		4	186					
~~101~~		5	197					

00%
iltered

QC: EG

@918 BO 8/22/19

CETIS™ v1.8.7.20

Analyst: BO

QA: AC 9/10/19

Marine Chronic Bioassay
DM-014

Water Quality Measurements

Client: Wood/POSD
Sample ID: SIYB-5
Sample Log No.: 19-0921
Test No.: 1908-S088

Test Species: *M. galloprovincialis*
Start Date/Time: 8/20/2019 1415
End Date/Time: 8/22/2019 1225

Concentration (%)	Salinity (ppt)			Temperature (°C)			Dissolved Oxygen (mg/L)			pH (pH units)		
	0	24	48	0	24	48	0	24	48	0	24	48
Lab Control	34.1	342	34.1	14.8	14.8	15.0	8.4	8.4	8.4	8.03	7.99	7.98
6.25	34.2	34.3	34.3	14.5	14.5	14.8	8.4	8.5	8.4	8.02	7.99	7.94
12.5	34.2	34.3	34.4	14.6	14.6	14.7	8.3	8.5	8.4	8.01	7.99	7.98
25	34.3	34.5	34.4	14.6	14.6	15.0	8.4	8.5	8.3	8.01	7.99	8.00
50	34.4	34.5	34.5	14.8	14.7	14.9	8.4	8.5	8.3	8.00	7.97	8.00
100	34.4	34.3	34.4	14.6	14.6	14.8	8.3	8.5	8.3	7.99	7.97	8.00
100 filtered	34.4	34.4	34.4	15.0	14.5	14.8	7.3	8.2	8.2	8.01	7.99	8.01

Technician Initials:

	0	24	48
WQ Readings:	BO	RT	BO
Dilutions made by:	AC/EG	▨	▨

Environmental Chamber: D

Comments:
0 hrs:
24 hrs:
48 hrs:

QC Check: AC 9/10/19

Final Review: LB 10/11/19

Enthalpy Analytical. 4340 Vandever Avenue. San Diego, CA 92120.

Marine Chronic Bioassay
DM-013

Larval Development Worksheet

Client: Wood/ POSD SIYB-5
Test No.: 1908-S088
Test Species: Mytilus galloprovincialis
Animal Source: Mission Bay
Date Received: 7/1/19
Test Chambers: 30mL glass shell vials
Sample Volume: 10mL

Start Date/Time: 8/20/2019 1415
End Date/Time: 8/22/2019 1225
Technician Initials: BO

Spawn Information

First Gamete Release Time: 1100

Sex	Number Spawning
Male	5
Female	4

Gamete Selection

Sex	Beaker Number(s)	Condition (sperm motility, egg density, color, shape, etc.)
Male	2,3,4	good motility, average density
Female 1	1	light yellow color, great shape, great density
Female 2	3	white, good shape, good density
Female 3	—	—

Egg Fertilization Time: 1200

Embryo Stock Selection

Stock Number	% of embryos at 2-cell division stage
Female 1	100
Female 2	100
Female 3	—

Stock(s) chosen for testing: 1

Embryo Inoculum Preparation

Target count on Sedgwick-Rafter slide for desired density is 6 embryos

Number Counted:

6	13
12	13
10	10
10	10
10	12

Mean: 10.6

Mean 10.6 X 50 = 530 embryos/ml

Initial Density: 530 = 1.77 (dilution factor)
Desired Final Density: 300
(to inoculate with 0.5 ml)

Prepare the embryo inoculum according to the calculated dilution factor. For example, if the dilution factor is 2.25, use 100 ml of existing stock (1 part) and 125 ml of dilution water (1.25 parts).

Time Zero Control Counts

Rand. No.	No. Dividing	Total	% Dividing	Mean % Dividing
T01	218	218	100	100
T02	198	198	100	
T03	183	183	100	
T04	203	203	100	
T05	187	187	100	

48-h QC: 224/227 = 98.6%

Comments: $\bar{x}$ = 198

QC Check: AC 9/10/19

Final Review: 10/11/19

CETIS Summary Report

Report Date: 11 Sep-19 10:13 (p 1 of 4)
Test Code: 1908-S089 | 18-8501-1017

Bivalve Larval Survival and Development Test

Nautilus Environmental (CA)

Batch ID:	20-2339-7305	**Test Type:**	Development-Survival	**Analyst:**	
Start Date:	20 Aug-19 14:15	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater
Ending Date:	22 Aug-19 12:25	**Species:**	Mytilus galloprovincialis	**Brine:**	Not Applicable
Duration:	46h	**Source:**	Mission Bay	**Age:**	

Sample ID:	11-9313-8386	**Code:**	19-0922	**Client:**	Wood Environment & Infrastructure
Sample Date:	19 Aug-19 10:00	**Material:**	Ambient Water	**Project:**	
Receive Date:	19 Aug-19 17:40	**Source:**	Shelter Island Yacht Basin		
Sample Age:	28h (5.4 °C)	**Station:**	SIYB-6		

Batch Note: 101 = 100% sample filtered to 0.45um

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
01-6858-2652	Combined Development Ra	100	>100	NA	4.73%	1	Dunnett Multiple Comparison Test
10-3070-5756	Development Rate	100	>100	NA	1.83%	1	Dunnett Multiple Comparison Test
05-2651-3378	Survival Rate	100	>100	NA	3.91%	1	Steel Many-One Rank Sum Test

Point Estimate Summary

Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method
15-7687-3219	Combined Development Ra	EC25	>100	N/A	N/A	<1	Linear Interpolation (ICPIN)
		EC50	>100	N/A	N/A	<1	
13-9892-7739	Development Rate	EC25	>100	N/A	N/A	<1	Linear Interpolation (ICPIN)
		EC50	>100	N/A	N/A	<1	
06-8533-0399	Survival Rate	EC25	>100	N/A	N/A	<1	Linear Interpolation (ICPIN)
		EC50	>100	N/A	N/A	<1	

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits	Overlap	Decision
10-3070-5756	Development Rate	Control Resp	0.9848	0.9 - NL	Yes	Passes Acceptability Criteria
13-9892-7739	Development Rate	Control Resp	0.9848	0.9 - NL	Yes	Passes Acceptability Criteria
05-2651-3378	Survival Rate	Control Resp	0.9758	0.5 - NL	Yes	Passes Acceptability Criteria
06-8533-0399	Survival Rate	Control Resp	0.9758	0.5 - NL	Yes	Passes Acceptability Criteria
01-6858-2652	Combined Development Ra	PMSD	0.04726	NL - 0.25	No	Passes Acceptability Criteria

Analyst: JC QA: lo 10/1/19

Bivalve Larval Survival and Development Test **Nautilus Environmental (CA)**

Combined Development Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Control	5	0.961	0.9189	1	0.9192	0.9907	0.01517	0.03392	3.53%	0.0%
6.25		5	0.9844	0.9725	0.9963	0.9726	0.9954	0.004282	0.009575	0.97%	-2.44%
12.5		5	0.986	0.9678	1	0.9621	1	0.006562	0.01467	1.49%	-2.61%
25		5	0.9631	0.9063	1	0.8838	1	0.02045	0.04573	4.75%	-0.22%
50		5	0.973	0.9417	1	0.9293	0.9899	0.01128	0.02521	2.59%	-1.25%
100		5	0.9734	0.9522	0.9946	0.9444	0.9867	0.007622	0.01704	1.75%	-1.3%
101		5	0.9784	0.9562	1	0.9545	0.9955	0.00799	0.01787	1.83%	-1.82%

Development Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Control	5	0.9848	0.9783	0.9914	0.9787	0.9907	0.002356	0.005269	0.54%	0.0%
6.25		5	0.9844	0.9725	0.9963	0.9726	0.9954	0.004282	0.009575	0.97%	0.05%
12.5		5	0.986	0.9678	1	0.9621	1	0.006562	0.01467	1.49%	-0.12%
25		5	0.9841	0.9697	0.9985	0.97	1	0.005193	0.01161	1.18%	0.08%
50		5	0.985	0.9767	0.9933	0.9735	0.9899	0.002987	0.006679	0.68%	-0.01%
100		5	0.9824	0.9742	0.9906	0.9724	0.9894	0.002955	0.006608	0.67%	0.25%
101		5	0.9894	0.9839	0.9949	0.9844	0.9955	0.001974	0.004415	0.45%	-0.46%

Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Control	5	0.9758	0.9336	1	0.9293	1	0.01519	0.03396	3.48%	0.0%
6.25		5	1	1	1	1	1	0	0	0.0%	-2.48%
12.5		5	1	1	1	1	1	0	0	0.0%	-2.48%
25		5	0.9788	0.9199	1	0.8939	1	0.02121	0.04743	4.85%	-0.31%
50		5	0.9879	0.9542	1	0.9394	1	0.01212	0.0271	2.74%	-1.24%
100		5	0.9909	0.9657	1	0.9545	1	0.009091	0.02033	2.05%	-1.55%
101		5	0.9889	0.9699	1	0.9697	1	0.006851	0.01532	1.55%	-1.35%

Analyst: JU QA: 10/1/19

Bivalve Larval Survival and Development Test **Nautilus Environmental (CA)**

Combined Development Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Control	0.9803	0.9192	0.9854	0.9293	0.9907
6.25		0.9765	0.9868	0.9906	0.9726	0.9954
12.5		0.9867	0.9956	0.9621	1	0.9856
25		0.97	0.9856	0.8838	0.9761	1
50		0.9293	0.9899	0.9735	0.9858	0.9865
100		0.9833	0.9724	0.9444	0.9802	0.9867
101		0.9646	0.9955	0.9914	0.9545	0.986

Development Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Control	0.9803	0.9891	0.9854	0.9787	0.9907
6.25		0.9765	0.9868	0.9906	0.9726	0.9954
12.5		0.9867	0.9956	0.9621	1	0.9856
25		0.97	0.9856	0.9887	0.9761	1
50		0.9892	0.9899	0.9735	0.9858	0.9865
100		0.9833	0.9724	0.9894	0.9802	0.9867
101		0.9896	0.9955	0.9914	0.9844	0.986

Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Control	1	0.9293	1	0.9495	1
6.25		1	1	1	1	1
12.5		1	1	1	1	1
25		1	1	0.8939	1	1
50		0.9394	1	1	1	1
100		1	1	0.9545	1	1
101		0.9747	1	1	0.9697	1

Analyst: JCl QA: bW/11/19

Bivalve Larval Survival and Development Test | **Nautilus Environmental (CA)**

Combined Development Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Control	199/203	182/198	202/205	184/198	213/215
6.25		208/213	224/227	211/213	213/219	217/218
12.5		222/225	228/229	203/211	208/208	206/209
25		194/200	205/208	175/198	204/209	214/214
50		184/198	196/198	220/226	208/211	220/223
100		236/240	211/217	187/198	198/202	223/226
101		191/198	220/221	231/233	189/198	211/214

Development Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Control	199/203	182/184	202/205	184/188	213/215
6.25		208/213	224/227	211/213	213/219	217/218
12.5		222/225	228/229	203/211	208/208	206/209
25		194/200	205/208	175/177	204/209	214/214
50		184/186	196/198	220/226	208/211	220/223
100		236/240	211/217	187/189	198/202	223/226
101		191/193	220/221	231/233	189/192	211/214

Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Control	198/198	184/198	198/198	188/198	198/198
6.25		198/198	198/198	198/198	198/198	198/198
12.5		198/198	198/198	198/198	198/198	198/198
25		198/198	198/198	177/198	198/198	198/198
50		186/198	198/198	198/198	198/198	198/198
100		198/198	198/198	189/198	198/198	198/198
101		193/198	198/198	198/198	192/198	198/198

CETIS Analytical Report

Report Date: 11 Sep-19 10:12 (p 1 of 8)
Test Code: 1908-S089 | 18-8501-1017

Bivalve Larval Survival and Development Test — **Nautilus Environmental (CA)**

Analysis ID:	01-6858-2652	**Endpoint:**	Combined Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 Sep-19 10:11	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Batch Note: 101 = 100% sample filtered to 0.45um

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C > T	NA	NA	4.73%	100	>100	NA	1

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		6.25	-1.337	2.362	0.112	8	0.9938	CDF	Non-Significant Effect
		12.5	-1.623	2.362	0.112	8	0.9975	CDF	Non-Significant Effect
		25	-0.3569	2.362	0.112	8	0.9175	CDF	Non-Significant Effect
		50	-0.6213	2.362	0.112	8	0.9551	CDF	Non-Significant Effect
		100	-0.5288	2.362	0.112	8	0.9440	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.02109342	0.004218683	5	0.7553	0.5906	Non-Significant Effect
Error	0.1340477	0.00558532	24			
Total	0.1551411		29			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	5.309	15.09	0.3793	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9488	0.9031	0.1568	Normal Distribution

Combined Development Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	0.961	0.9189	1	0.9803	0.9192	0.9907	0.01517	3.53%	0.0%
6.25		5	0.9844	0.9725	0.9963	0.9868	0.9726	0.9954	0.004282	0.97%	-2.44%
12.5		5	0.986	0.9678	1	0.9867	0.9621	1	0.006563	1.49%	-2.61%
25		5	0.9631	0.9063	1	0.9761	0.8838	1	0.02045	4.75%	-0.22%
50		5	0.973	0.9417	1	0.9858	0.9293	0.9899	0.01128	2.59%	-1.25%
100		5	0.9734	0.9522	0.9946	0.9802	0.9444	0.9867	0.007622	1.75%	-1.3%

Angular (Corrected) Transformed Summary

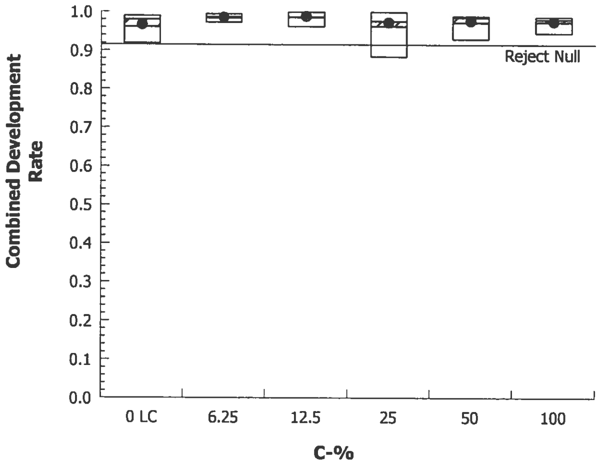
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	1.388	1.277	1.498	1.43	1.283	1.474	0.03972	6.4%	0.0%
6.25		5	1.451	1.4	1.501	1.456	1.405	1.503	0.01811	2.79%	-4.55%
12.5		5	1.464	1.388	1.54	1.455	1.375	1.536	0.02744	4.19%	-5.53%
25		5	1.404	1.262	1.547	1.416	1.223	1.537	0.05132	8.17%	-1.22%
50		5	1.417	1.332	1.502	1.451	1.302	1.47	0.03067	4.84%	-2.12%
100		5	1.413	1.352	1.473	1.43	1.333	1.455	0.02165	3.43%	-1.8%

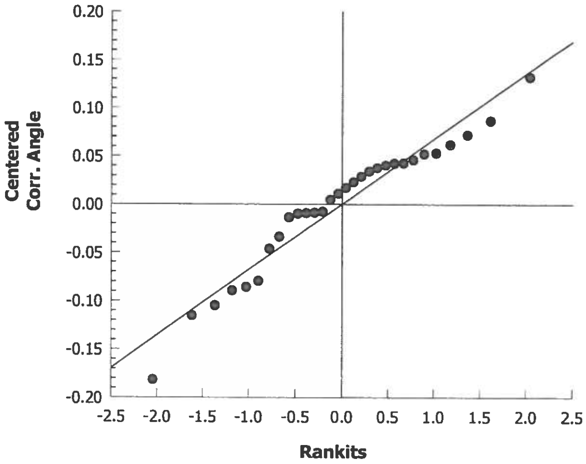
Analyst: JA QA:

Bivalve Larval Survival and Development Test **Nautilus Environmental (CA)**

Analysis ID:	01-6858-2652	**Endpoint:**	Combined Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 Sep-19 10:11	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Graphics





Analyst: JCL QA: [illegible]

TST

Bivalve Larval Survival and Development Test	**Nautilus Environmental (CA)**

Analysis ID:	00-2128-4735	**Endpoint:**	Combined Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 Sep-19 10:12	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Batch Note: 101 = 100% sample filtered to 0.45um

Data Transform	Zeta	Alt Hyp	Trials	Seed	TST b	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C*b < T	NA	NA	0.75	2.46%	100	>100	NA	1

TST-Welch's t Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		6.25*	11.76	1.943	0.068	6	<0.0001	CDF	Non-Significant Effect
		12.5*	10.46	1.895	0.077	7	<0.0001	CDF	Non-Significant Effect
		25*	6.13	1.943	0.115	6	0.0004	CDF	Non-Significant Effect
		50*	8.801	1.895	0.081	7	<0.0001	CDF	Non-Significant Effect
		100*	10.1	1.895	0.07	7	<0.0001	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.02109342	0.004218683	5	0.7553	0.5906	Non-Significant Effect
Error	0.1340477	0.00558532	24			
Total	0.1551411		29			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	5.309	15.09	0.3793	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9488	0.9031	0.1568	Normal Distribution

Combined Development Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	0.961	0.9189	1	0.9803	0.9192	0.9907	0.01517	3.53%	0.0%
6.25		5	0.9844	0.9725	0.9963	0.9868	0.9726	0.9954	0.004282	0.97%	-2.44%
12.5		5	0.986	0.9678	1	0.9867	0.9621	1	0.006563	1.49%	-2.61%
25		5	0.9631	0.9063	1	0.9761	0.8838	1	0.02045	4.75%	-0.22%
50		5	0.973	0.9417	1	0.9858	0.9293	0.9899	0.01128	2.59%	-1.25%
100		5	0.9734	0.9522	0.9946	0.9802	0.9444	0.9867	0.007622	1.75%	-1.3%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	1.388	1.277	1.498	1.43	1.283	1.474	0.03972	6.4%	0.0%
6.25		5	1.451	1.4	1.501	1.456	1.405	1.503	0.01811	2.79%	-4.55%
12.5		5	1.464	1.388	1.54	1.455	1.375	1.536	0.02744	4.19%	-5.53%
25		5	1.404	1.262	1.547	1.416	1.223	1.537	0.05132	8.17%	-1.22%
50		5	1.417	1.332	1.502	1.451	1.302	1.47	0.03067	4.84%	-2.12%
100		5	1.413	1.352	1.473	1.43	1.333	1.455	0.02165	3.43%	-1.8%

Analyst: JU QA:

CETIS Analytical Report

TST

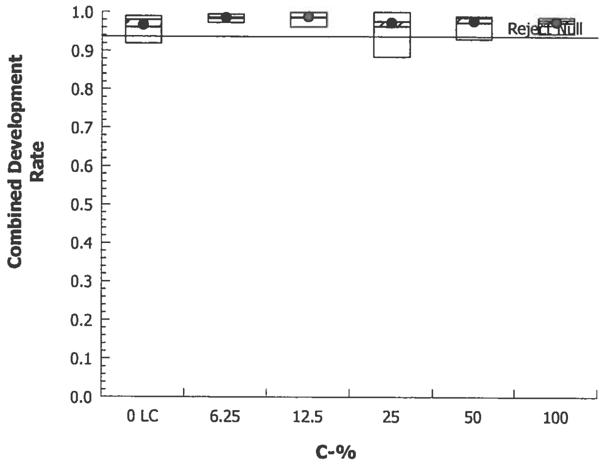
Report Date: 11 Sep-19 10:12 (p 4 of 8)
Test Code: 1908-S089 | 18-8501-1017

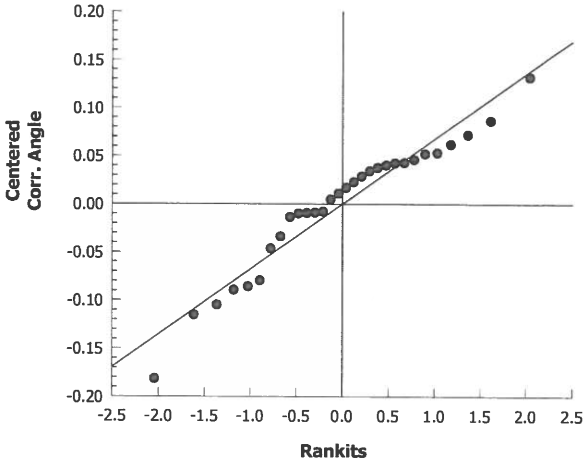
Bivalve Larval Survival and Development Test

Nautilus Environmental (CA)

Analysis ID:	00-2128-4735	**Endpoint:**	Combined Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 Sep-19 10:12	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Graphics





Analyst: JC QA:

CETIS Analytical Report

Report Date: 13 Sep-19 10:12 (p 1 of 4)
Test Code: 1908-S089 | 18-8501-1017

Bivalve Larval Survival and Development Test — **Nautilus Environmental (CA)**

Analysis ID:	21-0613-9287	**Endpoint:**	Combined Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	13 Sep-19 10:11	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch Note: 101 = 100% sample filtered to 0.45um

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	3.55%	Passes combined development rate

Equal Variance t Two-Sample Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		101	-0.9577	1.86	0.091	8	0.8169	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.005443532	0.005443532	1	0.9173	0.3662	Non-Significant Effect
Error	0.04747631	0.005934538	8			
Total	0.05291984		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.981	23.15	0.5242	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8754	0.7411	0.1156	Normal Distribution

Combined Development Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	0.961	0.9189	1	0.9803	0.9192	0.9907	0.01517	3.53%	0.0%
101		5	0.9784	0.9562	1	0.986	0.9545	0.9955	0.00799	1.83%	-1.82%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	1.388	1.277	1.498	1.43	1.283	1.474	0.03972	6.4%	0.0%
101		5	1.434	1.356	1.513	1.452	1.356	1.503	0.02822	4.4%	-3.36%

Analyst: JCL QA: 10/11/19

CETIS Analytical Report

TSt

Report Date:	13 Sep-19 10:12 (p 2 of 4)
Test Code:	1908-S089 | 18-8501-1017

Bivalve Larval Survival and Development Test	**Nautilus Environmental (CA)**

Analysis ID:	09-7451-2752	**Endpoint:**	Combined Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	13 Sep-19 10:11	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Batch Note: 101 = 100% sample filtered to 0.45um

Data Transform	Zeta	Alt Hyp	Trials	Seed	TST b	PMSD	Test Result
Angular (Corrected)	NA	C*b < T	NA	NA	0.75	2.87%	Passes combined development rate

TST-Welch's t Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		101*	9.591	1.895	0.078	7	<0.0001	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.005443532	0.005443532	1	0.9173	0.3662	Non-Significant Effect
Error	0.04747631	0.005934538	8			
Total	0.05291984		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.981	23.15	0.5242	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8754	0.7411	0.1156	Normal Distribution

Combined Development Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	0.961	0.9189	1	0.9803	0.9192	0.9907	0.01517	3.53%	0.0%
101		5	0.9784	0.9562	1	0.986	0.9545	0.9955	0.00799	1.83%	-1.82%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	1.388	1.277	1.498	1.43	1.283	1.474	0.03972	6.4%	0.0%
101		5	1.434	1.356	1.513	1.452	1.356	1.503	0.02822	4.4%	-3.36%

Analyst: JC QA: [illegible]

Bivalve Larval Survival and Development Test	**Nautilus Environmental (CA)**

Analysis ID:	10-3070-5756	**Endpoint:**	Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 Sep-19 10:11	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Batch Note: 101 = 100% sample filtered to 0.45um

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C > T	NA	NA	1.83%	100	>100	NA	1

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		6.25	-0.07252	2.362	0.061	8	0.8539	CDF	Non-Significant Effect
		12.5	-0.5944	2.362	0.061	8	0.9521	CDF	Non-Significant Effect
		25	-0.1475	2.362	0.061	8	0.8732	CDF	Non-Significant Effect
		50	-0.04283	2.362	0.061	8	0.8457	CDF	Non-Significant Effect
		100	0.3607	2.362	0.061	8	0.7057	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.001578882	0.0003157763	5	0.1885	0.9641	Non-Significant Effect
Error	0.04020764	0.001675318	24			
Total	0.04178653		29			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	6.902	15.09	0.2280	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9855	0.9031	0.9458	Normal Distribution

Development Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	0.9848	0.9783	0.9914	0.9854	0.9787	0.9907	0.002357	0.54%	0.0%
6.25		5	0.9844	0.9725	0.9963	0.9868	0.9726	0.9954	0.004282	0.97%	0.05%
12.5		5	0.986	0.9678	1	0.9867	0.9621	1	0.006563	1.49%	-0.12%
25		5	0.9841	0.9697	0.9985	0.9856	0.97	1	0.005193	1.18%	0.08%
50		5	0.985	0.9767	0.9933	0.9865	0.9735	0.9899	0.002987	0.68%	-0.01%
100		5	0.9824	0.9742	0.9906	0.9833	0.9724	0.9894	0.002955	0.67%	0.25%

Angular (Corrected) Transformed Summary

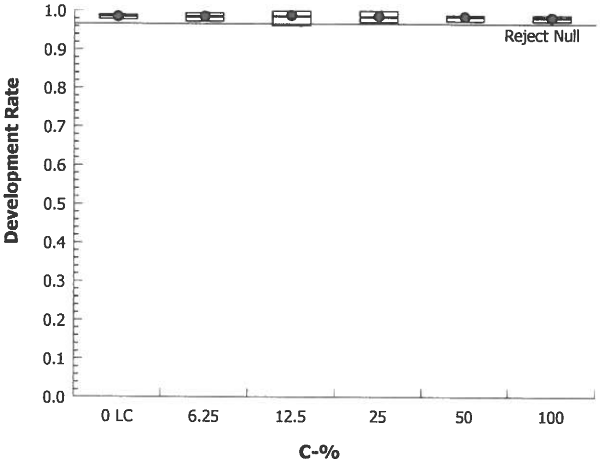
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	1.449	1.422	1.476	1.45	1.424	1.474	0.009755	1.51%	0.0%
6.25		5	1.451	1.4	1.501	1.456	1.405	1.503	0.01811	2.79%	-0.13%
12.5		5	1.464	1.388	1.54	1.455	1.375	1.536	0.02744	4.19%	-1.06%
25		5	1.453	1.386	1.52	1.45	1.397	1.537	0.02419	3.72%	-0.26%
50		5	1.45	1.419	1.481	1.455	1.407	1.47	0.01129	1.74%	-0.08%
100		5	1.44	1.409	1.47	1.441	1.404	1.468	0.01102	1.71%	0.64%

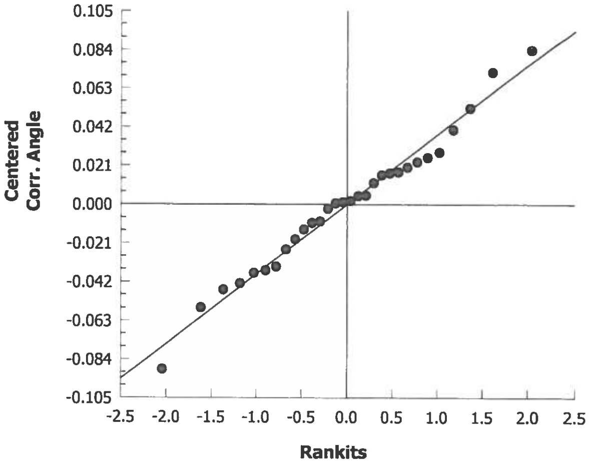
Analyst: JC QA: G 10/11/19

Bivalve Larval Survival and Development Test **Nautilus Environmental (CA)**

Analysis ID: 10-3070-5756 **Endpoint:** Development Rate **CETIS Version:** CETISv1.8.7
Analyzed: 11 Sep-19 10:11 **Analysis:** Parametric-Control vs Treatments **Official Results:** Yes

Graphics





Bivalve Larval Survival and Development Test **Nautilus Environmental (CA)**

Analysis ID:	10-3067-0345	**Endpoint:**	Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	13 Sep-19 10:11	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch Note: 101 = 100% sample filtered to 0.45um

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	0.68%	Passes development rate

Equal Variance t Two-Sample Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		101	-1.461	1.86	0.026	8	0.9090	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00107038	0.00107038	1	2.135	0.1821	Non-Significant Effect
Error	0.00401054	0.0005013174	8			
Total	0.00508092		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.107	23.15	0.9239	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9213	0.7411	0.3680	Normal Distribution

Development Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	0.9848	0.9783	0.9914	0.9854	0.9787	0.9907	0.002357	0.54%	0.0%
101		5	0.9894	0.9839	0.9949	0.9896	0.9844	0.9955	0.001975	0.45%	-0.46%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	1.449	1.422	1.476	1.45	1.424	1.474	0.009755	1.51%	0.0%
101		5	1.47	1.441	1.498	1.469	1.445	1.503	0.01026	1.56%	-1.43%

Analyst: JC QA: 10/11/19

CETIS Analytical Report TST

Report Date:	13 Sep-19 10:12 (p 4 of 4)
Test Code:	1908-S089 | 18-8501-1017

Bivalve Larval Survival and Development Test — **Nautilus Environmental (CA)**

Analysis ID:	11-5501-4996	**Endpoint:**	Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	13 Sep-19 10:11	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Batch Note: 101 = 100% sample filtered to 0.45um

Data Transform	Zeta	Alt Hyp	Trials	Seed	TST b	PMSD	Test Result
Angular (Corrected)	NA	C*b < T	NA	NA	0.75	0.6%	Passes development rate

TST-Welch's t Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		101*	30.38	1.895	0.024	7	<0.0001	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00107038	0.00107038	1	2.135	0.1821	Non-Significant Effect
Error	0.00401054	0.0005013174	8			
Total	0.00508092		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.107	23.15	0.9239	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9213	0.7411	0.3680	Normal Distribution

Development Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	0.9848	0.9783	0.9914	0.9854	0.9787	0.9907	0.002357	0.54%	0.0%
101		5	0.9894	0.9839	0.9949	0.9896	0.9844	0.9955	0.001975	0.45%	-0.46%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	1.449	1.422	1.476	1.45	1.424	1.474	0.009755	1.51%	0.0%
101		5	1.47	1.441	1.498	1.469	1.445	1.503	0.01026	1.56%	-1.43%

Analyst: JU QA:

CETIS Analytical Report

Report Date: 11 Sep-19 10:12 (p 7 of 8)
Test Code: 1908-S089 | 18-8501-1017

Bivalve Larval Survival and Development Test — **Nautilus Environmental (CA)**

Analysis ID:	05-2651-3378	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 Sep-19 10:11	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Batch Note: 101 = 100% sample filtered to 0.45um

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C > T	NA	NA	3.91%	100	>100	NA	1

Steel Many-One Rank Sum Test

Control	vs	C-%	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		6.25	32.5	16	1	8	0.9870	Asymp	Non-Significant Effect
		12.5	32.5	16	1	8	0.9870	Asymp	Non-Significant Effect
		25	29	16	1	8	0.9104	Asymp	Non-Significant Effect
		50	30	16	1	8	0.9446	Asymp	Non-Significant Effect
		100	31	16	1	8	0.9676	Asymp	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.02782167	0.005564334	5	0.7131	0.6197	Non-Significant Effect
Error	0.1872835	0.007803481	24			
Total	0.2151052		29			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	219.1	15.09	<0.0001	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.7852	0.9031	<0.0001	Non-normal Distribution

Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	0.9758	0.9336	1	1	0.9293	1	0.01519	3.48%	0.0%
6.25		5	1	1	1	1	1	1	0	0.0%	-2.48%
12.5		5	1	1	1	1	1	1	0	0.0%	-2.48%
25		5	0.9788	0.9199	1	1	0.8939	1	0.02121	4.85%	-0.31%
50		5	0.9879	0.9542	1	1	0.9394	1	0.01212	2.74%	-1.24%
100		5	0.9909	0.9657	1	1	0.9545	1	0.009091	2.05%	-1.55%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	1.45	1.305	1.596	1.535	1.302	1.535	0.05245	8.09%	0.0%
6.25		5	1.535	1.535	1.536	1.535	1.535	1.535	0	0.0%	-5.86%
12.5		5	1.535	1.535	1.536	1.535	1.535	1.535	0	0.0%	-5.86%
25		5	1.476	1.312	1.64	1.535	1.239	1.535	0.05924	8.97%	-1.77%
50		5	1.493	1.374	1.611	1.535	1.322	1.535	0.04264	6.39%	-2.92%
100		5	1.499	1.4	1.599	1.535	1.356	1.535	0.03586	5.35%	-3.38%

Analyst: Ja QA: [illegible] 10/11/19

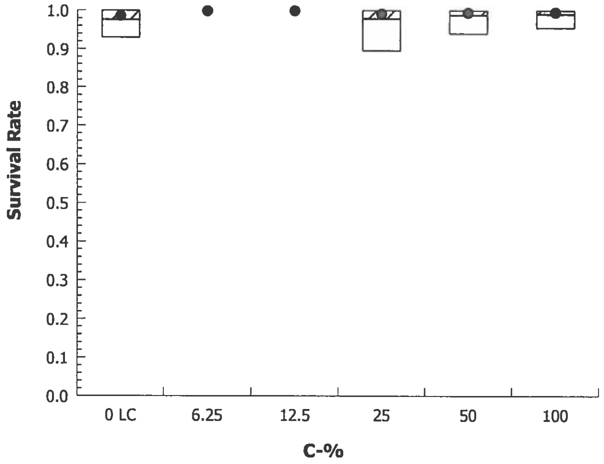
CETIS Analytical Report

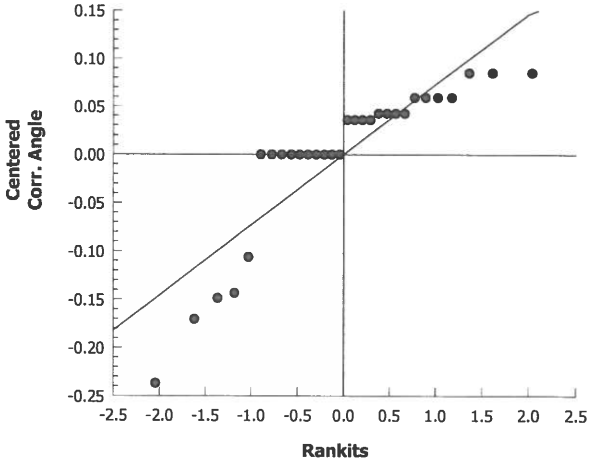
Report Date:	11 Sep-19 10:12 (p 8 of 8)
Test Code:	1908-S089 | 18-8501-1017

Bivalve Larval Survival and Development Test **Nautilus Environmental (CA)**

Analysis ID:	05-2651-3378	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 Sep-19 10:11	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Graphics





Analyst: JC QA:

CETIS Analytical Report

Report Date: 11 Sep-19 10:12 (p 1 of 3)
Test Code: 1908-S089 | 18-8501-1017

Bivalve Larval Survival and Development Test — **Nautilus Environmental (CA)**

Analysis ID:	15-7687-3219	**Endpoint:**	Combined Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 Sep-19 10:11	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Batch Note: 101 = 100% sample filtered to 0.45um

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	1570709	1000	Yes	Two-Point Interpolation

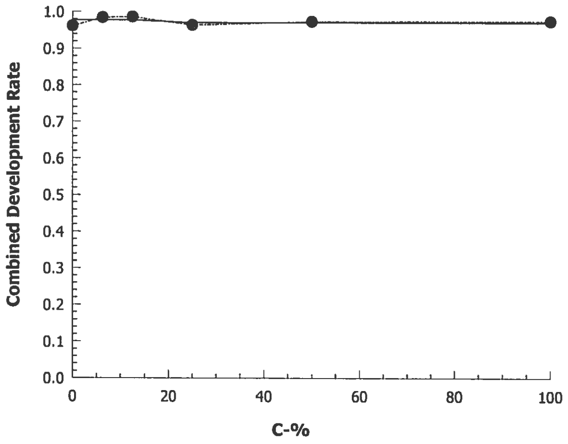
Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC25	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Combined Development Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Lab Control	5	0.961	0.9192	0.9907	0.01517	0.03392	3.53%	0.0%	980	1019
6.25		5	0.9844	0.9726	0.9954	0.004282	0.009574	0.97%	-2.44%	1073	1090
12.5		5	0.986	0.9621	1	0.006563	0.01467	1.49%	-2.61%	1067	1082
25		5	0.9631	0.8838	1	0.02045	0.04573	4.75%	-0.22%	992	1029
50		5	0.973	0.9293	0.9899	0.01128	0.02521	2.59%	-1.25%	1028	1056
100		5	0.9734	0.9444	0.9867	0.007622	0.01704	1.75%	-1.3%	1055	1083

Graphics



Analyst: JCL QA:

Bivalve Larval Survival and Development Test	**Nautilus Environmental (CA)**

Analysis ID:	13-9892-7739	**Endpoint:**	Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 Sep-19 10:12	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Batch Note: 101 = 100% sample filtered to 0.45um

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	801682	1000	Yes	Two-Point Interpolation

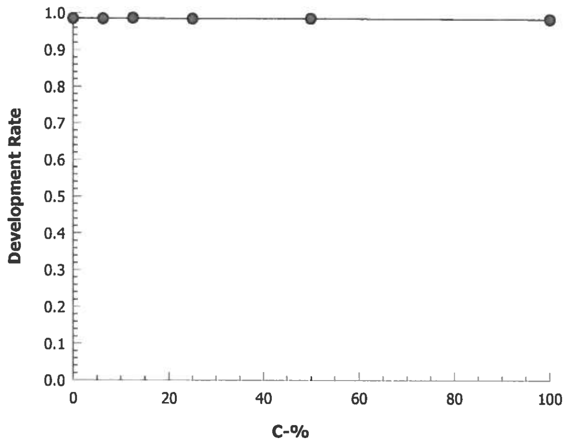
Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC25	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Development Rate Summary

			Calculated Variate(A/B)								
C-%	**Control Type**	**Count**	**Mean**	**Min**	**Max**	**Std Err**	**Std Dev**	**CV%**	**%Effect**	**A**	**B**
0	Lab Control	5	0.9848	0.9787	0.9907	0.002357	0.005269	0.54%	0.0%	980	995
6.25		5	0.9844	0.9726	0.9954	0.004282	0.009574	0.97%	0.05%	1073	1090
12.5		5	0.986	0.9621	1	0.006563	0.01467	1.49%	-0.12%	1067	1082
25		5	0.9841	0.97	1	0.005193	0.01161	1.18%	0.08%	992	1008
50		5	0.985	0.9735	0.9899	0.002987	0.006679	0.68%	-0.01%	1028	1044
100		5	0.9824	0.9724	0.9894	0.002955	0.006608	0.67%	0.25%	1055	1074

Graphics



CETIS Analytical Report

Report Date: 11 Sep-19 10:12 (p 3 of 3)
Test Code: 1908-S089 | 18-8501-1017

Bivalve Larval Survival and Development Test — **Nautilus Environmental (CA)**

Analysis ID:	06-8533-0399	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 Sep-19 10:11	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Batch Note: 101 = 100% sample filtered to 0.45um

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	1712738	1000	Yes	Two-Point Interpolation

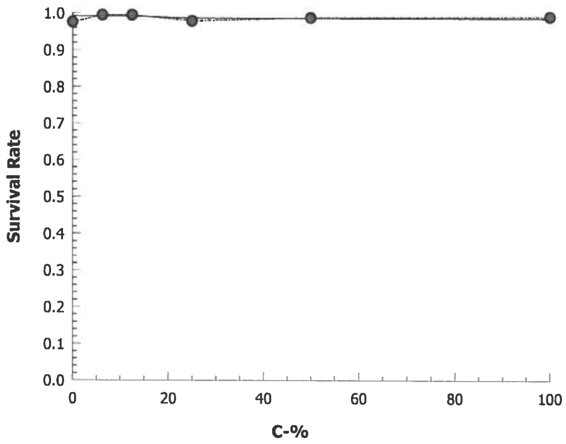
Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC25	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Lab Control	5	0.9758	0.9293	1	0.01519	0.03396	3.48%	0.0%	966	990
6.25		5	1	1	1	0	0	0.0%	-2.48%	990	990
12.5		5	1	1	1	0	0	0.0%	-2.48%	990	990
25		5	0.9788	0.8939	1	0.02121	0.04743	4.85%	-0.31%	969	990
50		5	0.9879	0.9394	1	0.01212	0.0271	2.74%	-1.24%	978	990
100		5	0.9909	0.9545	1	0.009091	0.02033	2.05%	-1.55%	981	990

Graphics



Embryo Larval Bioassay **48-hour Development**

Client: Wood/POSD
Test Species: *M. galloprovincialis*
Sample ID: SIYB-6
Start Date/Time: 8/20/2019 1415
Test ID: 1908-S089
End Date/Time: 8/22/2019 1225

Random #	Number Normal	Number Abnormal		Total Number Counted	Intials/Date
		Number Curved Shell	All other abnormal		
211	236	0	4	240	JL 9/15/19
212	211	0	6	217	
213	184	0	2	186	
214	182	0	2	184	
215	220	0	1	221	
216	198	0	Ⓐ ~~2~~ 4	202	
217	208	0	3	211	
218	224	0	3	227	
219	206	0	3	209	
220	208	0	5	213	
221	208	0	0	208	
222	223	0	3	226	
223	213	0	2	215	
224	222	0	3	225	
225	202	0	3	205	
226	175	0	2	177	
227	217	0	1	218	
228	213	0	6	219	
229	214	0	0	214	
230	184	0	4	188	
231	199	0	4	203	
232	211	0	3	214	
233	204	0	5	209	
234	228	0	1	229	
235	203	0	8	211	
236	196	0	2	198	
237	187	0	2	189	
238	189	0	3	192	
239	205	0	3	208	
240	220	0	3	223	
241	194	0	6	200	
242	231	0	2	233	
243	220	0	6	226	
244	191	0	2	193	
245	211	0	2	213	

Comments: Ⓐ Q18 JL 9/15/19

QC Check: AC 9/10/19

Final Review: 10/1/19

CETIS Test Data Worksheet

Report Date: 16 Aug-19 12:47 (p 1 of 1)
Test Code: 1908-S089 18-8501-1017/705AFC49

Bivalve Larval Survival and Development Test

Nautilus Environmental (CA)

Start Date:	20 Aug-19	**Species:**	Mytilus galloprovincialis	**Sample Code:**	19-0922
End Date:	22 Aug-19	**Protocol:**	EPA/600/R-95/136 (1995)	**Sample Source:**	Shelter Island Yacht Basin
Sample Date:	19 Aug-19	**Material:**	Ambient Water	**Sample Station:**	SIYB-6

C-%	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
0	LC	1	231					
0	LC	2	214					
0	LC	3	225			191	189	RT 8/22/19
0	LC	4	230					
0	LC	5	223					
6.25		1	220					
6.25		2	218					
6.25		3	245			211	211	RT
6.25		4	228					
6.25		5	227					
12.5		1	224					
12.5		2	234					
12.5		3	235			196	190	RT
12.5		4	221					
12.5		5	219					
25		1	241					
25		2	239					
25		3	226			166	165	RT
25		4	233					
25		5	229					
50		1	213					
50		2	236					
50		3	243			218	210	RT
50		4	217					
50		5	240					
100		1	211					
100		2	212					
100		3	237			183	178	RT
100		4	216					
100		5	222					
~~101~~		1	244					
~~101~~		2	215					
~~101~~	@	3	242			225	222	RT
~~101~~		4	238					
~~101~~		5	232					

100% filtered

QC: EG

@Q18 BO 8/22/19

Analyst: BO QA: AC 9/10/19

Marine Chronic Bioassay

DM-014

Water Quality Measurements

Client: Wood/POSD

Sample ID: SIYB-6

Sample Log No.: 19-0922

Test No.: 1908-S089

Test Species: *M. galloprovincialis*

Start Date/Time: 8/20/2019 1415

End Date/Time: 8/22/2019 1225

Concentration (%)	Salinity (ppt)			Temperature (°C)			Dissolved Oxygen (mg/L)			pH (pH units)		
	0	24	48	0	24	48	0	24	48	0	24	48
Lab Control	34.0	34.3	34.1	14.8	15.3	15.4	8.3	8.4	8.2	8.04	7.98	7.99
6.25	34.2	34.5	34.3	14.7	15.2	15.1	8.3	8.4	8.3	8.03	7.97	7.98
12.5	34.3	34.3	34.4	14.7	15.2	15.2	8.4	8.4	8.3	8.02	7.97	7.96
25	34.3	34.4	34.4	14.7	15.2	15.1	8.4	8.4	8.2	8.02	7.97	7.96
50	34.4	34.5	34.5	14.9	15.3	15.3	8.4	8.4	8.2	8.00	7.97	7.98
100	34.4	34.3	34.5	14.8	15.3	15.2	8.3	8.3	8.2	7.96	7.96	8.00
100 filtered	34.3	34.4	34.4	15.1	15.2	15.2	7.3	8.1	8.1	7.98	7.97	7.99

Technician Initials:

	0	24	48
WQ Readings:	BO	RT	BO
Dilutions made by:	AC/EG		

Environmental Chamber: Do

Comments:

0 hrs:

24 hrs:

48 hrs:

QC Check: AC 9/10/19

Final Review: 10/11/19

Marine Chronic Bioassay
DM-013

Larval Development Worksheet

Client: Wood/POSD SIYB-6
Test No.: 1908-S089
Test Species: Mytilus galloprovincialis
Animal Source: Mission Bay
Date Received: 7/1/19
Test Chambers: 30mL glass shell vials
Sample Volume: 10mL

Start Date/Time: 8/20/2019 1415
End Date/Time: 8/22/2019 1225
Technician Initials: BO

Spawn Information

First Gamete Release Time: 1100

Sex	Number Spawning
Male	5
Female	4

Gamete Selection

Sex	Beaker Number(s)	Condition (sperm motility, egg density, color, shape, etc.)
Male	2,3,4	good motility, average density
Female 1	1	light yellow color, great shape, great density
Female 2	3	white, good shape, good density
Female 3	—	—

Egg Fertilization Time: 1200

Embryo Stock Selection

Stock Number	% of embryos at 2-cell division stage
Female 1	100
Female 2	100
Female 3	—

Stock(s) chosen for testing: 1

Embryo Inoculum Preparation

Target count on Sedgwick-Rafter slide for desired density is 6 embryos

Number Counted:

6	13
17	13
10	10
10	10
10	12

Mean: 10.6

Mean 10.6 X 50 = 530 embryos/ml

Initial Density: 530
Desired Final Density: 300 = 1.77 (dilution factor)
(to inoculate with 0.5 ml)

Prepare the embryo inoculum according to the calculated dilution factor. For example, if the dilution factor is 2.25, use 100 ml of existing stock (1 part) and 125 ml of dilution water (1.25 parts).

Time Zero Control Counts

Rand. No.	No. Dividing	Total	% Dividing	Mean % Dividing
T01	218	218	100	100
T02	198	198	100	
T03	183	183	100	
T04	203	203	100	
T05	187	187	100	

48-h QC: 224/227 = 98.6%

Comments: $\bar{x} = 198$

QC Check: AC 9/10/19

Final Review: S 10/11/19

Enthalpy Analytical. 4340 Vandever Avenue. San Diego, CA 92120.

CETIS Summary Report

Report Date: 11 Sep-19 08:52 (p 1 of 2)
Test Code: 1908-S090 | 05-3874-5672

Bivalve Larval Survival and Development Test — **Nautilus Environmental (CA)**

Batch ID:	08-3309-9345	**Test Type:**	Development-Survival	**Analyst:**	
Start Date:	20 Aug-19 14:15	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Laboratory Seawater
Ending Date:	22 Aug-19 12:25	**Species:**	Mytilus galloprovincialis	**Brine:**	Not Applicable
Duration:	46h	**Source:**	Mission Bay	**Age:**	

Sample ID:	16-6929-7538	**Code:**	19-0923	**Client:**	Wood Environment & Infrastructure
Sample Date:	19 Aug-19 09:00	**Material:**	Ambient Water	**Project:**	
Receive Date:	19 Aug-19 17:40	**Source:**	Shelter Island Yacht Basin		
Sample Age:	29h (5 °C)	**Station:**	SIYB-REF		

Batch Note: 101 = 100% sample filtered to 0.45um

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
00-9015-8291	Combined Development Ra	100	>100	NA	3.08%	1	Dunnett Multiple Comparison Test
02-1133-8458	Development Rate	100	>100	NA	1.37%	1	Dunnett Multiple Comparison Test
19-4481-0645	Survival Rate	100	>100	NA	2.48%	1	Steel Many-One Rank Sum Test

Point Estimate Summary

Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method
10-2005-8625	Combined Development Ra	EC25	>100	N/A	N/A	<1	Linear Interpolation (ICPIN)
		EC50	>100	N/A	N/A	<1	
14-6834-2035	Development Rate	EC25	>100	N/A	N/A	<1	Linear Interpolation (ICPIN)
		EC50	>100	N/A	N/A	<1	
08-4798-8267	Survival Rate	EC25	>100	N/A	N/A	<1	Linear Interpolation (ICPIN)
		EC50	>100	N/A	N/A	<1	

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits	Overlap	Decision
02-1133-8458	Development Rate	Control Resp	0.9851	0.9 - NL	Yes	Passes Acceptability Criteria
14-6834-2035	Development Rate	Control Resp	0.9851	0.9 - NL	Yes	Passes Acceptability Criteria
08-4798-8267	Survival Rate	Control Resp	0.9869	0.5 - NL	Yes	Passes Acceptability Criteria
19-4481-0645	Survival Rate	Control Resp	0.9869	0.5 - NL	Yes	Passes Acceptability Criteria
00-9015-8291	Combined Development Ra	PMSD	0.0308	NL - 0.25	No	Passes Acceptability Criteria

Analyst: JCL QA:

CETIS Summary Report

Bivalve Larval Survival and Development Test — **Nautilus Environmental (CA)**

Combined Development Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Control	5	0.9721	0.9513	0.9929	0.9444	0.9872	0.007508	0.01679	1.73%	0.0%
6.25		5	0.9667	0.9477	0.9858	0.9444	0.9868	0.006856	0.01533	1.59%	0.55%
12.5		5	0.9676	0.9386	0.9966	0.9293	0.9865	0.01044	0.02334	2.41%	0.46%
25		5	0.9802	0.9577	1	0.9495	0.9956	0.00808	0.01807	1.84%	-0.83%
50		5	0.9846	0.9779	0.9913	0.9798	0.991	0.002423	0.005419	0.55%	-1.28%
100		5	0.9703	0.9371	1	0.9242	0.9906	0.01198	0.02679	2.76%	0.18%
101		5	0.9856	0.9728	0.9984	0.9727	0.9956	0.004614	0.01032	1.05%	-1.39%

Development Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Control	5	0.9851	0.9768	0.9934	0.9766	0.9948	0.002982	0.006667	0.68%	0.0%
6.25		5	0.9716	0.9604	0.9829	0.9641	0.9868	0.004054	0.009065	0.93%	1.37%
12.5		5	0.9784	0.9656	0.9912	0.9634	0.9865	0.004616	0.01032	1.06%	0.68%
25		5	0.9892	0.9812	0.9972	0.98	0.9956	0.002895	0.006473	0.65%	-0.42%
50		5	0.9876	0.9799	0.9953	0.9808	0.9949	0.002785	0.006227	0.63%	-0.26%
100		5	0.9771	0.9611	0.9931	0.9581	0.9906	0.005776	0.01292	1.32%	0.81%
101		5	0.9856	0.9728	0.9984	0.9727	0.9956	0.004614	0.01032	1.05%	-0.05%

Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Control	5	0.9869	0.9636	1	0.9596	1	0.008391	0.01876	1.9%	0.0%
6.25		5	0.9949	0.9809	1	0.9747	1	0.005051	0.01129	1.14%	-0.82%
12.5		5	0.9889	0.9689	1	0.9646	1	0.007214	0.01613	1.63%	-0.2%
25		5	0.9909	0.9657	1	0.9545	1	0.009091	0.02033	2.05%	-0.41%
50		5	0.997	0.9886	1	0.9848	1	0.00303	0.006776	0.68%	-1.02%
100		5	0.9929	0.9733	1	0.9646	1	0.007071	0.01581	1.59%	-0.61%
101		5	1	1	1	1	1	0	0	0.0%	-1.33%

Analyst: JC QA: SD 11/05

Bivalve Larval Survival and Development Test **Nautilus Environmental (CA)**

Combined Development Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Control	0.9444	0.9872	0.9766	0.9697	0.9825
6.25		0.9659	0.9868	0.9641	0.9444	0.9724
12.5		0.9646	0.9718	0.9293	0.9865	0.9857
25		0.9956	0.98	0.9899	0.9858	0.9495
50		0.9814	0.9808	0.991	0.9798	0.9899
100		0.9712	0.9242	0.9906	0.9862	0.9794
101		0.9955	0.9866	0.9727	0.9956	0.9777

Development Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Control	0.9842	0.9872	0.9766	0.9948	0.9825
6.25		0.9659	0.9868	0.9641	0.9689	0.9724
12.5		0.9845	0.9718	0.9634	0.9865	0.9857
25		0.9956	0.98	0.9899	0.9858	0.9947
50		0.9814	0.9808	0.991	0.9949	0.9899
100		0.9712	0.9581	0.9906	0.9862	0.9794
101		0.9955	0.9866	0.9727	0.9956	0.9777

Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Control	0.9596	1	1	0.9747	1
6.25		1	1	1	0.9747	1
12.5		0.9798	1	0.9646	1	1
25		1	1	1	1	0.9545
50		1	1	1	0.9848	1
100		1	0.9646	1	1	1
101		1	1	1	1	1

Analyst: JC QA: 10/11/19

Bivalve Larval Survival and Development Test **Nautilus Environmental (CA)**

Combined Development Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Control	187/198	231/234	209/214	192/198	225/229
6.25		198/205	225/228	242/251	187/198	211/217
12.5		191/198	207/213	184/198	219/222	207/210
25		226/227	196/200	196/198	209/212	188/198
50		211/215	204/208	221/223	194/198	196/198
100		202/208	183/198	211/213	215/218	238/243
101		219/220	221/224	214/220	224/225	219/224

Development Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Control	187/190	231/234	209/214	192/193	225/229
6.25		198/205	225/228	242/251	187/193	211/217
12.5		191/194	207/213	184/191	219/222	207/210
25		226/227	196/200	196/198	209/212	188/189
50		211/215	204/208	221/223	194/195	196/198
100		202/208	183/191	211/213	215/218	238/243
101		219/220	221/224	214/220	224/225	219/224

Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Control	190/198	198/198	198/198	193/198	198/198
6.25		198/198	198/198	198/198	193/198	198/198
12.5		194/198	198/198	191/198	198/198	198/198
25		198/198	198/198	198/198	198/198	189/198
50		198/198	198/198	198/198	195/198	198/198
100		198/198	191/198	198/198	198/198	198/198
101		198/198	198/198	198/198	198/198	198/198

Analyst: JCL QA: [illegible]

CETIS Analytical Report

Report Date: 11 Sep-19 08:37 (p 1 of 10)
Test Code: 1908-S090 | 05-3874-5672

Bivalve Larval Survival and Development Test — **Nautilus Environmental (CA)**

Analysis ID:	00-9015-8291	**Endpoint:**	Combined Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 Sep-19 8:21	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Batch Note: 101 = 100% sample filtered to 0.45um

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C > T	NA	NA	3.08%	100	>100	NA	1

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		6.25	0.4931	2.362	0.080	8	0.6499	CDF	Non-Significant Effect
		12.5	0.2988	2.362	0.080	8	0.7304	CDF	Non-Significant Effect
		25	-0.9252	2.362	0.080	8	0.9795	CDF	Non-Significant Effect
		50	-1.165	2.362	0.080	8	0.9896	CDF	Non-Significant Effect
		100	-0.0253	2.362	0.080	8	0.8407	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.01306354	0.002612708	5	0.9017	0.4961	Non-Significant Effect
Error	0.06953992	0.002897497	24			
Total	0.08260346		29			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	4.49	15.09	0.4812	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9183	0.9031	0.0242	Normal Distribution

Combined Development Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	0.9721	0.9513	0.9929	0.9766	0.9444	0.9872	0.007508	1.73%	0.0%
6.25		5	0.9667	0.9477	0.9858	0.9659	0.9444	0.9868	0.006856	1.59%	0.55%
12.5		5	0.9676	0.9386	0.9966	0.9718	0.9293	0.9865	0.01044	2.41%	0.46%
25		5	0.9802	0.9577	1	0.9858	0.9495	0.9956	0.008081	1.84%	-0.83%
50		5	0.9846	0.9779	0.9913	0.9814	0.9798	0.991	0.002423	0.55%	-1.28%
100		5	0.9703	0.9371	1	0.9794	0.9242	0.9906	0.01198	2.76%	0.18%

Angular (Corrected) Transformed Summary

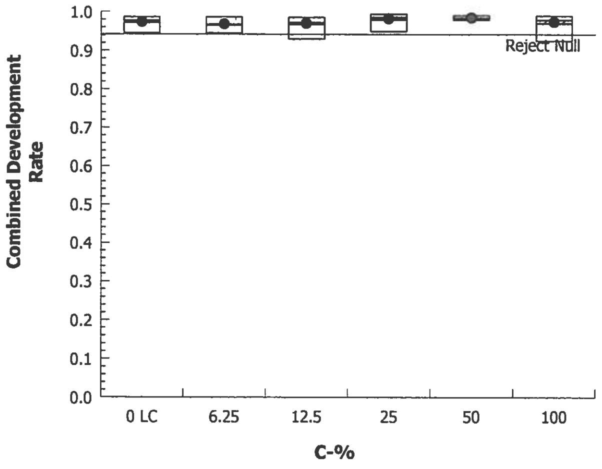
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	1.408	1.349	1.468	1.417	1.333	1.457	0.02148	3.41%	0.0%
6.25		5	1.392	1.336	1.447	1.385	1.333	1.456	0.01987	3.19%	1.19%
12.5		5	1.398	1.321	1.476	1.402	1.302	1.454	0.02788	4.46%	0.72%
25		5	1.44	1.365	1.515	1.452	1.344	1.504	0.02693	4.18%	-2.24%
50		5	1.448	1.419	1.477	1.434	1.428	1.476	0.01031	1.59%	-2.82%
100		5	1.409	1.321	1.498	1.427	1.292	1.474	0.03181	5.05%	-0.06%

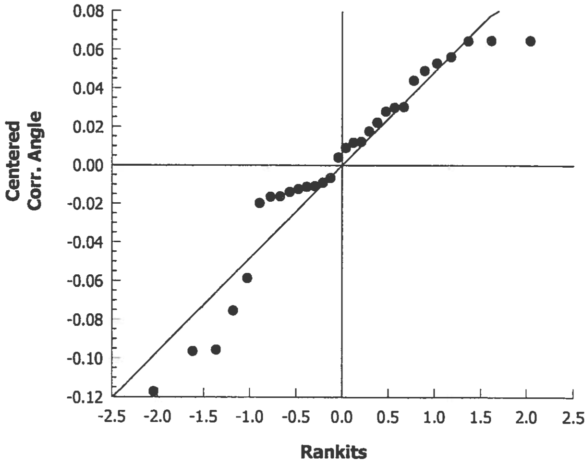
Analyst: JCL QA: [illegible] 9/11/19

Bivalve Larval Survival and Development Test — **Nautilus Environmental (CA)**

Analysis ID:	00-9015-8291	**Endpoint:**	Combined Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 Sep-19 8:21	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Graphics





TST

Bivalve Larval Survival and Development Test	**Nautilus Environmental (CA)**

Analysis ID:	16-0534-9709	**Endpoint:**	Combined Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 Sep-19 8:23	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Batch Note: 101 = 100% sample filtered to 0.45um

Data Transform	Zeta	Alt Hyp	Trials	Seed	TST b	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C*b < T	NA	NA	0.75	2.68%	100	>100	NA	1

TST-Welch's t Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		6.25*	13.11	1.895	0.048	7	<0.0001	CDF	Non-Significant Effect
		12.5*	10.62	1.943	0.063	6	<0.0001	CDF	Non-Significant Effect
		25*	12.22	1.943	0.061	6	<0.0001	CDF	Non-Significant Effect
		50*	20.48	1.943	0.037	6	<0.0001	CDF	Non-Significant Effect
		100*	9.897	2.015	0.072	5	<0.0001	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.01306354	0.002612708	5	0.9017	0.4961	Non-Significant Effect
Error	0.06953992	0.002897497	24			
Total	0.08260346		29			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	4.49	15.09	0.4812	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9183	0.9031	0.0242	Normal Distribution

Combined Development Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	0.9721	0.9513	0.9929	0.9766	0.9444	0.9872	0.007508	1.73%	0.0%
6.25		5	0.9667	0.9477	0.9858	0.9659	0.9444	0.9868	0.006856	1.59%	0.55%
12.5		5	0.9676	0.9386	0.9966	0.9718	0.9293	0.9865	0.01044	2.41%	0.46%
25		5	0.9802	0.9577	1	0.9858	0.9495	0.9956	0.008081	1.84%	-0.83%
50		5	0.9846	0.9779	0.9913	0.9814	0.9798	0.991	0.002423	0.55%	-1.28%
100		5	0.9703	0.9371	1	0.9794	0.9242	0.9906	0.01198	2.76%	0.18%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	1.408	1.349	1.468	1.417	1.333	1.457	0.02148	3.41%	0.0%
6.25		5	1.392	1.336	1.447	1.385	1.333	1.456	0.01987	3.19%	1.19%
12.5		5	1.398	1.321	1.476	1.402	1.302	1.454	0.02788	4.46%	0.72%
25		5	1.44	1.365	1.515	1.452	1.344	1.504	0.02693	4.18%	-2.24%
50		5	1.448	1.419	1.477	1.434	1.428	1.476	0.01031	1.59%	-2.82%
100		5	1.409	1.321	1.498	1.427	1.292	1.474	0.03181	5.05%	-0.06%

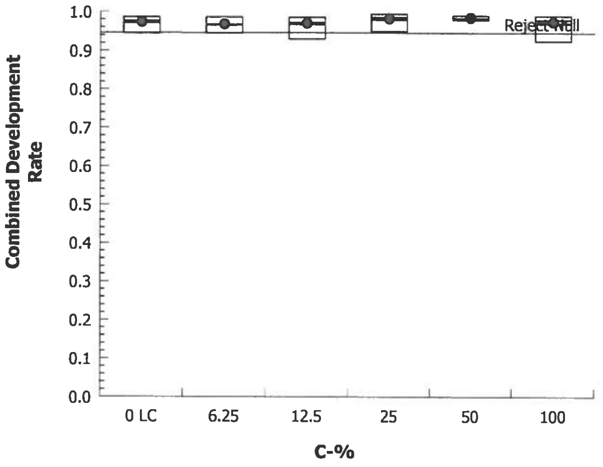
Analyst: JC QA: b 10/11/19

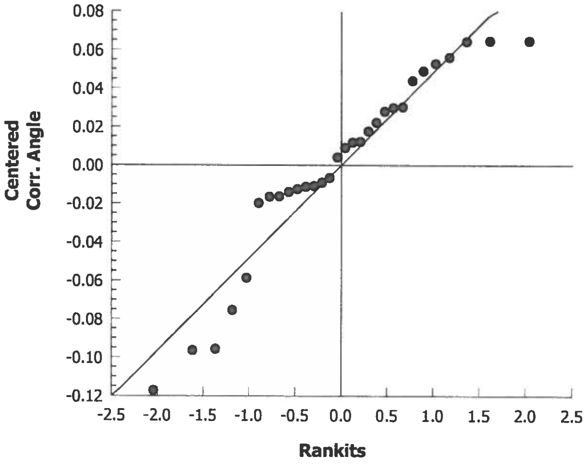
TST

Bivalve Larval Survival and Development Test **Nautilus Environmental (CA)**

Analysis ID: 16-0534-9709 **Endpoint:** Combined Development Rate **CETIS Version:** CETISv1.8.7
Analyzed: 11 Sep-19 8:23 **Analysis:** Parametric Bioequivalence-Two Sample **Official Results:** Yes

Graphics





Analyst: JCL QA: 10/11/19

Bivalve Larval Survival and Development Test — **Nautilus Environmental (CA)**

Analysis ID:	14-0314-0582	**Endpoint:**	Combined Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 Sep-19 8:30	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch Note: 101 = 100% sample filtered to 0.45um

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	1.93%	Passes combined development rate

Equal Variance t Two-Sample Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		101	-1.66	1.86	0.055	8	0.9323	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.006068558	0.006068558	1	2.756	0.1355	Non-Significant Effect
Error	0.01761847	0.002202308	8			
Total	0.02368702		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.1	23.15	0.9285	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9213	0.7411	0.3679	Normal Distribution

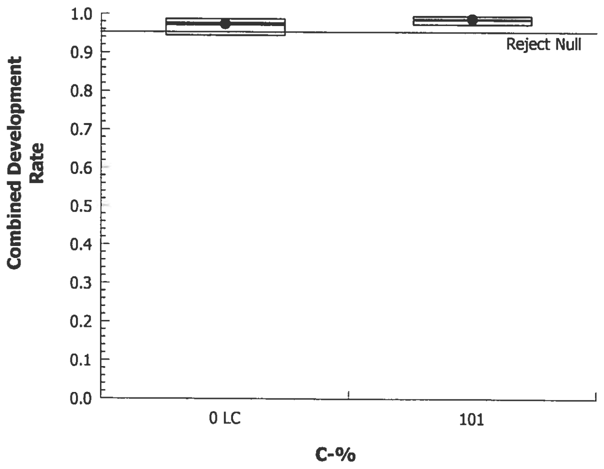
Combined Development Rate Summary

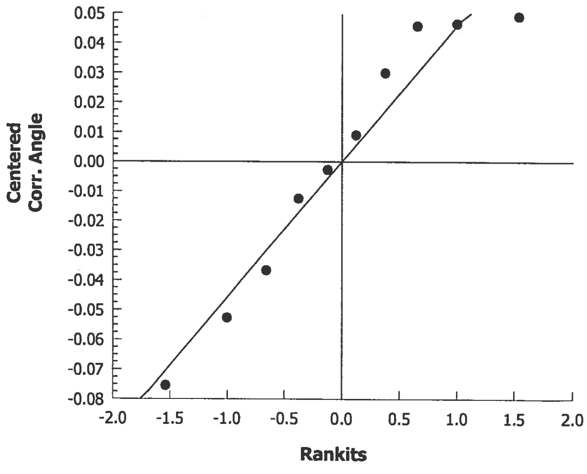
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	0.9721	0.9513	0.9929	0.9766	0.9444	0.9872	0.007508	1.73%	0.0%
101		5	0.9856	0.9728	0.9984	0.9866	0.9727	0.9956	0.004613	1.05%	-1.39%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	1.408	1.349	1.468	1.417	1.333	1.457	0.02148	3.41%	0.0%
101		5	1.458	1.401	1.514	1.455	1.405	1.504	0.02048	3.14%	-3.5%

Graphics





Analyst: JC QA: b 10/11/19

TST

Bivalve Larval Survival and Development Test	**Nautilus Environmental (CA)**

Analysis ID:	17-5913-7468	**Endpoint:**	Combined Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 Sep-19 8:35	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Batch Note: 101 = 100% sample filtered to 0.45um

Data Transform	Zeta	Alt Hyp	Trials	Seed	TST b	PMSD	Test Result
Angular (Corrected)	NA	C*b < T	NA	NA	0.75	1.68%	Passes combined development rate

TST-Welch's t Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		101*	15.4	1.895	0.049	7	<0.0001	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.006068558	0.006068558	1	2.756	0.1355	Non-Significant Effect
Error	0.01761847	0.002202308	8			
Total	0.02368702		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.1	23.15	0.9285	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9213	0.7411	0.3679	Normal Distribution

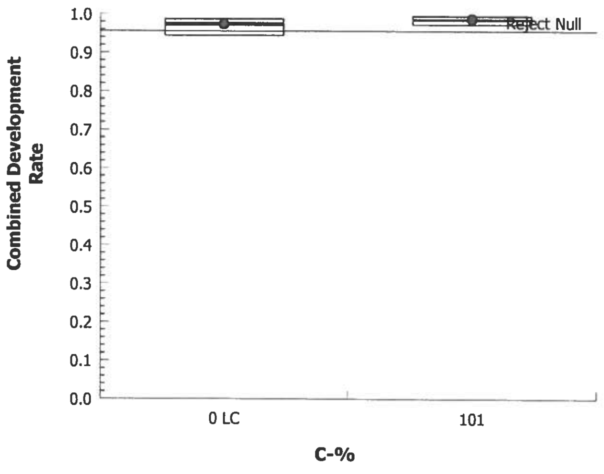
Combined Development Rate Summary

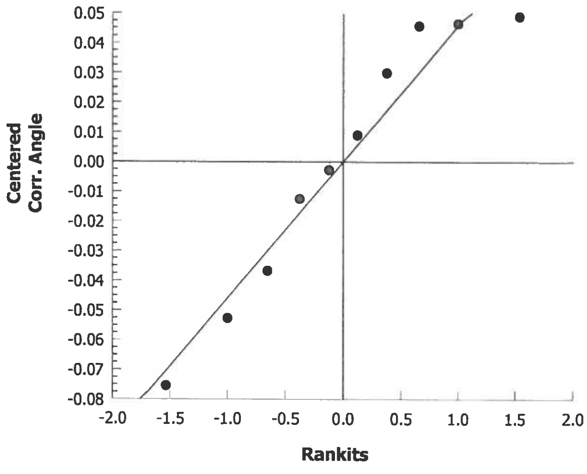
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	0.9721	0.9513	0.9929	0.9766	0.9444	0.9872	0.007508	1.73%	0.0%
101		5	0.9856	0.9728	0.9984	0.9866	0.9727	0.9956	0.004613	1.05%	-1.39%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	1.408	1.349	1.468	1.417	1.333	1.457	0.02148	3.41%	0.0%
101		5	1.458	1.401	1.514	1.455	1.405	1.504	0.02048	3.14%	-3.5%

Graphics





Analyst: JC QA:

CETIS Analytical Report

Report Date: 13 Sep-19 10:16 (p 1 of 4)
Test Code: 1908-S090 | 05-3874-5672

Bivalve Larval Survival and Development Test — **Nautilus Environmental (CA)**

Analysis ID:	07-1467-4869	**Endpoint:**	Combined Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	13 Sep-19 10:15	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch Note: 101 = 100% sample filtered to 0.45um

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	1.93%	Passes combined development rate

Equal Variance t Two-Sample Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		101	-1.66	1.86	0.055	8	0.9323	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.006068558	0.006068558	1	2.756	0.1355	Non-Significant Effect
Error	0.01761847	0.002202308	8			
Total	0.02368702		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.1	23.15	0.9285	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9213	0.7411	0.3679	Normal Distribution

Combined Development Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	0.9721	0.9513	0.9929	0.9766	0.9444	0.9872	0.007508	1.73%	0.0%
101		5	0.9856	0.9728	0.9984	0.9866	0.9727	0.9956	0.004613	1.05%	-1.39%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	1.408	1.349	1.468	1.417	1.333	1.457	0.02148	3.41%	0.0%
101		5	1.458	1.401	1.514	1.455	1.405	1.504	0.02048	3.14%	-3.5%

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Analyst: ~~FS~~
Q18 JCL
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QA:

CETIS Analytical Report

TST

Report Date: 13 Sep-19 10:16 (p 2 of 4)
Test Code: 1908-S090 | 05-3874-5672

Bivalve Larval Survival and Development Test	**Nautilus Environmental (CA)**

Analysis ID:	00-3937-9733	**Endpoint:**	Combined Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	13 Sep-19 10:15	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Batch Note: 101 = 100% sample filtered to 0.45um

Data Transform	Zeta	Alt Hyp	Trials	Seed	TST b	PMSD	Test Result
Angular (Corrected)	NA	C*b < T	NA	NA	0.75	1.68%	Passes combined development rate

TST-Welch's t Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		101*	15.4	1.895	0.049	7	<0.0001	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.006068558	0.006068558	1	2.756	0.1355	Non-Significant Effect
Error	0.01761847	0.002202308	8			
Total	0.02368702		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.1	23.15	0.9285	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9213	0.7411	0.3679	Normal Distribution

Combined Development Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	0.9721	0.9513	0.9929	0.9766	0.9444	0.9872	0.007508	1.73%	0.0%
101		5	0.9856	0.9728	0.9984	0.9866	0.9727	0.9956	0.004613	1.05%	-1.39%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	1.408	1.349	1.468	1.417	1.333	1.457	0.02148	3.41%	0.0%
101		5	1.458	1.401	1.514	1.455	1.405	1.504	0.02048	3.14%	-3.5%

Analyst: JCL QA:

Bivalve Larval Survival and Development Test					**Nautilus Environmental (CA)**
Analysis ID:	02-1133-8458	**Endpoint:**	Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 Sep-19 8:22	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Batch Note: 101 = 100% sample filtered to 0.45um

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C > T	NA	NA	1.37%	100	>100	NA	1

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		6.25	2.252	2.362	0.05	8	0.0620	CDF	Non-Significant Effect
		12.5	1.18	2.362	0.05	8	0.3425	CDF	Non-Significant Effect
		25	-0.9126	2.362	0.05	8	0.9788	CDF	Non-Significant Effect
		50	-0.5143	2.362	0.05	8	0.9420	CDF	Non-Significant Effect
		100	1.304	2.362	0.05	8	0.2933	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.01662518	0.003325037	5	2.975	0.0315	Significant Effect
Error	0.02682111	0.001117546	24			
Total	0.04344629		29			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	0.853	15.09	0.9735	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9725	0.9031	0.6094	Normal Distribution

Development Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	0.9851	0.9768	0.9934	0.9842	0.9766	0.9948	0.002982	0.68%	0.0%
6.25		5	0.9716	0.9604	0.9829	0.9689	0.9641	0.9868	0.004054	0.93%	1.37%
12.5		5	0.9784	0.9656	0.9912	0.9845	0.9634	0.9865	0.004616	1.06%	0.68%
25		5	0.9892	0.9812	0.9972	0.9899	0.98	0.9956	0.002896	0.65%	-0.42%
50		5	0.9876	0.9799	0.9953	0.9899	0.9808	0.9949	0.002785	0.63%	-0.26%
100		5	0.9771	0.9611	0.9931	0.9794	0.9581	0.9906	0.005776	1.32%	0.81%

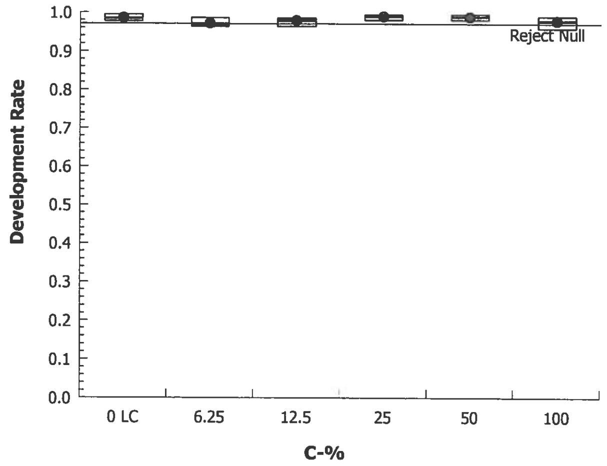
Angular (Corrected) Transformed Summary

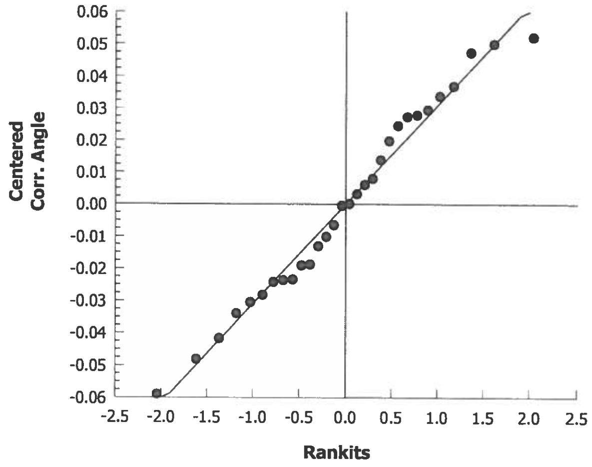
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	1.451	1.414	1.489	1.445	1.417	1.499	0.01352	2.08%	0.0%
6.25		5	1.404	1.366	1.442	1.394	1.38	1.456	0.01364	2.17%	3.28%
12.5		5	1.426	1.384	1.469	1.446	1.378	1.454	0.0153	2.4%	1.72%
25		5	1.471	1.431	1.51	1.47	1.429	1.504	0.01413	2.15%	-1.33%
50		5	1.462	1.426	1.498	1.47	1.432	1.499	0.01293	1.98%	-0.75%
100		5	1.424	1.37	1.477	1.427	1.365	1.474	0.01927	3.03%	1.9%

Analyst: JC QA: 10/11/19

Bivalve Larval Survival and Development Test					**Nautilus Environmental (CA)**
Analysis ID:	02-1133-8458	**Endpoint:**	Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 Sep-19 8:22	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Graphics





Bivalve Larval Survival and Development Test	**Nautilus Environmental (CA)**

Analysis ID:	18-9873-1827	**Endpoint:**	Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	13 Sep-19 10:15	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch Note: 101 = 100% sample filtered to 0.45um

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	1.23%	Passes development rate

Equal Variance t Two-Sample Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		101	-0.2565	1.86	0.046	8	0.5980	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	9.901947E-05	9.901947E-05	1	0.06578	0.8041	Non-Significant Effect
Error	0.01204298	0.001505373	8			
Total	0.012142		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	2.296	23.15	0.4406	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9054	0.7411	0.2507	Normal Distribution

Development Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	0.9851	0.9768	0.9934	0.9842	0.9766	0.9948	0.002982	0.68%	0.0%
101		5	0.9856	0.9728	0.9984	0.9866	0.9727	0.9956	0.004613	1.05%	-0.05%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	1.451	1.414	1.489	1.445	1.417	1.499	0.01352	2.08%	0.0%
101		5	1.458	1.401	1.514	1.455	1.405	1.504	0.02048	3.14%	-0.43%

Analyst: JCL QA: 10/1/19

CETIS Analytical Report

TST

Report Date: 13 Sep-19 10:16 (p 4 of 4)
Test Code: 1908-S090 | 05-3874-5672

Bivalve Larval Survival and Development Test — **Nautilus Environmental (CA)**

Analysis ID:	14-1541-3380	**Endpoint:**	Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	13 Sep-19 10:15	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Batch Note: 101 = 100% sample filtered to 0.45um

Data Transform	Zeta	Alt Hyp	Trials	Seed	TST b	PMSD	Test Result
Angular (Corrected)	NA	C*b < T	NA	NA	0.75	1.24%	Passes development rate

TST-Welch's t Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		101*	16.15	2.015	0.046	5	<0.0001	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	9.901947E-05	9.901947E-05	1	0.06578	0.8041	Non-Significant Effect
Error	0.01204298	0.001505373	8			
Total	0.012142		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	2.296	23.15	0.4406	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9054	0.7411	0.2507	Normal Distribution

Development Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	0.9851	0.9768	0.9934	0.9842	0.9766	0.9948	0.002982	0.68%	0.0%
101		5	0.9856	0.9728	0.9984	0.9866	0.9727	0.9956	0.004613	1.05%	-0.05%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	1.451	1.414	1.489	1.445	1.417	1.499	0.01352	2.08%	0.0%
101		5	1.458	1.401	1.514	1.455	1.405	1.504	0.02048	3.14%	-0.43%

Analyst: JU QA: 10/11/19

Bivalve Larval Survival and Development Test **Nautilus Environmental (CA)**

Analysis ID: 19-4481-0645 **Endpoint:** Survival Rate **CETIS Version:** CETISv1.8.7
Analyzed: 11 Sep-19 8:22 **Analysis:** Nonparametric-Control vs Treatments **Official Results:** Yes

Batch Note: 101 = 100% sample filtered to 0.45um

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C > T	NA	NA	2.48%	100	>100	NA	1

Steel Many-One Rank Sum Test

Control	vs	C-%	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		6.25	30.5	16	2	8	0.9573	Asymp	Non-Significant Effect
		12.5	28.5	16	1	8	0.8883	Asymp	Non-Significant Effect
		25	29	16	1	8	0.9104	Asymp	Non-Significant Effect
		50	31	16	1	8	0.9676	Asymp	Non-Significant Effect
		100	30	16	1	8	0.9446	Asymp	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.006215836	0.001243167	5	0.2691	0.9255	Non-Significant Effect
Error	0.1108553	0.004618973	24			
Total	0.1170712		29			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	2.356	15.09	0.7980	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.7761	0.9031	<0.0001	Non-normal Distribution

Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	0.9869	0.9636	1	1	0.9596	1	0.008391	1.9%	0.0%
6.25		5	0.9949	0.9809	1	1	0.9747	1	0.005051	1.14%	-0.82%
12.5		5	0.9889	0.9689	1	1	0.9646	1	0.007213	1.63%	-0.2%
25		5	0.9909	0.9657	1	1	0.9545	1	0.009091	2.05%	-0.41%
50		5	0.997	0.9886	1	1	0.9848	1	0.003031	0.68%	-1.02%
100		5	0.9929	0.9733	1	1	0.9646	1	0.007071	1.59%	-0.61%

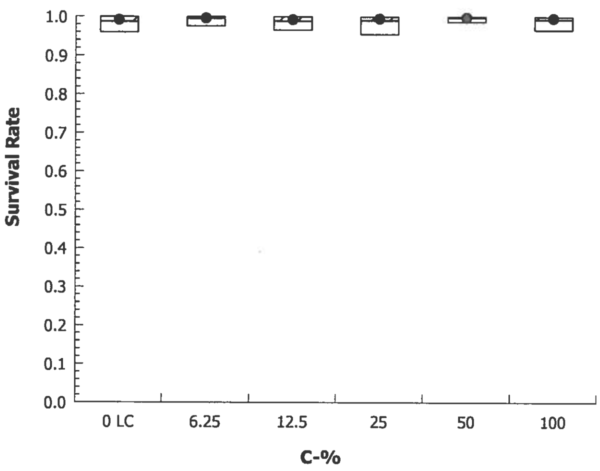
Angular (Corrected) Transformed Summary

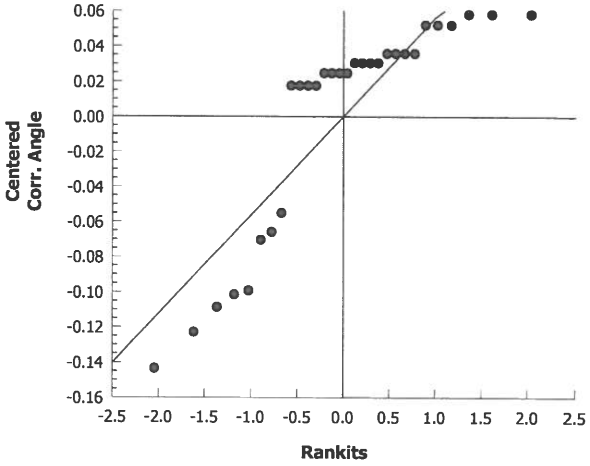
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	1.477	1.376	1.578	1.535	1.368	1.535	0.03626	5.49%	0.0%
6.25		5	1.51	1.442	1.579	1.535	1.411	1.535	0.02481	3.67%	-2.26%
12.5		5	1.483	1.392	1.574	1.535	1.382	1.535	0.03276	4.94%	-0.41%
25		5	1.499	1.4	1.599	1.535	1.356	1.535	0.03586	5.35%	-1.51%
50		5	1.518	1.469	1.566	1.535	1.447	1.535	0.01757	2.59%	-2.75%
100		5	1.505	1.419	1.59	1.535	1.382	1.535	0.03072	4.57%	-1.86%

Analyst: JC QA: 10/11/19

Bivalve Larval Survival and Development Test					**Nautilus Environmental (CA)**
Analysis ID:	19-4481-0645	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 Sep-19 8:22	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Graphics





Analyst: JCL QA: 10/11/19

CETIS Analytical Report

Report Date: 11 Sep-19 08:37 (p 1 of 3)
Test Code: 1908-S090 | 05-3874-5672

Bivalve Larval Survival and Development Test — **Nautilus Environmental (CA)**

Analysis ID:	10-2005-8625	**Endpoint:**	Combined Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 Sep-19 8:22	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Batch Note: 101 = 100% sample filtered to 0.45um

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	1932593	1000	Yes	Two-Point Interpolation

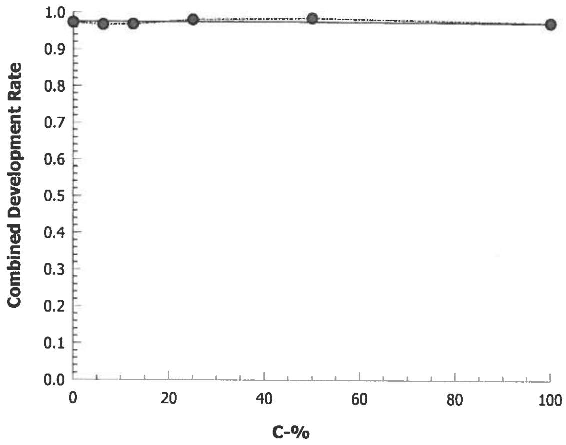
Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC25	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Combined Development Rate Summary — **Calculated Variate(A/B)**

C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Lab Control	5	0.9721	0.9444	0.9872	0.007508	0.01679	1.73%	0.0%	1044	1073
6.25		5	0.9667	0.9444	0.9868	0.006856	0.01533	1.59%	0.55%	1063	1099
12.5		5	0.9676	0.9293	0.9865	0.01044	0.02334	2.41%	0.46%	1008	1041
25		5	0.9802	0.9495	0.9956	0.008081	0.01807	1.84%	-0.83%	1015	1035
50		5	0.9846	0.9798	0.991	0.002423	0.005418	0.55%	-1.28%	1026	1042
100		5	0.9703	0.9242	0.9906	0.01198	0.02679	2.76%	0.18%	1049	1080

Graphics



Analyst: JC QA: GW 11/11/19

Bivalve Larval Survival and Development Test					Nautilus Environmental (CA)
Analysis ID: 14-6834-2035		**Endpoint:** Development Rate		**CETIS Version:** CETISv1.8.7	
Analyzed: 11 Sep-19 8:22		**Analysis:** Linear Interpolation (ICPIN)		**Official Results:** Yes	

Batch Note: 101 = 100% sample filtered to 0.45um

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	2115297	1000	Yes	Two-Point Interpolation

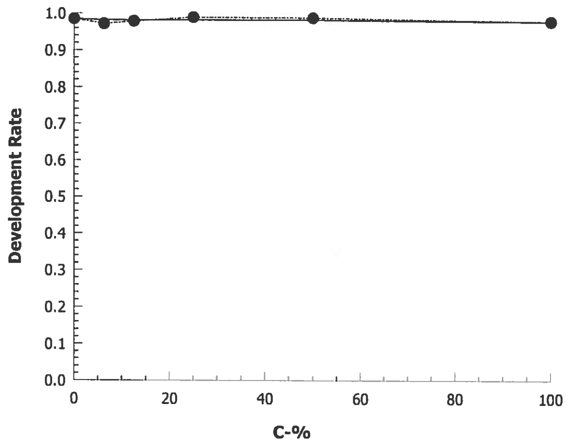
Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC25	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Development Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Lab Control	5	0.9851	0.9766	0.9948	0.002982	0.006668	0.68%	0.0%	1044	1060
6.25		5	0.9716	0.9641	0.9868	0.004054	0.009066	0.93%	1.37%	1063	1094
12.5		5	0.9784	0.9634	0.9865	0.004616	0.01032	1.06%	0.68%	1008	1030
25		5	0.9892	0.98	0.9956	0.002896	0.006475	0.65%	-0.42%	1015	1026
50		5	0.9876	0.9808	0.9949	0.002785	0.006227	0.63%	-0.26%	1026	1039
100		5	0.9771	0.9581	0.9906	0.005776	0.01291	1.32%	0.81%	1049	1073

Graphics



Analyst: JCL QA: 10/11/19

Bivalve Larval Survival and Development Test					**Nautilus Environmental (CA)**
Analysis ID:	08-4798-8267	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 Sep-19 8:22	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Batch Note: 101 = 100% sample filtered to 0.45um

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	346288	1000	Yes	Two-Point Interpolation

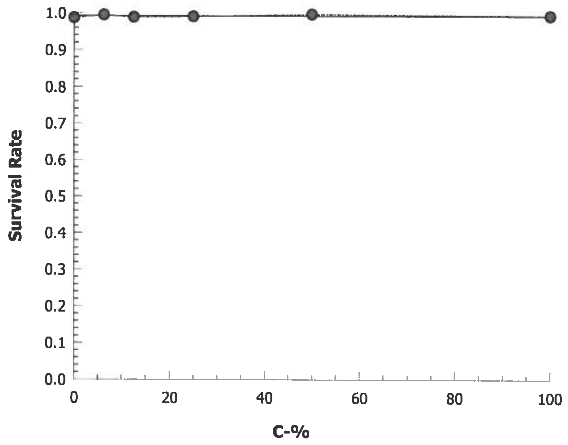
Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC25	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Lab Control	5	0.9869	0.9596	1	0.008391	0.01876	1.9%	0.0%	977	990
6.25		5	0.9949	0.9747	1	0.005051	0.01129	1.14%	-0.82%	985	990
12.5		5	0.9889	0.9646	1	0.007213	0.01613	1.63%	-0.2%	979	990
25		5	0.9909	0.9545	1	0.009091	0.02033	2.05%	-0.41%	981	990
50		5	0.997	0.9848	1	0.003031	0.006776	0.68%	-1.02%	987	990
100		5	0.9929	0.9646	1	0.007071	0.01581	1.59%	-0.61%	983	990

Graphics



Analyst: JG QA: 10/1/19

Embryo Larval Bioassay **48-hour Development**

Client: Wood/POSD
Sample ID: SIYB-REF
Test ID: 1908-S 090
Test Species: *M. galloprovincialis*
Start Date/Time: 8/20/2019 1415
End Date/Time: 8/22/2019 1225

Random #	Number Normal	Number Abnormal		Total Number Counted	Intials/Date
		Number Curved Shell	All other abnormal		
246	231	0	3	234	JCL 9/6/19
247	188	0	1	189	
248	214	0	6	220	
249	215	0	3	218	
250	202	0	6	208	
251	224	0	1	225	
252	191	0	3	194	
253	196	0	4	200	
254	192	0	1	193	
255	183	0	8	191	
256	225	0	3	228	
257	184	0	7	191	
258	211	0	Ⓐ ~~2~~ 4	215	
259	225	0	4	229	
260	242	0	9	251	
261	194	0	1	195	
262	209	0	Ⓐ ~~2~~ 5	214	
263	196	0	2	198	
264	209	0	3	212	
265	187	0	3	190	
266	219	0	5	224	
267	204	0	4	208	
268	238	0	5	243	
269	207	0	3	210	
270	207	0	6	213	
271	211	0	2	213	
272	221	0	3	224	
273	219	0	3	222	
274	198	0	7	205	
275	219	0	1	220	
276	196	0	2	198	
277	221	0	2	223	
278	211	0	6	217	
279	226	0	1	227	
280	187	0	6	193	

Comments: Ⓐ Q18 JCL 9/6/19

QC Check: AC 9/10/19 **Final Review:** 10/11/19

CETIS Test Data Worksheet

Report Date: 16 Aug-19 12:49 (p 1 of 1)
Test Code: 1908-S090 05-3874-5672/201C9B48

Bivalve Larval Survival and Development Test

Nautilus Environmental (CA)

Start Date: 20 Aug-19
End Date: 22 Aug-19
Sample Date: 19 Aug-19

Species: Mytilus galloprovincialis
Protocol: EPA/600/R-95/136 (1995)
Material: Ambient Water

Sample Code: 19- 0923
Sample Source: Shelter Island Yacht Basin
Sample Station: SIYB-REF

C-%	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
0	LC	1	265					
0	LC	2	246					
0	LC	3	262			209	202	RT 8/22/19
0	LC	4	254					
0	LC	5	259					
6.25		1	274					
6.25		2	256					
6.25		3	260			226	219	RT
6.25		4	280					
6.25		5	278					
12.5		1	252					
12.5		2	270					
12.5		3	257					
12.5		4	273			176	169	RT
12.5		5	269					
25		1	279					
25		2	253					
25		3	263			174	172	RT
25		4	264					
25		5	247					
50		1	258					
50		2	267					
50		3	277			217	216	RT
50		4	261					
50		5	276					
100		1	250					
100		2	255					
100		3	271			201	197	RT
100		4	249					
100		5	268					
101		1	275					
101		2	272					
101	@	3	248			186	183	RT
101		4	251					
101		5	266					

100% Filtered

QC: EG

@Q18 BO 8/22/19

Analyst: BO QA: AC 9/10/19

Marine Chronic Bioassay

DM-014

Water Quality Measurements

Client: Wood/POSD
Sample ID: SIYB-REF
Sample Log No.: 19-0923
Test No.: 1908-S090

Test Species: *M. galloprovincialis*
Start Date/Time: 8/20/2019 1415
End Date/Time: 8/22/2019 1225

Concentration (%)	Salinity (ppt)			Temperature (°C)			Dissolved Oxygen (mg/L)			pH (pH units)		
	0	24	48	0	24	48	0	24	48	0	24	48
Lab Control	34.1	34.2	34.1	14.7	14.9	15.1	8.4	8.4	8.2	8.04	8.00	8.00
6.25	34.3	34.3	34.3	14.6	14.7	14.9	8.4	8.5	8.3	8.03	7.99	8.01
12.5	34.3	34.4	34.4	14.6	14.6	14.9	8.4	8.4	8.3	8.02	7.99	8.02
25	34.3	34.4	34.4	14.8	14.6	14.8	8.3	8.5	8.3	8.02	7.99	8.01
50	34.3	34.5	34.5	14.7	14.8	15.1	8.4	8.4	8.2	8.01	7.99	8.00
100	34.4	34.7	34.7	14.7	14.6	15.0	8.4	84	8.2	7.97	7.97	8.00
100 filtered	34.4	34.5	34.4	15.1	14.5	14.8	7.4	8.2	8.3	8.00	8.00	7.99

Technician Initials:

	0	24	48
WQ Readings:	BO	RT	BO
Dilutions made by:	AC/EG		

Environmental Chamber: D.

Comments:
0 hrs:
24 hrs:
48 hrs:

QC Check: AC 9/10/19

Final Review: 10/11/19

Enthalpy Analytical. 4340 Vandever Avenue. San Diego, CA 92120.

Marine Chronic Bioassay
DM-013

Larval Development Worksheet

Client: Wood/ POSD SIYB-REF
Test No.: 1908-S090
Test Species: Mytilus galloprovincialis
Animal Source: Mission Bay
Date Received: 7/1/19
Test Chambers: 30mL glass shell vials
Sample Volume: 10mL

Start Date/Time: 8/20/2019 1415
End Date/Time: 8/22/2019 1225
Technician Initials: BO

Spawn Information

First Gamete Release Time: 1100

Sex	Number Spawning
Male	5
Female	4

Gamete Selection

Sex	Beaker Number(s)	Condition (sperm motility, egg density, color, shape, etc.)
Male	2,3,4	good motility, average density
Female 1	1	light yellow color, great shape, great density
Female 2	3	white, good shape, good density
Female 3	–	–

Egg Fertilization Time: 1200

Embryo Stock Selection

Stock Number	% of embryos at 2-cell division stage
Female 1	100
Female 2	100
Female 3	–

Stock(s) chosen for testing: 1

Embryo Inoculum Preparation

Target count on Sedgwick-Rafter slide for desired density is 6 embryos

Number Counted:

6	13
12	13
10	10
10	10
10	12

Mean: 10.6

Mean 10.6 X 50 = 530 embryos/ml

Initial Density: 530 / Desired Final Density: 300 = 1.77 (dilution factor)
(to inoculate with 0.5 ml)

Prepare the embryo inoculum according to the calculated dilution factor. For example, if the dilution factor is 2.25, use 100 ml of existing stock (1 part) and 125 ml of dilution water (1.25 parts).

Time Zero Control Counts

Rand. No.	No. Dividing	Total	% Dividing	Mean % Dividing
T01	218	218	100	100
T02	198	198	100	
T03	183	183	100	
T04	203	203	100	
T05	187	187	100	

48-h QC: 224/227 = 98.6%

Comments: $\bar{x}$ = 198

QC Check: AC 9/10/19

Final Review: 10/11/19

Enthalpy Analytical. 4340 Vandever Avenue. San Diego, CA 92120.

Pacific Topsmelt 96-hr Survival

8/19/19 Test

CETIS Summary Report

Report Date:	28 Aug-19 11:30 (p 1 of 1)
Test Code:	1908-S077 | 07-5506-3053

Pacific Topsmelt 96-h Acute Survival Test **Nautilus Environmental (CA)**

Batch ID:	02-2852-4351	**Test Type:**	Survival (96h)	**Analyst:**	
Start Date:	19 Aug-19 18:25	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	Natural Seawater
Ending Date:	23 Aug-19 16:25	**Species:**	Atherinops affinis	**Brine:**	Not Applicable
Duration:	94h	**Source:**	Aquatic Biosystems, CO	**Age:**	15d

Sample ID:	03-9064-5446	**Code:**	19-0917	**Client:**	Wood Environment & Infrastructure
Sample Date:	19 Aug-19 15:10	**Material:**	Ambient Sample	**Project:**	
Receive Date:	19 Aug-19 17:40	**Source:**	Shelter Island Yacht Basin		
Sample Age:	3h (7.5 °C)	**Station:**	SIYB-1		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TUa	Method
06-8580-8259	96h Survival Rate	100	>100	NA	27.7%	~~1~~ 0.72	Dunnett Multiple Comparison Test

BFP Q18 8/28/19

Point Estimate Summary

Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method
19-5340-3331	96h Survival Rate	EC25	>100	N/A	N/A	<1	Linear Interpolation (ICPIN)
		EC50	>100	N/A	N/A	<1	

96h Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Control	6 Q15	0.7333	0.6249	0.8417	0.6	0.8	0.04216	0.1033	14.08%	0.0%
25		6	0.9	0.785	1	0.8	1	0.04472	0.1095	12.17%	-22.73%
50		6	0.8	0.5701	1	0.4	1	0.08944	0.2191	27.39%	-9.09%
100		6	0.8333	0.6753	0.9913	0.6	1	0.06146	0.1506	18.07%	-13.64%

96h Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6
0	Lab Control	0.8	0.6	0.8	0.8	0.6	0.8
25		1	0.8	0.8	1	1	0.8
50		1	0.8	0.8	0.4	1	0.8
100		0.6	0.8	0.8	1	1	0.8

Analyst: JL QA: BFP 8/28/19

CETIS Analytical Report

Report Date:	28 Aug-19 11:29 (p 1 of 1)
Test Code:	1908-S077 | 07-5506-3053

Pacific Topsmelt 96-h Acute Survival Test

Nautilus Environmental (CA)

Analysis ID:	06-8580-8259	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	28 Aug-19 11:28	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C > T	NA	NA	27.7%	100	>100	NA	1

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		25	-1.939	2.192	0.218	10	0.9969	CDF	Non-Significant Effect
		50	-0.8315	2.192	0.218	10	0.9455	CDF	Non-Significant Effect
		100	-1.169	2.192	0.218	10	0.9752	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.1149016	0.03830054	3	1.292	0.3046	Non-Significant Effect
Error	0.593039	0.02965195	20			
Total	0.7079406		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	3.142	11.34	0.3702	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9456	0.884	0.2173	Normal Distribution

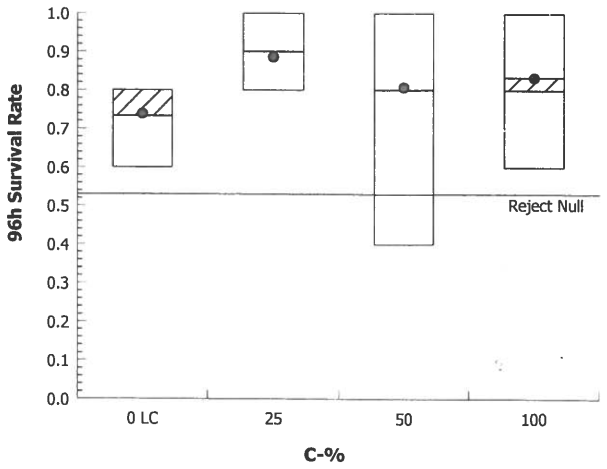
96h Survival Rate Summary

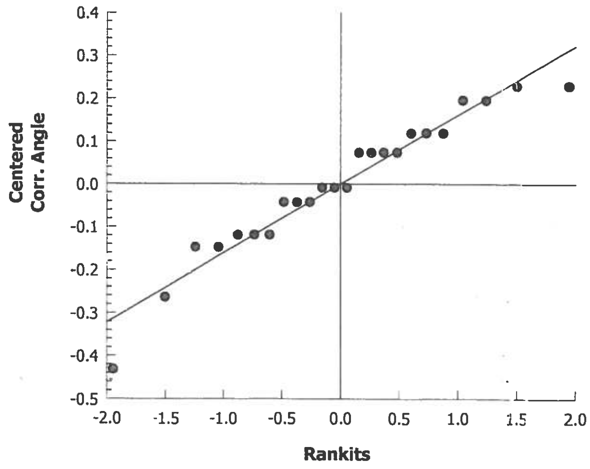
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	6	0.7333	0.6249	0.8417	0.8	0.6	0.8	0.04216	14.08%	0.0%
25		6	0.9	0.785	1	0.9	0.8	1	0.04472	12.17%	-22.73%
50		6	0.8	0.5701	1	0.8	0.4	1	0.08944	27.39%	-9.09%
100		6	0.8333	0.6753	0.9913	0.8	0.6	1	0.06146	18.07%	-13.64%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	6	1.033	0.9137	1.153	1.107	0.8861	1.107	0.04661	11.05%	0.0%
25		6	1.226	1.089	1.363	1.226	1.107	1.345	0.05325	10.64%	-18.65%
50		6	1.116	0.8628	1.369	1.107	0.6847	1.345	0.09855	21.63%	-8.0%
100		6	1.15	0.967	1.332	1.107	0.8861	1.345	0.07105	15.14%	-11.25%

Graphics





Analyst: Ja QA: KFP 8/28/19

CETIS Analytical Report

Report Date:	28 Aug-19 11:30 (p 1 of 1)
Test Code:	1908-S077 | 07-5506-3053

Pacific Topsmelt 96-h Acute Survival Test — **Nautilus Environmental (CA)**

Analysis ID:	02-5695-1001	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	28 Aug-19 11:28	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	TST b	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C*b < T	NA	NA	0.75	13.5%	100	>100	NA	1

TST-Welch's t Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:10%)
Lab Control		25*	7.082	1.397	0.089	8	<0.0001	CDF	Non-Significant Effect
		50*	3.261	1.44	0.151	6	0.0086	CDF	Non-Significant Effect
		100*	4.731	1.415	0.112	7	0.0011	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.1149016	0.03830054	3	1.292	0.3046	Non-Significant Effect
Error	0.593039	0.02965195	20			
Total	0.7079406		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	3.142	11.34	0.3702	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9456	0.884	0.2173	Normal Distribution

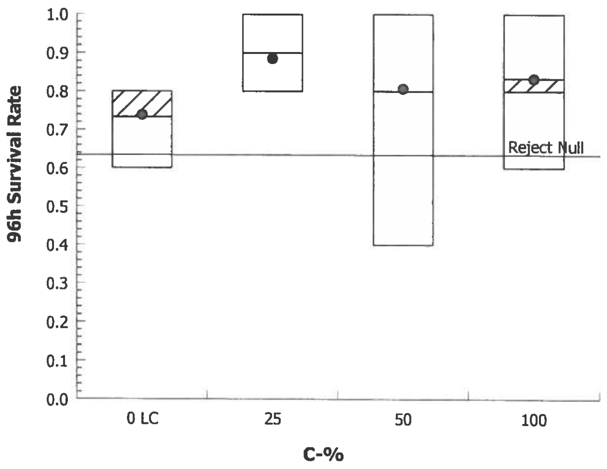
96h Survival Rate Summary

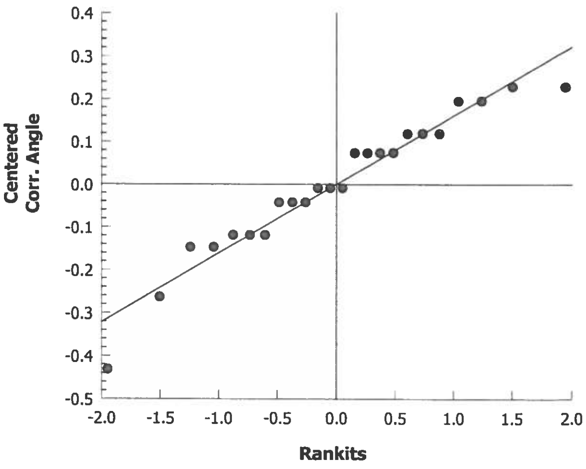
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	6	0.7333	0.6249	0.8417	0.8	0.6	0.8	0.04216	14.08%	0.0%
25		6	0.9	0.785	1	0.9	0.8	1	0.04472	12.17%	-22.73%
50		6	0.8	0.5701	1	0.8	0.4	1	0.08944	27.39%	-9.09%
100		6	0.8333	0.6753	0.9913	0.8	0.6	1	0.06146	18.07%	-13.64%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	6	1.033	0.9137	1.153	1.107	0.8861	1.107	0.04661	11.05%	0.0%
25		6	1.226	1.089	1.363	1.226	1.107	1.345	0.05325	10.64%	-18.65%
50		6	1.116	0.8628	1.369	1.107	0.6847	1.345	0.09855	21.63%	-8.0%
100		6	1.15	0.967	1.332	1.107	0.8861	1.345	0.07105	15.14%	-11.25%

Graphics





Analyst: JU

QA: KF 8/28/19

CETIS Analytical Report

Report Date:	28 Aug-19 11:29 (p 1 of 1)
Test Code:	1908-S077 | 07-5506-3053

Pacific Topsmelt 96-h Acute Survival Test **Nautilus Environmental (CA)**

Analysis ID:	19-5340-3331	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	28 Aug-19 11:28	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	844292	1000	Yes	Two-Point Interpolation

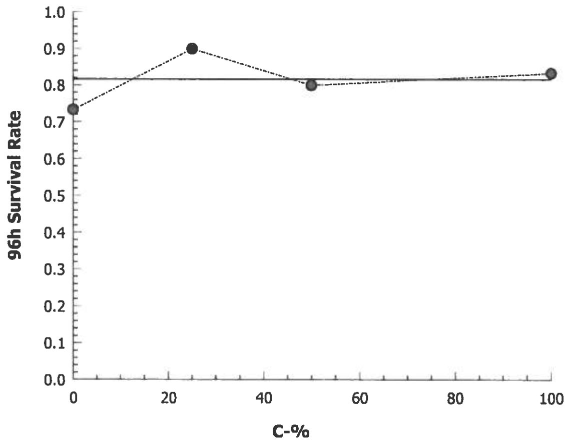
Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC25	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

96h Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Lab Control	6	0.7333	0.6	0.8	0.04216	0.1033	14.08%	0.0%	22	30
25		6	0.9	0.8	1	0.04472	0.1095	12.17%	-22.73%	27	30
50		6	0.8	0.4	1	0.08944	0.2191	27.39%	-9.09%	24	30
100		6	0.8333	0.6	1	0.06146	0.1506	18.07%	-13.64%	25	30

Graphics



Analyst: JCL QA: KTP 8/28/19

CETIS Summary Report

Report Date: 28 Aug-19 11:39 (p 1 of 1)
Test Code: 1908-S078 | 02-9873-4674

Pacific Topsmelt 96-h Acute Survival Test — **Nautilus Environmental (CA)**

Batch ID:	06-5169-1128	**Test Type:**	Survival (96h)	**Analyst:**	
Start Date:	19 Aug-19 18:25	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	Natural Seawater
Ending Date:	23 Aug-19 16:25	**Species:**	Atherinops affinis	**Brine:**	Not Applicable
Duration:	94h	**Source:**	Aquatic Biosystems, CO	**Age:**	15d

Sample ID:	16-8811-0941	**Code:**	19-0918	**Client:**	Wood Environment & Infrastructure
Sample Date:	19 Aug-19 14:10	**Material:**	Ambient Sample	**Project:**	
Receive Date:	19 Aug-19 17:40	**Source:**	Shelter Island Yacht Basin		
Sample Age:	4h (4 °C)	**Station:**	SIYB-2		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TUa	Method
20-7234-3174	96h Survival Rate	100	>100	NA	26.3%	~~1~~ 0.80	Dunnett Multiple Comparison Test

KFP Q18
8/28/19

Point Estimate Summary

Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method
13-8135-3511	96h Survival Rate	EC25	>100	N/A	N/A	<1	Linear Interpolation (ICPIN)
		EC50	>100	N/A	N/A	<1	

96h Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Control	6	0.7333	0.6249	0.8417	0.6	0.8	0.04216	0.1033	14.08%	0.0%
25		6	0.7333	0.562	0.9047	0.6	1	0.06667	0.1633	22.27%	0.0%
50		6	0.8333	0.6753	0.9913	0.6	1	0.06146	0.1506	18.07%	-13.64%
100		6	0.7667	0.6087	0.9247	0.6	1	0.06146	0.1506	19.64%	-4.55%

96h Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6
0	Lab Control	0.8	0.6	0.8	0.8	0.6	0.8
25		0.6	0.8	1	0.8	0.6	0.6
50		1	0.8	0.8	0.6	1	0.8
100		1	0.6	0.6	0.8	0.8	0.8

Analyst: JCL QA: KFP 8/28/19

CETIS Analytical Report

Report Date: 28 Aug-19 11:38 (p 1 of 2)
Test Code: 1908-S078 | 02-9873-4674

Pacific Topsmelt 96-h Acute Survival Test

Nautilus Environmental (CA)

Analysis ID: 20-7234-3174
Analyzed: 28 Aug-19 11:38
Endpoint: 96h Survival Rate
Analysis: Parametric-Control vs Treatments
CETIS Version: CETISv1.8.7
Official Results: Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C > T	NA	NA	26.3%	100	>100	NA	1

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		25	-0.03005	2.192	0.208	10	0.7607	CDF	Non-Significant Effect
		50	-1.228	2.192	0.208	10	0.9786	CDF	Non-Significant Effect
		100	-0.4194	2.192	0.208	10	0.8743	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.05274175	0.01758058	3	0.6544	0.5896	Non-Significant Effect
Error	0.5373246	0.02686623	20			
Total	0.5900664		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	1.18	11.34	0.7577	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9455	0.884	0.2158	Normal Distribution

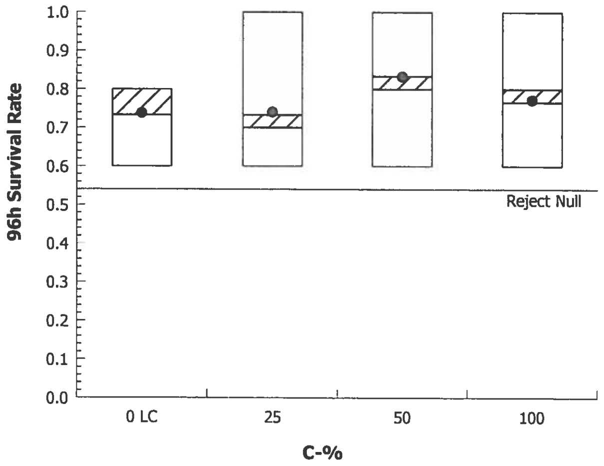
96h Survival Rate Summary

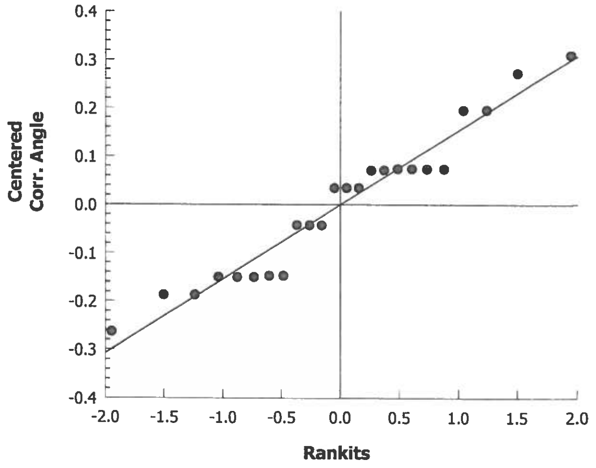
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	6	0.7333	0.6249	0.8417	0.8	0.6	0.8	0.04216	14.08%	0.0%
25		6	0.7333	0.562	0.9047	0.7	0.6	1	0.06667	22.27%	0.0%
50		6	0.8333	0.6753	0.9913	0.8	0.6	1	0.06146	18.07%	-13.64%
100		6	0.7667	0.6087	0.9247	0.8	0.6	1	0.06146	19.64%	-4.55%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	6	1.033	0.9137	1.153	1.107	0.8861	1.107	0.04661	11.05%	0.0%
25		6	1.036	0.841	1.232	0.9966	0.8861	1.345	0.07598	17.96%	-0.28%
50		6	1.15	0.967	1.332	1.107	0.8861	1.345	0.07105	15.14%	-11.25%
100		6	1.073	0.8929	1.253	1.107	0.8861	1.345	0.07012	16.01%	-3.84%

Graphics





Analyst: Jcl QA: KF 8/28/19

CETIS Analytical Report

Report Date: 28 Aug-19 11:39 (p 2 of 2)
Test Code: 1908-S078 | 02-9873-4674

Pacific Topsmelt 96-h Acute Survival Test **Nautilus Environmental (CA)**

Analysis ID:	12-0958-3939	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	28 Aug-19 11:38	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	TST b	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C*b < T	NA	NA	0.8	13.5%	100	>100	NA	1

TST-Welch's t Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:10%)
Lab Control		25*	2.476	1.415	0.12	7	0.0212	CDF	Non-Significant Effect
		50*	4.025	1.415	0.114	7	0.0025	CDF	Non-Significant Effect
		100*	3.102	1.415	0.112	7	0.0086	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.05274175	0.01758058	3	0.6544	0.5896	Non-Significant Effect
Error	0.5373246	0.02686623	20			
Total	0.5900664		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	1.18	11.34	0.7577	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9455	0.884	0.2158	Normal Distribution

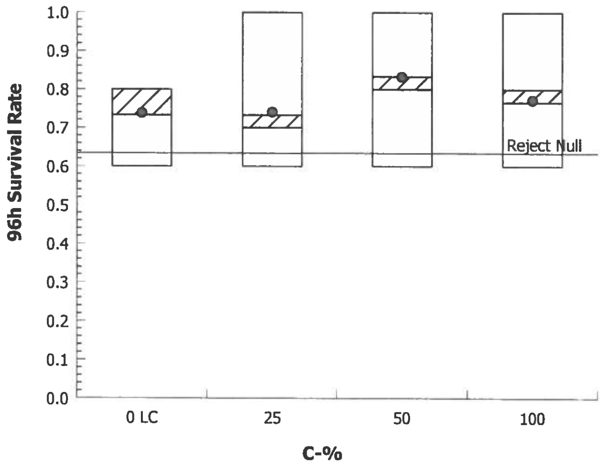
96h Survival Rate Summary

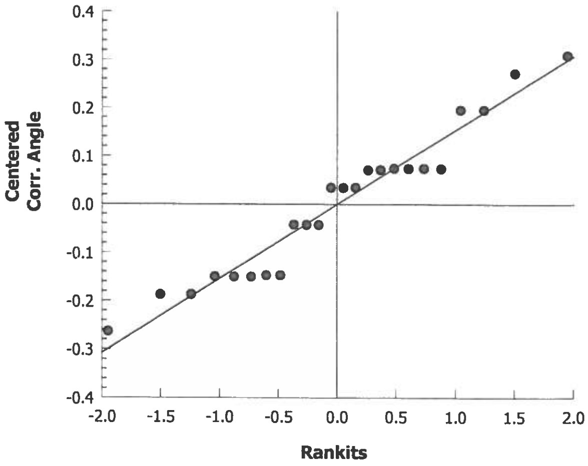
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	6	0.7333	0.6249	0.8417	0.8	0.6	0.8	0.04216	14.08%	0.0%
25		6	0.7333	0.562	0.9047	0.7	0.6	1	0.06667	22.27%	0.0%
50		6	0.8333	0.6753	0.9913	0.8	0.6	1	0.06146	18.07%	-13.64%
100		6	0.7667	0.6087	0.9247	0.8	0.6	1	0.06146	19.64%	-4.55%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	6	1.033	0.9137	1.153	1.107	0.8861	1.107	0.04661	11.05%	0.0%
25		6	1.036	0.841	1.232	0.9966	0.8861	1.345	0.07598	17.96%	-0.28%
50		6	1.15	0.967	1.332	1.107	0.8861	1.345	0.07105	15.14%	-11.25%
100		6	1.073	0.8929	1.253	1.107	0.8861	1.345	0.07012	16.01%	-3.84%

Graphics





Analyst: JC QA: KFP 8/28/19

CETIS Analytical Report

Report Date: 28 Aug-19 11:46 (p 1 of 1)
Test Code: 1908-S078 | 02-9873-4674

Pacific Topsmelt 96-h Acute Survival Test

Nautilus Environmental (CA)

Analysis ID:	13-8135-3511	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	28 Aug-19 11:38	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	2079158	1000	Yes	Two-Point Interpolation

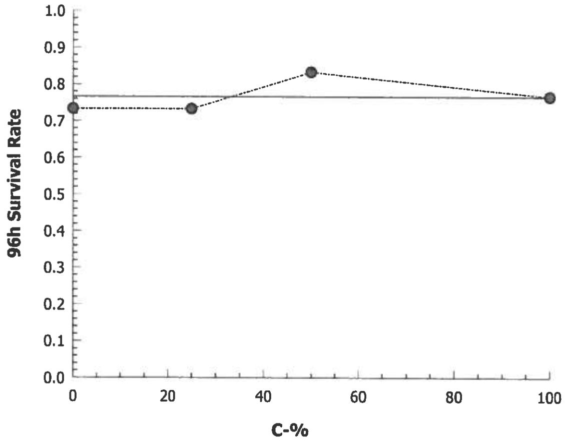
Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC25	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

96h Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Lab Control	6	0.7333	0.6	0.8	0.04216	0.1033	14.08%	0.0%	22	30
25		6	0.7333	0.6	1	0.06667	0.1633	22.27%	0.0%	22	30
50		6	0.8333	0.6	1	0.06146	0.1506	18.07%	-13.64%	25	30
100		6	0.7667	0.6	1	0.06146	0.1506	19.64%	-4.55%	23	30

Graphics



Analyst: JCL QA: KF 8/28/19

CETIS Summary Report

Report Date: 28 Aug-19 11:47 (p 1 of 1)
Test Code: 1908-S079 | 05-5751-1854

Pacific Topsmelt 96-h Acute Survival Test — **Nautilus Environmental (CA)**

Batch ID:	13-1119-5991	**Test Type:**	Survival (96h)	**Analyst:**	
Start Date:	19 Aug-19 18:25	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	Natural Seawater
Ending Date:	23 Aug-19 16:25	**Species:**	Atherinops affinis	**Brine:**	Not Applicable
Duration:	94h	**Source:**	Aquatic Biosystems, CO	**Age:**	15d

Sample ID:	08-1246-2292	**Code:**	19-0919	**Client:**	Wood Environment & Infrastructure
Sample Date:	19 Aug-19 13:10	**Material:**	Ambient Sample	**Project:**	
Receive Date:	19 Aug-19 17:40	**Source:**	Shelter Island Yacht Basin		
Sample Age:	5h (9 °C)	**Station:**	SIYB-3		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TUa	Method
11-0669-2678	96h Survival Rate	100	>100	NA	29.7%	~~1~~ 0.77	Dunnett Multiple Comparison Test

KFP 8/28/19
Q18

Point Estimate Summary

Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method
09-4824-7087	96h Survival Rate	EC25	>100	N/A	N/A	<1	Linear Interpolation (ICPIN)
		EC50	>100	N/A	N/A	<1	

96h Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Control	6	0.7333	0.6249	0.8417	0.6	0.8	0.04216	0.1033	14.08%	0.0%
25		6	0.8	0.6123	0.9877	0.6	1	0.07303	0.1789	22.36%	-9.09%
50		6	0.9	0.7244	1	0.6	1	0.06831	0.1673	18.59%	-22.73%
100		6	0.8	0.6123	0.9877	0.6	1	0.07303	0.1789	22.36%	-9.09%

96h Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6
0	Lab Control	0.8	0.6	0.8	0.8	0.6	0.8
25		1	1	0.6	0.8	0.6	0.8
50		0.6	1	1	1	1	0.8
100		0.6	0.8	0.8	1	0.6	1

Analyst: JC QA: KFP 8/28/19

CETIS Analytical Report

Report Date:	28 Aug-19 11:47 (p 1 of 2)
Test Code:	1908-S079 | 05-5751-1854

Pacific Topsmelt 96-h Acute Survival Test **Nautilus Environmental (CA)**

Analysis ID:	11-0669-2678	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	28 Aug-19 11:44	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C > T	NA	NA	29.7%	100	>100	NA	1

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		25	-0.7491	2.192	0.232	10	0.9348	CDF	Non-Significant Effect
		50	-1.846	2.192	0.232	10	0.9959	CDF	Non-Significant Effect
		100	-0.7491	2.192	0.232	10	0.9348	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.1168161	0.03893869	3	1.156	0.3511	Non-Significant Effect
Error	0.6736282	0.03368141	20			
Total	0.7904443		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	1.831	11.34	0.6083	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9238	0.884	0.0709	Normal Distribution

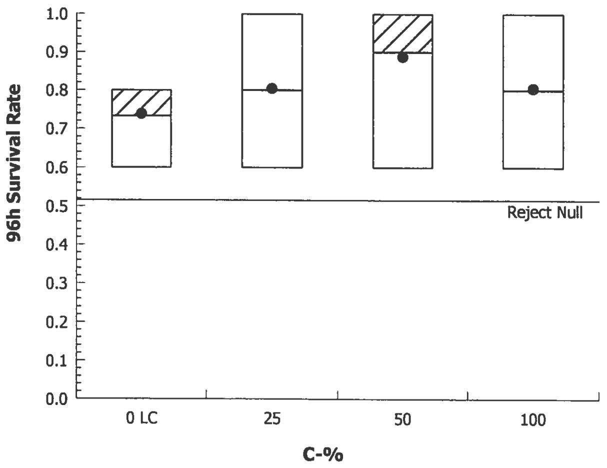
96h Survival Rate Summary

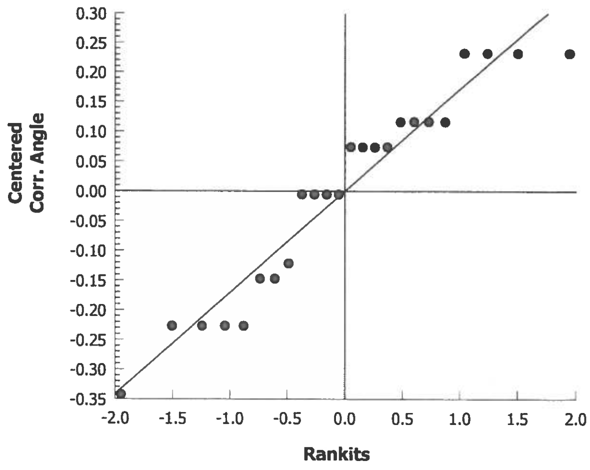
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	6	0.7333	0.6249	0.8417	0.8	0.6	0.8	0.04216	14.08%	0.0%
25		6	0.8	0.6123	0.9877	0.8	0.6	1	0.07303	22.36%	-9.09%
50		6	0.9	0.7244	1	1	0.6	1	0.06831	18.59%	-22.73%
100		6	0.8	0.6123	0.9877	0.8	0.6	1	0.07303	22.36%	-9.09%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	6	1.033	0.9137	1.153	1.107	0.8861	1.107	0.04661	11.05%	0.0%
25		6	1.113	0.8973	1.328	1.107	0.8861	1.345	0.08386	18.46%	-7.68%
50		6	1.229	1.026	1.432	1.345	0.8861	1.345	0.07885	15.72%	-18.93%
100		6	1.113	0.8973	1.328	1.107	0.8861	1.345	0.08386	18.46%	-7.68%

Graphics





Analyst: JU QA: KFP 8/28/19

CETIS Analytical Report

Report Date: 28 Aug-19 11:47 (p 2 of 2)
Test Code: 1908-S079 | 05-5751-1854

Pacific Topsmelt 96-h Acute Survival Test — **Nautilus Environmental (CA)**

Analysis ID:	00-9250-4631	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	28 Aug-19 11:44	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	TST b	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C*b < T	NA	NA	0.8	16.2%	100	>100	NA	1

TST-Welch's t Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:10%)
Lab Control		25*	3.117	1.44	0.132	6	0.0103	CDF	Non-Significant Effect
		50*	4.612	1.415	0.123	7	0.0012	CDF	Non-Significant Effect
		100*	3.117	1.44	0.132	6	0.0103	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.1168161	0.03893869	3	1.156	0.3511	Non-Significant Effect
Error	0.6736282	0.03368141	20			
Total	0.7904443		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	1.831	11.34	0.6083	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9238	0.884	0.0709	Normal Distribution

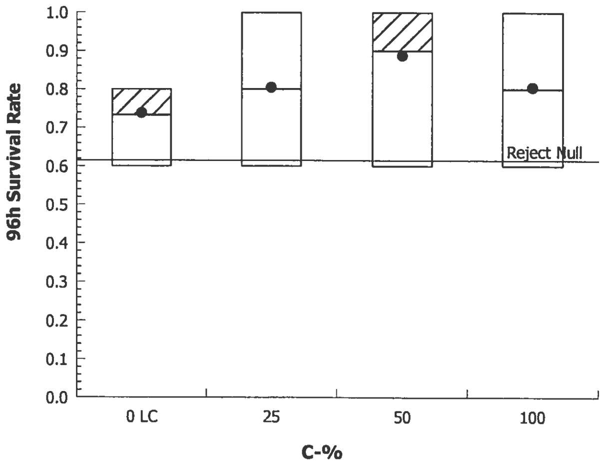
96h Survival Rate Summary

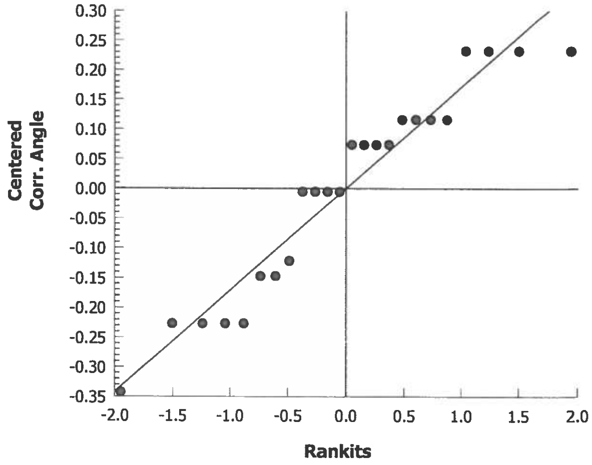
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	6	0.7333	0.6249	0.8417	0.8	0.6	0.8	0.04216	14.08%	0.0%
25		6	0.8	0.6123	0.9877	0.8	0.6	1	0.07303	22.36%	-9.09%
50		6	0.9	0.7244	1	1	0.6	1	0.06831	18.59%	-22.73%
100		6	0.8	0.6123	0.9877	0.8	0.6	1	0.07303	22.36%	-9.09%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	6	1.033	0.9137	1.153	1.107	0.8861	1.107	0.04661	11.05%	0.0%
25		6	1.113	0.8973	1.328	1.107	0.8861	1.345	0.08386	18.46%	-7.68%
50		6	1.229	1.026	1.432	1.345	0.8861	1.345	0.07885	15.72%	-18.93%
100		6	1.113	0.8973	1.328	1.107	0.8861	1.345	0.08386	18.46%	-7.68%

Graphics





Analyst: JCL QA: KFP 8/28/19

CETIS Analytical Report

Report Date: 28 Aug-19 11:47 (p 1 of 1)
Test Code: 1908-S079 | 05-5751-1854

Pacific Topsmelt 96-h Acute Survival Test **Nautilus Environmental (CA)**

Analysis ID:	09-4824-7087	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	28 Aug-19 11:44	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	485360	1000	Yes	Two-Point Interpolation

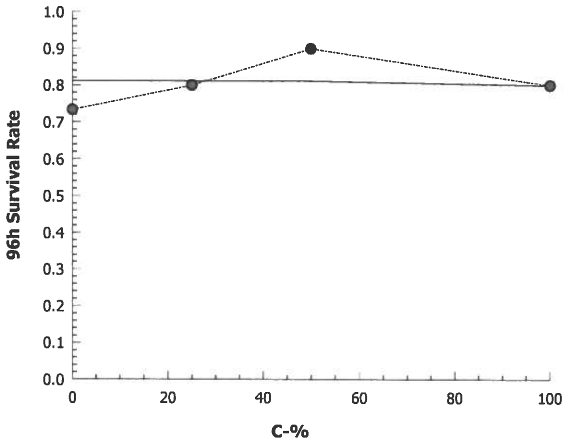
Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC25	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

96h Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Lab Control	6	0.7333	0.6	0.8	0.04216	0.1033	14.08%	0.0%	22	30
25		6	0.8	0.6	1	0.07303	0.1789	22.36%	-9.09%	24	30
50		6	0.9	0.6	1	0.06831	0.1673	18.59%	-22.73%	27	30
100		6	0.8	0.6	1	0.07303	0.1789	22.36%	-9.09%	24	30

Graphics



Analyst: JCL QA: KFP 8/28/19

CETIS Summary Report

Report Date: 28 Aug-19 11:55 (p 1 of 1)
Test Code: 1908-S080 | 19-4846-5900

Pacific Topsmelt 96-h Acute Survival Test — **Nautilus Environmental (CA)**

Batch ID:	07-5429-9597	**Test Type:**	Survival (96h)	**Analyst:**	
Start Date:	19 Aug-19 19:00	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	Natural Seawater
Ending Date:	23 Aug-19 17:00	**Species:**	Atherinops affinis	**Brine:**	Not Applicable
Duration:	94h	**Source:**	Aquatic Biosystems, CO	**Age:**	15d

Sample ID:	05-5530-4912	**Code:**	19-0920	**Client:**	Wood Environment & Infrastructure
Sample Date:	19 Aug-19 12:10	**Material:**	Ambient Sample	**Project:**	
Receive Date:	19 Aug-19 17:40	**Source:**	Shelter Island Yacht Basin		
Sample Age:	7h (3.5 °C)	**Station:**	SIYB-4		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TUa	Method
08-6003-5622	96h Survival Rate	100	>100	NA	18.9%	~~1~~ 0.66	Dunnett Multiple Comparison Test

KFP 8/28/19

Point Estimate Summary

Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method
04-3440-7007	96h Survival Rate	EC25	>100	N/A	N/A	<1	Linear Interpolation (ICPIN)
		EC50	>100	N/A	N/A	<1	

96h Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Control	6	0.8333	0.6753	0.9913	0.6	1	0.06146	0.1506	18.07%	0.0%
25		6	0.8333	0.7476	0.919	0.8	1	0.03333	0.08165	9.8%	0.0%
50		6	0.9667	0.881	1	0.8	1	0.03333	0.08165	8.45%	-16.0%
100		6	0.8667	0.6953	1	0.6	1	0.06667	0.1633	18.84%	-4.0%

96h Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6
0	Lab Control	0.8	1	0.8	0.6	0.8	1
25		0.8	0.8	0.8	0.8	1	0.8
50		1	1	1	0.8	1	1
100		1	0.6	1	0.8	0.8	1

Analyst: QA: KFP 8/28/19

CETIS Analytical Report

Report Date: 28 Aug-19 11:55 (p 1 of 2)
Test Code: 1908-S080 | 19-4846-5900

Pacific Topsmelt 96-h Acute Survival Test

Nautilus Environmental (CA)

Analysis ID:	08-6003-5622	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	28 Aug-19 11:54	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C > T	NA	NA	18.9%	100	>100	NA	1

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		25	0.03381	2.192	0.184	10	0.7377	CDF	Non-Significant Effect
		50	-1.854	2.192	0.184	10	0.9960	CDF	Non-Significant Effect
		100	-0.4719	2.192	0.184	10	0.8860	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.09961858	0.03320619	3	1.565	0.2291	Non-Significant Effect
Error	0.4243811	0.02121906	20			
Total	0.5239997		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	3.424	11.34	0.3308	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9179	0.884	0.0525	Normal Distribution

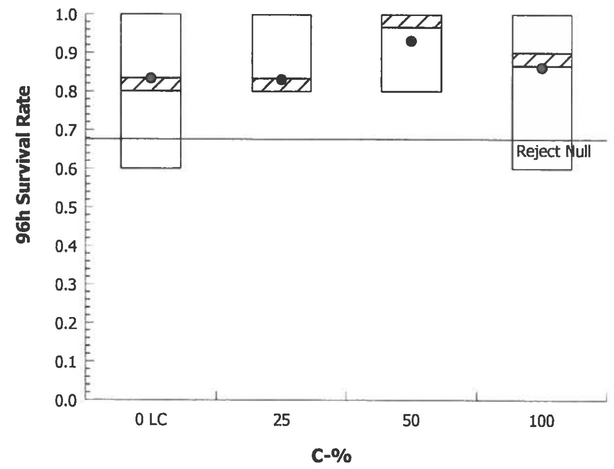
96h Survival Rate Summary

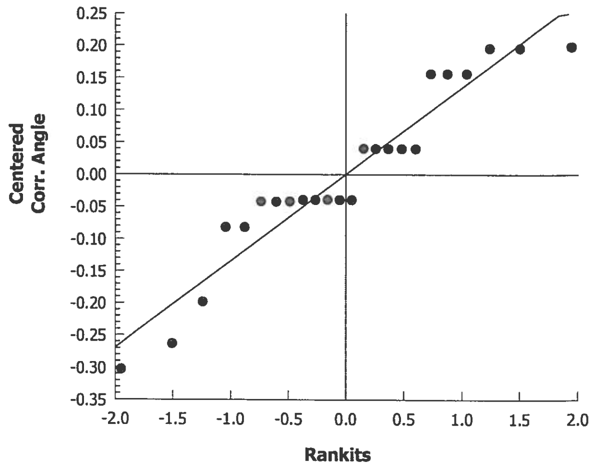
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	6	0.8333	0.6753	0.9913	0.8	0.6	1	0.06146	18.07%	0.0%
25		6	0.8333	0.7476	0.919	0.8	0.8	1	0.03333	9.8%	0.0%
50		6	0.9667	0.881	1	1	0.8	1	0.03333	8.45%	-16.0%
100		6	0.8667	0.6953	1	0.9	0.6	1	0.06667	18.84%	-4.0%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	6	1.15	0.967	1.332	1.107	0.8861	1.345	0.07105	15.14%	0.0%
25		6	1.147	1.045	1.249	1.107	1.107	1.345	0.03969	8.48%	0.25%
50		6	1.306	1.204	1.408	1.345	1.107	1.345	0.03969	7.45%	-13.56%
100		6	1.189	0.9911	1.388	1.226	0.8861	1.345	0.07712	15.88%	-3.45%

Graphics





Analyst: JCL QA: KFP 8/28/19

CETIS Analytical Report

Report Date:	28 Aug-19 11:55 (p 2 of 2)
Test Code:	1908-S080 | 19-4846-5900

Pacific Topsmelt 96-h Acute Survival Test **Nautilus Environmental (CA)**

Analysis ID:	09-0630-8961	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	28 Aug-19 11:54	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	TST b	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C*b < T	NA	NA	0.8	13.2%	100	>100	NA	1

TST-Welch's t Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:10%)
Lab Control		25*	3.276	1.397	0.097	8	0.0056	CDF	Non-Significant Effect
		50*	5.566	1.397	0.097	8	0.0003	CDF	Non-Significant Effect
		100*	2.814	1.383	0.133	9	0.0101	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.09961858	0.03320619	3	1.565	0.2291	Non-Significant Effect
Error	0.4243811	0.02121906	20			
Total	0.5239997		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	3.424	11.34	0.3308	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9179	0.884	0.0525	Normal Distribution

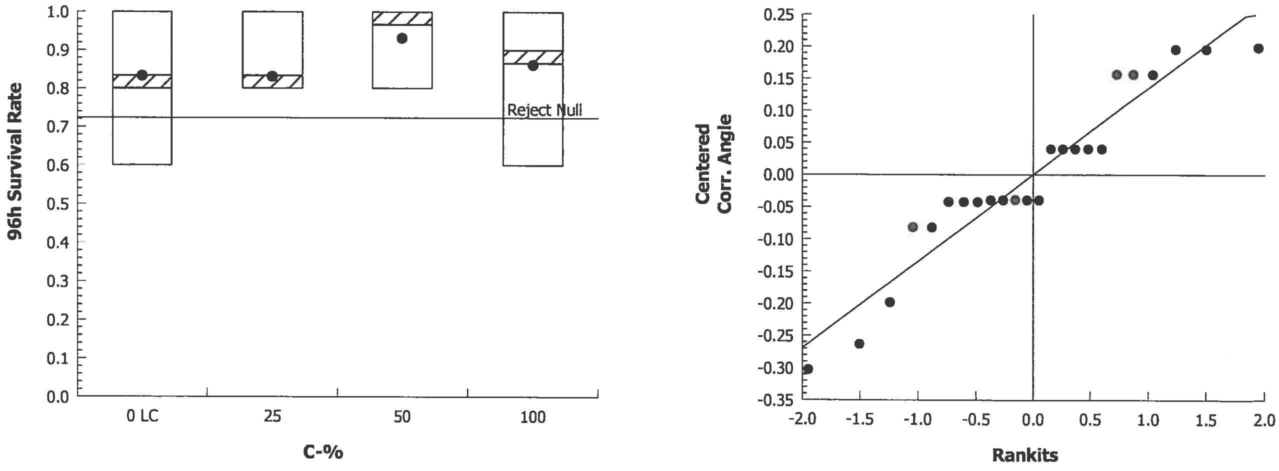
96h Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	6	0.8333	0.6753	0.9913	0.8	0.6	1	0.06146	18.07%	0.0%
25		6	0.8333	0.7476	0.919	0.8	0.8	1	0.03333	9.8%	0.0%
50		6	0.9667	0.881	1	1	0.8	1	0.03333	8.45%	-16.0%
100		6	0.8667	0.6953	1	0.9	0.6	1	0.06667	18.84%	-4.0%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	6	1.15	0.967	1.332	1.107	0.8861	1.345	0.07105	15.14%	0.0%
25		6	1.147	1.045	1.249	1.107	1.107	1.345	0.03969	8.48%	0.25%
50		6	1.306	1.204	1.408	1.345	1.107	1.345	0.03969	7.45%	-13.56%
100		6	1.189	0.9911	1.388	1.226	0.8861	1.345	0.07712	15.88%	-3.45%

Graphics



Analyst: JL QA: KF 8/28/19

CETIS Analytical Report

Report Date: 28 Aug-19 11:55 (p 1 of 1)
Test Code: 1908-S080 | 19-4846-5900

Pacific Topsmelt 96-h Acute Survival Test — **Nautilus Environmental (CA)**

Analysis ID: 04-3440-7007 **Endpoint:** 96h Survival Rate **CETIS Version:** CETISv1.8.7
Analyzed: 28 Aug-19 11:54 **Analysis:** Linear Interpolation (ICPIN) **Official Results:** Yes

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	2112104	1000	Yes	Two-Point Interpolation

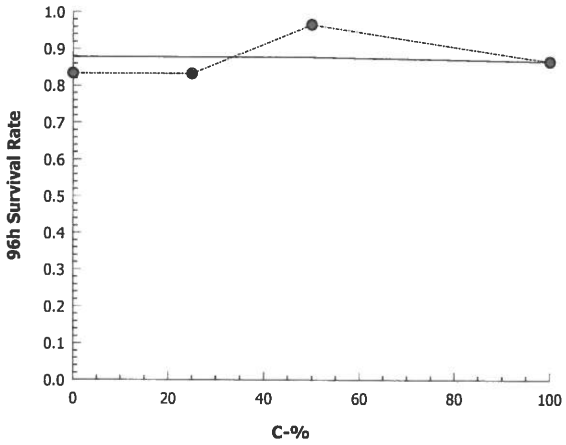
Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC25	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

96h Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Lab Control	6	0.8333	0.6	1	0.06146	0.1506	18.07%	0.0%	25	30
25		6	0.8333	0.8	1	0.03333	0.08165	9.8%	0.0%	25	30
50		6	0.9667	0.8	1	0.03333	0.08165	8.45%	-16.0%	29	30
100		6	0.8667	0.6	1	0.06667	0.1633	18.84%	-4.0%	26	30

Graphics



Analyst: JC QA: KFP 8/28/19

CETIS Summary Report

Report Date: 28 Aug-19 12:01 (p 1 of 1)
Test Code: 1908-S081 | 06-1029-7002

Pacific Topsmelt 96-h Acute Survival Test

Nautilus Environmental (CA)

Batch ID:	04-4012-0363	**Test Type:**	Survival (96h)	**Analyst:**	
Start Date:	19 Aug-19 19:00	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	Natural Seawater
Ending Date:	23 Aug-19 17:00	**Species:**	Atherinops affinis	**Brine:**	Not Applicable
Duration:	94h	**Source:**	Aquatic Biosystems, CO	**Age:**	15d

Sample ID:	11-7719-5544	**Code:**	19-0921	**Client:**	Wood Environment & Infrastructure
Sample Date:	19 Aug-19 11:00	**Material:**	Ambient Sample	**Project:**	
Receive Date:	19 Aug-19 17:40	**Source:**	Shelter Island Yacht Basin		
Sample Age:	8h (8.5 °C)	**Station:**	SIYB-5		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TUa	Method
04-4479-4797	96h Survival Rate	100	>100	NA	22.5%	~~1~~ 0.12	Dunnett Multiple Comparison Test

KPP 8/28/19

Point Estimate Summary

Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method
17-8635-1891	96h Survival Rate	EC25	>100	N/A	N/A	<1	Linear Interpolation (ICPIN)
		EC50	>100	N/A	N/A	<1	

96h Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Control	6	0.8333	0.6753	0.9913	0.6	1	0.06146	0.1506	18.07%	0.0%
25		6	0.8	0.6673	0.9327	0.6	1	0.05164	0.1265	15.81%	4.0%
50		6	0.7	0.585	0.815	0.6	0.8	0.04472	0.1095	15.65%	16.0%
100		6	0.8333	0.627	1	0.6	1	0.08028	0.1966	23.6%	0.0%

96h Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6
0	Lab Control	0.8	1	0.8	0.6	0.8	1
25		1	0.8	0.8	0.8	0.8	0.6
50		0.6	0.6	0.8	0.8	0.8	0.6
100		0.6	1	1	0.6	0.8	1

Analyst: JCL QA: KPP 8/28/19

CETIS Analytical Report

Report Date: 28 Aug-19 12:02 (p 1 of 2)
Test Code: 1908-S081 | 06-1029-7002

Pacific Topsmelt 96-h Acute Survival Test — **Nautilus Environmental (CA)**

Analysis ID:	04-4479-4797	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	28 Aug-19 12:00	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C > T	NA	NA	22.5%	100	>100	NA	1

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		25	0.4017	2.192	0.217	10	0.5875	CDF	Non-Significant Effect
		50	1.549	2.192	0.217	10	0.1544	CDF	Non-Significant Effect
		100	-0.02878	2.192	0.217	10	0.7602	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0959789	0.03199297	3	1.092	0.3753	Non-Significant Effect
Error	0.58579	0.0292895	20			
Total	0.681769		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	1.982	11.34	0.5760	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9206	0.884	0.0602	Normal Distribution

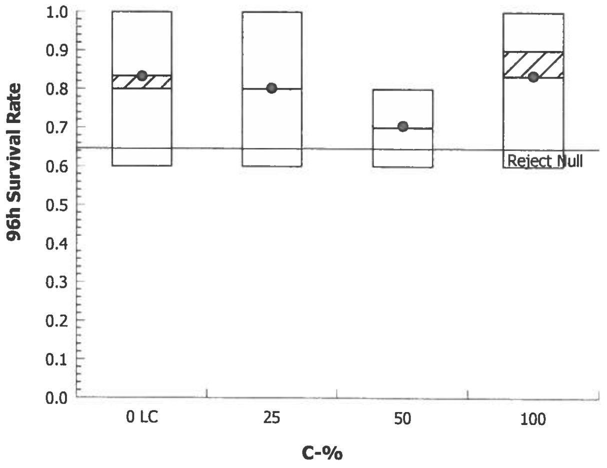
96h Survival Rate Summary

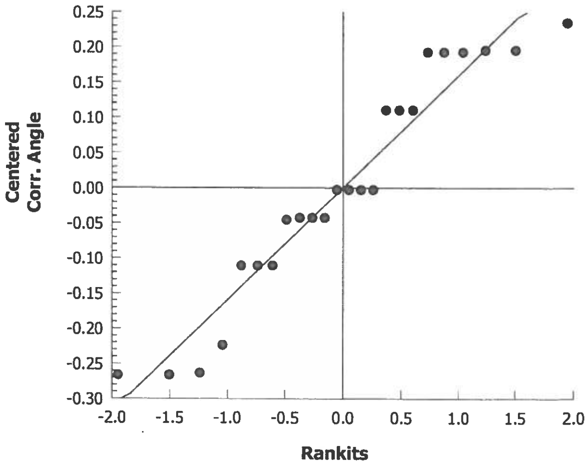
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	6	0.8333	0.6753	0.9913	0.8	0.6	1	0.06146	18.07%	0.0%
25		6	0.8	0.6673	0.9327	0.8	0.6	1	0.05164	15.81%	4.0%
50		6	0.7	0.585	0.815	0.7	0.6	0.8	0.04472	15.65%	16.0%
100		6	0.8333	0.627	1	0.9	0.6	1	0.08028	23.6%	0.0%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	6	1.15	0.967	1.332	1.107	0.8861	1.345	0.07105	15.14%	0.0%
25		6	1.11	0.9575	1.262	1.107	0.8861	1.345	0.05931	13.09%	3.45%
50		6	0.9966	0.8695	1.124	0.9966	0.8861	1.107	0.04943	12.15%	13.31%
100		6	1.153	0.9153	1.39	1.226	0.8861	1.345	0.09229	19.61%	-0.25%

Graphics





Analyst: JCL QA: KFP 8/28/19

CETIS Analytical Report

Report Date: 28 Aug-19 12:02 (p 2 of 2)
Test Code: 1908-S081 | 06-1029-7002

Pacific Topsmelt 96-h Acute Survival Test **Nautilus Environmental (CA)**

Analysis ID:	00-4151-3804	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	28 Aug-19 12:01	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	TST b	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C*b < T	NA	NA	0.8	15.2%	100	>100	NA	1

TST-Welch's t Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:10%)
Lab Control		25*	2.316	1.383	0.114	9	0.0229	CDF	Non-Significant Effect
		50	1.02	1.383	0.104	9	0.1671	CDF	Significant Effect
		100*	2.148	1.397	0.151	8	0.0320	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0959789	0.03199297	3	1.092	0.3753	Non-Significant Effect
Error	0.58579	0.0292895	20			
Total	0.681769		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	1.982	11.34	0.5760	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9206	0.884	0.0602	Normal Distribution

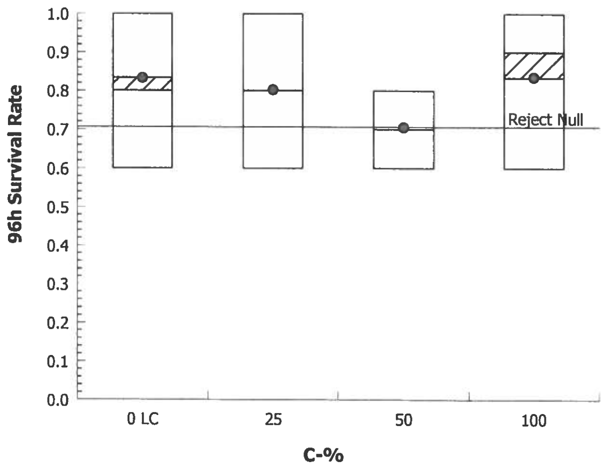
96h Survival Rate Summary

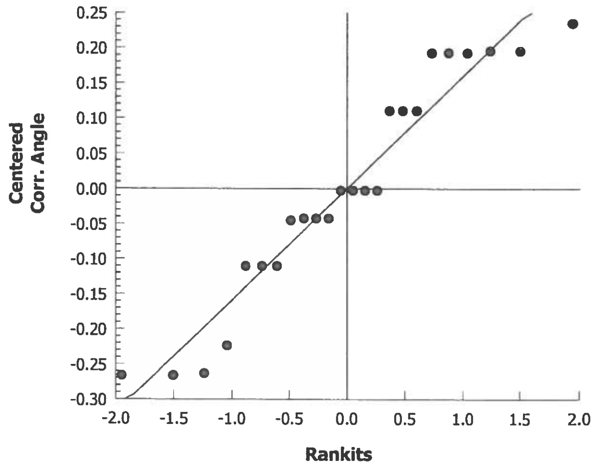
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	6	0.8333	0.6753	0.9913	0.8	0.6	1	0.06146	18.07%	0.0%
25		6	0.8	0.6673	0.9327	0.8	0.6	1	0.05164	15.81%	4.0%
50		6	0.7	0.585	0.815	0.7	0.6	0.8	0.04472	15.65%	16.0%
100		6	0.8333	0.627	1	0.9	0.6	1	0.08028	23.6%	0.0%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	6	1.15	0.967	1.332	1.107	0.8861	1.345	0.07105	15.14%	0.0%
25		6	1.11	0.9575	1.262	1.107	0.8861	1.345	0.05931	13.09%	3.45%
50		6	0.9966	0.8695	1.124	0.9966	0.8861	1.107	0.04943	12.15%	13.31%
100		6	1.153	0.9153	1.39	1.226	0.8861	1.345	0.09229	19.61%	-0.25%

Graphics





Analyst: JC QA: KFP 8/28/19

CETIS Analytical Report

Report Date:	28 Aug-19 12:02 (p 1 of 1)
Test Code:	1908-S081 | 06-1029-7002

Pacific Topsmelt 96-h Acute Survival Test **Nautilus Environmental (CA)**

Analysis ID:	17-8635-1891	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	28 Aug-19 12:01	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	1228978	1000	Yes	Two-Point Interpolation

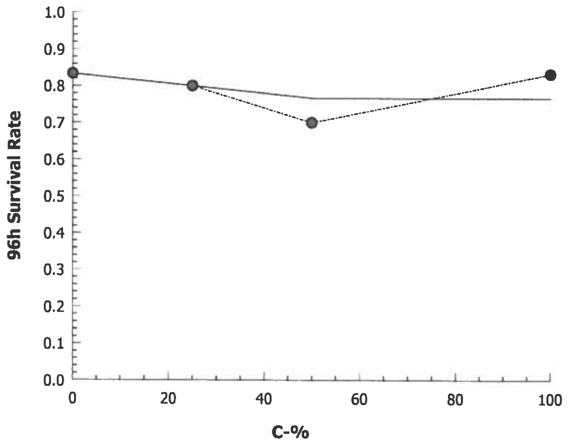
Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC25	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

96h Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Lab Control	6	0.8333	0.6	1	0.06146	0.1506	18.07%	0.0%	25	30
25		6	0.8	0.6	1	0.05164	0.1265	15.81%	4.0%	24	30
50		6	0.7	0.6	0.8	0.04472	0.1095	15.65%	16.0%	21	30
100		6	0.8333	0.6	1	0.08028	0.1966	23.6%	0.0%	25	30

Graphics



Analyst: JC QA: KFP 8/28/19

CETIS Summary Report

Report Date: 28 Aug-19 12:07 (p 1 of 1)
Test Code: 1908-S082 | 05-4152-3561

Pacific Topsmelt 96-h Acute Survival Test **Nautilus Environmental (CA)**

Batch ID:	17-7952-4763	**Test Type:**	Survival (96h)	**Analyst:**	
Start Date:	19 Aug-19 19:00	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	Natural Seawater
Ending Date:	23 Aug-19 17:00	**Species:**	Atherinops affinis	**Brine:**	Not Applicable
Duration:	94h	**Source:**	Aquatic Biosystems, CO	**Age:**	15d

Sample ID:	00-8357-8676	**Code:**	19-0922	**Client:**	Wood Environment & Infrastructure
Sample Date:	19 Aug-19 10:00	**Material:**	Ambient Sample	**Project:**	
Receive Date:	19 Aug-19 17:40	**Source:**	Shelter Island Yacht Basin		
Sample Age:	9h (5.4 °C)	**Station:**	SIYB-6		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TUa	Method
18-9100-1136	96h Survival Rate	100	>100	NA	21.0%	~~1~~ 0.84	Dunnett Multiple Comparison Test

KFP 8/28/19

Point Estimate Summary

Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method
09-9725-7991	96h Survival Rate	EC25	>100	N/A	N/A	<1	Linear Interpolation (ICPIN)
		EC50	>100	N/A	N/A	<1	

96h Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Control	6	0.8333	0.6753	0.9913	0.6	1	0.06146	0.1506	18.07%	0.0%
25		6	0.8333	0.6753	0.9913	0.6	1	0.06146	0.1506	18.07%	0.0%
50		6	0.7667	0.6087	0.9247	0.6	1	0.06146	0.1506	19.64%	8.0%
100		6	0.7333	0.6249	0.8417	0.6	0.8	0.04216	0.1033	14.08%	12.0%

96h Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6
0	Lab Control	0.8	1	0.8	0.6	0.8	1
25		0.6	1	0.8	1	0.8	0.8
50		0.8	0.6	1	0.8	0.6	0.8
100		0.6	0.8	0.8	0.6	0.8	0.8

Analyst: JL QA: KFP 8/28/19

CETIS Analytical Report

Report Date: 28 Aug-19 12:08 (p 1 of 2)
Test Code: 1908-S082 | 05-4152-3561

Pacific Topsmelt 96-h Acute Survival Test — **Nautilus Environmental (CA)**

Analysis ID:	18-9100-1136	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	28 Aug-19 12:07	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C > T	NA	NA	21.0%	100	>100	NA	1

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		25	0	2.192	0.203	10	0.7500	CDF	Non-Significant Effect
		50	0.8257	2.192	0.203	10	0.4012	CDF	Non-Significant Effect
		100	1.254	2.192	0.203	10	0.2384	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.06045892	0.02015297	3	0.7818	0.5180	Non-Significant Effect
Error	0.5155485	0.02577743	20			
Total	0.5760074		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	1.037	11.34	0.7924	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9526	0.884	0.3078	Normal Distribution

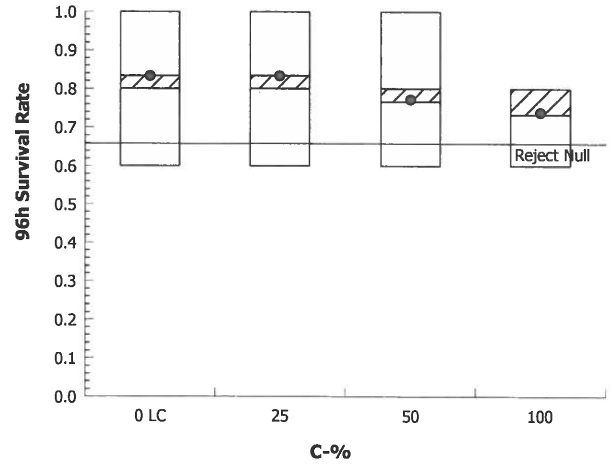
96h Survival Rate Summary

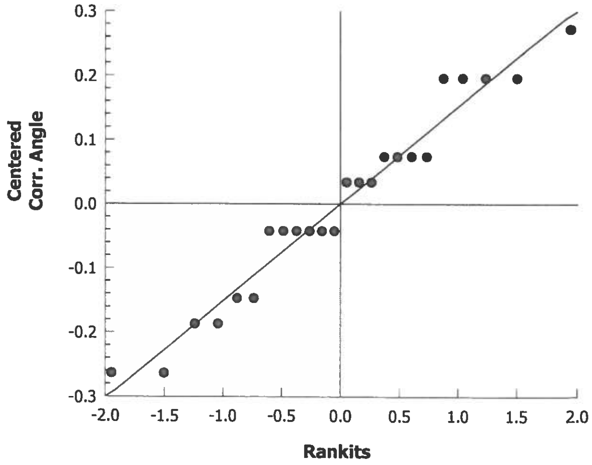
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	6	0.8333	0.6753	0.9913	0.8	0.6	1	0.06146	18.07%	0.0%
25		6	0.8333	0.6753	0.9913	0.8	0.6	1	0.06146	18.07%	0.0%
50		6	0.7667	0.6087	0.9247	0.8	0.6	1	0.06146	19.64%	8.0%
100		6	0.7333	0.6249	0.8417	0.8	0.6	0.8	0.04216	14.08%	12.0%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	6	1.15	0.967	1.332	1.107	0.8861	1.345	0.07105	15.14%	0.0%
25		6	1.15	0.967	1.332	1.107	0.8861	1.345	0.07105	15.14%	0.0%
50		6	1.073	0.8929	1.253	1.107	0.8861	1.345	0.07012	16.01%	6.66%
100		6	1.033	0.9137	1.153	1.107	0.8861	1.107	0.04661	11.05%	10.11%

Graphics





Analyst: Ja QA: HP 8/28/19

CETIS Analytical Report

Report Date:	28 Aug-19 12:08 (p 2 of 2)
Test Code:	1908-S082 | 05-4152-3561

Pacific Topsmelt 96-h Acute Survival Test **Nautilus Environmental (CA)**

Analysis ID:	04-8052-9335	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	28 Aug-19 12:07	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	TST b	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C*b < T	NA	NA	0.8	9.91%	100	>100	NA	1

TST-Welch's t Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:10%)
Lab Control		25*	2.527	1.383	0.126	9	0.0162	CDF	Non-Significant Effect
		50*	1.699	1.383	0.125	9	0.0617	CDF	Non-Significant Effect
		100*	1.547	1.383	0.102	9	0.0781	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.06045892	0.02015297	3	0.7818	0.5180	Non-Significant Effect
Error	0.5155485	0.02577743	20			
Total	0.5760074		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	1.037	11.34	0.7924	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9526	0.884	0.3078	Normal Distribution

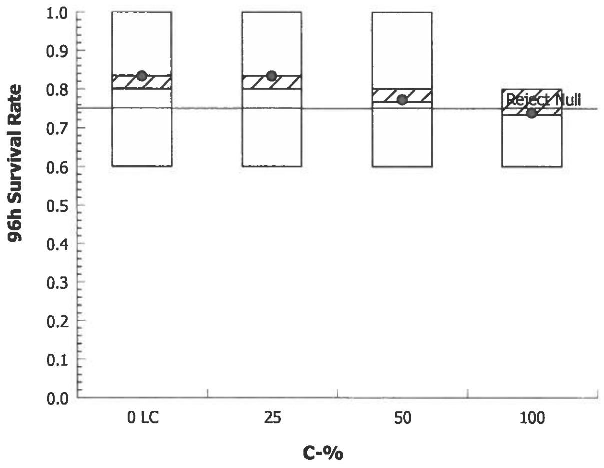
96h Survival Rate Summary

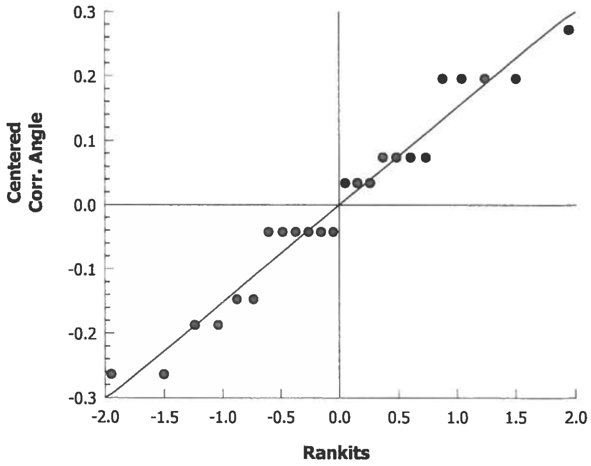
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	6	0.8333	0.6753	0.9913	0.8	0.6	1	0.06146	18.07%	0.0%
25		6	0.8333	0.6753	0.9913	0.8	0.6	1	0.06146	18.07%	0.0%
50		6	0.7667	0.6087	0.9247	0.8	0.6	1	0.06146	19.64%	8.0%
100		6	0.7333	0.6249	0.8417	0.8	0.6	0.8	0.04216	14.08%	12.0%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	6	1.15	0.967	1.332	1.107	0.8861	1.345	0.07105	15.14%	0.0%
25		6	1.15	0.967	1.332	1.107	0.8861	1.345	0.07105	15.14%	0.0%
50		6	1.073	0.8929	1.253	1.107	0.8861	1.345	0.07012	16.01%	6.66%
100		6	1.033	0.9137	1.153	1.107	0.8861	1.107	0.04661	11.05%	10.11%

Graphics





Analyst: JL QA: KFP 8/28/19

CETIS Analytical Report

Report Date: 28 Aug-19 12:08 (p 1 of 1)
Test Code: 1908-S082 | 05-4152-3561

Pacific Topsmelt 96-h Acute Survival Test — **Nautilus Environmental (CA)**

Analysis ID:	09-9725-7991	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	28 Aug-19 12:07	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	1745211	1000	Yes	Two-Point Interpolation

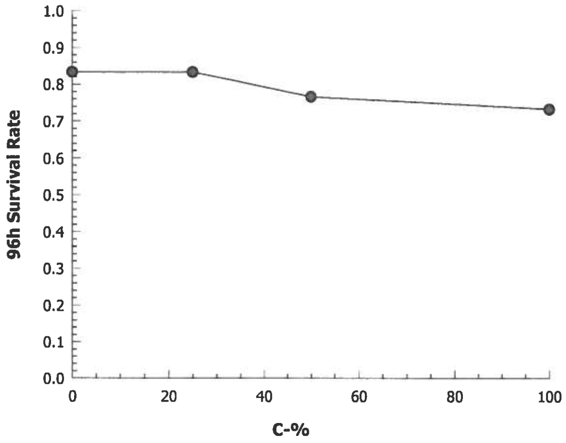
Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC25	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

96h Survival Rate Summary — **Calculated Variate(A/B)**

C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Lab Control	6	0.8333	0.6	1	0.06146	0.1506	18.07%	0.0%	25	30
25		6	0.8333	0.6	1	0.06146	0.1506	18.07%	0.0%	25	30
50		6	0.7667	0.6	1	0.06146	0.1506	19.64%	8.0%	23	30
100		6	0.7333	0.6	0.8	0.04216	0.1033	14.08%	12.0%	22	30

Graphics



Analyst: JCL QA: KF 8/28/19

CETIS Summary Report

Report Date: 28 Aug-19 12:19 (p 1 of 1)
Test Code: 1908-S083 | 07-1198-4536

Pacific Topsmelt 96-h Acute Survival Test — **Nautilus Environmental (CA)**

Batch ID:	13-7422-2098	**Test Type:**	Survival (96h)	**Analyst:**	
Start Date:	19 Aug-19 19:25	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	Natural Seawater
Ending Date:	23 Aug-19 17:25	**Species:**	Atherinops affinis	**Brine:**	Not Applicable
Duration:	94h	**Source:**	Aquatic Biosystems, CO	**Age:**	15d

Sample ID:	03-4380-9945	**Code:**	19-0923	**Client:**	Wood Environment & Infrastructure
Sample Date:	19 Aug-19 09:00	**Material:**	Ambient Sample	**Project:**	
Receive Date:	19 Aug-19 17:40	**Source:**	Shelter Island Yacht Basin		
Sample Age:	10h (5 °C)	**Station:**	SIYB-REF		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TUa	Method
13-9503-9008	96h Survival Rate	100	>100	NA	35.0%	~~1~~ 0.80	Dunnett Multiple Comparison Test

KFP 8/28/19

Point Estimate Summary

Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method
06-0071-2901	96h Survival Rate	EC25	>100	N/A	N/A	<1	Linear Interpolation (ICPIN)
		EC50	>100	N/A	N/A	<1	

96h Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Control	6	0.7667	0.5213	1	0.4	1	0.09545	0.2338	30.5%	0.0%
25		6	0.7	0.4107	0.9893	0.4	1	0.1125	0.2757	39.38%	8.7%
50		6	0.7667	0.6087	0.9247	0.6	1	0.06146	0.1506	19.64%	0.0%
100		6	0.7667	0.6087	0.9247	0.6	1	0.06146	0.1506	19.64%	0.0%

96h Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6
0	Lab Control	0.6	0.8	1	0.4	1	0.8
25		1	0.4	0.6	0.4	1	0.8
50		0.8	0.6	0.8	0.8	0.6	1
100		1	0.8	0.8	0.6	0.8	0.6

Analyst: JC QA: KFP 8/28/19

CETIS Analytical Report

Report Date: 28 Aug-19 12:19 (p 1 of 1)
Test Code: 1908-S083 | 07-1198-4536

Pacific Topsmelt 96-h Acute Survival Test — **Nautilus Environmental (CA)**

Analysis ID: 13-9503-9008 **Endpoint:** 96h Survival Rate **CETIS Version:** CETISv1.8.7
Analyzed: 28 Aug-19 12:17 **Analysis:** Parametric-Control vs Treatments **Official Results:** Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C > T	NA	NA	35.0%	100	>100	NA	1

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		25	0.5218	2.192	0.296	10	0.5344	CDF	Non-Significant Effect
		50	0.04543	2.192	0.296	10	0.7334	CDF	Non-Significant Effect
		100	0.04543	2.192	0.296	10	0.7334	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.01994202	0.00664734	3	0.1217	0.9462	Non-Significant Effect
Error	1.092339	0.05461694	20			
Total	1.112281		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	2.308	11.34	0.5110	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9266	0.884	0.0818	Normal Distribution

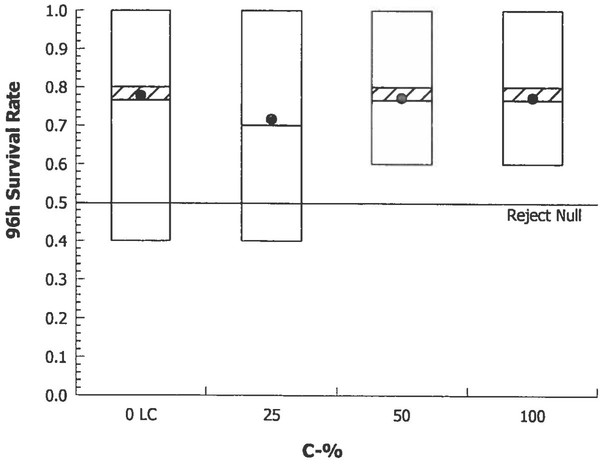
96h Survival Rate Summary

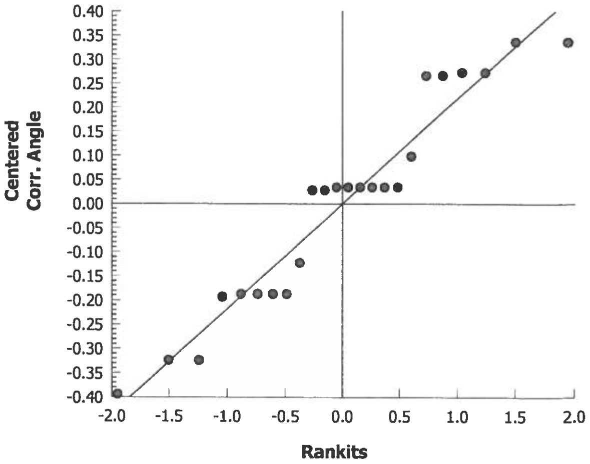
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	6	0.7667	0.5213	1	0.8	0.4	1	0.09545	30.5%	0.0%
25		6	0.7	0.4107	0.9893	0.7	0.4	1	0.1125	39.38%	8.7%
50		6	0.7667	0.6087	0.9247	0.8	0.6	1	0.06146	19.64%	0.0%
100		6	0.7667	0.6087	0.9247	0.8	0.6	1	0.06146	19.64%	0.0%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	6	1.079	0.8072	1.351	1.107	0.6847	1.345	0.1058	24.02%	0.0%
25		6	1.009	0.6901	1.328	0.9966	0.6847	1.345	0.124	30.1%	6.52%
50		6	1.073	0.8929	1.253	1.107	0.8861	1.345	0.07012	16.01%	0.57%
100		6	1.073	0.8929	1.253	1.107	0.8861	1.345	0.07012	16.01%	0.57%

Graphics





Analyst: JCL QA: KFP8/28/19

CETIS Analytical Report

Report Date: 28 Aug-19 12:19 (p 1 of 1)
Test Code: 1908-S083 | 07-1198-4536

Pacific Topsmelt 96-h Acute Survival Test — **Nautilus Environmental (CA)**

Analysis ID:	07-4561-2606	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	28 Aug-19 12:17	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	TST b	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C*b < T	NA	NA	0.75	15.8%	100	>100	NA	1

TST-Welch's t Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:10%)
Lab Control		25	1.354	1.397	0.206	8	0.1063	CDF	Significant Effect
		50*	2.49	1.383	0.147	9	0.0172	CDF	Non-Significant Effect
		100*	2.49	1.383	0.147	9	0.0172	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.01994202	0.00664734	3	0.1217	0.9462	Non-Significant Effect
Error	1.092339	0.05461694	20			
Total	1.112281		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	2.308	11.34	0.5110	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9266	0.884	0.0818	Normal Distribution

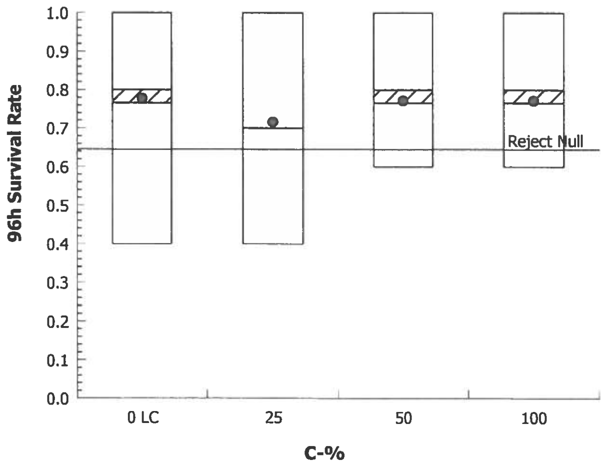
96h Survival Rate Summary

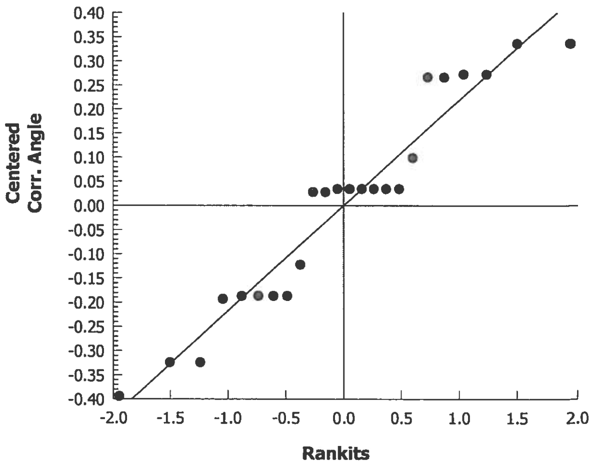
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	6	0.7667	0.5213	1	0.8	0.4	1	0.09545	30.5%	0.0%
25		6	0.7	0.4107	0.9893	0.7	0.4	1	0.1125	39.38%	8.7%
50		6	0.7667	0.6087	0.9247	0.8	0.6	1	0.06146	19.64%	0.0%
100		6	0.7667	0.6087	0.9247	0.8	0.6	1	0.06146	19.64%	0.0%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	6	1.079	0.8072	1.351	1.107	0.6847	1.345	0.1058	24.02%	0.0%
25		6	1.009	0.6901	1.328	0.9966	0.6847	1.345	0.124	30.1%	6.52%
50		6	1.073	0.8929	1.253	1.107	0.8861	1.345	0.07012	16.01%	0.57%
100		6	1.073	0.8929	1.253	1.107	0.8861	1.345	0.07012	16.01%	0.57%

Graphics





Analyst: JL QA: KFP 8/28/19

CETIS Analytical Report

Report Date:	28 Aug-19 12:19 (p 1 of 1)
Test Code:	1908-S083 | 07-1198-4536

Pacific Topsmelt 96-h Acute Survival Test **Nautilus Environmental (CA)**

Analysis ID:	06-0071-2901	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	28 Aug-19 12:17	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	1352251	1000	Yes	Two-Point Interpolation

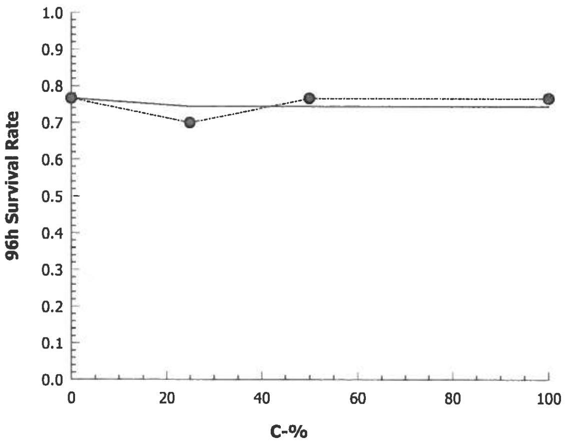
Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC25	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

96h Survival Rate Summary

C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	Calculated Variate(A/B) A	 B
0	Lab Control	6	0.7667	0.4	1	0.09545	0.2338	30.5%	0.0%	23	30
25		6	0.7	0.4	1	0.1125	0.2757	39.38%	8.7%	21	30
50		6	0.7667	0.6	1	0.06146	0.1506	19.64%	0.0%	23	30
100		6	0.7667	0.6	1	0.06146	0.1506	19.64%	0.0%	23	30

Graphics



Analyst: JL QA: KP 8/28/19

Marine Acute Bioassay
Static-Renewal Conditions
DM-001

Water Quality Measurements
& Test Organism Survival

Client: Wood/POSD
Sample ID: SIYB-1
Sample Log-in No.: 19-0917
Test No.: 1908-S077

Test Species: *A. affinis*
Start Date/Time: 8/19/19 1825
End Date/Time: 8/23/19 1625

Tech Initials	0	24	48	72	96
Counts:	JBS/KK	RT	JBS	JBS	RT
Readings:	EG	HH	HH	BO	HH
Dilutions made by:	JBS		JBS		

Concentration %	Rep	Number of Live Organisms					Salinity (ppt)					Temperature (°C)					Dissolved Oxygen (mg/L)					pH (units)				
		0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	7	96	0	24	48	72	96
Lab Control	A	5	5	5	5	4	34.3	34.8	i 34.4	34.7	34.5	21.1	21.9	i 20.9	21.8	21.7	7.4	6.0	i 7.2	6.1	6.5	7.96	7.80	i 7.82	7.69	7.73
#1	B	5	5	5	4	3			f 34.9					f 21.8					f 5.5					f 7.75		
Q15	C	5	5	5	4	4																				
	D	5	5	4	4	4																				
	E	5	5	6	3	3																				
	F	5	5	5	4	4																				
25	A	5	5	5	5	5	34.4	34.6	i 34.6	34.7	34.8	21.1	21.9	i 21.3	21.7	21.7	7.3	5.8	i 7.0	6.0	6.3	7.95	7.76	i 8.01	7.69	7.73
	B	5	5	5	4	4			f 34.8					f 21.6					f 5.3					f 7.73		
	C	5	5	5	5	4																				
	D	5	5	5	5	5																				
	E	5	5	5	5	5																				
	F	5	5	5	4	4																				
50	A	5	5	5	5	5	34.6	34.7	i 34.6	34.8	34.8	21.1	21.9	i 21.4	21.8	21.7	7.3	5.7	i 7.2	5.9	6.1	7.96	7.78	i 7.91	7.70	7.73
	B	5	5	5	5	4			f 34.9					f 21.6					f 5.3					f 7.75		
	C	5	5	4	4	4																				
	D	5	5	3	2	2																				
	E	5	5	5	5	5																				
	F	5	5	5	4	4																				
100	A	5	5	4	4	3	34.8	34.9	i 34.7	34.8	34.9	21.3	21.9	i 21.5	21.7	21.7	7.4	5.5	i 7.0	5.7	6.1	7.95	7.77	i 7.78	7.69	7.73
	B	5	5	5	5	4			f 34.9					f 21.6					f 5.2					f 7.73		
	C	5	5	5	4	4																				
	D	5	5	5	5	5																				
	E	5	5	5	5	5																				
	F	5	5	5	5	4																				

Initial Counts QC'd by: EG
Initiated by: JBS/EG

Environmental Chamber: B

Animal Source/Date Received: ABS 8/17/19

Age at Initiation: 15 days

Animal Acclimation Qualifiers (circle all that apply): [✓ Q22] / Q23 / Q24 / none

Feeding Times				
0	24	48	72	96
	0830	0905	0845	0915
1855				

Comments: i = initial reading in fresh test solution, f = final reading in test chamber prior to renewal

Organisms fed prior to initiation, circle one ([✓ y] / n)

QC Check: AC 8/28/19

Final Review: PFP 8/28/19

Enthalpy Analytical. 4340 Vandever Avenue. San Diego, CA 92120.

Marine Acute Bioassay
Static-Renewal Conditions
DM-001

Water Quality Measurements
& Test Organism Survival

Client: Wood/POSD
Sample ID: SIYB-2
Sample Log-in No.: 19-0918
Test No.: 1908-SOT8

Test Species: *A. affinis*
Start Date/Time: 8/19/19 1825
End Date/Time: 8/23/19 1625

Tech Initials	0	24	48	72	96
Counts:	JBS/AC	RT	JBS	JBS	RT
Readings:	EG	HH	HH	BO	HH
Dilutions made by:	JBS		JBS		

Concentration %	Rep	Number of Live Organisms					Salinity (ppt)					Temperature (°C)					Dissolved Oxygen (mg/L)					pH (units)				
		0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
Lab Control	A	5	5	5	5	4	34.3	34.8	i 34.4	34.7	34.5	21.1	21.9	i 20.9	21.8	21.7	7.4	6.0	i 7.2	6.1	6.5	7.96	7.80	i 7.82	7.69	7.73
#1	B	5	5	5	4	3			f 34.9					f 21.8					f 5.5					f 7.75		
Q15	C	5	5	5	4	4																				
	D	5	5	4	4	4																				
	E	5	5	5	3	3																				
	F	5	5	5	4	4	Ⓐ																			
25	A	5	5	5	3	3	~~34.8~~	34.8	i 34.5	34.5	34.4	20.6	21.8	i 21.2	21.7	21.7	7.3	6.0	i 6.9	6.2	6.3	7.98	7.76	i 7.97	7.69	7.74
	B	5	5	~~4~~5 Ⓝ	4	4	34.4		f 34.5					f 21.5					f 5.7					f 7.73		
	C	5	5	5	5	5																				
	D	5	5	5	5	4																				
	E	5	4	4	3	3																				
	F	5	5	5	3	3																				
50	A	5	5	5	5	5	34.5	34.8	i 34.7	34.8	34.9	20.4	21.6	i 21.3	21.6	21.6	7.5	5.7	i 7.2	6.1	6.1	7.98	7.74	i 8.07	7.70	7.71
	B	5	5	5	5	4			f 34.9					f 21.5					f 5.2					f 7.74		
	C	5	5	5	5	4																				
	D	5	5	5	4	3																				
	E	5	5	5	5	5																				
	F	5	5	5	5	4																				
100	A	5	5	5	5	5	34.8	34.9	i 34.9	34.8	34.9	21.0	21.4	i 21.3	21.5	21.5	7.6	5.9	i 7.8	5.8	6.1	7.98	7.79	i 8.00	7.68	7.73
	B	5	5	5	5	3			f 34.9					f 21.5					f 5.4					f 7.78		
	C	5	5	4	3	3																				
	D	5	5	5	5	4																				
	E	5	5	Ⓝ ~~4~~5	5	4																				
	F	5	5	4	4	4																				

Initial Counts QC'd by: EG
Initiated by: JBS/ EG
Environmental Chamber: B
Animal Source/Date Received: ABS 8/17/19
Age at Initiation: 15 days
Animal Acclimation Qualifiers (circle all that apply): [✓ Q22] / Q23 / Q24 / none

Feeding Times	0	24	48	72	96
AM:		0830	0905	0845	0915
PM:	1855				

Comments: i = initial reading in fresh test solution, f = final reading in test chamber prior to renewal
Organisms fed prior to initiation, circle one ([✓ y] / n) Ⓐ EG Q18 8/19/19 Ⓝ Q18 JBS 8/21/19

QC Check: AC 8/28/19

Final Review: KFP / /9

Enthalpy Analytical. 4340 Vandever Avenue. San Diego, CA 92120.

Marine Acute Bioassay
Static-Renewal Conditions
DM-001

Water Quality Measurements
& Test Organism Survival

Client: Wood/POSD
Sample ID: SIYB-3
Sample Log-in No.: 19-0919
Test No.: 1908-5079

Test Species: *A. affinis*
Start Date/Time: 8/19/19 18
End Date/Time: 8/23/19 1625

Tech Initials	0	24	48	72	96
Counts	JBS/HC	RT	JBS	JBS	RT
Readings	EG	HH	HH	BO	HH
Dilutions made by	JBS		JBS		

Concentration %	Rep	Number of Live Organisms					Salinity (ppt)					Temperature (°C)					Dissolved Oxygen (mg/L)					pH (units)				
		0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	2	96
Lab Control	A	5	5	5	5	4	34.3	34.8	i 34.4	34.7	34.5	21.1	9	i 20.9	21.8	21.7	7.4	6.0	i 7.2	6.1	6.5	7.96	7.80	i 7.82	7.69	7.73
#1	B	5	5	5	4	3			f 34.9					f 21.8					f 5.5					f 7.75		
Q15	C	5	5	5	4	4																				
	D	5	5	4	4	4																				
	E	5	5	5	3	3																				
	F	5	5	5	4	4																				
25	A	5	5	5	5	5	34.4	34.8	i 34.4	34.6	34.9	21.1	21.8	i 21.2	21.5	21.5	7.3	5.7	i 6.9	6.2	6.2	7.91	7.73	i 7.92	7.70	7.74
	B	5	5	5	5	5			f 34.6					f 21.5					f 5.5					f 7.73		
	C	5	5	5	4	3																				
	D	5	5	4	4	4																				
	E	5	5	5	4	3																				
	F	5	5	5	5	4																				
50	A	5	5	5	3	3	34.5	34.7	i 34.5	34.7	34.8	21.2	21.6	i 21.2	21.5	21.5	7.3	5.7	i 7.1	6.1	6.3	7.93	7.74	i 8.01	7.68	7.76
	B	5	5	5	5	5			f 34.8					f 21.5					f 5.3					f 7.73		
	C	5	5	5	5	5																				
	D	5	5	5	5	5																				
	E	5	5	5	5	5																				
	F	5	5	5	5	4																				
100	A	5	5	5	4	3	34.7	34.9	i 34.7	34.8	34.9	21.2	21.6	i 21.2	21.4	21.3	7.3	5.6	i 7.7	5.9	6.1	7.93	7.75	i 8.00	7.69	7.74
	B	5	5	5	5	4			f 34.9					f 21.4					f 5.2					f 7.73		
	C	5	5	5	5	4																				
	D	5	5	5	5	5																				
	E	5	5	5	5	3																				
	F	5	5	5	5	5																				

Initial Counts QC'd by: EG
Initiated by: JBS/EG

Environmental Chambe B

Animal Source/Date Received: ABS 8/17/19
Age at Initiation: 18 days

Animal Acclimation Qualifiers (circle all that apply): [✓ Q22] / Q23 / Q24 / none

Feeding Times	0	24	48	72	96
AM:		0830	0805	0845	0915
PM:	1865				

Comments: i = initial reading in fresh test solution, f = final reading in test chamber prior to renewal

Organisms fed prior to initiation, circle one ([✓ y] / n)

QC Check: AC 8/28/19

Final Review: 8/28/19

Enthalpy Analytical. 4340 Vandever Avenue. San Diego, CA 92120.

Marine Acute Bioassay
Static-Renewal Conditions
DM-001

Water Quality Measurements
& Test Organism Survival

Client: Wood/POSD
Sample ID: SIYB-4
Sample Log-in No.: 19-0920
Test No.: ~~1908-S07~~ 1908-S080
Q18 AC 8/27

Test Species: *A. affinis*
Start Date/Time: 8/19/19 1900
End Date/Time: 8/23/19 1700

Tech Initials	0	24	48	72	96
Counts:	JBS/AC	RT	JBS	JBS	RT
Readings:	EG	HH	HH	BO	HH
Dilutions made by:	JBS		JBS		

Concentration %	Rep	Number of Live Organisms					Salinity (ppt)					Temperature (°C)					Dissolved Oxygen (mg/L)					pH (units)				
		0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
Lab Control	A	5	5	5	4	4	34.4	34.7	i 34.4	34.5	34.4	21.0	21.9	i 20.9	21.6	21.6	7.3	5.6	i 7.1	6.1	6.2		7.73	i 8.02	7.68	7.64
#2	B	5	5	5	5	5			f 34.6					f 21.6					f 5.3					f 7.75		
Q15	C	5	5	5	5	4																				
	D	5	5	5	3	3																				
	E	5	5	4	4	4																				
	F	5	5	5	5	5																				
25	A	5	5	4	4	4	34.3	34.5	i 34.5	34.6	34.6	21.1	21.9	i 20.9	21.8	21.7	7.3	5.6	i 6.9	6.2	6.4	7.91	7.77	i 8.01	7.66	7.73
	B	5	5	5	5	4			f 34.6					f 21.7					f 5.3					f 7.76		
	C	5	5	5	4	4																				
	D	5	5	5	4	4																				
	E	5	5	5	5	5																				
	F	5	5	5	5	4																				
50	A	5	5	5	5	5	34.5	34.6	i 34.6	34.7	34.7	21.2	22.0	i 21.0	21.6	21.7	7.4	5.2	i 7.1	6.1	6.1	7.92	7.72	i 8.02	7.67	7.71
	B	5	5	5	5	5			f 34.7					f 21.7					f 5.1					f 7.72		
	C	5	5	5	5	5																				
	D	5	5	5	5	4																				
	E	5	5	5	5	5																				
	F	5	5	5	5	5																				
100	A	5	5	5	5	5	34.7	34.7	i 34.7	34.8	34.8	21.4	22.0	i 21.3	21.7	21.9	7.4	5.3	i 7.5	5.7	6.1	7.94	7.74	i 8.01	7.66	7.69
	B	5	5	5	4	3			f 34.7					f 21.8					f 5.0					f 7.71		
	C	5	5	5	5	5																				
	D	5	5	5	5	4																				
	E	5	4	4	4	4																				
	F	5	5	5	5	5																				

Initial Counts QC'd by: EG
Initiated by: EG

Environmental Chamber: B

Animal Source/Date Received: ABS

Age at Initiation: 1 dys

Animal Acclimation Qualifiers (circle all that apply): [✓ Q22] / Q23 / Q24 / none

Feeding Times				
0	24	48	72	96
	0830	0905	0845	
1920				

5

Comments: i = initial reading in fresh test solution, f = final reading in test chamber prior to renewal

Organisms fed prior to initiation, circle one ([✓ y] / n)

QC Check: AC 8/28/19

KFP 8/28

Enthalpy Analytical. 4340 Vandever Avenue. San Diego, CA 92120.

Marine Acute Bioassay
Static-Renewal Conditions
DM-001

Water Quality Measurements
& Test Organism Survival

Client: Wood/POSD
Sample ID: SIYB-5
Sample Log-in No.: 19-0921
Test No.: 1908-S081

Test Species: *A. affinis*
Start Date/Time: 8/19/19 1900
End Date/Time: 8/23/19 1700

Tech Initials	0	24	48	72	96
Counts:	JBS/AC	RT	JBS	JBS	RT
Readings:	EG	HH	HH	BO	HH
Dilutions made by:	JBS		JBS		

Concentration %	Rep	Number of Live Organisms					Salinity (ppt)					Temperature (°C)					Dissolved Oxygen (mg/L)					pH (units)				
		0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
Lab Control	A	5	5	5	4	4	34.4	34.7	i 34.4	34.5	34.4	21.0	21.9	i 20.9	21.6	21.0	7.3	5.6	i 7.1	6.1	6.2	7.98	7.73	i 8.02	7.68	7.04
#2	B	5	5	5	5	5			f 34.6					f 21.0					f 5.3					f 7.70		
Q15	C	5	5	5	5	4																				
	D	5	5	5	3	3																				
	E	5	5	4	4	4																				
	F	5	5	5	5	5																				
25	A	5	5	5	5	5	34.3	34.8	i 34.8	34.7	34.7	20.6	22.0	i 21.0	21.8	21.7	7.4	5.5	i 6.8	6.0	6.2	7.92	7.74	i 7.99	7.67	7.70
	B	5	5	5	4	4			f 34.4					f 21.8					f 5.4					f 7.70		
	C	5	5	5	5	4																				
	D	5	5	5	5	4																				
	E	5	5	5	5	4																				
	F	5	5	5	4	3																				
50	A	5	5	4	4	3	34.5	34.6	i 34.6	34.7	34.7	20.4	22.0	i 20.9	21.7	21.7	7.5	5.5	i 7.1	6.1	6.2	7.94	7.75	i 7.98	7.69	7.74
	B	5	5	5	3	3			f 34.6					f 21.8					f 5.5					f 7.75		
	C	5	5	5	4	4																				
	D	5	5	5	5	4																				
	E	5	5	5	4	4																				
	F	5	5	4	4	3																				
100	A	5	5	4	3	3	34.7	34.7	i 34.8	34.6	34.9	20.8	22.0	i 20.8	21.8	21.7	7.4	5.5	i 7.5	5.8	6.0	7.92	7.75	i 7.98	7.70	7.70
	B	5	5	5	5	5			f 34.7					f 21.8					f 5.3					f 7.74		
	C	5	5	5	5	5																				
	D	5	5	4	3	3																				
	E	5	5	5	5	4																				
	F	5	5	5	5	5																				

Initial Counts QC'd by: EG
Initiated by: EG

Environmental Chamber: B

Animal Source/Date Received: ABS 8/17/19

Age at Initiation: 15 days

Animal Acclimation Qualifiers (circle all that apply): [✓ Q22] / Q23 / Q24 / none

Feeding Times				
0	24	48	72	96
	0830	0905	0845	091
1920				

Comments: i = initial reading in fresh test solution, f = final reading in test chamber prior to renewal

Organisms fed prior to initiation, circle one ([✓ y] / n)

QC Check: AC 8/28/19

Enthalpy Analytical. 4340 Vandever Avenue. San Diego, CA 92120.

Marine Acute Bioassay
Static-Renewal Conditions
DM-001

Water Quality Measurements
& Test Organism Survival

Client: Wood/POSD
Sample ID: SIYB-6
Sample Log-in No.: 19-0922
Test No.: 1908-5082

Test Species: *A. affinis*
Start Date/Time: 8/19/19 1900
End Date/Time: 8/23/19 1700

Tech Initials	0	24	48	72	96
Counts:	JB/AC	KRT	JBS	JBS	RT
Readings:	EG	HH	HH	BO	HH
Dilutions made by:	JBS		JBS		

Concentration %	Rep	Number of Live Organisms					Salinity (ppt)					Temperature (°C)					Dissolved Oxygen (mg/L)					(				
		0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
Lab Control	A	5	5	5	4	4	34.4	34.7	i 34.4	34.5	34.4	21.0	21.9	i 20.9	21.6	21.6	7.3	5.6	i 7.1	6.1	6.2	7.98	7.73	i 8.02	7.68	7.04
#2	B	5	5	5	6	5			f 34.6					f 21.6					f 5.3					f 7.70		
Q15	C	5	5	5	5	4																				
	D	5	5	5	3	3																				
	E	5	5	4	4	4																				
	F	5	5	5	5	5																				
25	A	5	5	4	4	3	34.5	34.4	i 34.7	34.4	34.6	21.0	22.0	i 21.1	21.7	21.8	7.3	5.7	i 6.9	6.0	6.2	7.95	7.76	i 7.91	7.70	7.72
	B	5	5	5	5	5			f 34.4					f 21.6					f 5.7					f 7.76		
	C	5	5	4	4	4																				
	D	5	5	5	5	5																				
	E	5	5	5	5	4																				
	F	5	5	4	4	4																				
50	A	5	5	5	5	4	34.5	34.5	i 34.6	34.7	34.7	21.0	22.0	i 21.1	21.8	21.8	7.3	5.4	i 7.2	6.0	6.1	7.94	7.74	i 7.85	7.69	7.71
	B	5	5	5	5	3			f 34.6					f 21.5					f 5.4					f 7.72		
	C	5	5	5	5	5																				
	D	5	5	5	5	4																				
	E	5	5	5	5	3																				
	F	5	5	4	4	4																				
100	A	5	5	5	5	3	34.9	34.7	i 34.7	34.8	34.8	21.0	22.0	i 21.0	21.8	21.7	7.5	5.5	i 7.8	5.8	6.0	7.91	7.74	i 7.89	7.69	7.70
	B	5	5	5	5	4			f 34.8					f 21.6					f 5.5					f 7.70		
	C	5	5	5	5	4																				
	D	5	5	4	4	3																				
	E	5	5	5	4	4																				
	F	5	5	5	4	4																				

Initial Counts QC'd by: EG
Initiated by: EG

Environmental Chamber: B

Animal Source/Date Received: ABS 8/17/19

Age at Initiation: 15 days

Animal Acclimation Qualifiers (circle all that apply): [✓ Q22] / Q23 / Q24 / none

Feeding Times	0	24	48	72	96
AM:		0830	0901	0845	091
PM:	1920				

Comments: i = initial reading in fresh test solution, f = final reading in test chamber prior to renewal

Organisms fed prior to initiation, circle one ([✓ y] / n)

QC Check: AC 8/28/19

Final Review: KFP 8/28/19

Enthalpy Analytical. 4340 Vandever Avenue. San Diego, CA 92120.

Marine Acute Bioassay
Static-Renewal Conditions
DM-001

Water Quality Measurements
& Test Organism Survival

Client: Wood/POSD
Sample ID: SIYB-REF
Sample Log-in No.: 19-0923
Test No.: 1908-S083

Test Species: *A. affinis*
Start Date/Time: 8/19/19 1925
End Date/Time: 8/23/19 1725

Tech Initials	**0**	**24**	**48**	**72**	**96**
Counts:	JBS/ACRT		JBS	JBS	BO
Readings:	EG	HH	HH	BO	HH
Dilutions made by:	JBS		JBS		

Concentration %	**Rep**	**Number of Live Organisms**					**Salinity (ppt)**					**Temperature (°C)**					**Dissolved Oxygen (mg/L)**					**pH (units)**				
		0	**24**	**48**	**72**	**96**	**0**	**24**	**48**	**72**	**96**	**0**	**24**	**48**	**72**	**96**	**0**	**24**	**48**	**72**	**96**	**0**	**24**	**48**	**72**	**96**
Lab Control	**A**	5	5	5	4	3	34.4	34.5	i 34.4	34.6	34.9	20.9	21.6	i 20.8	21.6	21.4	7.3	5.8	i 7.2	6.0	6.2	7.99	7.75	i 8.00	7.71	7.72
#3	**B**	5	5	5	5	4			f 34.9					f 21.6					f 5.3					f 7.72		
Q15	**C**	5	5	5	5	5																				
	D	5	5	5	4	2																				
	E	5	5	5	5	5																				
	F	5	5	5	5	4																				
25	**A**	5	5	5	5	5	34.5	34.6	i 34.5	34.6	34.7	21.0	21.9	i 21.0	21.6	21.5	7.3	5.6	i 7.0	5.9	6.0	7.97	7.77	i 7.98	7.69	7.72
	B	5	5	4	4	2			f 34.6					f 21.5					f 5.3					f 7.70		
	C	5	5	3	3	3																				
	D	5	5	4	4	2																				
	E	5	5	5	5	5																				
	F	5	5	5	4	4																				
50	**A**	5	5	5	5	4	34.5	34.6	i 34.6	34.7	34.9	20.9	21.9	i 20.9	21.6	21.4	7.3	5.7	i 7.2	5.9	6.2	7.96	7.79	i 7.98	7.69	7.77
	B	5	5	4	3	3			f 34.7					f 21.5					f 5.4					f 7.78		
	C	5	5	5	5	4																				
	D	5	5	5	4	4																				
	E	5	5	4	4	3																				
	F	5	5	5	5	5																				
100	**A**	5	5	5	5	5	34.7	34.7	i 34.7	34.8	34.9	20.8	21.8	i 20.7	21.5	21.4	7.5	5.7	i 7.7	5.8	6.1	7.94	7.77	i 7.97	7.74	7.76
	B	5	5	5	4	4			f 34.9					f 21.4					f 5.3					f 7.77		
	C	5	5	5	5	4																				
	D	5	5	5	3	3																				
	E	5	5	4	4	4																				
	F	5	5	5	5	3																				

Initial Counts QC'd by: EG
Initiated by: EG

Environmental Chamber: B

Animal Source/Date Received: ABS 8/17/19

Age at Initiation: 15 days

Animal Acclimation Qualifiers (circle all that apply): [✓ Q22] / Q23 / Q24 / none

Feeding Times	**0**	**24**	**48**	**72**	**96**
AM:		0830	0905	0845	0915
PM:	1940				

Comments: i = initial reading in fresh test solution, f = final reading in test chamber prior to renewal

Organisms fed prior to initiation, circle one ([✓ y] / n)

QC Check: AC 8/28/19

Final Review: KFP 8/28/19

Enthalpy Analytical. 4340 Vandever Avenue. San Diego, CA 92120.

Pacific Topsmelt 96-hr Survival

8/22/19 Test

CETIS Summary Report

Report Date: 28 Aug-19 12:26 (p 1 of 1)
Test Code: 1908-S134 | 16-2305-7844

Pacific Topsmelt 96-h Acute Survival Test — **Nautilus Environmental (CA)**

Batch ID:	03-8068-3403	**Test Type:**	Survival (96h)	**Analyst:**	
Start Date:	22 Aug-19 15:45	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	Natural Seawater
Ending Date:	26 Aug-19 14:20	**Species:**	Atherinops affinis	**Brine:**	Not Applicable
Duration:	95h	**Source:**	Aquatic Biosystems, CO	**Age:**	11d

Sample ID:	18-4191-9069	**Code:**	19-0917	**Client:**	Wood Environment & Infrastructure
Sample Date:	19 Aug-19 15:10	**Material:**	Ambient Sample	**Project:**	
Receive Date:	19 Aug-19 17:40	**Source:**	Shelter Island Yacht Basin		
Sample Age:	73h (7.5 °C)	**Station:**	SIYB-1		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TUa	Method
01-5492-9772	96h Survival Rate	100	>100	NA	12.1%	~~1~~ 0.59	Wilcoxon Rank Sum Two-Sample Test

PFP 8/28/19

96h Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Control	6	0.9333	0.8249	1	0.8	1	0.04216	0.1033	11.07%	0.0%
100		6	0.9	0.785	1	0.8	1	0.04472	0.1095	12.17%	3.57%

96h Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6
0	Lab Control	1	1	1	0.8	0.8	1
100		1	0.8	0.8	1	0.8	1

Analyst: JCL QA: PFP 8/28/19

CETIS Analytical Report

Report Date: 28 Aug-19 12:27 (p 1 of 2)
Test Code: 1908-S134 | 16-2305-7844

Pacific Topsmelt 96-h Acute Survival Test — **Nautilus Environmental (CA)**

Analysis ID: 01-5492-9772 **Endpoint:** 96h Survival Rate **CETIS Version:** CETISv1.8.7
Analyzed: 28 Aug-19 12:26 **Analysis:** Nonparametric-Two Sample **Official Results:** Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	12.1%	Passes 96h survival rate

Wilcoxon Rank Sum Two-Sample Test

Control	vs	C-%	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		100	36	NA	2	10	0.5000	Exact	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.004725658	0.004725658	1	0.2941	0.5995	Non-Significant Effect
Error	0.1606724	0.01606724	10			
Total	0.165398		11			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.125	14.94	0.9003	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.7633	0.8025	0.0037	Non-normal Distribution

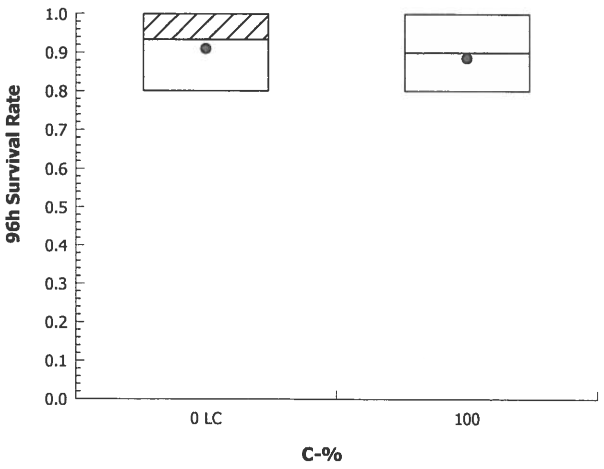
96h Survival Rate Summary

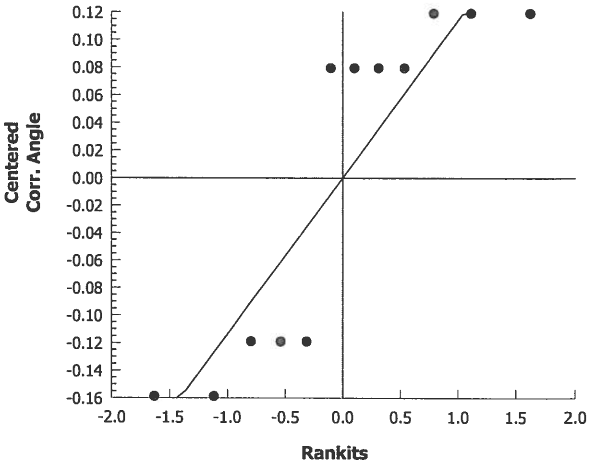
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	6	0.9333	0.8249	1	1	0.8	1	0.04216	11.07%	0.0%
100		6	0.9	0.785	1	0.9	0.8	1	0.04472	12.17%	3.57%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	6	1.266	1.137	1.395	1.345	1.107	1.345	0.0502	9.71%	0.0%
100		6	1.226	1.089	1.363	1.226	1.107	1.345	0.05325	10.64%	3.14%

Graphics





Analyst: JCL QA: KF 8/28/19

CETIS Analytical Report

Report Date:	28 Aug-19 12:27 (p 2 of 2)
Test Code:	1908-S134 | 16-2305-7844

Pacific Topsmelt 96-h Acute Survival Test — **Nautilus Environmental (CA)**

Analysis ID:	00-3777-8461	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	28 Aug-19 12:26	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	TST b	PMSD	Test Result
Angular (Corrected)	NA	C*b < T	NA	NA	0.8	8.89%	Passes 96h survival rate

TST-Welch's t Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:10%)
Lab Control		100*	3.201	1.383	0.092	9	0.0054	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.004725658	0.004725658	1	0.2941	0.5995	Non-Significant Effect
Error	0.1606724	0.01606724	10			
Total	0.165398		11			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.125	14.94	0.9003	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.7633	0.8025	0.0037	Non-normal Distribution

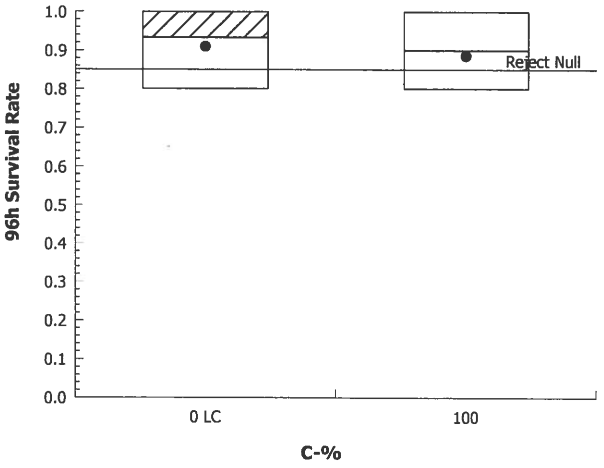
96h Survival Rate Summary

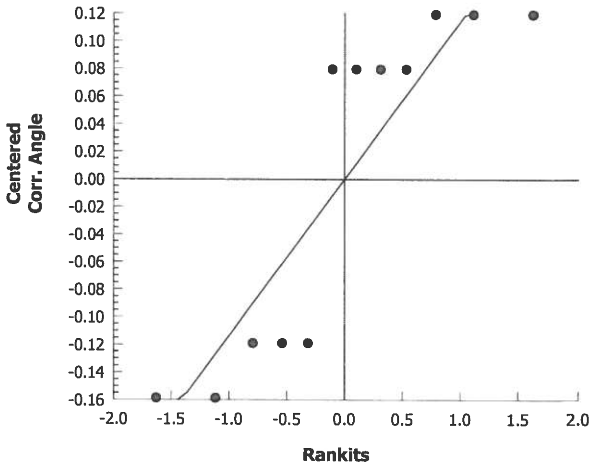
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	6	0.9333	0.8249	1	1	0.8	1	0.04216	11.07%	0.0%
100		6	0.9	0.785	1	0.9	0.8	1	0.04472	12.17%	3.57%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	6	1.266	1.137	1.395	1.345	1.107	1.345	0.0502	9.71%	0.0%
100		6	1.226	1.089	1.363	1.226	1.107	1.345	0.05325	10.64%	3.14%

Graphics





Analyst: JC QA: KP 8/28/19

CETIS Summary Report

Report Date: 28 Aug-19 13:06 (p 1 of 1)
Test Code: 1908-S135 | 03-2996-7462

Pacific Topsmelt 96-h Acute Survival Test — **Nautilus Environmental (CA)**

Batch ID:	04-8382-9193	**Test Type:**	Survival (96h)	**Analyst:**	
Start Date:	22 Aug-19 15:45	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	Natural Seawater
Ending Date:	26 Aug-19 14:20	**Species:**	Atherinops affinis	**Brine:**	Not Applicable
Duration:	95h	**Source:**	Aquatic Biosystems, CO	**Age:**	11d

Sample ID:	19-7971-6372	**Code:**	19-0918	**Client:**	Wood Environment & Infrastructure
Sample Date:	19 Aug-19 14:10	**Material:**	Ambient Sample	**Project:**	
Receive Date:	19 Aug-19 17:40	**Source:**	Shelter Island Yacht Basin		
Sample Age:	74h (4 °C)	**Station:**	SIYB-2		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TUa	Method
04-9950-0118	96h Survival Rate	100	>100	NA	11.8%	~~1~~ 0.49	Wilcoxon Rank Sum Two-Sample Test

8/28/19

96h Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Control	6	0.9333	0.8249	1	0.8	1	0.04216	0.1033	11.07%	0.0%
100		6	0.9333	0.8249	1	0.8	1	0.04216	0.1033	11.07%	0.0%

96h Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6
0	Lab Control	1	1	1	0.8	0.8	1
100		0.8	1	1	1	1	0.8

Analyst: Jc QA: 8/28/19

CETIS Analytical Report

Report Date: 28 Aug-19 13:06 (p 1 of 1)
Test Code: 1908-S135 | 03-2996-7462

Pacific Topsmelt 96-h Acute Survival Test — **Nautilus Environmental (CA)**

Analysis ID:	04-9950-0118	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	28 Aug-19 13:06	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	11.8%	Passes 96h survival rate

Wilcoxon Rank Sum Two-Sample Test

Control	vs	C-%	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		100	39	NA	2	10	0.7273	Exact	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.1512211	0.01512211	10			
Total	0.1512211		11			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1	14.94	1.0000	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.6081	0.8025	0.0001	Non-normal Distribution

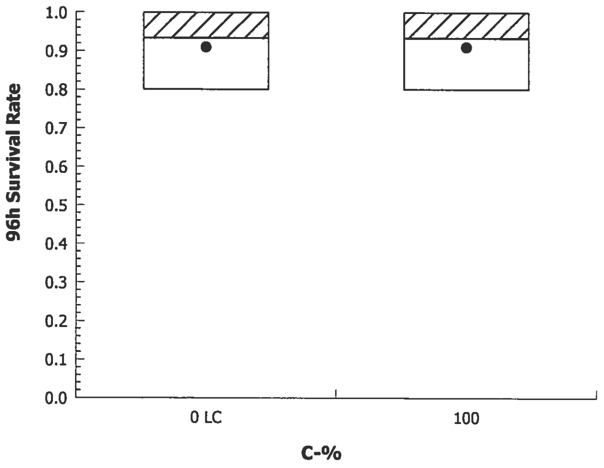
96h Survival Rate Summary

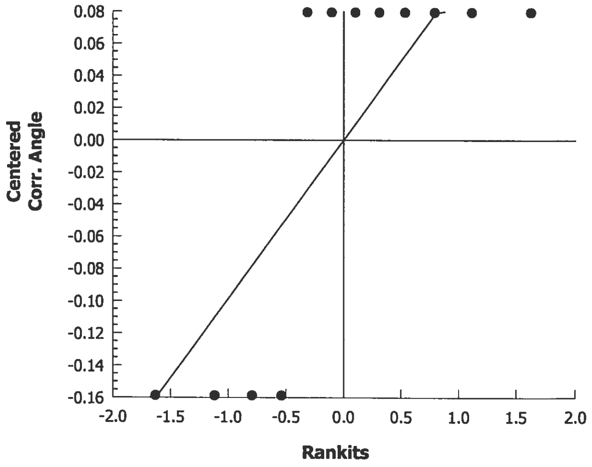
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	6	0.9333	0.8249	1	1	0.8	1	0.04216	11.07%	0.0%
100		6	0.9333	0.8249	1	1	0.8	1	0.04216	11.07%	0.0%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	6	1.266	1.137	1.395	1.345	1.107	1.345	0.0502	9.71%	0.0%
100		6	1.266	1.137	1.395	1.345	1.107	1.345	0.0502	9.71%	0.0%

Graphics





Analyst: JCL QA: KPP 8/28/19

CETIS Analytical Report

Report Date: 28 Aug-19 13:07 (p 1 of 1)
Test Code: 1908-S135 | 03-2996-7462

Pacific Topsmelt 96-h Acute Survival Test — **Nautilus Environmental (CA)**

Analysis ID:	21-4537-7273	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	28 Aug-19 13:06	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	TST b	PMSD	Test Result
Angular (Corrected)	NA	C*b < T	NA	NA	0.8	8.63%	Passes 96h survival rate

TST-Welch's t Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:10%)
Lab Control		100*	3.938	1.383	0.089	9	0.0017	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.1512211	0.01512211	10			
Total	0.1512211		11			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1	14.94	1.0000	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.6081	0.8025	0.0001	Non-normal Distribution

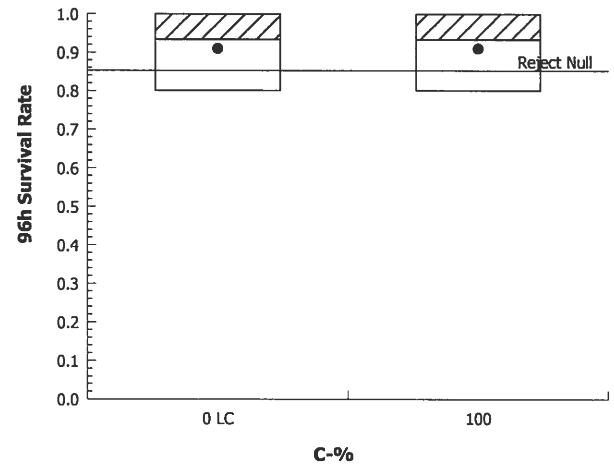
96h Survival Rate Summary

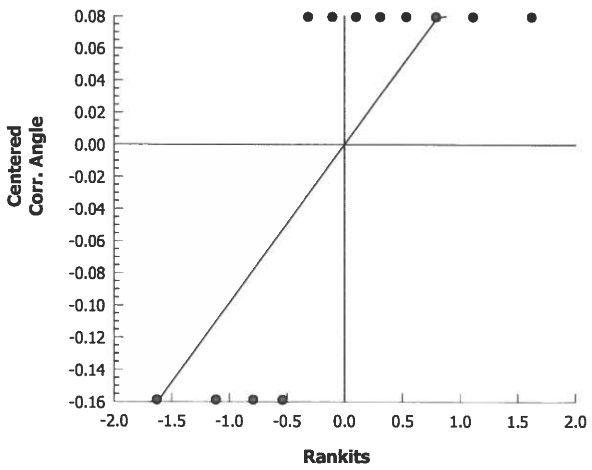
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	6	0.9333	0.8249	1	1	0.8	1	0.04216	11.07%	0.0%
100		6	0.9333	0.8249	1	1	0.8	1	0.04216	11.07%	0.0%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	6	1.266	1.137	1.395	1.345	1.107	1.345	0.0502	9.71%	0.0%
100		6	1.266	1.137	1.395	1.345	1.107	1.345	0.0502	9.71%	0.0%

Graphics





Analyst: JCL QA: 8/28/19

CETIS Summary Report

Report Date: 28 Aug-19 13:12 (p 1 of 1)
Test Code: 1908-S136 | 04-7761-7936

Pacific Topsmelt 96-h Acute Survival Test — **Nautilus Environmental (CA)**

Batch ID:	14-8016-9095	**Test Type:**	Survival (96h)	**Analyst:**	
Start Date:	22 Aug-19 15:45	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	Natural Seawater
Ending Date:	26 Aug-19 14:20	**Species:**	Atherinops affinis	**Brine:**	Not Applicable
Duration:	95h	**Source:**	Aquatic Biosystems, CO	**Age:**	11d

Sample ID:	19-8915-1992	**Code:**	19-0919	**Client:**	Wood Environment & Infrastructure
Sample Date:	19 Aug-19 13:10	**Material:**	Ambient Sample	**Project:**	
Receive Date:	19 Aug-19 17:40	**Source:**	Shelter Island Yacht Basin		
Sample Age:	75h (9 °C)	**Station:**	SIYB-3		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TUa	Method
00-3427-0387	96h Survival Rate	100	>100	NA	10.7%	~~1~~ 0.31	Wilcoxon Rank Sum Two-Sample Test

KFP QA 8/28/19

96h Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Control	6	0.9333	0.8249	1	0.8	1	0.04216	0.1033	11.07%	0.0%
100		6	0.9667	0.881	1	0.8	1	0.03333	0.08165	8.45%	-3.57%

96h Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6
0	Lab Control	1	1	1	0.8	0.8	1
100		0.8	1	1	1	1	1

Analyst: JCL QA: KFP 8/28/19

CETIS Analytical Report

Report Date: 28 Aug-19 13:12 (p 1 of 2)
Test Code: 1908-S136 | 04-7761-7936

Pacific Topsmelt 96-h Acute Survival Test

Nautilus Environmental (CA)

Analysis ID:	00-3427-0387	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	28 Aug-19 13:11	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	10.7%	Passes 96h survival rate

Wilcoxon Rank Sum Two-Sample Test

Control	vs	C-%	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		100	42	NA	2	10	0.9091	Exact	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.004725658	0.004725658	1	0.3846	0.5490	Non-Significant Effect
Error	0.1228671	0.01228671	10			
Total	0.1275928		11			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.6	14.94	0.6186	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.7008	0.8025	0.0009	Non-normal Distribution

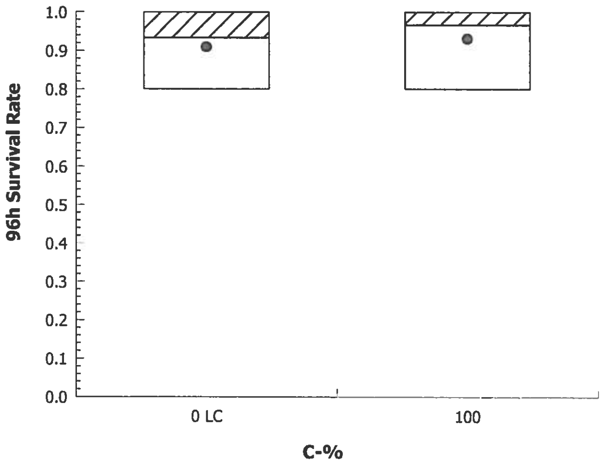
96h Survival Rate Summary

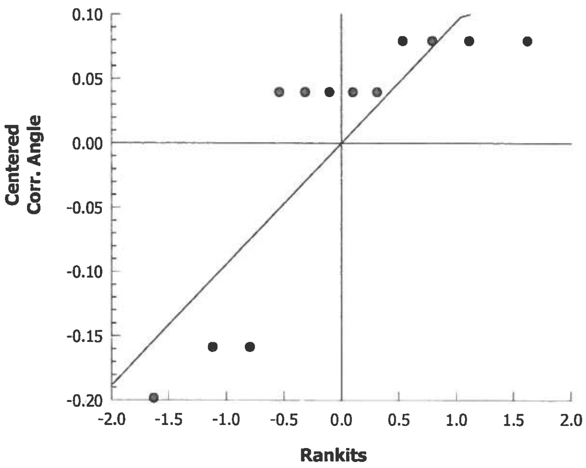
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	6	0.9333	0.8249	1	1	0.8	1	0.04216	11.07%	0.0%
100		6	0.9667	0.881	1	1	0.8	1	0.03333	8.45%	-3.57%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	6	1.266	1.137	1.395	1.345	1.107	1.345	0.0502	9.71%	0.0%
100		6	1.306	1.204	1.408	1.345	1.107	1.345	0.03969	7.45%	-3.14%

Graphics





Analyst: JCL QA: KFP 8/28/19

Pacific Topsmelt 96-h Acute Survival Test			**Nautilus Environmental (CA)**
Analysis ID: 16-0631-8634	**Endpoint:** 96h Survival Rate		**CETIS Version:** CETISv1.8.7
Analyzed: 28 Aug-19 13:12	**Analysis:** Parametric Bioequivalence-Two Sample		**Official Results:** Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	TST b	PMSD	Test Result
Angular (Corrected)	NA	C*b < T	NA	NA	0.75	7.64%	Passes 96h survival rate

TST-Welch's t Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:10%)
Lab Control		100*	6.51	1.383	0.076	9	<0.0001	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.004725658	0.004725658	1	0.3846	0.5490	Non-Significant Effect
Error	0.1228671	0.01228671	10			
Total	0.1275928		11			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.6	14.94	0.6186	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.7008	0.8025	0.0009	Non-normal Distribution

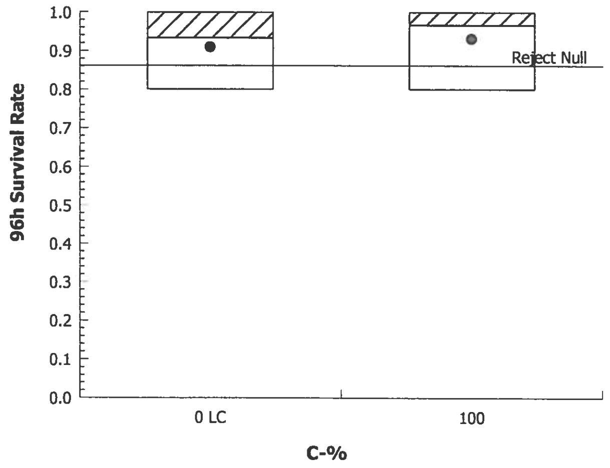
96h Survival Rate Summary

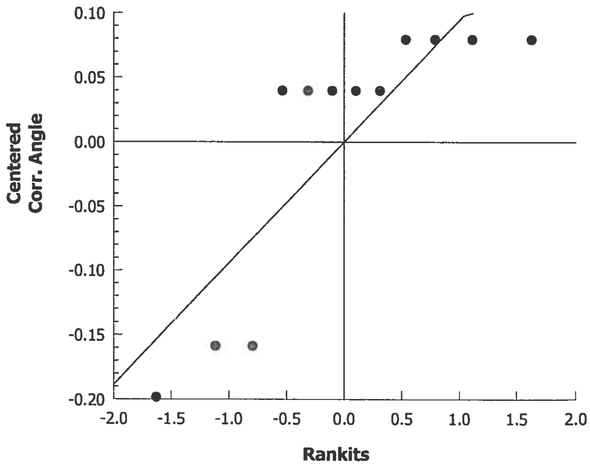
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	6	0.9333	0.8249	1	1	0.8	1	0.04216	11.07%	0.0%
100		6	0.9667	0.881	1	1	0.8	1	0.03333	8.45%	-3.57%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	6	1.266	1.137	1.395	1.345	1.107	1.345	0.0502	9.71%	0.0%
100		6	1.306	1.204	1.408	1.345	1.107	1.345	0.03969	7.45%	-3.14%

Graphics





Analyst: JC QA: KF 8/28/19

CETIS Summary Report

Report Date: 28 Aug-19 13:18 (p 1 of 1)
Test Code: 1908-S137 | 11-5652-4445

Pacific Topsmelt 96-h Acute Survival Test — **Nautilus Environmental (CA)**

Batch ID:	14-3779-9072	**Test Type:**	Survival (96h)	**Analyst:**	
Start Date:	22 Aug-19 15:45	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	Natural Seawater
Ending Date:	26 Aug-19 14:20	**Species:**	Atherinops affinis	**Brine:**	Not Applicable
Duration:	95h	**Source:**	Aquatic Biosystems, CO	**Age:**	11d

Sample ID:	09-0992-4783	**Code:**	19-0920	**Client:**	Wood Environment & Infrastructure
Sample Date:	19 Aug-19 12:10	**Material:**	Ambient Sample	**Project:**	
Receive Date:	19 Aug-19 17:40	**Source:**	Shelter Island Yacht Basin		
Sample Age:	76h (3.5 °C)	**Station:**	SIYB-4		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TUa	Method
01-6605-1373	96h Survival Rate	<100	100	NA	12.8%	~~>1~~ 0.77	Equal Variance t Two-Sample Test

KFP 8/28/18

96h Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Control	6	0.9333	0.8249	1	0.8	1	0.04216	0.1033	11.07%	0.0%
100		6	0.8	0.6673	0.9327	0.6	1	0.05164	0.1265	15.81%	14.29%

96h Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6
0	Lab Control	1	1	1	0.8	0.8	1
100		0.8	1	0.6	0.8	0.8	0.8

Analyst: JC QA: KFP 8/28/19

CETIS Analytical Report

Report Date: 28 Aug-19 13:18 (p 1 of 2)
Test Code: 1908-S137 | 11-5652-4445

Pacific Topsmelt 96-h Acute Survival Test **Nautilus Environmental (CA)**

Analysis ID:	01-6605-1373	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	28 Aug-19 13:17	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	12.8%	Fails 96h survival rate

Equal Variance t Two-Sample Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		100*	2.006	1.812	0.141	10	0.0363	CDF	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.072926	0.072926	1	4.026	0.0726	Non-Significant Effect
Error	0.1811426	0.01811426	10			
Total	0.2540686		11			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.396	14.94	0.7234	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9149	0.8025	0.2464	Normal Distribution

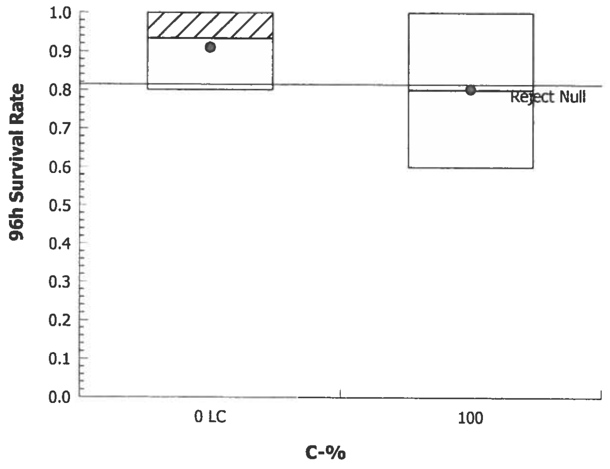
96h Survival Rate Summary

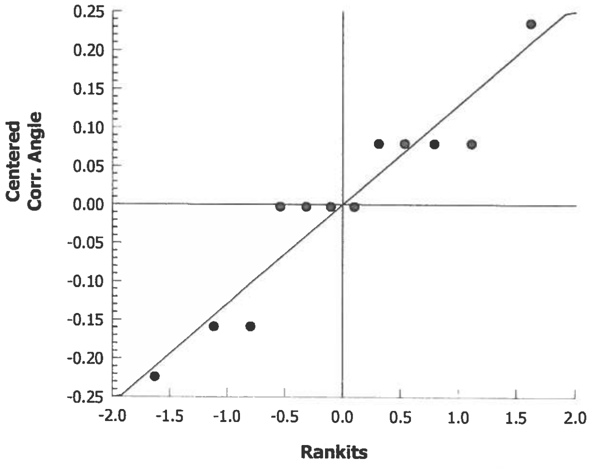
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	6	0.9333	0.8249	1	1	0.8	1	0.04216	11.07%	0.0%
100		6	0.8	0.6673	0.9327	0.8	0.6	1	0.05164	15.81%	14.29%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	6	1.266	1.137	1.395	1.345	1.107	1.345	0.0502	9.71%	0.0%
100		6	1.11	0.9575	1.262	1.107	0.8861	1.345	0.05931	13.09%	12.32%

Graphics





Analyst: JCL QA: KFP 8/28/19

CETIS Analytical Report

Report Date: 28 Aug-19 13:18 (p 2 of 2)
Test Code: 1908-S137 | 11-5652-4445

Pacific Topsmelt 96-h Acute Survival Test — **Nautilus Environmental (CA)**

Analysis ID:	21-4581-8067	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	28 Aug-19 13:17	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	TST b	PMSD	Test Result
Angular (Corrected)	NA	C*b < T	NA	NA	0.8	9.49%	Fails 96h survival rate

TST-Welch's t Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:10%)
Lab Control		100	1.358	1.397	0.100	8	0.1058	CDF	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.072926	0.072926	1	4.026	0.0726	Non-Significant Effect
Error	0.1811426	0.01811426	10			
Total	0.2540686		11			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.396	14.94	0.7234	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9149	0.8025	0.2464	Normal Distribution

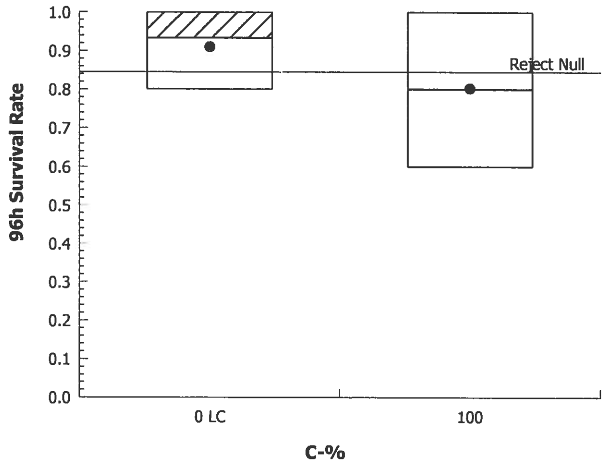
96h Survival Rate Summary

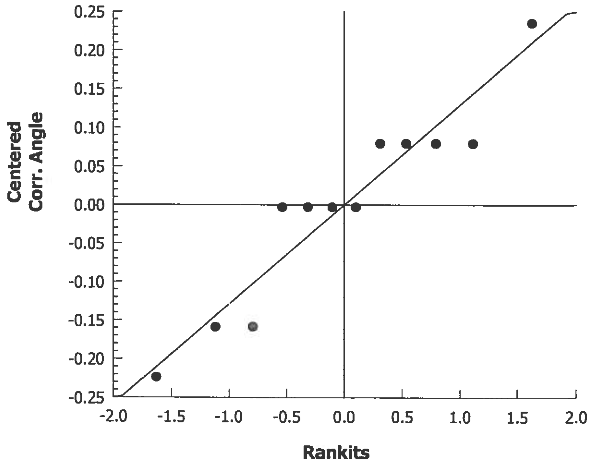
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	6	0.9333	0.8249	1	1	0.8	1	0.04216	11.07%	0.0%
100		6	0.8	0.6673	0.9327	0.8	0.6	1	0.05164	15.81%	14.29%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	6	1.266	1.137	1.395	1.345	1.107	1.345	0.0502	9.71%	0.0%
100		6	1.11	0.9575	1.262	1.107	0.8861	1.345	0.05931	13.09%	12.32%

Graphics





Analyst: JU QA: KP 8/28/19

CETIS Summary Report

Report Date:	28 Aug-19 13:23 (p 1 of 1)
Test Code:	1908-S138 | 15-6388-0959

Pacific Topsmelt 96-h Acute Survival Test — **Nautilus Environmental (CA)**

Batch ID:	21-2291-1552	**Test Type:**	Survival (96h)	**Analyst:**	
Start Date:	22 Aug-19 15:45	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	Natural Seawater
Ending Date:	26 Aug-19 14:20	**Species:**	Atherinops affinis	**Brine:**	Not Applicable
Duration:	95h	**Source:**	Aquatic Biosystems, CO	**Age:**	11d

Sample ID:	11-1365-9793	**Code:**	19-0921	**Client:**	Wood Environment & Infrastructure
Sample Date:	19 Aug-19 11:00	**Material:**	Ambient Sample	**Project:**	
Receive Date:	19 Aug-19 17:40	**Source:**	Shelter Island Yacht Basin		
Sample Age:	77h (8.5 °C)	**Station:**	SIYB-5		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU$_a$	Method
09-4537-8586	96h Survival Rate	100	>100	NA	10.7%	~~1~~ 0.31	Wilcoxon Rank Sum Two-Sample Test

KFPQ18 8/28/19

96h Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Control	6	0.9333	0.8249	1	0.8	1	0.04216	0.1033	11.07%	0.0%
100		6	0.9667	0.881	1	0.8	1	0.03333	0.08165	8.45%	-3.57%

96h Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6
0	Lab Control	1	1	1	0.8	0.8	1
100		1	1	1	1	1	0.8

Analyst: JCL QA: KFP 8/28/19

CETIS Analytical Report

Report Date: 28 Aug-19 13:23 (p 1 of 2)
Test Code: 1908-S138 | 15-6388-0959

Pacific Topsmelt 96-h Acute Survival Test — **Nautilus Environmental (CA)**

Analysis ID:	09-4537-8586	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	28 Aug-19 13:23	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	10.7%	Passes 96h survival rate

Wilcoxon Rank Sum Two-Sample Test

Control	vs	C-%	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		100	42	NA	2	10	0.9091	Exact	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.004725658	0.004725658	1	0.3846	0.5490	Non-Significant Effect
Error	0.1228671	0.01228671	10			
Total	0.1275928		11			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.6	14.94	0.6186	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.7008	0.8025	0.0009	Non-normal Distribution

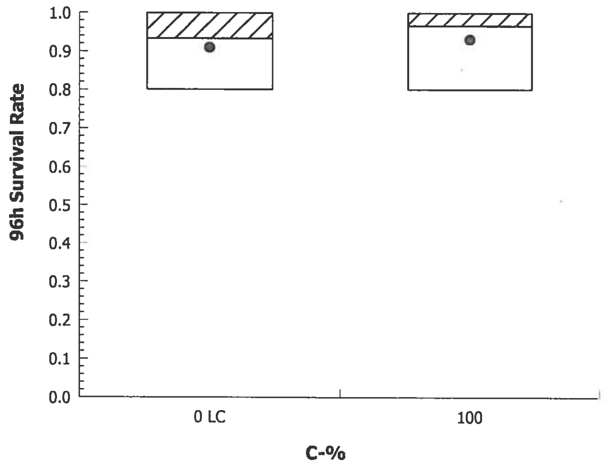
96h Survival Rate Summary

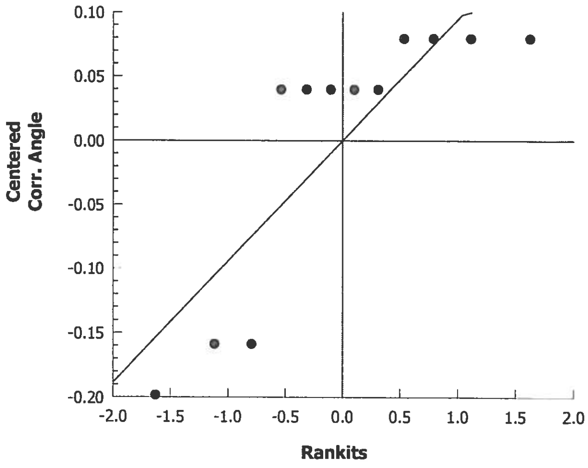
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	6	0.9333	0.8249	1	1	0.8	1	0.04216	11.07%	0.0%
100		6	0.9667	0.881	1	1	0.8	1	0.03333	8.45%	-3.57%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	6	1.266	1.137	1.395	1.345	1.107	1.345	0.0502	9.71%	0.0%
100		6	1.306	1.204	1.408	1.345	1.107	1.345	0.03969	7.45%	-3.14%

Graphics





Analyst: JCL QA: KF 8/28/19

Pacific Topsmelt 96-h Acute Survival Test

Nautilus Environmental (CA)

Analysis ID:	13-6557-7712	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	28 Aug-19 13:23	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	TST b	PMSD	Test Result
Angular (Corrected)	NA	C*b < T	NA	NA	0.8	7.82%	Passes 96h survival rate

TST-Welch's t Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:10%)
Lab Control		100*	5.187	1.383	0.078	9	0.0003	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.004725658	0.004725658	1	0.3846	0.5490	Non-Significant Effect
Error	0.1228671	0.01228671	10			
Total	0.1275928		11			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.6	14.94	0.6186	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.7008	0.8025	0.0009	Non-normal Distribution

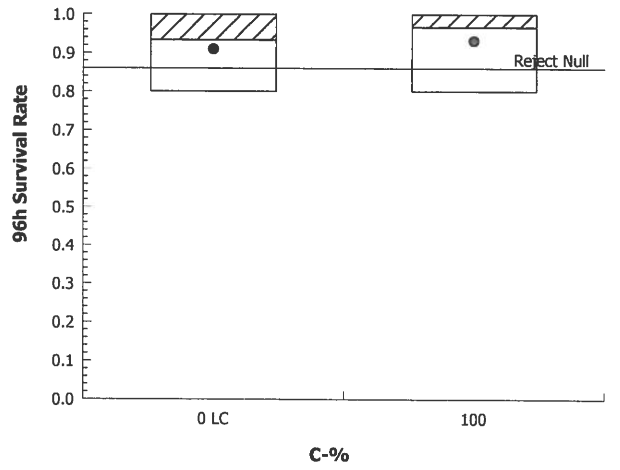
96h Survival Rate Summary

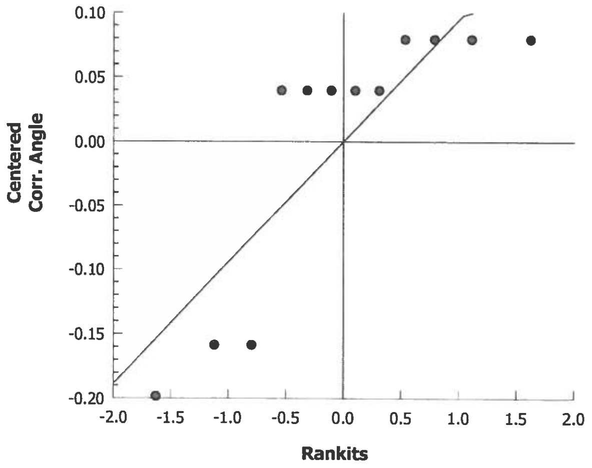
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	6	0.9333	0.8249	1	1	0.8	1	0.04216	11.07%	0.0%
100		6	0.9667	0.881	1	1	0.8	1	0.03333	8.45%	-3.57%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	6	1.266	1.137	1.395	1.345	1.107	1.345	0.0502	9.71%	0.0%
100		6	1.306	1.204	1.408	1.345	1.107	1.345	0.03969	7.45%	-3.14%

Graphics





Analyst: JC QA: KF 8/28/19

CETIS Summary Report

Report Date: 28 Aug-19 13:27 (p 1 of 1)
Test Code: 1908-S139 | 05-7139-6481

Pacific Topsmelt 96-h Acute Survival Test — **Nautilus Environmental (CA)**

Batch ID:	10-2090-4517	**Test Type:**	Survival (96h)	**Analyst:**	
Start Date:	22 Aug-19 15:45	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	Natural Seawater
Ending Date:	26 Aug-19 14:20	**Species:**	Atherinops affinis	**Brine:**	Not Applicable
Duration:	95h	**Source:**	Aquatic Biosystems, CO	**Age:**	11d

Sample ID:	17-7903-9394	**Code:**	19-0922	**Client:**	Wood Environment & Infrastructure
Sample Date:	19 Aug-19 10:00	**Material:**	Ambient Sample	**Project:**	
Receive Date:	19 Aug-19 17:40	**Source:**	Shelter Island Yacht Basin		
Sample Age:	78h (5.4 °C)	**Station:**	SIYB-6		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TUa	Method
13-9827-5146	96h Survival Rate	100	>100	NA	11.8%	~~1~~ 0.49	Wilcoxon Rank Sum Two-Sample Test

KFP Q18
8/28/19

96h Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Control	6	0.9333	0.8249	1	0.8	1	0.04216	0.1033	11.07%	0.0%
100		6	0.9333	0.8249	1	0.8	1	0.04216	0.1033	11.07%	0.0%

96h Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6
0	Lab Control	1	1	1	0.8	0.8	1
100		1	1	0.8	1	0.8	1

Analyst: JC QA: KFP 8/28/19

CETIS Analytical Report

Report Date:	28 Aug-19 13:27 (p 1 of 2)
Test Code:	1908-S139 | 05-7139-6481

Pacific Topsmelt 96-h Acute Survival Test **Nautilus Environmental (CA)**

Analysis ID:	13-9827-5146	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	28 Aug-19 13:27	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	11.8%	Passes 96h survival rate

Wilcoxon Rank Sum Two-Sample Test

Control	vs	C-%	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		100	39	NA	2	10	0.7273	Exact	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.1512211	0.01512211	10			
Total	0.1512211		11			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1	14.94	1.0000	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.6081	0.8025	0.0001	Non-normal Distribution

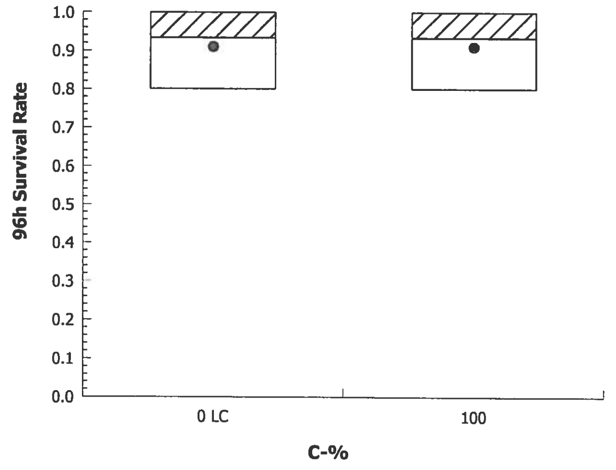
96h Survival Rate Summary

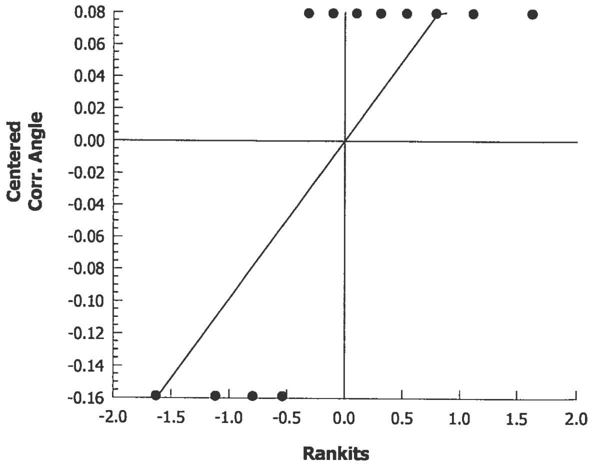
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	6	0.9333	0.8249	1	1	0.8	1	0.04216	11.07%	0.0%
100		6	0.9333	0.8249	1	1	0.8	1	0.04216	11.07%	0.0%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	6	1.266	1.137	1.395	1.345	1.107	1.345	0.0502	9.71%	0.0%
100		6	1.266	1.137	1.395	1.345	1.107	1.345	0.0502	9.71%	0.0%

Graphics





Analyst: JCL QA: KF 8/28/19

CETIS Analytical Report

Report Date: 28 Aug-19 13:27 (p 2 of 2)
Test Code: 1908-S139 | 05-7139-6481

Pacific Topsmelt 96-h Acute Survival Test **Nautilus Environmental (CA)**

Analysis ID:	00-0877-4789	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	28 Aug-19 13:27	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	TST b	PMSD	Test Result
Angular (Corrected)	NA	C*b < T	NA	NA	0.8	8.63%	Passes 96h survival rate

TST-Welch's t Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:10%)
Lab Control		100*	3.938	1.383	0.089	9	0.0017	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.1512211	0.01512211	10			
Total	0.1512211		11			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1	14.94	1.0000	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.6081	0.8025	0.0001	Non-normal Distribution

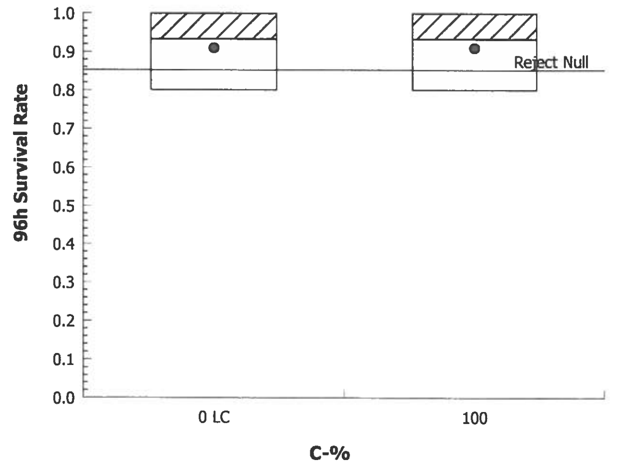
96h Survival Rate Summary

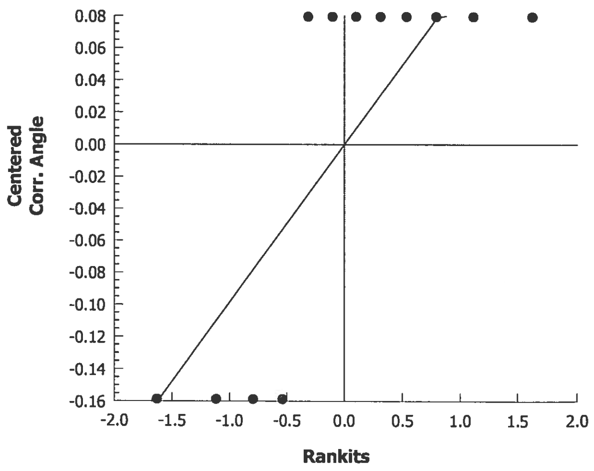
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	6	0.9333	0.8249	1	1	0.8	1	0.04216	11.07%	0.0%
100		6	0.9333	0.8249	1	1	0.8	1	0.04216	11.07%	0.0%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	6	1.266	1.137	1.395	1.345	1.107	1.345	0.0502	9.71%	0.0%
100		6	1.266	1.137	1.395	1.345	1.107	1.345	0.0502	9.71%	0.0%

Graphics





Analyst: JC QA: KP 8/28/19

CETIS Summary Report

Report Date: 28 Aug-19 13:31 (p 1 of 1)
Test Code: 1908-S140 | 04-8465-7402

Pacific Topsmelt 96-h Acute Survival Test — **Nautilus Environmental (CA)**

Batch ID:	06-6837-4929	**Test Type:**	Survival (96h)	**Analyst:**	
Start Date:	22 Aug-19 15:45	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	Natural Seawater
Ending Date:	26 Aug-19 14:20	**Species:**	Atherinops affinis	**Brine:**	Not Applicable
Duration:	95h	**Source:**	Aquatic Biosystems, CO	**Age:**	11d

Sample ID:	09-9664-0619	**Code:**	19-0923	**Client:**	Wood Environment & Infrastructure
Sample Date:	19 Aug-19 09:00	**Material:**	Ambient Sample	**Project:**	
Receive Date:	19 Aug-19 17:40	**Source:**	Shelter Island Yacht Basin		
Sample Age:	79h (5 °C)	**Station:**	SIYB-REF		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TUa	Method
15-5499-4072	96h Survival Rate	100	>100	NA	10.7%	~~1~~ 0.31	Wilcoxon Rank Sum Two-Sample Test

KFP 8/28/19

96h Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Control	6	0.9333	0.8249	1	0.8	1	0.04216	0.1033	11.07%	0.0%
100		6	0.9667	0.881	1	0.8	1	0.03333	0.08165	8.45%	-3.57%

96h Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6
0	Lab Control	1	1	1	0.8	0.8	1
100		1	1	1	1	0.8	1

Analyst: JC QA: KFP 8/28/19

CETIS Analytical Report

Report Date:	28 Aug-19 13:31 (p 1 of 2)
Test Code:	1908-S140 | 04-8465-7402

Pacific Topsmelt 96-h Acute Survival Test — **Nautilus Environmental (CA)**

Analysis ID:	15-5499-4072	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	28 Aug-19 13:31	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	10.7%	Passes 96h survival rate

Wilcoxon Rank Sum Two-Sample Test

Control	vs	C-%	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		100	42	NA	2	10	0.9091	Exact	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.004725658	0.004725658	1	0.3846	0.5490	Non-Significant Effect
Error	0.1228671	0.01228671	10			
Total	0.1275928		11			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.6	14.94	0.6186	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.7008	0.8025	0.0009	Non-normal Distribution

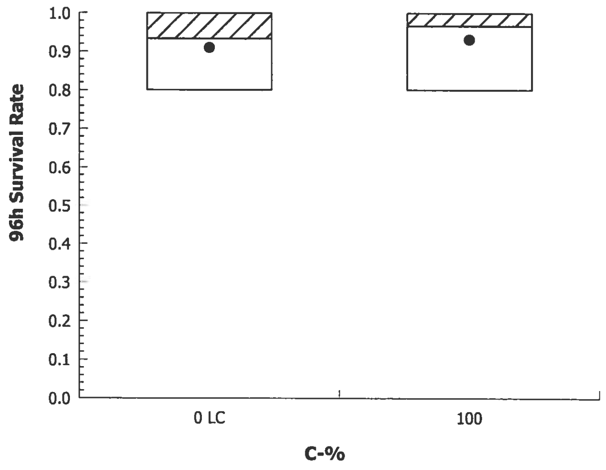
96h Survival Rate Summary

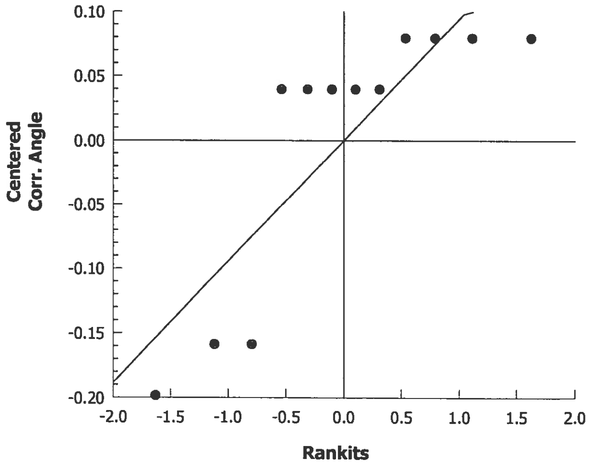
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	6	0.9333	0.8249	1	1	0.8	1	0.04216	11.07%	0.0%
100		6	0.9667	0.881	1	1	0.8	1	0.03333	8.45%	-3.57%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	6	1.266	1.137	1.395	1.345	1.107	1.345	0.0502	9.71%	0.0%
100		6	1.306	1.204	1.408	1.345	1.107	1.345	0.03969	7.45%	-3.14%

Graphics





Analyst: JCL QA: KF 8/28/19

CETIS Analytical Report

Report Date: 28 Aug-19 13:31 (p 2 of 2)
Test Code: 1908-S140 | 04-8465-7402

Pacific Topsmelt 96-h Acute Survival Test | **Nautilus Environmental (CA)**

Analysis ID:	15-1309-4075	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	28 Aug-19 13:31	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	TST b	PMSD	Test Result
Angular (Corrected)	NA	C*b < T	NA	NA	0.8	7.82%	Passes 96h survival rate

TST-Welch's t Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:10%)
Lab Control		100*	5.187	1.383	0.078	9	0.0003	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.004725658	0.004725658	1	0.3846	0.5490	Non-Significant Effect
Error	0.1228671	0.01228671	10			
Total	0.1275928		11			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.6	14.94	0.6186	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.7008	0.8025	0.0009	Non-normal Distribution

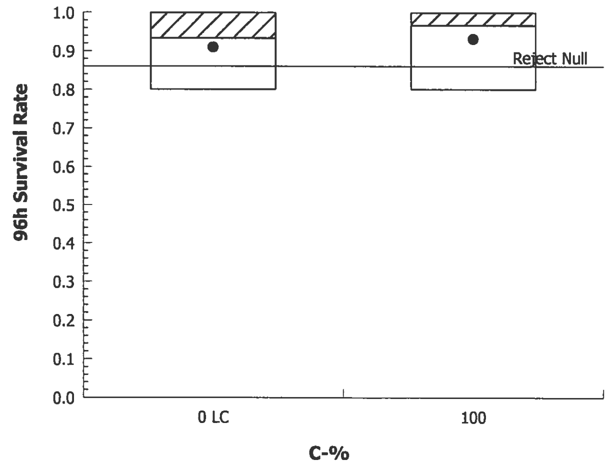
96h Survival Rate Summary

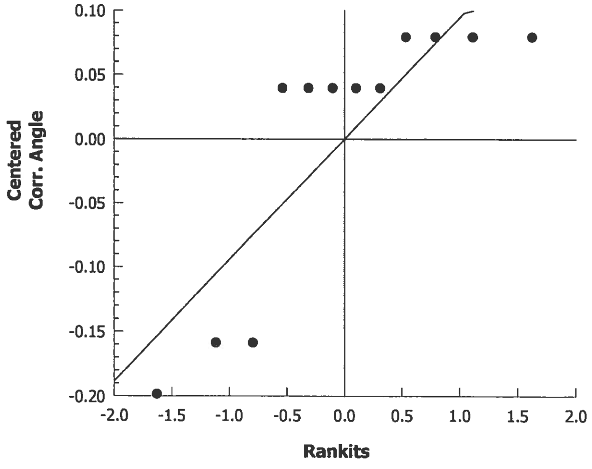
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	6	0.9333	0.8249	1	1	0.8	1	0.04216	11.07%	0.0%
100		6	0.9667	0.881	1	1	0.8	1	0.03333	8.45%	-3.57%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	6	1.266	1.137	1.395	1.345	1.107	1.345	0.0502	9.71%	0.0%
100		6	1.306	1.204	1.408	1.345	1.107	1.345	0.03969	7.45%	-3.14%

Graphics





Analyst: JCL QA: KFP 8/28/19

Marine Acute Bioassay
Static-Renewal Conditions
DM-001

Water Quality Measurements
& Test Organism Survival

Client: Wood/POSD
Sample ID: SIYB
Sample Log-in No.: 19-0917 to 0923
Test No.: 1908-S134 to S140

Test Species: *A. affinis*
Start Date/Time: 8/22/2019 1545
End Date/Time: 8/26/2019 1420

Tech Initials	0	24	48	72	96
Counts:	TN	RT	TN	JBS	JBS
Readings:	AC	HH	TN	JBS	ABS
Dilutions made by:	TN		RT		

Concentration 100%	Rep	Number of Live Organisms					Salinity (ppt)					Temperature (°C)					Dissolved Oxygen (mg/L)					pH (units)				
		0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
Lab Control	A	5	5	5	5	5	34.2	34.3	i 34.4	34.3	34.7	20.1	21.7	i 20.7	21.8	20.7	6.9	6.4	i 7.3	6.2	5.7	7.94	7.82	i 7.73	7.91	7.66
	B	5	5	5	5	5			f 34.3					f 21.7					f 6.2					f 7.66		
	C	5	5	5	5	5																				
	D	5	5	4	4	4																				
	E	5	5	5	4	4																				
	F	5	5	5	5	5																				
5134 SIYB-1	A	5	5	5	5	5	34.5	34.7	i 34.7	34.8	34.9	20.3	21.7	i 20.6	21.7	20.7	7.9	6.2	i 7.7	6.4	5.8	7.97	7.82	i 7.94	7.92	7.70
	B	5	5	5	4	4			f 34.7					f 21.7					f 5.9					f 7.66		
	C	5	5	5	4	4																				
	D	5	5	5	5	5																				
	E	5	5	5	4	4																				
	F	5	5	5	5	5																				
5135 SIYB-2	A	5	5	5	4	4	34.5	34.0	i 34.7	34.7	34.6	20.3	21.6	i 20.7	21.7	20.6	8.2	6.3	i 7.7	6.0	5.8	7.98	7.84	i 7.96	7.91	7.72
	B	5	5	5	5	5			f 34.6					f 21.7					f 5.8					f 7.67		
	C	5	5	5	5	5																				
	D	5	5	5	5	5																				
	E	5	5	5	5	5																				
	F	5	5	4	4	4																				
5136 SIYB-3	A	5	5	5	5	4	34.4	34.9	i 34.6	34.7	35.0	20.1	21.5	i 20.7	21.7	20.7	8.1	6.2	i 7.8	6.2	6.0	7.97	7.81	i 7.95	7.74	7.74
	B	5	5	5	5	5			f 34.6					f 21.7					f 5.7					f 7.68		
	C	5	5	5	5	5																				
	D	5	5	5	5	5																				
	E	5	5	5	5	5																				
	F	5	5	5	5	5																				

Initial Counts QC'd by: JBS/AC
Initiated by: JBS/AC

Environmental Chamber: B

Animal Source/Date Received: ABS 8/20/19

Age at Initiation: 11 days

Animal Acclimation Qualifiers (circle all that apply): [✓ Q22] / Q23 / Q24 / none

Feeding Times	0	24	48	72	96
AM:		0915	0940	0840	0855
PM:	1700				

Comments: i = initial reading in fresh test solution, f = final reading in test chamber prior to renewal
Organisms fed prior to initiation, circle one ([✓ y] / n)

QC Check: AC 8/28/19

Final Review: KFP 8/28/19

Enthalpy Analytical. 4340 Vandever Avenue. San Diego, CA 92120.

Marine Acute Bioassay
Static-Renewal Conditions
DM-001

Water Quality Measurements
& Test Organism Survival

Client: Wood/POSD
Sample ID: SIYB
Sample Log-in No.: 19-0917 to 0923
Test No.: 1908-S134 to S140

Test Species: *A. affinis*
Start Date/Time: 8/22/2019 1545
End Date/Time: 8/26/2019 1420

Tech Initials	0	24	48	72	96
Counts:	TN	RT	TN	~~JBS~~	JBS
Readings:	AC	HH	TN	JBS	AS
Dilutions made by:	TN		RT		

	Concentration 100%	Rep	Number of Live Organisms					Salinity (ppt)					Temperature (°C)					Dissolved Oxygen (mg/L)					pH (units)				
			0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
	SIYB-4	A	5	5	5	5	4	34.4	34.8	i 34.7	34.6	34.5	20.3	21.6	i 20.7	21.8	20.7	8.2	6.1	i 7.8	6.0	5.9	7.97	7.82	i 7.97	7.71	7.74
S137		B	5	5	5	5	5			f 34.7					f 21.7					f 5.7					f 7.61		
		C	5	5	5	5	3																				
		D	5	4	4	4	4																				
		E	5	5	5	5	4																				
		F	5	5	4	4	4																				
S138	SIYB-5	A	5	5	5	5	5	34.8	34.5	i 34.6	34.7	34.5	20.1	21.6	i 20.7	21.7	20.7	8.3	6.3	i ~~7.8~~	6.1	6.0	7.94	7.83	i 7.83	7.71	7.74
		B	5	5	5	5	5			f 34.6					f 21.6					f 6.0					f 7.63		
		C	5	5	5	5	5																				
		D	5	5	5	5	5																				
		E	5	5	5	5	5																				
		F	5	5	5	4	4																				
	SIYB-6	A	5	5	5	5	Ⓐ ~~4~~ 5	34.5	34.5	i 34.7	34.8	34.5	20.8	21.6	i 20.9	21.7	20.7	8.2	6.4	i 7.8	6.2	6.1	7.88	7.81	i 7.82	7.75	7.72
S139		B	5	5	5	5	5			f 34.7					f 21.6					f 5.9					f 7.68		
		C	5	5	4	4	4																				
		D	5	5	5	5	5																				
		E	5	5	4	4	4																				
		F	5	5	5	5	5																				
	SIYB-REF	A	5	5	5	5	5	34.4	34.6	i 34.8	34.8	34.6	20.1	21.6	i 20.7	21.6	20.6	8.3	6.2	i 7.8	6.1	6.1	7.94	7.80	i 7.54	7.80	7.72
S140		B	5	5	5	5	5			f 34.5					f 21.7					f 5.7					f 7.58		
		C	5	5	5	5	5																				
		D	5	5	5	5	5																				
		E	5	5	5	5	4																				
		F	5	5	5	5	5																				

Initial Counts QC'd by: JBS/AC
Initiated by: JBS/AC

Environmental Chamber: B

Animal Source/Date Received: ABS 8/20/19

Age at Initiation: 11 days

Animal Acclimation Qualifiers (circle all that apply): [✓ Q22] / Q23 / Q24 / none

Feeding Times	0	24	48	72	96
AM:		0915	0940	0840	0855
PM:	1700				

Comments: i = initial reading in fresh test solution, f = final reading in test chamber prior to renewal
Organisms fed prior to initiation, circle one ([✓ y] / n) Ⓐ Q18 JBS 8/26/19

QC Check: AC 8/28/19

Final Review: KFP 8/28/19

Enthalpy Analytical. 4340 Vandever Avenue. San Diego, CA 92120.

Pacific Topsmelt 96-hr Survival

9/10/19 Test

CETIS Summary Report

Report Date: 27 Sep-19 09:54 (p 1 of 1)
Test Code: 1909-S169 | 07-9248-3596

Pacific Topsmelt 96-h Acute Survival Test — **Nautilus Environmental (CA)**

Batch ID:	17-7567-7099	**Test Type:**	Survival (96h)	**Analyst:**	
Start Date:	10 Sep-19 10:25	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	ⓐ ~~Natural Seawater~~ N/A
Ending Date:	14 Sep-19 09:30	**Species:**	Atherinops affinis	**Brine:**	Not Applicable
Duration:	95h	**Source:**	Aquatic Biosystems, CO	**Age:**	15d

Sample ID:	01-8882-3065	**Code:**	19-0975	**Client:**	Wood Environment & Infrastructure
Sample Date:	09 Sep-19 09:00	**Material:**	Ambient Sample	**Project:**	POSD/SIYB TMDL
Receive Date:	09 Sep-19 11:00	**Source:**	Shelter Island Yacht Basin		
Sample Age:	25h (7 °C)	**Station:**	SIYB-REF		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TUa	Method
11-5952-6045	96h Survival Rate	100	>100	NA	8.59%	Q18 ~~1~~ 0.31 BO 9/27/19	Wilcoxon Rank Sum Two-Sample Test

96h Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Control	6	1	1	1	1	1	0	0	0.0%	0.0%
100		6	0.9667	0.881	1	0.8	1	0.03333	0.08165	8.45%	3.33%

96h Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6
0	Lab Control	1	1	1	1	1	1
100		1	0.8	1	1	1	1

ⓐ Q18 AC10/2/19

Analyst: BO QA: AC10/2/19

CETIS Analytical Report

Report Date:	27 Sep-19 09:54 (p 1 of 2)
Test Code:	1909-S169 | 07-9248-3596

Pacific Topsmelt 96-h Acute Survival Test — **Nautilus Environmental (CA)**

Analysis ID:	11-5952-6045	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	27 Sep-19 9:53	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	8.59%	Passes 96h survival rate

Wilcoxon Rank Sum Two-Sample Test

Control	vs	C-%	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		100	36	NA	1	10	0.5000	Exact	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.004725658	0.004725658	1	1	0.3409	Non-Significant Effect
Error	0.04725658	0.004725658	10			
Total	0.05198224		11			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Mod Levene Equality of Variance	1	10.04	0.3409	Equal Variances
Variances	Levene Equality of Variance	6.25	10.04	0.0314	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.5612	0.8025	<0.0001	Non-normal Distribution

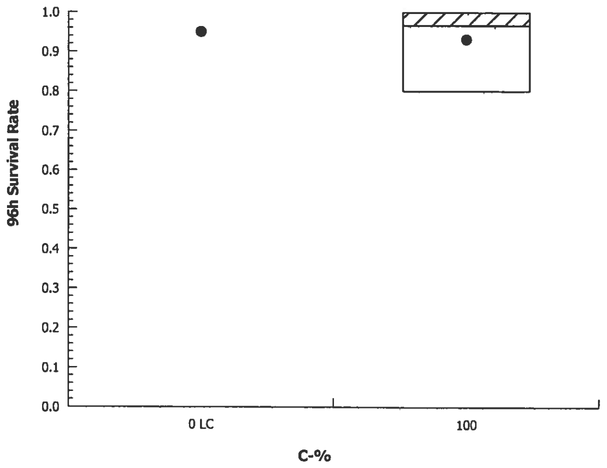
96h Survival Rate Summary

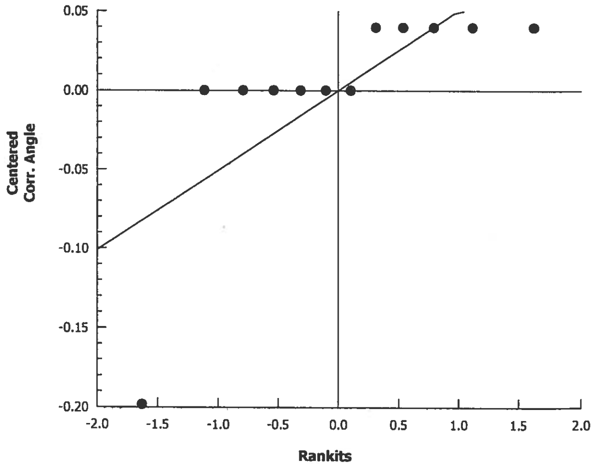
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	6	1	1	1	1	1	1	0	0.0%	0.0%
100		6	0.9667	0.881	1	1	0.8	1	0.03333	8.45%	3.33%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	6	1.345	1.345	1.345	1.345	1.345	1.345	0	0.0%	0.0%
100		6	1.306	1.204	1.408	1.345	1.107	1.345	0.03969	7.45%	2.95%

Graphics





Analyst: BO QA: AC 10/2/19

CETIS Analytical Report

TST

Report Date:	27 Sep-19 09:54 (p 2 of 2)
Test Code:	1909-S169 | 07-9248-3596

Pacific Topsmelt 96-h Acute Survival Test **Nautilus Environmental (CA)**

Analysis ID:	11-7133-0920	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	27 Sep-19 9:53	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	TST b	PMSD	Test Result
Angular (Corrected)	NA	C*b < T	NA	NA	0.8	7.86%	Passes 96h survival rate

TST-Welch's t Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:10%)
Lab Control		100*	5.779	1.476	0.059	5	0.0011	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.004725658	0.004725658	1	1	0.3409	Non-Significant Effect
Error	0.04725658	0.004725658	10			
Total	0.05198224		11			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Mod Levene Equality of Variance	1	10.04	0.3409	Equal Variances
Variances	Levene Equality of Variance	6.25	10.04	0.0314	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.5612	0.8025	<0.0001	Non-normal Distribution

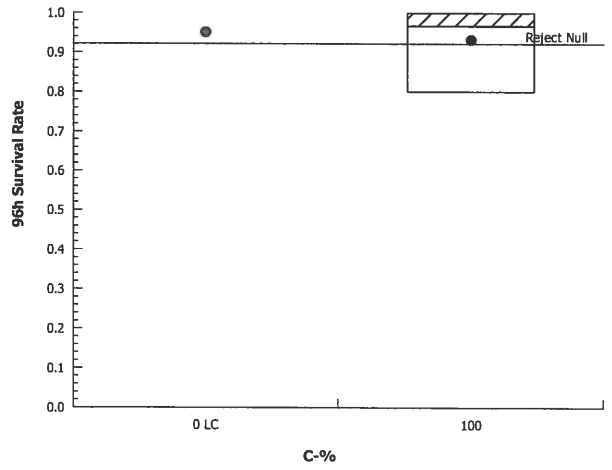
96h Survival Rate Summary

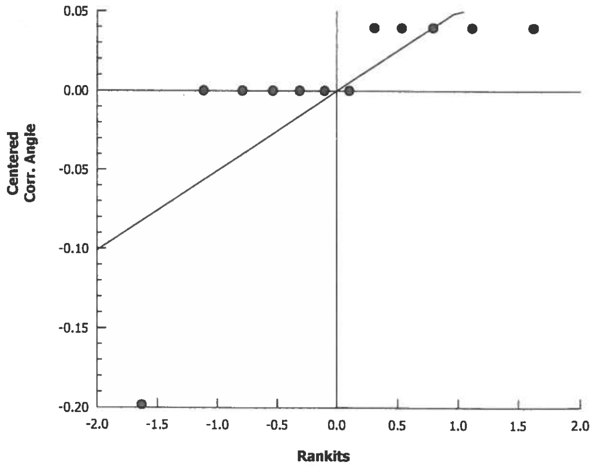
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	6	1	1	1	1	1	1	0	0.0%	0.0%
100		6	0.9667	0.881	1	1	0.8	1	0.03333	8.45%	3.33%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	6	1.345	1.345	1.345	1.345	1.345	1.345	0	0.0%	0.0%
100		6	1.306	1.204	1.408	1.345	1.107	1.345	0.03969	7.45%	2.95%

Graphics





Analyst: BO QA: AC 10/2/19

CETIS Summary Report

Report Date: 26 Sep-19 12:50 (p 1 of 1)
Test Code: 1909-S168 | 02-6160-2145

Pacific Topsmelt 96-h Acute Survival Test — **Nautilus Environmental (CA)**

Batch ID:	11-9481-6721	**Test Type:**	Survival (96h)	**Analyst:**	
Start Date:	10 Sep-19 10:25	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	ⓐ ~~Natural Seawater~~ N/A
Ending Date:	14 Sep-19 09:30	**Species:**	Atherinops affinis	**Brine:**	Not Applicable
Duration:	95h	**Source:**	Aquatic Biosystems, CO	**Age:**	15d

Sample ID:	03-4659-4050	**Code:**	19-0974	**Client:**	Wood Environment & Infrastructure
Sample Date:	09 Sep-19 08:15	**Material:**	Ambient Sample	**Project:**	POSD/ SIYB TMDL
Receive Date:	09 Sep-19 11:00	**Source:**	Shelter Island Yacht Basin		
Sample Age:	26h (7 °C)	**Station:**	SIYB-4		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TUa	Method
11-1679-5941	96h Survival Rate	100	>100	NA	NA	Q18 BO 9/26/19 0.0	Wilcoxon Rank Sum Two-Sample Test

96h Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Control	6	1	1	1	1	1	0	0	0.0%	0.0%
100		6	1	1	1	1	1	0	0	0.0%	0.0%

96h Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6
0	Lab Control	1	1	1	1	1	1
100		1	1	1	1	1	1

ⓐ Q13 AC 10/2/19

Analyst: BO QA: AC 10/2/19

CETIS Analytical Report

Report Date: 26 Sep-19 12:50 (p 1 of 2)
Test Code: 1909-S168 | 02-6160-2145

Pacific Topsmelt 96-h Acute Survival Test — **Nautilus Environmental (CA)**

Analysis ID: 11-1679-5941 **Endpoint:** 96h Survival Rate **CETIS Version:** CETISv1.8.7
Analyzed: 26 Sep-19 12:50 **Analysis:** Nonparametric-Two Sample **Official Results:** Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	Test Result
Angular (Corrected)	NA	C > T	NA	NA	Passes 96h survival rate

Wilcoxon Rank Sum Two-Sample Test

Control	vs	C-%	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		100	39	NA	1	10	1.0000	Exact	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	65540	<0.0001	Significant Effect
Error	0	0	10			
Total	0		11			

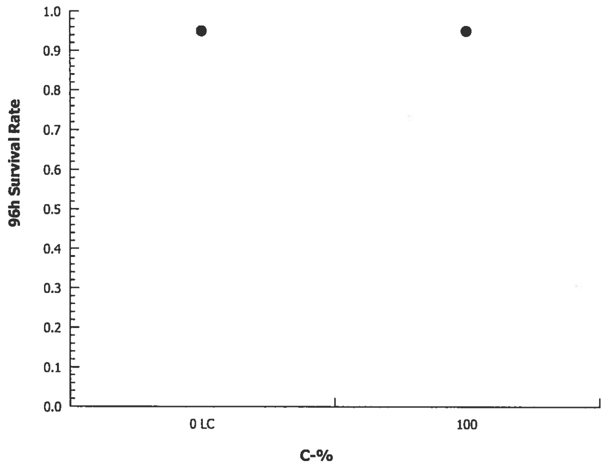
96h Survival Rate Summary

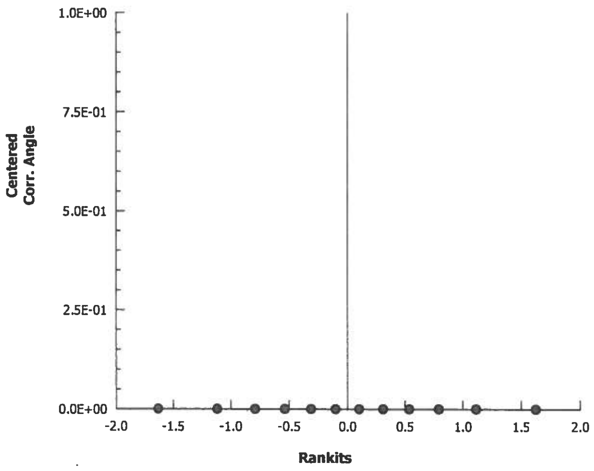
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	6	1	1	1	1	1	1	0	0.0%	0.0%
100		6	1	1	1	1	1	1	0	0.0%	0.0%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	6	1.345	1.345	1.345	1.345	1.345	1.345	0	0.0%	0.0%
100		6	1.345	1.345	1.345	1.345	1.345	1.345	0	0.0%	0.0%

Graphics





Analyst: BO QA: AC 10/2/19

CETIS Analytical Report TST

Report Date: 26 Sep-19 12:50 (p 2 of 2)
Test Code: 1909-S168 | 02-6160-2145

Pacific Topsmelt 96-h Acute Survival Test	**Nautilus Environmental (CA)**

Analysis ID:	01-4161-9906	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	26 Sep-19 12:50	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	TST b	Test Result
Angular (Corrected)	NA	C*b < T	NA	NA	0.8	Passes 96h survival rate

TST-Welch's t Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:10%)
Lab Control		100*	0.2691	NA			<0.1		Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	65540	<0.0001	Significant Effect
Error	0	0	10			
Total	0		11			

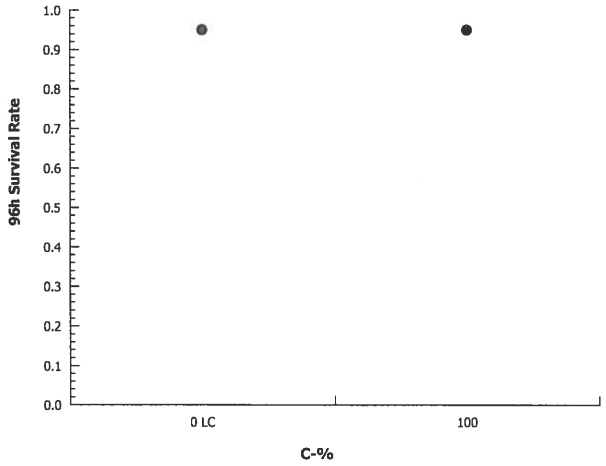
96h Survival Rate Summary

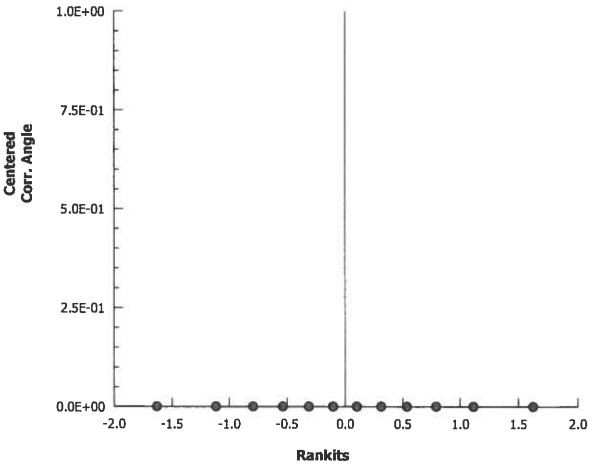
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	6	1	1	1	1	1	1	0	0.0%	0.0%
100		6	1	1	1	1	1	1	0	0.0%	0.0%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	6	1.345	1.345	1.345	1.345	1.345	1.345	0	0.0%	0.0%
100		6	1.345	1.345	1.345	1.345	1.345	1.345	0	0.0%	0.0%

Graphics





Analyst: BO QA: AC 10/2/19

Marine Acute Bioassay
Static-Renewal Conditions
DM-001

Water Quality Measurements
& Test Organism Survival

Client: Wood/ POSD
Project: SIYB TMDL
Sample Log-in No.: 19-0974, 0975
Test No.: 1909-S168, 1909-S169

Test Species: *A. affinis*
Start Date/Time: ~~9/9/2019~~ 9/10/19 1025
End Date/Time: Ⓑ ~~9/13/2019~~ 9/14/19 0930

Tech Initials	0	24	48	72	96
Counts:	JBS	KS	[illegible]	RT	BO
Readings:	JBS	[illegible]	JBS	HH	BO
Dilutions made by:	JBS		RT		

Concentration %	Rep	Number of Live Organisms					Salinity (ppt)					Temperature (°C)					Dissolved Oxygen (mg/L)					pH (units)				
		0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
Lab Control	A	5	5	5	5	5	34.7	34.1	i 34.4	34.3	34.2	20.1	20.5	i 20.2	20.4	20.2	7.6	6.7	i 7.6	6.8	6.8	8.00	7.84	i 8.03	7.84	7.79
	B	5	5	5	5	5			f 34.1					f 20.2					f 6.0					f 7.78		
	C	5	5	5	5	5																				
	D	5	5	5	5	5																				
	E	5	5	5	5	5																				
	F	5	5	5	5	5																				
0.2-µm filter	A	5	5	5	5	5	34.4	34.5	i 34.5	34.4	34.3	21.3	20.5	i 20.8	20.1	20.1	7.2	6.4	i 7.8	6.6	6.8	8.02	7.85	i 8.04	7.81	7.80
Control	B	5	5	5	5	5			f 34.1					f 20.2					f 5.9					f 7.74		
	C	5	5	5	4	4																				
	D	5	5	5	5	5																				
	E	5	4	4	4	4																				
	F	5	5	5	5	5																				
SIYB-4 100%	A	5	5	5	5	5	34.5	34.4	i 34.6	34.7	34.5	21.4	20.4	i 20.6	20.2	20.2	7.1	6.2	i 8.0	6.7	6.9	7.99	7.87	i 8.03	7.80	7.80
	B	5	5	5	5	5			f 34.5					f 20.2					f 5.9					f 7.77		
	C	5	5	5	5	5																				
	D	5	5	5	5	5																				
	E	5	5	5	5	5																				
	F	5	5	5	5	5																				
SIYB-4 100%	A	5	5	5	5	5	34.6	34.2	i 34.6	34.7	34.7	21.2	20.3	i 20.7	20.2	20.3	7.7	6.5	i 8.1	6.7	6.8	8.01	7.86	i 8.02	7.88	7.82
0.2-µm filtered	B	5	5	5	5	5			f 34.9					f ~~19.9~~ 20.1 Ⓐ					f 6.3					f 7.80		
	C	5	5	5	5	5																				
	D	5	5	5	5	5																				
	E	5	5	5	5	5																				
	F	5	5	5	5	5																				
SIYB-REF	A	5	5	5	5	5	34.6	34.1	i 34.7	34.7	34.6	20.2	20.4	i 20.2	20.1	20.3	7.9	6.5	i 7.4	6.6	6.7	8.07	7.86	i 8.01	7.84	7.81
100%	B	5	5	5	4	4			f 34.3					f 20.1					f 6.3					f 7.79		
	C	5	5	5	5	5																				
	D	5	5	5	5	5																				
	E	5	5	5	5	5																				
	F	5	5	5	5	5																				

Initial Counts QC'd by: BO
Initiated by: JBS

Environmental Chamber: C

Animal Source/Date Received: ABS 9/7/19

Age at Initiation: 15 days

Animal Acclimation Qualifiers (circle all that apply): Q22 / Q23 / Q24 / [✓ none]

Feeding Times	0	24	48	72	96
AM:		0850	0935	1040	1000
PM:	1630	—	—	—	—

Comments: i = initial reading in fresh test solution, f = final reading in test chamber prior to renewal

Organisms fed prior to initiation, circle one ([✓ y] n) Ⓐ Q10 JBS 9/12/19 Ⓑ 8 Q14 9/12/19

QC Check: BO 9/26/19

Final Review: AC 10/2/19

Enthalpy Analytical. 4340 Vandever Avenue. San Diego, CA 92120.

Appendix B

Sample Receipt Information

Enthalpy Analytical
4340 Vandever Avenue
San Diego, CA 92120

Sample Check-In Information

Client: Wood/ POSD

Tests Performed: Acute topsmelt, mussel development

Project: Shelter Island Yacht Basin TMDL Monitoring

Test ID No.(s) : 1908-S077 to S090

Sample ID:	1) SIYB-1	2) SIYB-2	3) SIYB-3	4) SIYB-4	5) SIYB-5	6) SIYB-6	7) SIYB-REF
Log-in No. (19-xxxx):	0917	0918	0919	0920	0921	0922	0923
Sample Collection Date & Time:	8/19/19 1510	8/19/19 1410	8/19/19 1310	8/19/19 1210	8/19/19 1100	8/19/19 1000	8/19/19 0900
Sample Receipt Date & Time:	8/19/19 1240 →						→
Number of Containers & Container Type:	2x10L cubi	2x10L cubi	2x10L cubi	2x10L cubi	2x10L cubi	2x10L cubi	2x10L cubi
Approx. Total Volume Received (L):	18-20	18	18	18	18	18	18
Check-in Temp (°C)	7.5	4.0	9.0	3.5	8.5	5.4	5.0
Temperature OK? [1]	[✓ Y] N	[✓ Y] N	[✓ Y] N	[✓ Y] N	[✓ Y] N	[✓ Y] N	[✓ Y] N
DO (mg/L)	7.2	7.7	7.2	7.7	7.0	7.4	7.6
pH (units)	7.99	8.03	7.97	8.00	7.85	7.85	7.97
Conductivity (µS/cm)	–	–	–	–	–	–	–
Salinity (ppt)	34.3	34.3	34.4	34.3	34.7	34.4	34.4
Alkalinity (mg/L) [2]	106	111	113	114	120	119	123
Hardness (mg/L) [2, 3]	–	–	–	–	–	–	–
Total Chlorine (mg/L)	0.02	0.04	0.03	<0.02	0.03	0.04	<0.02
Technician Initials	AC/EG	AC/EG	AC/EG	AC/EG	AC/EG	AC/EG	AC/EG

Sample Descriptions:
1) Colorless, Clear, no odor, no debris
2) Colorless, clear, no odor, no debris
3) Colorless, clear, no odor, no debris
4) Colorless, clear, no odor, no debris
5) Colorless, clear, no odor, no debris
6) Colorless, clear, no odor, no debris
7) Colorless, clear, no odor, no debris

COC Complete? [✓ Y] N

Filtration? [✓ Y] ~~[✓ N]~~ 018AC8/27

Pore Size: 0.45 µm 100% only for mussel test

[✓ **Organisms**] or **Debris**

pH Adjustment? Y [✓ N]

	1	2	3	4	5	6
Initial pH:						
Amount of HCl added:						
Final pH:						

Cl_2 Adjustment? Y [✓ N]

	1	2	3	4	5	6
Initial Free Cl_2:						
STS added:						
Final Free Cl_2:						

Sample Aeration? Y [✓ N]

	1	2	3	4	5	6
Initial D.O.						
Duration & Rate						
Final D.O.						

Marine Tests:

Control/Dilution Water Source: [✓ LAB SW] ART SW Other: ____________ Alkalinity: 128 Salinity: 34ppt

Additional Control? Y N = ____________ Alkalinity: ______ Salinity: ______

Sample Salted w/ artificial salt? Y N If yes, target ppt and source? ______

Sample salted w/brine? Y N If yes, target ppt? ______

Notes [1] Temperature for sample must be 0-6°C if received >24 hours past collection time.
[2] mg/L as CaCO3, [3] Measured for freshwater samples only, NA = Not Applicable

Additional Comments ____________

Subsamples For Additional Chemistry Required? Y [✓ N]

NH3 **Other** ______

Tech Initials ______

QC Check: AC 8/28/19

Final Review: KFP 8/28/19

Enthalpy Analytical
4340 Vandever Avenue
San Diego, CA 92120

Sample Check-In Information

DC-006

Client: Wood | POSD

Tests Performed: Topsmelt Acute

Project: SIYB TMDL

Test ID No.(s) : 1909-5168, 1909-5169

Sample ID:	1) SIYB-4	2) SIYB-REF	3	4)
Log-in No. (19-xxxx):	0974	0975		
Sample Collection Date & Time:	9/9/19 0815	9/9/19 0900		
Sample Receipt Date & Time:	9/9/19 1100	9/9/19 1100		
Number of Containers & Container Type:	2-10L cubi	2-10L cubi		
Approx. Total Volume Received (L):	~20L	~20L		
Check-in Temp (°C)	7.0	7.0		
Temperature OK? [1]	[✓ Y] N	[✓ Y] N	Y N	Y N
DO (mg/L)	8.0	8.2		
pH (units)	8.00	8.11		
Conductivity (µS/cm)	–	–		
Salinity (ppt)	34.2	34.2		
Alkalinity (mg/L) [2]	107	111		
Hardness (mg/L) [2, 3]	–	–		
Total Chlorine (mg/L)	<0.02	<0.02		
Technician Initials	JBS	JBS		

Sample Descriptions:

1) no color, clear, no odor, no debris
2) no color, clear, no odor, no debris
3)
4)

COC Complete? [✓ Y] N

Filtration? [✓ Y] N

Initials: 1) BO AC 2) 3) 4)

Pore Size: 0.2um (SIYB-4 only)

[✓ **Organisms**] or **Debris**

pH Adjustment? Y [✓ N]

	1	2	3	4	5	6
Initial pH:						
Amount of HCl added:						
Final pH:						

Freshwater Tests:

Control/Dilution Water Source: 8:2 Culligan Other: ______ Alkalinity: ______ Hardness: ______

Additional Control? Y N = ______ Alkalinity: ______ Hardness: ______

Marine Tests:

Control/Dilution Water Source: [✓ LAB SW] ART SW Other: ______ Alkalinity: 111 Salinity: 34ppt

Additional Control? [✓ Y] N = 0.2um Filter Control Alkalinity: Not measured Salinity: 34ppt

Sample Salted w/ artificial salt? Y [✓ N] If yes, target ppt and source? ______

Sample salted w/brine? Y [✓ N] If yes, target ppt? ______

Cl_2 Adjustment? Y [✓ N]

	1	2	3	4	5	6
Initial Free Cl_2:						
STS added:						
Final Free Cl_2:						

Sample Aeration? Y [✓ N]

	1	2	3	4	5	6
Initial D.O.						
Duration & Rate						
Final D.O.						

Notes [1] Temperature for sample must be 0-6°C if received >24 hours past collection time.

[2] mg/L as CaCO3, [3] Measured for freshwater samples only, NA = Not Applicable

Additional Comments ______

Subsamples For Additional Chemistry Required? Y [✓ N]

NH3 **Other** ______

Tech Initials ______

QC Check: BO 9/26/19

Final Review: AC 10/2/19

Appendix C

Chain of Custody Forms

Nautilus Environmental

Chain of Custody (electronic)

4340 Vandever Ave. San Diego, CA 92120

Date 8/19/19 Page 1 of 1

Sample Collection By:	Wood Environment & Infrastructure Solutions, Inc.	
Corey Sheredy	**Report to:** Barry Snyder / Corey Sheredy barry.snyder@woodplc.com / corey.sheredy@woodplc.com	Invoice to: Barry Snyder / Corey Sheredy barry.snyder@woodplc.com / corey.sheredy@woodplc.co
Company	Wood Environment & Infrastructure Solutions, Inc.	Wood Environment & Infrastructure Solutions, Inc.
Address	9210 Sky Park Ct. Ste 200	9210 Sky Park Ct. Ste 200
City/State/Zip	San Diego, CA 92123	San Diego, CA 92123
Contact	Corey Sheredy	Barry Snyder
Phone	858-300-4316	858-300-4320
Email	corey.sheredy@woodplc.com	barry.snyder@woodplc.com

							ANALYSES REQUIRED								
SAMPLE ID	**DATE**	**TIME**	**MATRIX**	**CONTAINER TYPE**	**# OF CONTAINERS**	**COMMENTS**	Topsmelt 96-hr Acute Survival	Mussel 48-hr Survival and Dev.							Receipt Temperature (°C)
SIYB-1	8/19/2019	1510	SW	10-L Poly	2		X	X							7.5
SIYB-2	8/19/2019	1410	SW	10-L Poly	2		X	X							4.0
SIYB-3	8/19/2019	1310	SW	10-L Poly	2		X	X							9.0
SIYB-4	8/19/2019	1210	SW	10-L Poly	2		X	X							3.5
SIYB-5	8/19/2019	1100	SW	10-L Poly	2		X	X							8.5
SIYB-6	8/19/2019	1000	SW	10-L Poly	2		X	X							5.4
SIYB-REF	8/19/2019	0900	SW	10-L Poly	2		X	X							5.0

PROJECT INFORMATION	**SAMPLE RECEIPT**	
Client: wood E+I	**Total # Containers:**	14
P.O. No.:	**Good Condition?**	y
Shipped Via: Hand delivered	**Matches Test Schedule?**	y

Relinquished By:	**Received By (courier):**
Signature: 8/19/19 Date	**Signature:** Date
Print Name: COREY SHEREDY 1740 Time	**Print Name:** Time
Company: WOOD E+I	**Company:**
Relinquished By (courier):	**Received By Lab:**
Signature: Date	**Signature:** Adrienne Cibor 8/19/19 Date
Print Name: Time	**Print Name:** Adrienne Cibor 1740 Time
Company:	**Company:** Nautilus

Comments:
Concurrent ref. tox. test for both species (Topsmelt 0,50,100,200,400,800 ug/L)
(Bivalve ref. tox. test copper conc. of 0, 2.5, 5.0, 10, 20 and 40 µg/L)
Topsmelt at 3 concentrations (25,50, 100 percent) and a control. 6 reps.
Bivalve testing 5 concentrations (6.25, 12.5, 25, 50, and 100 percent), and
a control. Also a 100% filtered undiluted sample.5 reps. Look for *Noctiluca* sp.)

Additional costs may be required for sample disposal or storage. Net 30 unless otherwise contracted.

19-0917 – 19-0923

Nautilus Environmental

4340 Vandever Ave. San Diego, CA 92120

Chain of Custody (electronic)

Date 9/9/19 Page 1 of 1

Sample Collection By:	Wood Environment & Infrastructure Solutions, Inc.	
	Report to: Barry Snyder / Corey Sheredy barry.snyder@woodplc.com / corey.sheredy@woodplc.com	Invoice to: Barry Snyder / Corey Sheredy barry.snyder@woodplc.com / corey.sheredy@woodplc.co
Company	Wood Environment & Infrastructure Solutions, Inc.	Wood Environment & Infrastructure Solutions, Inc.
Address	9210 Sky Park Ct. Ste 200	9210 Sky Park Ct. Ste 200
City/State/Zip	San Diego, CA 92123	San Diego, CA 92123
Contact	Corey Sheredy	Barry Snyder
Phone	858-300-4316	858-300-4320
Email	corey.sheredy@woodplc.com	barry.snyder@woodplc.com

							ANALYSES REQUIRED								
SAMPLE ID	**DATE**	**TIME**	**MATRIX**	**CONTAINER TYPE**	**# OF CONTAINERS**	**COMMENTS**	Topsmelt 96-hr Acute Survival								Receipt Temperature (°C)
SIYB-4	9/9/2019	0815	SW	10-L Poly	2		X								7.0
SIYB-REF	9/9/2019	0900	SW	10-L Poly	2		X								7.0

PROJECT INFORMATION		**SAMPLE RECEIPT**		**Relinquished By:**	**Received By (courier):**
Client:		**Total # Containers:**	4	**Signature:** 9/9/19 **Date**	**Signature:** **Date**
P.O. No.:		**Good Condition?**	Y	**Print Name:** Corey Sheredy 1100 **Time**	**Print Name:** **Time**
Shipped Via: hand del.		**Matches Test Schedule?**	Y	**Company:** Wood	**Company:**
				Relinquished By (courier):	**Received By Lab:**
Comments: See attached email for details.				**Signature:** **Date**	**Signature:** Adrienne Cibor 9/9/19 **Date**
				Print Name: **Time**	**Print Name:** Adrienne Cibor 1100 **Time**
				Company:	**Company:** Nautilus/Enthalpy

Additional costs may be required for sample disposal or storage. Net 30 unless otherwise contracted.

Nautilus ID: 19-0974, 19-0975

Appendix D

Laboratory Qualifier Codes

Glossary of Qualifier Codes:

Q1 -	Temperatures out of recommended range; corrective action taken and recorded in Test Temperature Correction Log
Q2 -	Temperatures out of recommended range; no action taken, test terminated same day
Q3 -	Sample aerated prior to initiation or renewal due to dissolved oxygen (D.O.) levels below 6.0 mg/L
Q4 -	Test aerated; D.O. levels dropped below 4.0 mg/L
Q5 -	Test initiated with aeration due to an anticipated drop in D.O.
Q6 -	Airline obstructed or fell out of replicate and replaced; drop in D.O. occurred
Q7 -	Salinity out of recommended range
Q8 -	Spilled test chamber/ Unable to recover test organism(s)
Q9 -	Inadequate sample volume remaining, 50% renewal performed
Q10 -	Inadequate sample volume remaining, no renewal performed
Q11 -	Sample out of holding time; refer to QA section of report
Q12 -	Replicate(s) not initiated; excluded from data analysis
Q13 -	Survival counts not recorded due to poor visibility or heavy debris
Q14 -	D.O. percent saturation was checked and was ≤ 110%
Q15 -	Did not meet minimum test acceptability criteria. Refer to QA section of report.
Q16 -	Percent minimum significant difference (PMSD) was <u>below</u> the lower bound limit for acceptability. This indicates that statistics may be over-sensitive in detecting a difference from the control due to low variability in the data set.
Q17 -	Percent minimum significant difference (PMSD) was <u>above</u> the upper bound limit for acceptability. This indicates that statistics may be under-sensitive in detecting a difference from the control due to high variability in the data set.
Q18 -	Incorrect Entry
Q19 -	Illegible Entry
Q20 -	Miscalculation
Q21 -	Other (provide reason in comments section)
Q22 -	Greater than 10% <u>mortality</u> observed upon receipt and/or in holding prior to test initiation. Organisms acclimated to test conditions at Nautilus and ultimately deemed fit to use for testing.
Q23 -	Test organisms received at a <u>temperature</u> greater than 3°C outside the recommended test temperature range. However, due to age-specific protocol requirements and/or sample holding time constraints, the organisms were used to initiate tests upon the day of arrival. Organisms were acclimated to the appropriate test conditions upon receipt and prior to test initiation.
Q24 -	Test organisms received at <u>salinity</u> greater than 3 ppt outside of the recommended test salinity range. However, due to age-specific protocol requirements and/or sample holding time constraints, the organisms were used to initiate tests upon the day of arrival. Organisms were acclimated to the appropriate test conditions upon receipt and prior to test initiation.

Updated: 6/30/15

Appendix E

Reference Toxicant Tests

Test Data and Statistical Analyses

Bivalve Survival and Development Test

CETIS Summary Report

Report Date: 13 Sep-19 08:31 (p 1 of 3)
Test Code: 190820msdv | 14-8361-1578

Bivalve Larval Survival and Development Test — **Nautilus Environmental (CA)**

Batch ID:	00-0388-2957	**Test Type:**	Development-Survival	**Analyst:**	
Start Date:	20 Aug-19 14:15	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Diluted Natural Seawater
Ending Date:	22 Aug-19 12:25	**Species:**	Mytilus galloprovincialis	**Brine:**	Not Applicable
Duration:	46h	**Source:**	Mission Bay	**Age:**	

Sample ID:	19-6416-5082	**Code:**	190820msdv	**Client:**	Internal
Sample Date:	20 Aug-19	**Material:**	Copper chloride	**Project:**	
Receive Date:	20 Aug-19	**Source:**	Reference Toxicant		
Sample Age:	14h	**Station:**	Copper Chloride		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
00-8025-4913	Combined Development Ra	5	10	7.071	2.92%		Dunnett Multiple Comparison Test
05-7898-7295	Development Rate	5	10	7.071	1.11%		Dunnett Multiple Comparison Test
11-7717-2342	Survival Rate	20	40	28.28	2.78%		Steel Many-One Rank Sum Test

Point Estimate Summary

Analysis ID	Endpoint	Level	µg/L	95% LCL	95% UCL	TU	Method
03-1832-9380	Combined Development Ra	EC25	7.669	7.311	7.945		Linear Interpolation (ICPIN)
		EC50	10.86	10.25	11.38		
12-0750-5104	Development Rate	EC25	7.693	7.458	7.898		Linear Interpolation (ICPIN)
		EC50	10.76	10.13	11.29		
02-5800-6574	Survival Rate	EC25	28.92	27.68	30.09		Linear Interpolation (ICPIN)
		EC50	37.92	35.88	40.4		

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits	Overlap	Decision
05-7898-7295	Development Rate	Control Resp	0.9843	0.9 - NL	Yes	Passes Acceptability Criteria
12-0750-5104	Development Rate	Control Resp	0.9843	0.9 - NL	Yes	Passes Acceptability Criteria
02-5800-6574	Survival Rate	Control Resp	0.9869	0.5 - NL	Yes	Passes Acceptability Criteria
11-7717-2342	Survival Rate	Control Resp	0.9869	0.5 - NL	Yes	Passes Acceptability Criteria
00-8025-4913	Combined Development Ra	PMSD	0.02917	NL - 0.25	No	Passes Acceptability Criteria

Analyst: JC QA: AC 9/16/19

Bivalve Larval Survival and Development Test — **Nautilus Environmental (CA)**

Combined Development Rate Summary

C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Control	5	0.9713	0.9561	0.9865	0.9545	0.9858	0.005476	0.01225	1.26%	0.0%
2.5		5	0.9747	0.9581	0.9913	0.9545	0.9905	0.005973	0.01336	1.37%	-0.35%
5		5	0.9547	0.9114	0.998	0.904	0.9862	0.01561	0.0349	3.66%	1.7%
10		5	0.5328	0.4981	0.5675	0.4951	0.5672	0.01249	0.02794	5.24%	45.14%
20		5	0	0	0	0	0	0	0		100.0%
40		5	0	0	0	0	0	0	0		100.0%

Development Rate Summary

C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Control	5	0.9843	0.9732	0.9953	0.972	0.9947	0.003978	0.008894	0.9%	0.0%
2.5		5	0.9786	0.9692	0.988	0.9716	0.9905	0.003399	0.0076	0.78%	0.58%
5		5	0.9774	0.9679	0.9869	0.9668	0.9862	0.003423	0.007654	0.78%	0.7%
10		5	0.5328	0.4981	0.5675	0.4951	0.5672	0.01249	0.02794	5.24%	45.87%
20		5	0	0	0	0	0	0	0		100.0%
40		5	0	0	0	0	0	0	0		100.0%

Survival Rate Summary

C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Control	5	0.9869	0.9636	1	0.9596	1	0.008391	0.01876	1.9%	0.0%
2.5		5	0.996	0.9847	1	0.9798	1	0.00404	0.009035	0.91%	-0.92%
5		5	0.9768	0.9357	1	0.9293	1	0.01478	0.03304	3.38%	1.02%
10		5	1	1	1	1	1	0	0	0.0%	-1.33%
20		5	0.9909	0.9657	1	0.9545	1	0.009091	0.02033	2.05%	-0.41%
40		5	0.4384	0.3651	0.5117	0.3737	0.5253	0.02641	0.05905	13.47%	55.58%

Combined Development Rate Detail

C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Control	0.9545	0.9646	0.972	0.9793	0.9858
2.5		0.9545	0.9751	0.9905	0.9817	0.9716
5		0.9668	0.9862	0.904	0.9821	0.9343
10		0.5227	0.5266	0.5672	0.4951	0.5524
20		0	0	0	0	0
40		0	0	0	0	0

Development Rate Detail

C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Control	0.9947	0.9896	0.972	0.9793	0.9858
2.5		0.9742	0.9751	0.9905	0.9817	0.9716
5		0.9668	0.9862	0.9728	0.9821	0.9788
10		0.5227	0.5266	0.5672	0.4951	0.5524
20		0	0	0	0	0
40		0	0	0	0	0

Survival Rate Detail

C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Control	0.9596	0.9747	1	1	1
2.5		0.9798	1	1	1	1
5		1	1	0.9293	1	0.9545
10		1	1	1	1	1
20		1	0.9545	1	1	1
40		0.4495	0.3939	0.4495	0.5253	0.3737

Analyst: JG QA: AC 9/16/19

Bivalve Larval Survival and Development Test **Nautilus Environmental (CA)**

Combined Development Rate Binomials

C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Control	189/198	191/198	208/214	237/242	208/211
2.5		189/198	196/201	208/210	214/218	205/211
5		204/211	214/217	179/198	220/224	185/198
10		115/220	109/207	114/201	102/206	116/210
20		0/226	0/198	0/215	0/244	0/209
40		0/198	0/198	0/198	0/198	0/198

Development Rate Binomials

C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Control	189/190	191/193	208/214	237/242	208/211
2.5		189/194	196/201	208/210	214/218	205/211
5		204/211	214/217	179/184	220/224	185/189
10		115/220	109/207	114/201	102/206	116/210
20		0/226	0/189	0/215	0/244	0/209
40		0/89	0/78	0/89	0/104	0/74

Survival Rate Binomials

C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Control	190/198	193/198	198/198	198/198	198/198
2.5		194/198	198/198	198/198	198/198	198/198
5		198/198	198/198	184/198	198/198	189/198
10		198/198	198/198	198/198	198/198	198/198
20		198/198	189/198	198/198	198/198	198/198
40		89/198	78/198	89/198	104/198	74/198

Analyst: JC QA: AC 9/16/19

CETIS Analytical Report

Report Date: 13 Sep-19 08:31 (p 1 of 4)
Test Code: 190820msdv | 14-8361-1578

Bivalve Larval Survival and Development Test — **Nautilus Environmental (CA)**

Analysis ID:	00-8025-4913	**Endpoint:**	Combined Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	13 Sep-19 8:29	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C > T	NA	NA	2.92%	5	10	7.071	

Dunnett Multiple Comparison Test

Control	vs	C-µg/L	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		2.5	-0.3592	2.227	0.074	8	0.8594	CDF	Non-Significant Effect
		5	1.041	2.227	0.074	8	0.3158	CDF	Non-Significant Effect
		10*	17.61	2.227	0.074	8	<0.0001	CDF	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.257691	0.4192303	3	151.7	<0.0001	Significant Effect
Error	0.0442164	0.002763525	16			
Total	1.301907		19			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	5.108	11.34	0.1641	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9812	0.866	0.9490	Normal Distribution

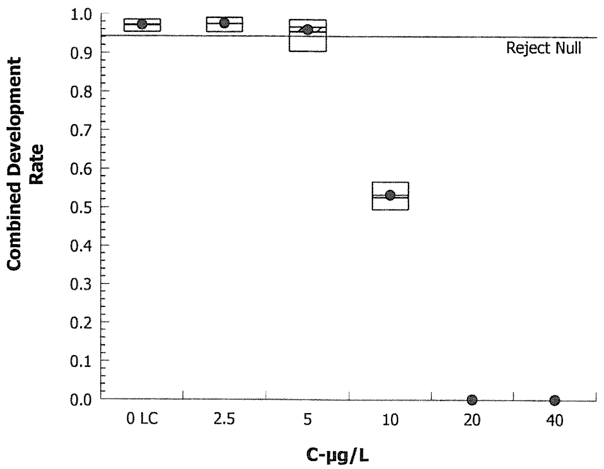
Combined Development Rate Summary

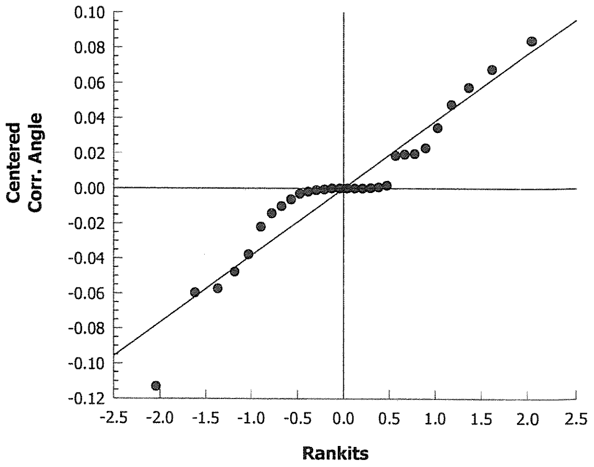
C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	0.9713	0.9561	0.9865	0.972	0.9545	0.9858	0.005476	1.26%	0.0%
2.5		5	0.9747	0.9581	0.9913	0.9751	0.9545	0.9905	0.005973	1.37%	-0.35%
5		5	0.9547	0.9114	0.998	0.9668	0.904	0.9862	0.01561	3.66%	1.7%
10		5	0.5328	0.4981	0.5675	0.5266	0.4951	0.5672	0.01249	5.24%	45.14%
20		5	0	0	0	0	0	0	0		100.0%
40		5	0	0	0	0	0	0	0		100.0%

Angular (Corrected) Transformed Summary

C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	1.404	1.357	1.45	1.403	1.356	1.451	0.01666	2.66%	0.0%
2.5		5	1.416	1.362	1.469	1.412	1.356	1.473	0.01929	3.05%	-0.85%
5		5	1.369	1.265	1.473	1.388	1.256	1.453	0.03747	6.12%	2.47%
10		5	0.8183	0.7835	0.853	0.812	0.7805	0.8528	0.01253	3.42%	41.7%
20		5	0.0339	0.03224	0.03557	0.03411	0.03201	0.03554	0.000599	3.95%	97.58%
40		5	0.03554	0.03554	0.03555	0.03554	0.03554	0.03554	0	0.0%	97.47%

Graphics





Analyst: JA QA: AC 9/16/19

CETIS Analytical Report

Bivalve Larval Survival and Development Test — **Nautilus Environmental (CA)**

Analysis ID:	05-7898-7295	**Endpoint:**	Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	13 Sep-19 8:29	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C > T	NA	NA	1.11%	5	10	7.071	

Dunnett Multiple Comparison Test

Control	vs	C-µg/L	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		2.5	1.215	2.227	0.043	8	0.2539	CDF	Non-Significant Effect
		5	1.465	2.227	0.043	8	0.1788	CDF	Non-Significant Effect
		10*	33.02	2.227	0.043	8	<0.0001	CDF	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.416636	0.4722121	3	516.9	<0.0001	Significant Effect
Error	0.01461705	0.0009135653	16			
Total	1.431253		19			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	0.5635	11.34	0.9047	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9713	0.866	0.7812	Normal Distribution

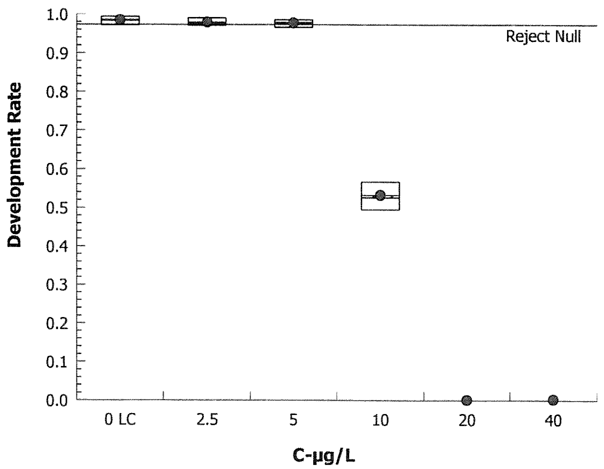
Development Rate Summary

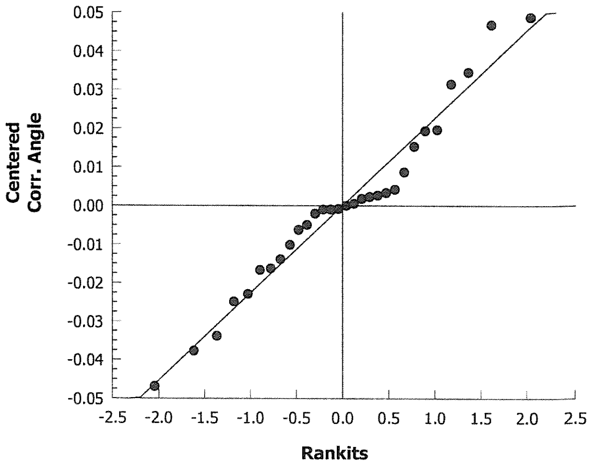
C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	0.9843	0.9732	0.9953	0.9858	0.972	0.9947	0.003978	0.9%	0.0%
2.5		5	0.9786	0.9692	0.988	0.9751	0.9716	0.9905	0.003399	0.78%	0.58%
5		5	0.9774	0.9679	0.9869	0.9788	0.9668	0.9862	0.003423	0.78%	0.7%
10		5	0.5328	0.4981	0.5675	0.5266	0.4951	0.5672	0.01249	5.24%	45.87%
20		5	0	0	0	0	0	0	0		100.0%
40		5	0	0	0	0	0	0	0		100.0%

Angular (Corrected) Transformed Summary

C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	1.449	1.404	1.495	1.451	1.403	1.498	0.01655	2.55%	0.0%
2.5		5	1.426	1.39	1.462	1.412	1.401	1.473	0.01295	2.03%	1.6%
5		5	1.421	1.39	1.453	1.425	1.388	1.453	0.0115	1.81%	1.93%
10		5	0.8183	0.7835	0.853	0.812	0.7805	0.8528	0.01253	3.42%	43.55%
20		5	0.03407	0.03206	0.03608	0.03411	0.03201	0.03638	0.000724	4.75%	97.65%
40		5	0.05398	0.04956	0.0584	0.05302	0.04905	0.05816	0.001592	6.59%	96.28%

Graphics





Analyst: JCL QA: AC 9/16/19

CETIS Analytical Report

Report Date: 13 Sep-19 08:31 (p 3 of 4)
Test Code: 190820msdv | 14-8361-1578

Bivalve Larval Survival and Development Test — **Nautilus Environmental (CA)**

Analysis ID:	11-7717-2342	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	13 Sep-19 8:30	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C > T	NA	NA	2.78%	20	40	28.28	

Steel Many-One Rank Sum Test

Control	vs	C-µg/L	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		2.5	31	16	1	8	0.9676	Asymp	Non-Significant Effect
		5	25.5	16	1	8	0.6807	Asymp	Non-Significant Effect
		10	32.5	16	1	8	0.9870	Asymp	Non-Significant Effect
		20	29	16	1	8	0.9104	Asymp	Non-Significant Effect
		40*	15	16	0	8	0.0191	Asymp	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2.505962	0.5011925	5	93.96	<0.0001	Significant Effect
Error	0.128016	0.005334002	24			
Total	2.633978		29			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	110.4	15.09	<0.0001	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.9069	0.9031	0.0124	Normal Distribution

Survival Rate Summary

C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	0.9869	0.9636	1	1	0.9596	1	0.008391	1.9%	0.0%
2.5		5	0.996	0.9847	1	1	0.9798	1	0.00404	0.91%	-0.92%
5		5	0.9768	0.9357	1	1	0.9293	1	0.01478	3.38%	1.02%
10		5	1	1	1	1	1	1	0	0.0%	-1.33%
20		5	0.9909	0.9657	1	1	0.9545	1	0.009091	2.05%	-0.41%
40		5	0.4384	0.3651	0.5117	0.4495	0.3737	0.5253	0.02641	13.47%	55.58%

Angular (Corrected) Transformed Summary

C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	5	1.477	1.376	1.578	1.535	1.368	1.535	0.03626	5.49%	0.0%
2.5		5	1.514	1.454	1.573	1.535	1.428	1.535	0.02141	3.16%	-2.49%
5		5	1.453	1.31	1.595	1.535	1.302	1.535	0.05129	7.9%	1.65%
10		5	1.535	1.535	1.536	1.535	1.535	1.535	0	0.0%	-3.94%
20		5	1.499	1.4	1.599	1.535	1.356	1.535	0.03586	5.35%	-1.51%
40		5	0.7233	0.6493	0.7973	0.7348	0.6578	0.8107	0.02664	8.24%	51.03%

Analyst: JCA QA: AC 9/16/19

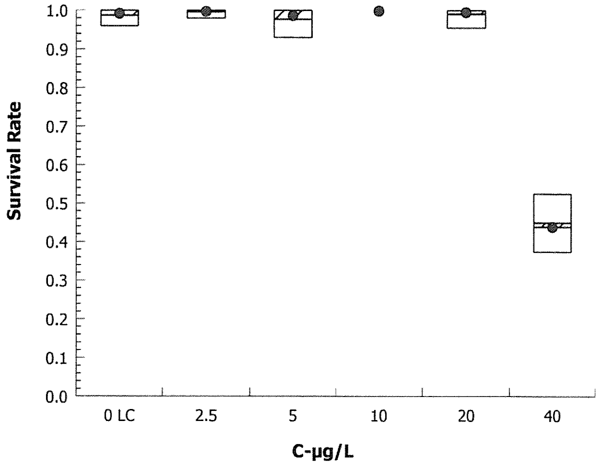
CETIS Analytical Report

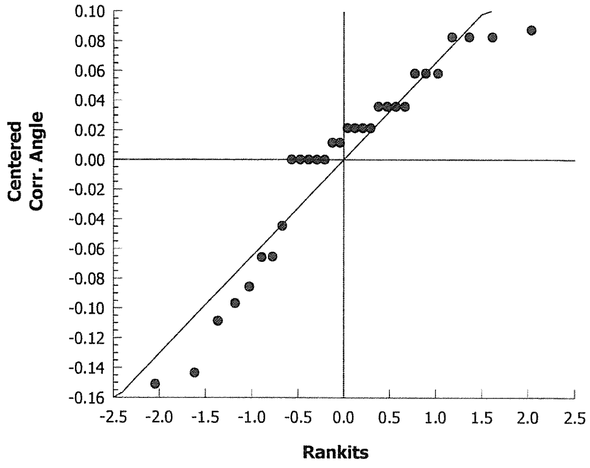
Report Date: 13 Sep-19 08:31 (p 4 of 4)
Test Code: 190820msdv | 14-8361-1578

Bivalve Larval Survival and Development Test **Nautilus Environmental (CA)**

Analysis ID: 11-7717-2342 **Endpoint:** Survival Rate **CETIS Version:** CETISv1.8.7
Analyzed: 13 Sep-19 8:30 **Analysis:** Nonparametric-Control vs Treatments **Official Results:** Yes

Graphics





Analyst: JCL QA: AF 9/16/19

CETIS Analytical Report

Report Date: 13 Sep-19 08:31 (p 1 of 3)
Test Code: 190820msdv | 14-8361-1578

Bivalve Larval Survival and Development Test

Nautilus Environmental (CA)

Analysis ID:	03-1832-9380	**Endpoint:**	Combined Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	13 Sep-19 8:30	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	465303	1000	Yes	Two-Point Interpolation

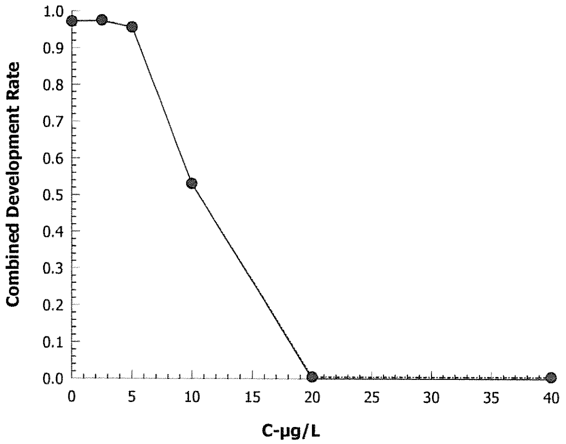
Point Estimates

Level	µg/L	95% LCL	95% UCL
EC25	7.669	7.311	7.945
EC50	10.86	10.25	11.38

Combined Development Rate Summary

										Calculated Variate(A/B)	
C-µg/L	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Lab Control	5	0.9713	0.9545	0.9858	0.005476	0.01225	1.26%	0.0%	1033	1063
2.5		5	0.9747	0.9545	0.9905	0.005973	0.01336	1.37%	-0.35%	1012	1038
5		5	0.9547	0.904	0.9862	0.01561	0.0349	3.66%	1.7%	1002	1048
10		5	0.5328	0.4951	0.5672	0.01249	0.02794	5.24%	45.14%	554	1044
20		5	0	0	0	0	0		100.0%	0	1092
40		5	0	0	0	0	0		100.0%	0	990

Graphics



Analyst: Ja QA: AC 9/16/19

Bivalve Larval Survival and Development Test **Nautilus Environmental (CA)**

Analysis ID:	12-0750-5104	**Endpoint:**	Development Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	13 Sep-19 8:30	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	1533053	1000	Yes	Two-Point Interpolation

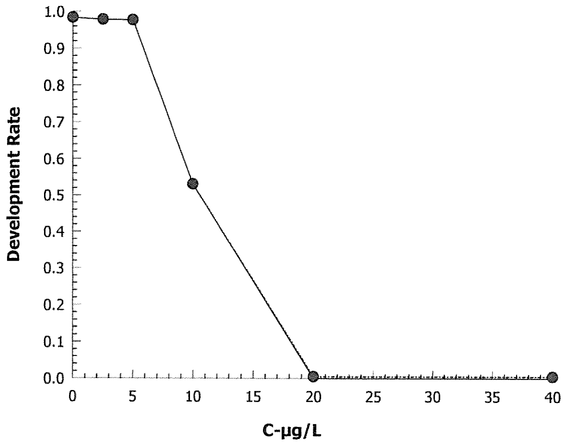
Point Estimates

Level	µg/L	95% LCL	95% UCL
EC25	7.693	7.458	7.898
EC50	10.76	10.13	11.29

Development Rate Summary

			Calculated Variate(A/B)								
C-µg/L	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Lab Control	5	0.9843	0.972	0.9947	0.003978	0.008895	0.9%	0.0%	1033	1050
2.5		5	0.9786	0.9716	0.9905	0.003399	0.0076	0.78%	0.58%	1012	1034
5		5	0.9774	0.9668	0.9862	0.003423	0.007655	0.78%	0.7%	1002	1025
10		5	0.5328	0.4951	0.5672	0.01249	0.02794	5.24%	45.87%	554	1044
20		5	0	0	0	0	0		100.0%	0	1083
40		5	0	0	0	0	0		100.0%	0	434

Graphics



Analyst: JCL QA: AC 9/16/19

CETIS Analytical Report

Report Date: 13 Sep-19 08:31 (p 3 of 3)
Test Code: 190820msdv | 14-8361-1578

Bivalve Larval Survival and Development Test — **Nautilus Environmental (CA)**

Analysis ID:	02-5800-6574	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	13 Sep-19 8:30	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	598216	1000	Yes	Two-Point Interpolation

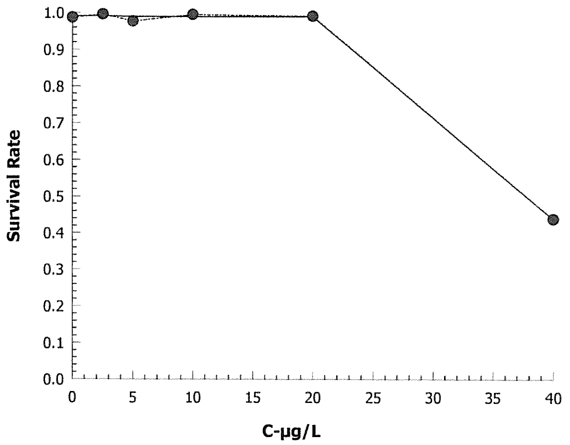
Point Estimates

Level	µg/L	95% LCL	95% UCL
EC25	28.92	27.68	30.09
EC50	37.92	35.88	40.4

Survival Rate Summary

			Calculated Variate(A/B)								
C-µg/L	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Lab Control	5	0.9869	0.9596	1	0.008391	0.01876	1.9%	0.0%	977	990
2.5		5	0.996	0.9798	1	0.00404	0.009034	0.91%	-0.92%	986	990
5		5	0.9768	0.9293	1	0.01478	0.03304	3.38%	1.02%	967	990
10		5	1	1	1	0	0	0.0%	-1.33%	990	990
20		5	0.9909	0.9545	1	0.009091	0.02033	2.05%	-0.41%	981	990
40		5	0.4384	0.3737	0.5253	0.02641	0.05905	13.47%	55.58%	434	990

Graphics



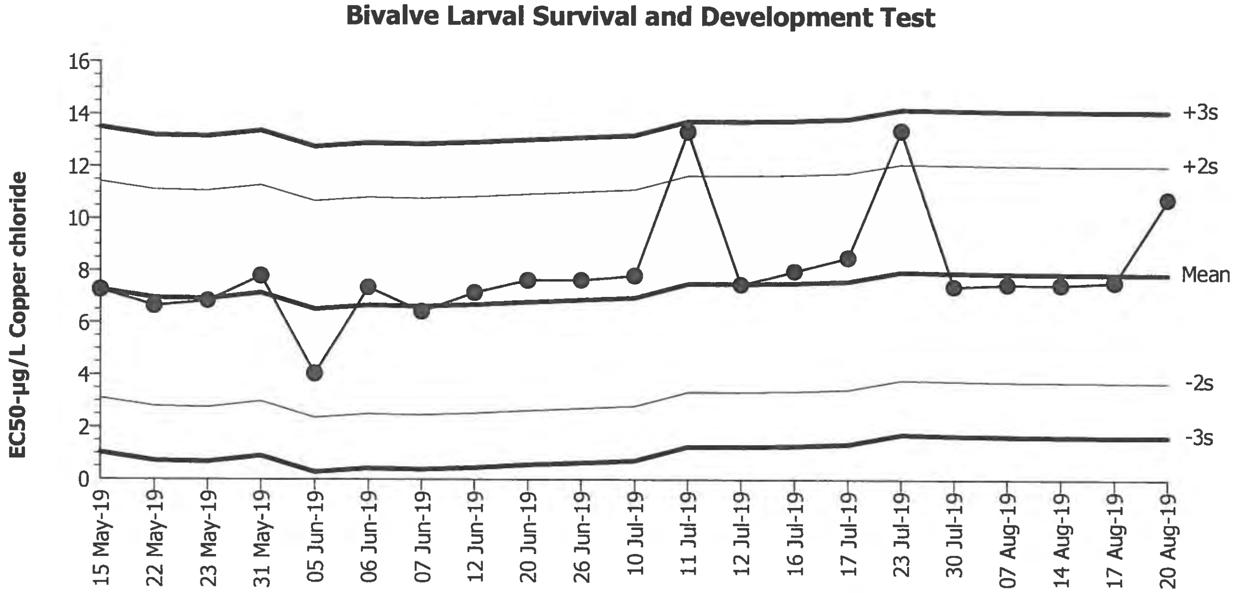
Analyst: JCL QA: AC 9/16/19

CETIS QC Plot

Report Date: 18 Sep-19 08:44 (1 of 1)

Bivalve Larval Survival and Development Test | **Nautilus Environmental (CA)**

Test Type: Development-Survival
Protocol: EPA/600/R-95/136 (1995)
Organism: Mytilus galloprovincialis (Bay Mussel
Endpoint: Development Rate
Material: Copper chloride
Source: Reference Toxicant-REF



Mean: 7.855 **Count:** 20 **-2s Warning Limit:** 3.697 **-3s Action Limit:** 1.618
Sigma: 2.079 **CV:** 26.50% **+2s Warning Limit:** 12.01 **+3s Action Limit:** 14.09

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2019	May	15	15:10	7.264	-0.5913	-0.2844			12-3612-1420	11-8863-7865
2			22	14:35	6.635	-1.22	-0.5867			07-8876-2604	17-1974-2634
3			23	14:30	6.832	-1.023	-0.4919			04-4294-0564	17-8215-3713
4			31	14:45	7.79	-0.06512	-0.03132			03-7170-8467	14-6790-8476
5		Jun	5	14:30	4.043	-3.812	-1.833			14-9865-1579	11-4839-0192
6			6	15:45	7.353	-0.5017	-0.2413			20-7222-8009	04-5983-4829
7			7	13:35	6.42	-1.435	-0.6903			16-0229-2669	12-7601-7003
8			12	15:00	7.147	-0.7085	-0.3408			20-8735-2782	10-3598-4911
9			20	15:00	7.627	-0.2277	-0.1095			00-4624-1892	15-3942-3527
10			26	15:55	7.636	-0.2188	-0.1053			00-8415-2643	06-7718-5278
11		Jul	10	15:15	7.8	-0.05545	-0.02667			02-0190-4206	02-8661-6124
12			11	14:35	13.34	5.485	2.638	(+)		05-8111-1120	03-7465-8007
13			12	14:45	7.467	-0.388	-0.1866			01-0237-5581	09-6402-3981
14			16	14:35	7.977	0.1219	0.05865			04-6285-8375	01-4279-2596
15			17	14:50	8.504	0.6489	0.3121			04-5072-3133	09-0911-7730
16			23	14:30	13.38	5.526	2.658	(+)		07-6771-8781	07-7153-3575
17			30	15:30	7.388	-0.4669	-0.2246			15-3542-8276	07-3589-9194
18		Aug	7	15:30	7.473	-0.382	-0.1837			01-2834-9487	19-8086-2685
19			14	14:15	7.466	-0.3891	-0.1872			18-5609-6564	14-6389-5644
20			17	14:00	7.563	-0.2916	-0.1403			15-9584-4385	06-2135-1537
21			20	14:15	10.76	2.909	1.399			14-8361-1578	12-0750-5104

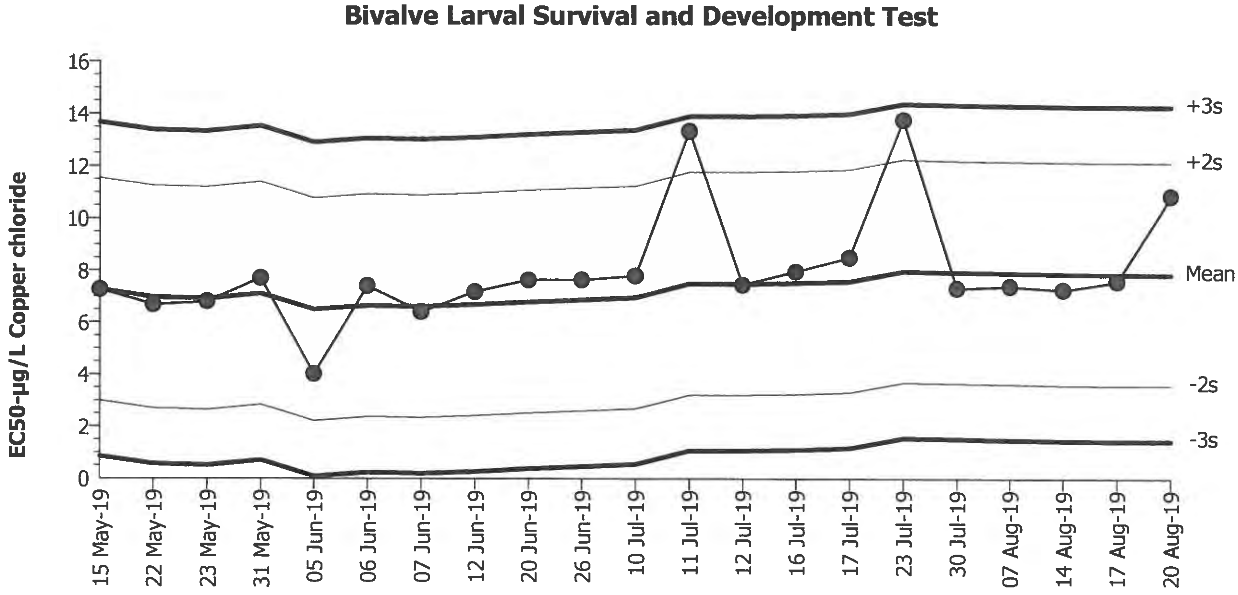
Analyst: JCC QA: AC 9/19/19

CETIS QC Plot

Report Date: 18 Sep-19 08:44 (1 of 1)

Bivalve Larval Survival and Development Test **Nautilus Environmental (CA)**

Test Type:	Development-Survival	**Organism:**	Mytilus galloprovincialis (Bay Mussel	**Material:**	Copper chloride
Protocol:	EPA/600/R-95/136 (1995)	**Endpoint:**	Combined Development Rate	**Source:**	Reference Toxicant-REF



Mean:	7.852	**Count:**	20	**-2s Warning Limit:**	3.576	**-3s Action Limit:**	1.438
Sigma:	2.138	**CV:**	27.20%	**+2s Warning Limit:**	12.13	**+3s Action Limit:**	14.27

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2019	May	15	15:10	7.264	-0.588	-0.275			12-3612-1420	09-9400-1021
2			22	14:35	6.682	-1.17	-0.5471			07-8876-2604	11-8156-7920
3			23	14:30	6.802	-1.05	-0.4909			04-4294-0564	00-1747-4708
4			31	14:45	7.705	-0.1473	-0.0689			03-7170-8467	07-0824-5140
5		Jun	5	14:30	4.018	-3.834	-1.793			14-9865-1579	13-4485-4153
6			6	15:45	7.404	-0.4484	-0.2097			20-7222-8009	13-0272-9420
7			7	13:35	6.408	-1.444	-0.6755			16-0229-2669	15-6829-1413
8			12	15:00	7.174	-0.6781	-0.3172			20-8735-2782	03-4367-9827
9			20	15:00	7.627	-0.225	-0.1052			00-4624-1892	07-7845-5970
10			26	15:55	7.636	-0.2157	-0.1009			00-8415-2643	12-3790-3484
11		Jul	10	15:15	7.786	-0.06613	-0.03093			02-0190-4206	08-2094-6054
12			11	14:35	13.33	5.477	2.562	(+)		05-8111-1120	10-3716-8433
13			12	14:45	7.443	-0.409	-0.1913			01-0237-5581	01-3582-7031
14			16	14:35	7.951	0.09913	0.04636			04-6285-8375	08-7682-6614
15			17	14:50	8.497	0.6452	0.3018			04-5072-3133	00-7236-3161
16			23	14:30	13.76	5.909	2.764	(+)		07-6771-8781	18-1893-5656
17			30	15:30	7.313	-0.5391	-0.2522			15-3542-8276	10-4430-8659
18		Aug	7	15:30	7.395	-0.4574	-0.2139			01-2834-9487	15-5629-3220
19			14	14:15	7.255	-0.5969	-0.2792			18-5609-6564	17-5885-5207
20			17	14:00	7.582	-0.2701	-0.1264			15-9584-4385	02-8136-8757
21			20	14:15	10.86	3.01	1.408			14-8361-1578	03-1832-9380

Analyst: JC QA: AC 9/19/19

CETIS Test Data Worksheet

Report Date: 16 Aug-19 12:28 (p 1 of 1)
Test Code: 14-8361-1578/190820msdv

Bivalve Larval Survival and Development Test

Nautilus Environmental (CA)

Start Date: 20 Aug-19
End Date: 22 Aug-19
Sample Date: 20 Aug-19
Species: Mytilus galloprovincialis
Protocol: EPA/600/R-95/136 (1995)
Material: Copper chloride
Sample Code: 190820msdv
Sample Source: Reference Toxicant
Sample Station: Copper Chloride

C-µg/L	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
			1			224	220	JCL 9/6/19
			2			211	204	
			3			104	0	some cells lysed
			4			190	189	
			5			218	214	
			6			89	0	some cells lysed
			7			78	0	some cells lysed
			8			210	116	
			9			189	185	
			10			189	0	
			11			217	214	JCL 9/10/19
			12			201	196	
			13			214	208	
			14			211	205	
			15			242	237	
			16			201	114	
			17			74	0	some cells lysed
			18			193	191	
			19			207	109	
			20			89	0	some cells lysed
			21			184	179	
			22			Ⓐ + 206	102	
			23			210	208	
			24			226	0	
			25			220	115	
			26			215	0	
			27			211	208	lid was loose, some evaporation occurred
			28			209	0	
			29			244	0	
			30			194	189	

Ⓐ Q18 JCL 9/10/19

Analyst: JCL

QA: AC 9/12/19

CETIS Test Data Worksheet

Report Date: 16 Aug-19 12:28 (p 1 of 1)
Test Code: 14-8361-1578/190820msdv

Bivalve Larval Survival and Development Test **Nautilus Environmental (CA)**

Start Date: 20 Aug-19 **Species:** Mytilus galloprovincialis **Sample Code:** 190820msdv
End Date: 22 Aug-19 **Protocol:** EPA/600/R-95/136 (1995) **Sample Source:** Reference Toxicant
Sample Date: 20 Aug-19 **Material:** Copper chloride **Sample Station:** Copper Chloride

C-µg/L	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
0	LC	1	4			212	209	BO 8/22/19
0	LC	2	18					
0	LC	3	13					
0	LC	4	15					
0	LC	5	27					
2.5		1	30					
2.5		2	12			203	200	BO 8/22/19
2.5		3	23					
2.5		4	5					
2.5		5	14					
5		1	2					
5		2	11					
5		3	21					
5		4	1			232	226	BO 8/22/19
5		5	9					
10		1	25					
10		2	19					
10		3	16			208	120	BO 8/22/19
10		4	22					
10		5	8					
20		1	24					
20		2	10			193	0	BO 8/22/19
20		3	26					
20		4	29					
20		5	28					
40		1	6					
40		2	7					
40		3	20					
40		4	3			113	0	cells lysed BO 8/22/19
40		5	17					

QC: EG

Analyst: BO QA: AC 9/12/19

Marine Chronic Bioassay
DM-014

Water Quality Measurements

Client: Internal
Sample ID: $CuCl_2$
Test No.: 190820msdv

Test Species: *M. galloprovincialis*
Start Date/Time: 8/20/2019 1415
End Date/Time: 8/22/2019 1225

Concentration (µg/L)	Salinity (ppt)			Temperature (°C)			Dissolved Oxygen (mg/L)			pH (pH units)		
	0	24	48	0	24	48	0	24	48	0	24	48
Lab Control	31.8	31.8	31.6	14.5	14.6	14.6	8.3	8.5	8.3	8.03	8.01	8.00
2.5	32.0	32.1	32.1	14.3	14.4	14.4	8.3	8.5	8.4	8.02	7.97	7.98
5	32.0	32.1	32.1	14.3	14.4	14.4	8.3	8.4	8.4	8.01	7.97	7.98
10	32.1	32.2	32.2	14.4	14.6	14.5	8.2	8.4	8.4	8.02	7.98	7.97
20	32.0	32.2	32.2	14.3	14.5	14.5	8.1	8.4	8.4	8.01	7.97	7.98
40	32.0	32.1	32.1	14.3	14.5	14.4	8.1	8.5	8.3	8.03	7.98	7.97

Technician Initials:

	0	24	48
WQ Readings:	BO	RT	BO
Dilutions made by:	AC	▨	▨

High conc. made (µg/L):	40
Vol. Cu stock added (mL):	1.9
Final Volume (mL):	500
Cu stock concentration (µg/L):	10,400

Environmental Chamber: ____________

Comments:
0 hrs: ____________
24 hrs: ____________
48 hrs: ____________

QC Check: AC 9/12/19

Final Review: EG 9/16/19

Enthalpy Analytical. 4340 Vandever Avenue. San Diego, CA 92120.

Marine Chronic Bioassay
DM-013

Larval Development Worksheet

Client: Internal / CuCl2
Test No.: 190820 msdv
Test Species: Mytilus galloprovincialis
Animal Source: Mission Bay
Date Received: 7/1/19
Test Chambers: 30mL glass shell vials
Sample Volume: 10mL

Start Date/Time: 8/20/2019 1415
End Date/Time: 8/22/2019 1225
Technician Initials: BO

Spawn Information

First Gamete Release Time: 1100

Sex	Number Spawning
Male	5
Female	4

Gamete Selection

Sex	Beaker Number(s)	Condition (sperm motility, egg density, color, shape, etc.)
Male	2,3,4	good motility, average density
Female 1	1	light yellow color, great shape, great density
Female 2	3	white, good shape, good density
Female 3	—	—

Egg Fertilization Time: 1200

Embryo Stock Selection

Stock Number	% of embryos at 2-cell division stage
Female 1	100
Female 2	100
Female 3	—

Stock(s) chosen for testing: 1

Embryo Inoculum Preparation

Target count on Sedgwick-Rafter slide for desired density is 6 embryos

Number Counted:

6	13
12	13
10	10
10	10
10	12

Mean: 10.6

Mean 10.6 X 50 = 530 embryos/ml

Initial Density: 530 = 1.77 (dilution factor)
Desired Final Density: 300
(to inoculate with 0.5 ml)

Prepare the embryo inoculum according to the calculated dilution factor. For example, if the dilution factor is 2.25, use 100 ml of existing stock (1 part) and 125 ml of dilution water (1.25 parts).

Time Zero Control Counts

Rand. No.	No. Dividing	Total	% Dividing	Mean % Dividing
T01	218	218	100	100
T02	198	198	100	
T03	183	183	100	
T04	203	203	100	
T05	187	187	100	

48-h QC: 224/227 = 98.6%

Comments: x̄ = 198

QC Check: AC 9/10/19

Final Review: Eh 9/16/19

Enthalpy Analytical. 4340 Vandever Avenue. San Diego, CA 92120.

Pacific Topsmelt 96-hr Survival

CETIS Summary Report

Report Date: 28 Aug-19 11:10 (p 1 of 1)
Test Code: 190819aara | 00-1616-6988

Pacific Topsmelt 96-h Acute Survival Test — **Nautilus Environmental (CA)**

Batch ID:	20-3644-8455	**Test Type:**	Survival (96h)	**Analyst:**	
Start Date:	19 Aug-19 19:30	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	Diluted Natural Seawater
Ending Date:	23 Aug-19 17:35	**Species:**	Atherinops affinis	**Brine:**	Not Applicable
Duration:	94h	**Source:**	Aquatic Biosystems, CO	**Age:**	15d

Sample ID:	02-0317-6991	**Code:**	190819aara	**Client:**	Internal
Sample Date:	19 Aug-19	**Material:**	Copper chloride	**Project:**	
Receive Date:	19 Aug-19	**Source:**	Reference Toxicant		
Sample Age:	20h	**Station:**	Copper Chloride		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
13-5011-3678	96h Survival Rate	100	200	141.4	26.5%		Dunnett Multiple Comparison Test

Point Estimate Summary

Analysis ID	Endpoint	Level	µg/L	95% LCL	95% UCL	TU	Method
16-4823-3084	96h Survival Rate	EC50	158.7	129	195.3		Spearman-Kärber

96h Survival Rate Summary

C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Control	4 015	0.85	0.6909	1	0.8	1	0.05	0.1	11.76%	0.0%
50		4	0.95	0.7909	1	0.8	1	0.05	0.1	10.53%	-11.76%
100		4	0.65	0.3453	0.9547	0.4	0.8	0.09574	0.1915	29.46%	23.53%
200		4	0.4	0.1402	0.6598	0.2	0.6	0.08165	0.1633	40.82%	52.94%
400		4	0	0	0	0	0	0	0		100.0%
800		4	0	0	0	0	0	0	0		100.0%

96h Survival Rate Detail

C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Lab Control	1	0.8	0.8	0.8
50		1	1	0.8	1
100		0.6	0.4	0.8	0.8
200		0.6	0.4	0.2	0.4
400		0	0	0	0
800		0	0	0	0

Analyst: JCL QA: KFP 8/28/1

CETIS Analytical Report

Report Date: 28 Aug-19 11:10 (p 1 of 1)
Test Code: 190819aara | 00-1616-6988

Pacific Topsmelt 96-h Acute Survival Test — **Nautilus Environmental (CA)**

Analysis ID:	13-5011-3678	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	28 Aug-19 11:09	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C > T	NA	NA	26.5%	100	200	141.4	

Dunnett Multiple Comparison Test

Control	vs	C-µg/L	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		50	-1.068	2.287	0.255	6	0.9661	CDF	Non-Significant Effect
		100	1.977	2.287	0.255	6	0.0840	CDF	Non-Significant Effect
		200*	4.368	2.287	0.255	6	0.0012	CDF	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.8532631	0.284421	3	11.45	0.0008	Significant Effect
Error	0.2981783	0.02484819	12			
Total	1.151441		15			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	1.144	11.34	0.7665	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.946	0.8408	0.4292	Normal Distribution

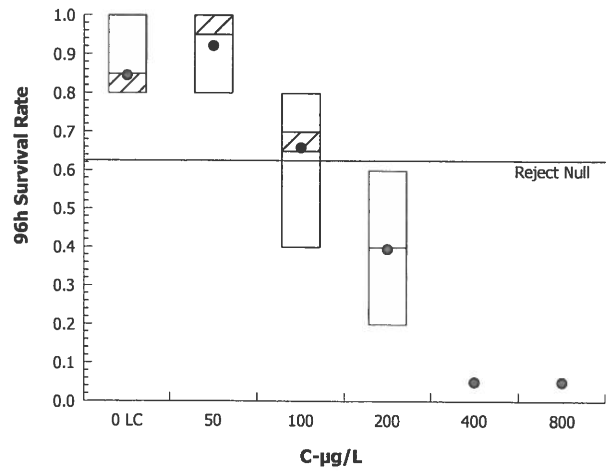
96h Survival Rate Summary

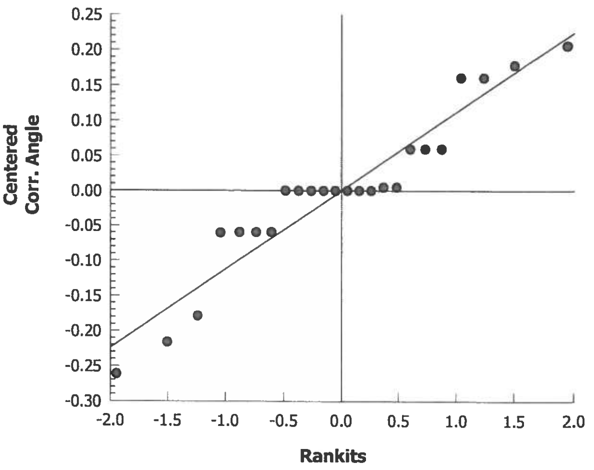
C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	4	0.85	0.6909	1	0.8	0.8	1	0.05	11.76%	0.0%
50		4	0.95	0.7909	1	1	0.8	1	0.05	10.53%	-11.76%
100		4	0.65	0.3453	0.9547	0.7	0.4	0.8	0.09574	29.46%	23.53%
200		4	0.4	0.1402	0.6598	0.4	0.2	0.6	0.08165	40.82%	52.94%
400		4	0	0	0	0	0	0	0		100.0%
800		4	0	0	0	0	0	0	0		100.0%

Angular (Corrected) Transformed Summary

C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	4	1.167	0.9772	1.356	1.107	1.107	1.345	0.05953	10.21%	0.0%
50		4	1.286	1.096	1.475	1.345	1.107	1.345	0.05953	9.26%	-10.21%
100		4	0.9463	0.623	1.27	0.9966	0.6847	1.107	0.1016	21.47%	18.89%
200		4	0.6798	0.4052	0.9544	0.6847	0.4636	0.8861	0.08628	25.38%	41.73%
400		4	0.2255	0.2255	0.2256	0.2255	0.2255	0.2255	0	0.0%	80.67%
800		4	0.2255	0.2255	0.2256	0.2255	0.2255	0.2255	0	0.0%	80.67%

Graphics





Analyst: JC QA: KFP 8/28/1

CETIS Analytical Report

Report Date: 28 Aug-19 11:10 (p 1 of 1)
Test Code: 190819aara | 00-1616-6988

Pacific Topsmelt 96-h Acute Survival Test

Nautilus Environmental (CA)

Analysis ID: 16-4823-3084 **Endpoint:** 96h Survival Rate **CETIS Version:** CETISv1.8.7
Analyzed: 28 Aug-19 11:09 **Analysis:** Untrimmed Spearman-Kärber **Official Results:** Yes

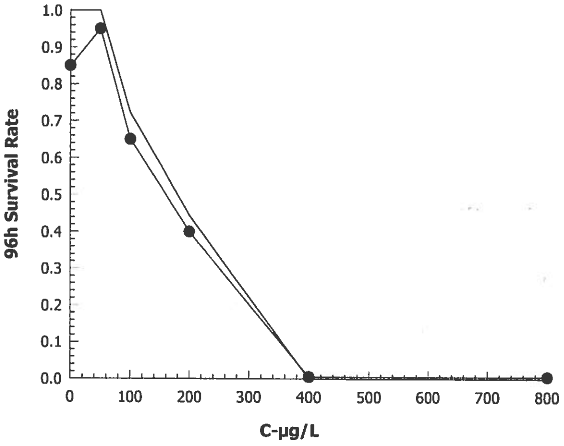
Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0.15	0.00%	2.201	0.04503	158.7	129	195.3

96h Survival Rate Summary

			Calculated Variate(A/B)								
C-µg/L	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Lab Control	4	0.85	0.8	1	0.05	0.1	11.76%	0.0%	17	20
50		4	0.95	0.8	1	0.05	0.1	10.53%	-11.76%	19	20
100		4	0.65	0.4	0.8	0.09574	0.1915	29.46%	23.53%	13	20
200		4	0.4	0.2	0.6	0.08165	0.1633	40.82%	52.94%	8	20
400		4	0	0	0	0	0		100.0%	0	20
800		4	0	0	0	0	0		100.0%	0	20

Graphics



Analyst: JCL QA: KFP 8/28/1

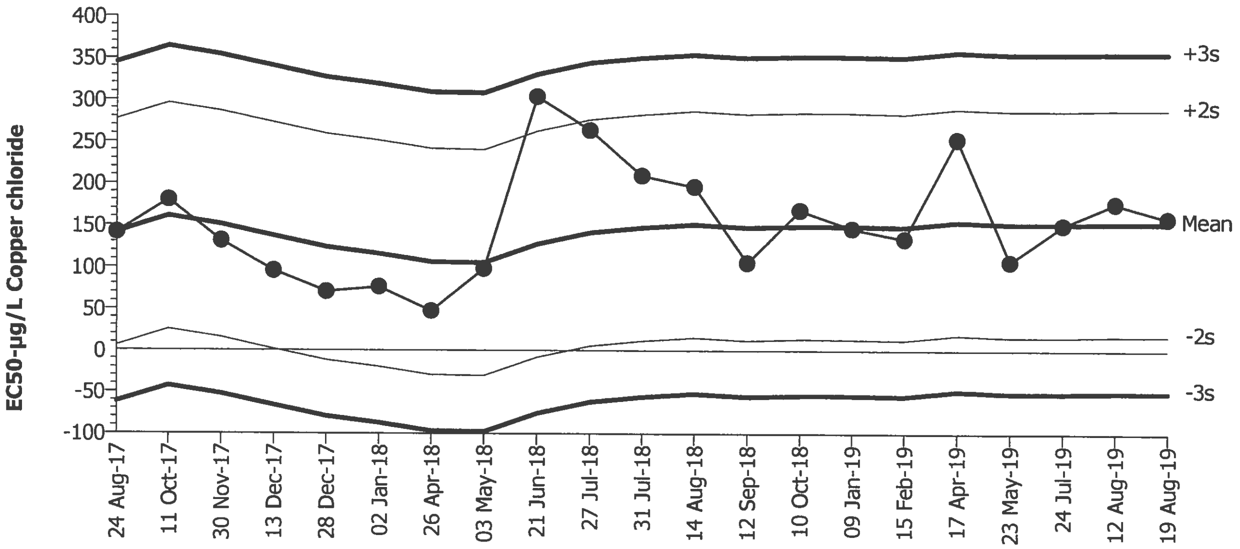
CETIS QC Plot

Report Date: 28 Aug-19 11:10 (1 of 1)

Pacific Topsmelt 96-h Acute Survival Test **Nautilus Environmental (CA)**

Test Type:	Survival (96h)	**Organism:**	Atherinops affinis (Topsmelt)	**Material:**	Copper chloride
Protocol:	EPA/821/R-02-012 (2002)	**Endpoint:**	96h Survival Rate	**Source:**	Reference Toxicant-REF

Pacific Topsmelt 96-h Acute Survival Test



Mean:	152.8	**Count:**	20	**-2s Warning Limit:**	17.28	**-3s Action Limit:**	-50.5
Sigma:	67.78	**CV:**	44.40%	**+2s Warning Limit:**	288.4	**+3s Action Limit:**	356.2

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2017	Aug	24	14:45	141.4	-11.38	-0.1679			04-3270-4077	21-0546-3622
2		Oct	11	15:15	180.3	27.45	0.405			09-8131-0051	08-6143-6647
3		Nov	30	12:15	131.5	-21.33	-0.3147			06-5828-7628	11-9084-4410
4		Dec	13	15:35	95.76	-57.04	-0.8415			20-5100-4727	07-8527-1377
5			28	13:00	70.71	-82.09	-1.211			16-4874-9266	20-1729-5429
6	2018	Jan	2	15:00	76.37	-76.43	-1.128			07-8786-9002	01-0853-3714
7		Apr	26	16:00	47.5	-105.3	-1.554			13-5076-1359	11-6152-1189
8		May	3	11:30	98.19	-54.61	-0.8057			10-2125-8586	19-5652-0046
9		Jun	21	17:15	304.1	151.3	2.232	(+)		01-0576-9762	09-0246-7639
10		Jul	27	15:45	263.9	111.1	1.639			14-8822-7369	11-4350-5971
11			31	16:30	209.6	56.79	0.8379			19-5107-0005	20-6864-5330
12		Aug	14	16:00	196.4	43.58	0.643			15-6494-9229	17-8173-7294
13		Sep	12	14:00	105.6	-47.18	-0.696			16-1211-7168	05-2683-6884
14		Oct	10	16:55	168.2	15.38	0.2269			03-4460-7421	02-8297-4115
15	2019	Jan	9	16:00	146.4	-6.391	-0.0943			16-8541-8400	01-0716-9806
16		Feb	15	16:10	134	-18.8	-0.2774			08-0425-5661	18-0762-3864
17		Apr	17	17:50	253.5	100.7	1.486			05-1475-1452	18-1058-7085
18		May	23	15:30	106.6	-46.17	-0.6812			03-2154-6851	19-3512-2662
19		Jul	24	16:25	150.4	-2.391	-0.03528			02-4547-9337	03-4444-2456
20		Aug	12	16:15	176.5	23.67	0.3493			05-6999-0080	19-2452-0933
21			19	19:30	158.7	5.94	0.08764			00-1616-6988	16-4823-3084

Analyst: JL QA: KFP 8/28/19

Marine Acute Bioassay
Static-Renewal Conditions
DM-001

Water Quality Measurements
& Test Organism Survival

Client: Internal
Sample ID: $CuCl_2$
Test No.: 190819aara

Test Species: *A. affinis*
Start Date/Time: 8/19/2019 1930
End Date/Time: 8/23/2019 1735

	Tech Initials				
	0	24	48	72	96
Counts:	AC	RT	JBS	JBS	BO
Readings:	JBS	HH	HH	BO	HH
Dilutions made by:	JBS	—	JBS	—	—
High conc. made (µg/L):	800	--	800	--	--
Vol. Cu stock added (mL):	17.2	--	17.2	--	--
Final Volume (mL):	2000	--	2000	--	--

Cu stock concentration (µg/L): 93,000

Concentration __(µg/L)__	Rand #	Number of Live Organisms					Salinity (ppt)					Temperature (°C)					Dissolved Oxygen (mg/L)					pH (units)				
		0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
Lab Control	22	5	5	5	5	5	29.3	29.5	i 29.7	29.4	29.4	20.8	21.7	i 20.5	21.5	21.5	7.3	5.7	i 6.7	6.1	6.3	7.97	7.72	i 8.04	7.69	7.67
Q15	2	5	5	5	5	4			f 30.4					f 21.6					f 5.5					f 7.66		
	10	5	5	5	5	4																				
	15	5	5	4	4	4																				
50	24	5	5	5	5	5	29.4	29.4	i 29.8	29.5	29.5	20.8	21.6	i 20.4	21.5	21.4	7.5	5.7	i 6.8	6.0	6.4	7.97	7.73	i 8.03	7.68	7.70
	8	5	5	5	5	5			f 30.4					f 21.5					f 5.4					f 7.68		
	17	5	5	4	4	4																				
	11	5	5	5	5	5																				
100	12	5	5	5	4	3	29.4	29.4	i 30.2	29.5	29.4	20.8	21.6	i 20.5	21.6	21.5	7.5	5.6	i 6.7	6.0	6.2	7.97	7.73	i 8.05	7.67	7.68
	4	5	5	4	4	2			f 30.3					f 21.6					f 5.3					f 7.69		
	1	5	5	5	5	4																				
	19	5	5	4	4	4																				
200	23	5	4	4	3	3	29.3	29.3	i 30.2	29.4	29.4	20.9	21.7	i 20.4	21.6	21.5	7.4	5.8	i 6.8	5.9	6.2	7.97	7.70	i 8.11	7.66	7.69
	13	5	4	Ⓐ ~~3~~ 2	2	2			f 30.3					f 21.6					f 5.5					f 7.72		
	14	5	1	1	1	1																				
	18	5	2	2	2	2																				
400	9	5	0				29.3	29.3	i 30.2	—	-	20.9	21.8	i 20.5	-	-	7.4	6.1	i 6.7	—	-	7.97	7.71	i 8.05	—	—
	16	5	0	ALL DEAD					f					f					f					f		
	7	5	0																							
	5	5	0																							
800	3	5	0				29.2	29.6	i 30.0	—	-	20.9	21.3	i 20.5			7.4	6.3	i 6.9	—	-	7.94	7.79	i 8.07	—	—
	21	5	0	ALL DEAD					f					f					f					f		
	6	5	0																							
	20	5	0																							

Rand # QC: JBS
Initial Counts QC'd by: EG
Initiated by: EG

Environmental Chamber: B

Animal Source/Date Received: ABS 8/17/19
Age at Initiation: ~15 days

Animal Acclimation Qualifiers (circle all that apply): [✓ Q22] / Q23 / Q24 / none

Feeding Times					
	0	24	48	72	96
AM:	--	0830	0905	0845	0915
PM:	1945	--	--	--	--

Comments: i = initial reading in fresh test solution, f = final reading in test chamber prior to renewal Ⓐ Q18 JBS 8/21/19
Organisms fed prior to initiation, circle one ([✓ y] / n)

QC Check: AC 8/27/19

Final Review: KFP 8/28/19

Enthalpy Analytical. 4340 Vandever Avenue. San Diego, CA 92120.

CETIS Summary Report

Report Date: 28 Aug-19 11:17 (p 1 of 1)
Test Code: 190822aara | 14-6253-4066

Pacific Topsmelt 96-h Acute Survival Test

Nautilus Environmental (CA)

Batch ID:	07-4371-1158	**Test Type:**	Survival (96h)	**Analyst:**	
Start Date:	22 Aug-19 16:45	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	Diluted Natural Seawater
Ending Date:	26 Aug-19 14:50	**Species:**	Atherinops affinis	**Brine:**	Not Applicable
Duration:	94h	**Source:**	Aquatic Biosystems, CO	**Age:**	11d

Sample ID:	09-7022-6042	**Code:**	190822aara	**Client:**	Internal
Sample Date:	22 Aug-19	**Material:**	Copper chloride	**Project:**	
Receive Date:	22 Aug-19	**Source:**	Reference Toxicant		
Sample Age:	17h	**Station:**	Copper Chloride		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
04-0556-2056	96h Survival Rate	200	400	282.8	50.5%		Dunnett Multiple Comparison Test

Point Estimate Summary

Analysis ID	Endpoint	Level	µg/L	95% LCL	95% UCL	TU	Method
09-6589-6472	96h Survival Rate	EC50	232	200.7	268.2		Spearman-Kärber

96h Survival Rate Summary

C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Control	4 Q15	0.85	0.6909	1	0.8	1	0.05	0.1	11.76%	0.0%
50		4	0.9	0.7163	1	0.8	1	0.05774	0.1155	12.83%	-5.88%
100		4	0.85	0.5453	1	0.6	1	0.09574	0.1915	22.53%	0.0%
200		4	0.65	0	1	0	1	0.2217	0.4435	68.23%	23.53%
400		4	0	0	0	0	0	0	0		100.0%
800		4	0	0	0	0	0	0	0		100.0%

96h Survival Rate Detail

C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Lab Control	0.8	0.8	1	0.8
50		0.8	0.8	1	1
100		1	0.6	1	0.8
200		0	0.8	0.8	1
400		0	0	0	0
800		0	0	0	0

Analyst: JCL QA: KFP 8/28/1

CETIS Analytical Report

Report Date:	28 Aug-19 11:17 (p 1 of 1)
Test Code:	190822aara | 14-6253-4066

Pacific Topsmelt 96-h Acute Survival Test — **Nautilus Environmental (CA)**

Analysis ID:	04-0556-2056	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	28 Aug-19 11:14	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C > T	NA	NA	50.5%	200	400	282.8	

Dunnett Multiple Comparison Test

Control	vs	C-µg/L	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		50	-0.2953	2.287	0.461	6	0.8423	CDF	Non-Significant Effect
		100	-0.02116	2.287	0.461	6	0.7575	CDF	Non-Significant Effect
		200	1.093	2.287	0.461	6	0.3001	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.1840434	0.0613478	3	0.7545	0.5407	Non-Significant Effect
Error	0.9757112	0.08130927	12			
Total	1.159755		15			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	6.907	11.34	0.0749	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8643	0.8408	0.0223	Normal Distribution

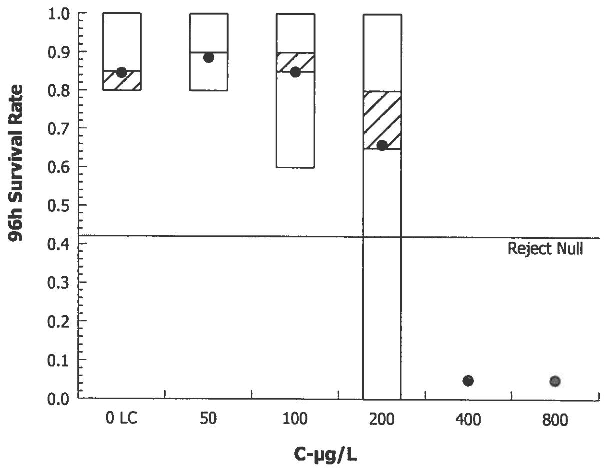
96h Survival Rate Summary

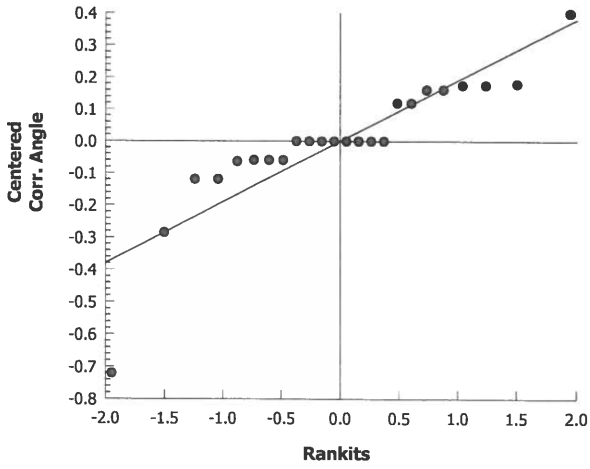
C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	4	0.85	0.6909	1	0.8	0.8	1	0.05	11.76%	0.0%
50		4	0.9	0.7163	1	0.9	0.8	1	0.05774	12.83%	-5.88%
100		4	0.85	0.5453	1	0.9	0.6	1	0.09574	22.53%	0.0%
200		4	0.65	0	1	0.8	0	1	0.2217	68.23%	23.53%
400		4	0	0	0	0	0	0	0		100.0%
800		4	0	0	0	0	0	0	0		100.0%

Angular (Corrected) Transformed Summary

C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	4	1.167	0.9772	1.356	1.107	1.107	1.345	0.05953	10.21%	0.0%
50		4	1.226	1.007	1.445	1.226	1.107	1.345	0.06874	11.21%	-5.1%
100		4	1.171	0.8199	1.522	1.226	0.8861	1.345	0.1103	18.84%	-0.37%
200		4	0.9463	0.1611	1.731	1.107	0.2255	1.345	0.2467	52.15%	18.89%
400		4	0.2255	0.2255	0.2256	0.2255	0.2255	0.2255	0	0.0%	80.67%
800		4	0.2255	0.2255	0.2256	0.2255	0.2255	0.2255	0	0.0%	80.67%

Graphics





Analyst: JCa QA: KFP 8/28/1

CETIS Analytical Report

Report Date: 28 Aug-19 11:17 (p 1 of 1)
Test Code: 190822aara | 14-6253-4066

Pacific Topsmelt 96-h Acute Survival Test — **Nautilus Environmental (CA)**

Analysis ID:	09-6589-6472	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	28 Aug-19 11:16	**Analysis:**	Untrimmed Spearman-Kärber	**Official Results:**	Yes

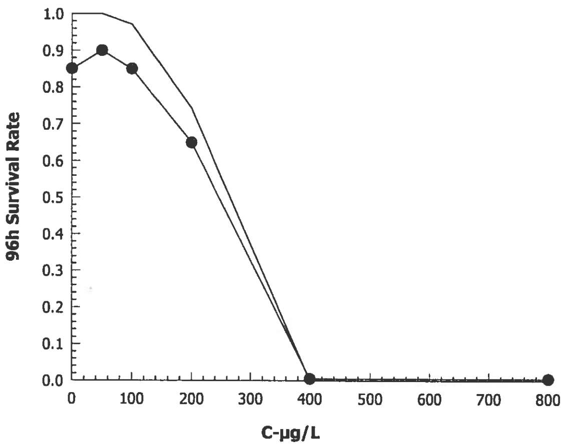
Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0.15	0.00%	2.366	0.03148	232	200.7	268.2

96h Survival Rate Summary

			Calculated Variate(A/B)								
C-µg/L	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Lab Control	4	0.85	0.8	1	0.05	0.1	11.76%	0.0%	17	20
50		4	0.9	0.8	1	0.05774	0.1155	12.83%	-5.88%	18	20
100		4	0.85	0.6	1	0.09574	0.1915	22.53%	0.0%	17	20
200		4	0.65	0	1	0.2217	0.4435	68.23%	23.53%	13	20
400		4	0	0	0	0	0		100.0%	0	20
800		4	0	0	0	0	0		100.0%	0	20

Graphics



Analyst: JCL QA: KFP 8/28/1

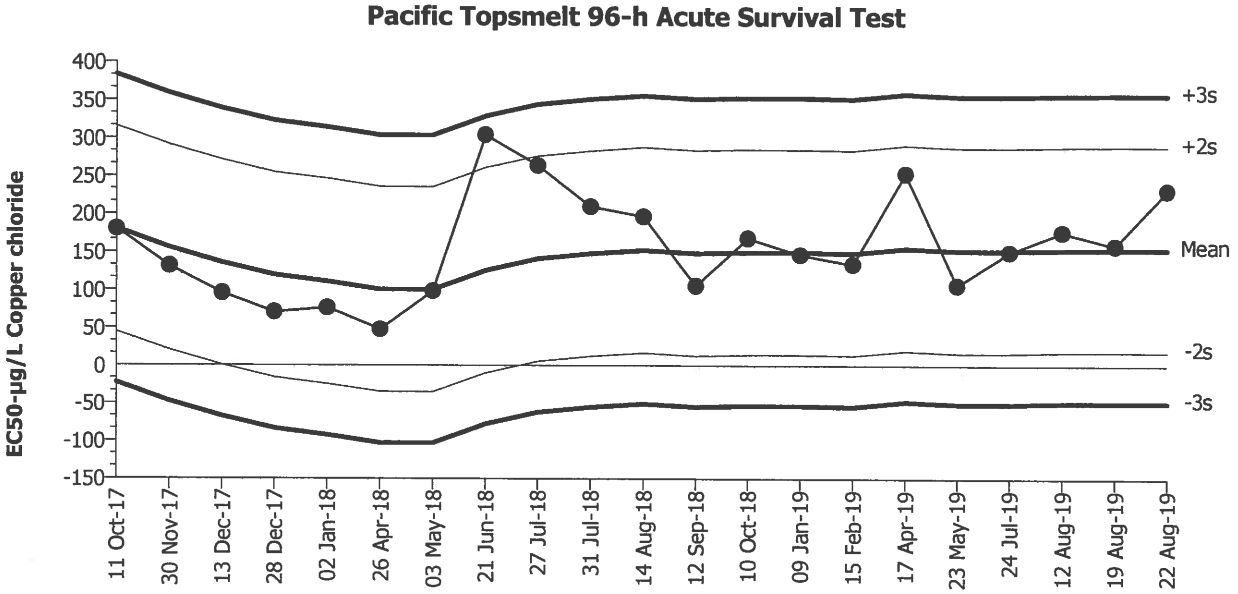
CETIS QC Plot

Report Date: 28 Aug-19 11:16 (1 of 1)

Pacific Topsmelt 96-h Acute Survival Test

Nautilus Environmental (CA)

Test Type: Survival (96h)
Protocol: EPA/821/R-02-012 (2002)
Organism: Atherinops affinis (Topsmelt)
Endpoint: 96h Survival Rate
Material: Copper chloride
Source: Reference Toxicant-REF



Mean:	153.7	**Count:**	20	**-2s Warning Limit:**	18.23	**-3s Action Limit:**	-49.51
Sigma:	67.74	**CV:**	44.10%	**+2s Warning Limit:**	289.2	**+3s Action Limit:**	356.9

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2017	Oct	11	15:15	180.3	26.55	0.3919			09-8131-0051	08-6143-6647
2		Nov	30	12:15	131.5	-22.23	-0.3282			06-5828-7628	11-9084-4410
3		Dec	13	15:35	95.76	-57.94	-0.8553			20-5100-4727	07-8527-1377
4			28	13:00	70.71	-82.99	-1.225			16-4874-9266	20-1729-5429
5	2018	Jan	2	15:00	76.37	-77.33	-1.142			07-8786-9002	01-0853-3714
6		Apr	26	16:00	47.5	-106.2	-1.568			13-5076-1359	11-6152-1189
7		May	3	11:30	98.19	-55.51	-0.8194			10-2125-8586	19-5652-0046
8		Jun	21	17:15	304.1	150.4	2.22	(+)		01-0576-9762	09-0246-7639
9		Jul	27	15:45	263.9	110.2	1.627			14-8822-7369	11-4350-5971
10			31	16:30	209.6	55.89	0.8251			19-5107-0005	20-6864-5330
11		Aug	14	16:00	196.4	42.68	0.6301			15-6494-9229	17-8173-7294
12		Sep	12	14:00	105.6	-48.08	-0.7097			16-1211-7168	05-2683-6884
13		Oct	10	16:55	168.2	14.48	0.2137			03-4460-7421	02-8297-4115
14	2019	Jan	9	16:00	146.4	-7.291	-0.1076			16-8541-8400	01-0716-9806
15		Feb	15	16:10	134	-19.7	-0.2908			08-0425-5661	18-0762-3864
16		Apr	17	17:50	253.5	99.85	1.474			05-1475-1452	18-1058-7085
17		May	23	15:30	106.6	-47.07	-0.6949			03-2154-6851	19-3512-2662
18		Jul	24	16:25	150.4	-3.291	-0.04859			02-4547-9337	03-4444-2456
19		Aug	12	16:15	176.5	22.77	0.3362			05-6999-0080	19-2452-0933
20			19	19:30	158.7	5.04	0.0744			00-1616-6988	16-4823-3084
21			22	16:45	232	78.33	1.156			14-6253-4066	09-6589-6472

Analyst: JCL QA: PFP 8/28/1

Marine Acute Bioassay
Static-Renewal Conditions
DM-001

Water Quality Measurements
& Test Organism Survival

Client: Internal
Sample ID: $CuCl_2$
Test No.: 190822aara

Test Species: *A. affinis*
Start Date/Time: 8/22/2019 1645
End Date/Time: 8/26/2019 1450

	Tech Initials				
	0	24	48	72	96
Counts:	JBS	RT	TN	JBS	JBS
Readings:	JBS	AH	TN, JBS		AS
Dilutions made by:	~~JBS doo~~ TN	—	RT	—	—
High conc. made (µg/L):	800	--	400	--	--
Vol. Cu stock added (mL):	17.2	--	8.6	--	--
Final Volume (mL):	2000	--	2000	--	--

Cu stock concentration (µg/L): 93,000

Concentration (µg/L)	Rand #	Number of Live Organisms					Salinity (ppt)					Temperature (°C)					Dissolved Oxygen (mg/L)					pH (units)				
		0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96
Lab Control	22	5	5	4	4	4	29.5	29.1	i 30.1	29.9	29.8	20.9	21.1	i 20.9	21.7	20.5	7.1	6.5	i 6.7	6.2	6.1	7.90	7.79	i 7.97	7.74	7.67
615	2	5	5	4	4	4			f 30.1					f 21.6					f 5.8					f 7.63		
	10	5	5	5	5	5																				
	15	5	5	5	4	4																				
50	24	5	5	5	5	4	29.6	29.3	i 29.9	29.8	29.6	20.9	21.6	i 20.8	21.6	20.4	7.1	6.4	i 7.1	6.2	6.0	7.92	7.79	i 7.99	7.73	7.68
	8	5	5	5	5	4			f 29.3					f 21.5					f 5.9					f 7.65		
	17	5	5	5	5	5																				
	11	5	5	5	5	5																				
100	12	5	5	5	5	5	29.6	29.6	i 29.9	29.8	29.9	20.8	21.7	i 20.7	21.6	20.4	7.1	6.4	i 7.1	6.3	6.2	7.93	7.80	i 7.99	7.73	7.66
	4	5	5	5	4	3			f 29.4					f 21.6					f 6.0					f 7.69		
	1	5	5	5	5	5																				
	19	5	5	5	5	4																				
200	23	5	4	4	3	0	29.6	29.3	i 29.9	30.0	29.8	20.9	21.6	i 20.8	21.6	20.4	7.1	6.5	i 7.0	6.3	6.2	7.93	7.82	i 7.99	7.76	7.69
	13	5	4	4	4	4			f 29.5					f 21.5					f 6.0					f 7.69		
	14	5	5	5	5	4																				
	18	5	5	5	5	5																				
400	9	5	1	0	–	–	29.5	29.4	i 29.7	–	–	20.9	21.6	i 20.7	–	–	7.1	6.4	i 7.1	–	–	7.92	7.79	i 7.98	–	–
	16	5	0	–	–	–			f 29.3					f 21.5					f 6.0					f 7.68		
	7	5	1	0	–	–																				
	5	5	1	0	–	–																				
800	3	5	0				29.4	29.1	i –	–	–	20.8	21.6	i –	–	–	7.1	6.6	i –	–	–	7.90	7.80	i –	–	–
	21	5	0	All dead					f –					f –					f –					f –		
	6	5	0																							
	20	5	0																							

Rand # QC: JBS
Initial Counts QC'd by: JBS doo AC
Initiated by: JBS doo AC

Environmental Chamber: B

Animal Source/Date Received: ABS / 8/20/19
Age at Initiation: 11 days

Animal Acclimation Qualifiers (circle all that apply): [✓ Q22] / Q23 / Q24 / none

	Feeding Times				
	0	24	48	72	96
AM:	--	0915	0940	0840	0855
PM:	1700	--	--	--	--

Comments: i = initial reading in fresh test solution, f = final reading in test chamber prior to renewal

Organisms fed prior to initiation, circle one ([✓ y] / n)

QC Check: AC 8/27/19

Final Review: KFP 8/28/19

Enthalpy Analytical. 4340 Vandever Avenue. San Diego, CA 92120.

CETIS Summary Report

Report Date: 16 Sep-19 08:49 (p 1 of 1)
Test Code: 190910aara | 01-3190-7470

Pacific Topsmelt 96-h Acute Survival Test **Nautilus Environmental (CA)**

Batch ID:	01-5466-8206	**Test Type:**	Survival (96h)	**Analyst:**	
Start Date:	10 Sep-19 11:15	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	Diluted Natural Seawater
Ending Date:	14 Sep-19 09:45	**Species:**	Atherinops affinis	**Brine:**	Not Applicable
Duration:	94h	**Source:**	Aquatic Biosystems, CO	**Age:**	15d

Sample ID:	11-3548-5598	**Code:**	190910aara	**Client:**	Internal
Sample Date:	10 Sep-19	**Material:**	Copper chloride	**Project:**	
Receive Date:	10 Sep-19	**Source:**	Reference Toxicant		
Sample Age:	11h	**Station:**	Copper Chloride		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
15-3488-4165	96h Survival Rate	100	200	141.4	11.8%		Steel Many-One Rank Sum Test

Point Estimate Summary

Analysis ID	Endpoint	Level	µg/L	95% LCL	95% UCL	TU	Method
00-5901-5932	96h Survival Rate	EC50	246.2	210.6	288		Spearman-Kärber

96h Survival Rate Summary

C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Lab Control	4	1	1	1	1	1	0	0	0.0%	0.0%
50		4	1	1	1	1	1	0	0	0.0%	0.0%
100		4	0.95	0.7909	1	0.8	1	0.05	0.1	10.53%	5.0%
200		4	0.8	0.8	0.8	0.8	0.8	0	0	0.0%	20.0%
400		4	0.05	0	0.2091	0	0.2	0.05	0.1	200.0%	95.0%
800		4	0	0	0	0	0	0	0		100.0%

96h Survival Rate Detail

C-µg/L	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Lab Control	1	1	1	1
50		1	1	1	1
100		0.8	1	1	1
200		0.8	0.8	0.8	0.8
400		0	0	0	0.2
800		0	0	0	0

Analyst: AC QA: EG 9/17/19

CETIS Analytical Report

Report Date: 16 Sep-19 08:49 (p 1 of 2)
Test Code: 190910aara | 01-3190-7470

Pacific Topsmelt 96-h Acute Survival Test — **Nautilus Environmental (CA)**

Analysis ID:	15-3488-4165	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	16 Sep-19 8:49	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C > T	NA	NA	11.8%	100	200	141.4	

Steel Many-One Rank Sum Test

Control	vs	C-µg/L	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		50	18	10	1	6	0.8000	Asymp	Non-Significant Effect
		100	16	10	1	6	0.5661	Asymp	Non-Significant Effect
		200*	10	10	0	6	0.0350	Asymp	Significant Effect
		400*	10	10	0	6	0.0350	Asymp	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.262288	0.815572	4	143.8	<0.0001	Significant Effect
Error	0.08506185	0.00567079	15			
Total	3.34735		19			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Mod Levene Equality of Variance	0.75	4.893	0.5732	Equal Variances
Variances	Levene Equality of Variance	6.75	4.893	0.0026	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.8109	0.866	0.0013	Non-normal Distribution

96h Survival Rate Summary

C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	4	1	1	1	1	1	1	0	0.0%	0.0%
50		4	1	1	1	1	1	1	0	0.0%	0.0%
100		4	0.95	0.7909	1	1	0.8	1	0.05	10.53%	5.0%
200		4	0.8	0.7997	0.8003	0.8	0.8	0.8	0	0.0%	20.0%
400		4	0.05	0	0.2091	0	0	0.2	0.05	200.0%	95.0%
800		4	0	0	0	0	0	0	0		100.0%

Angular (Corrected) Transformed Summary

C-µg/L	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Lab Control	4	1.345	1.345	1.346	1.345	1.345	1.345	0	0.0%	0.0%
50		4	1.345	1.345	1.346	1.345	1.345	1.345	0	0.0%	0.0%
100		4	1.286	1.096	1.475	1.345	1.107	1.345	0.05953	9.26%	4.43%
200		4	1.107	1.107	1.108	1.107	1.107	1.107	0	0.0%	17.7%
400		4	0.285	0.09558	0.4745	0.2255	0.2255	0.4636	0.05953	41.77%	78.81%
800		4	0.2255	0.2255	0.2256	0.2255	0.2255	0.2255	0	0.0%	83.24%

Analyst: AC QA: EA 9/17/19

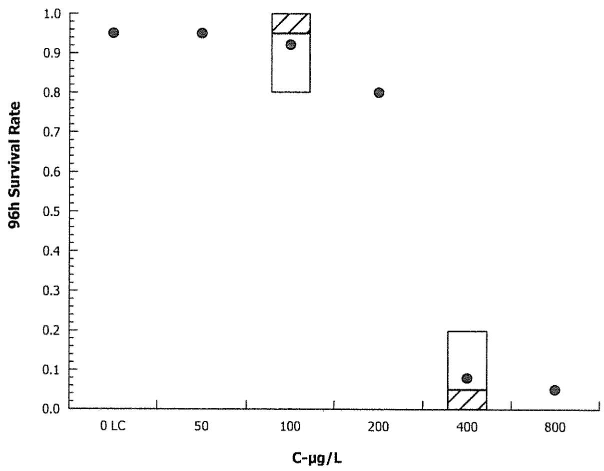
CETIS Analytical Report

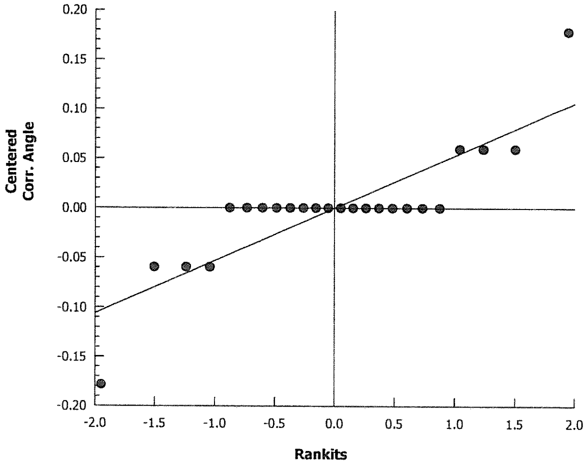
Report Date: 16 Sep-19 08:49 (p 2 of 2)
Test Code: 190910aara | 01-3190-7470

Pacific Topsmelt 96-h Acute Survival Test **Nautilus Environmental (CA)**

Analysis ID:	15-3488-4165	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	16 Sep-19 8:49	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Graphics





Analyst: AC QA: EG 9/17/19

CETIS Analytical Report

Report Date: 16 Sep-19 08:49 (p 1 of 1)
Test Code: 190910aara | 01-3190-7470

Pacific Topsmelt 96-h Acute Survival Test **Nautilus Environmental (CA)**

Analysis ID:	00-5901-5932	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	16 Sep-19 8:49	**Analysis:**	Untrimmed Spearman-Kärber	**Official Results:**	Yes

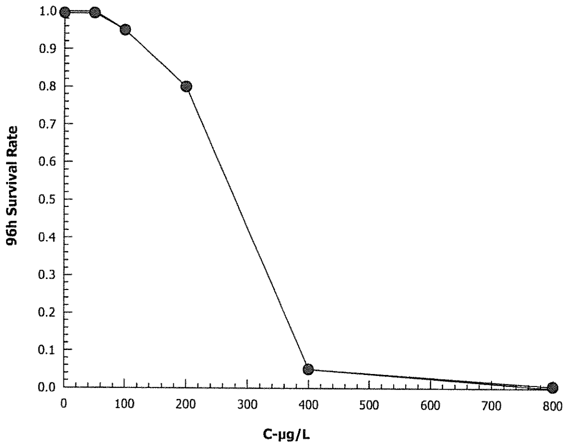
Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0	0.00%	2.391	0.03399	246.2	210.6	288

96h Survival Rate Summary

			Calculated Variate(A/B)								
C-µg/L	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Lab Control	4	1	1	1	0	0	0.0%	0.0%	20	20
50		4	1	1	1	0	0	0.0%	0.0%	20	20
100		4	0.95	0.8	1	0.05	0.1	10.53%	5.0%	19	20
200		4	0.8	0.8	0.8	0	0	0.0%	20.0%	16	20
400		4	0.05	0	0.2	0.05	0.1	200.0%	95.0%	1	20
800		4	0	0	0	0	0		100.0%	0	20

Graphics



Analyst: AC QA: EG 9/17/19

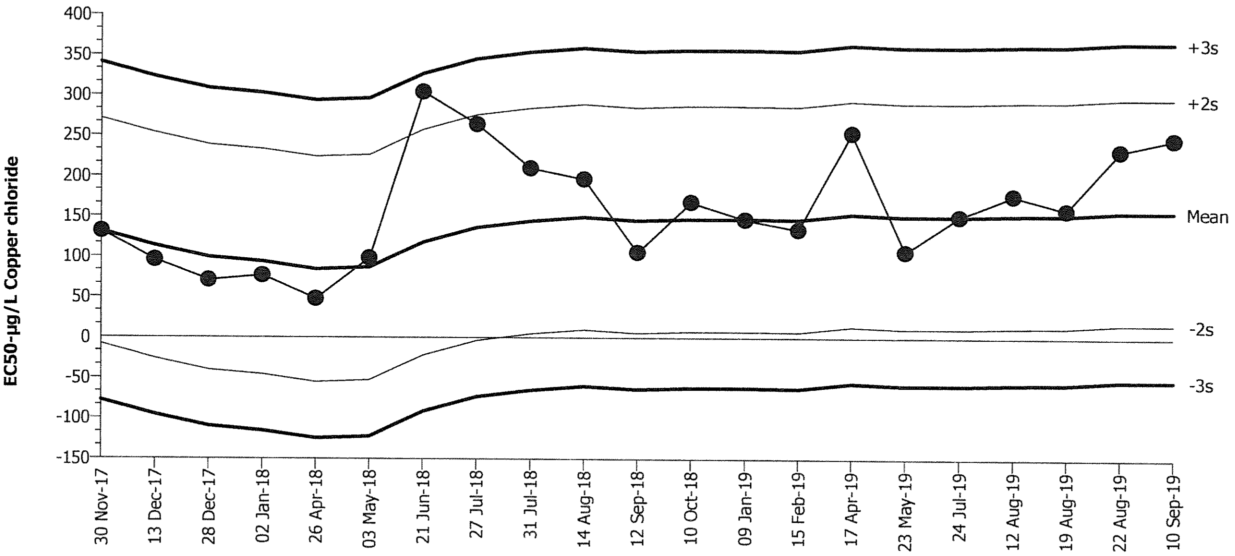
CETIS QC Plot

Report Date: 16 Sep-19 08:49 (1 of 1)

Pacific Topsmelt 96-h Acute Survival Test — **Nautilus Environmental (CA)**

Test Type:	Survival (96h)	**Organism:**	Atherinops affinis (Topsmelt)	**Material:**	Copper chloride
Protocol:	EPA/821/R-02-012 (2002)	**Endpoint:**	96h Survival Rate	**Source:**	Reference Toxicant-REF

Pacific Topsmelt 96-h Acute Survival Test



Mean:	156.3	**Count:**	20	**-2s Warning Limit:**	16.76	**-3s Action Limit:**	-53.01
Sigma:	69.77	**CV:**	44.60%	**+2s Warning Limit:**	295.8	**+3s Action Limit:**	365.6

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2017	Nov	30	12:15	131.5	-24.83	-0.3559			06-5828-7628	11-9084-4410
2		Dec	13	15:35	95.76	-60.54	-0.8677			20-5100-4727	07-8527-1377
3			28	13:00	70.71	-85.59	-1.227			16-4874-9266	20-1729-5429
4	2018	Jan	2	15:00	76.37	-79.93	-1.146			07-8786-9002	01-0853-3714
5		Apr	26	16:00	47.5	-108.8	-1.559			13-5076-1359	11-6152-1189
6		May	3	11:30	98.19	-58.11	-0.8328			10-2125-8586	19-5652-0046
7		Jun	21	17:15	304.1	147.8	2.118	(+)		01-0576-9762	09-0246-7639
8		Jul	27	15:45	263.9	107.6	1.542			14-8822-7369	11-4350-5971
9			31	16:30	209.6	53.29	0.7638			19-5107-0005	20-6864-5330
10		Aug	14	16:00	196.4	40.08	0.5745			15-6494-9229	17-8173-7294
11		Sep	12	14:00	105.6	-50.68	-0.7263			16-1211-7168	05-2683-6884
12		Oct	10	16:55	168.2	11.88	0.1703			03-4460-7421	02-8297-4115
13	2019	Jan	9	16:00	146.4	-9.891	-0.1418			16-8541-8400	01-0716-9806
14		Feb	15	16:10	134	-22.3	-0.3196			08-0425-5661	18-0762-3864
15		Apr	17	17:50	253.5	97.25	1.394			05-1475-1452	18-1058-7085
16		May	23	15:30	106.6	-49.67	-0.7119			03-2154-6851	19-3512-2662
17		Jul	24	16:25	150.4	-5.891	-0.08444			02-4547-9337	03-4444-2456
18		Aug	12	16:15	176.5	20.17	0.2891			05-6999-0080	19-2452-0933
19			19	19:30	158.7	2.44	0.03497			00-1616-6988	16-4823-3084
20			22	16:45	232	75.73	1.085			14-6253-4066	09-6589-6472
21		Sep	10	11:15	246.2	89.93	1.289			01-3190-7470	00-5901-5932

Analyst: AC QA: EG 9/17/19

Marine Acute Bioassay
Static-Renewal Conditions
DM-001

Water Quality Measurements
& Test Organism Survival

Client: Internal
Sample ID: $CuCl_2$
Test No.: 190910aara

Test Species: *A. affinis*
Start Date/Time: 9/10/2019 1115
End Date/Time: 9/14/2019 0945

Cu stock concentration (µg/L): 93,000

	Tech Initials				
	0	24	48	72	96
Counts:	JBS	ACS	RT	RT	BO
Readings:	JBS	ACS	JBS	HH	BO
Dilutions made by:	JBS	—	HH	—	—
High conc. made (µg/L):	800	--	400	--	--
Vol. Cu stock added (mL):	17.2	--	8.6	--	--
Final Volume (mL):	2000	--	2000	--	--

Concentration __(µg/L)__	Rand #	Number of Live Organisms					Salinity (ppt)					Temperature (°C) Q1					Dissolved Oxygen (mg/L)					pH (units)				
		0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	Ⓐ 0	24	48	72	96
Lab Control	22	5	5	5	5	5	29.6	29.5	i 29.4	29.7	30.0	20.1	20.5	i 20.1	19.9	20.3	7.7	6.1	i 7.2	7.0	6.6	~~7.98~~	7.71	i 7.97	7.79	7.82
	2	5	5	5	5	5			f 29.9					f 20.1					f 6.0			7.94		f 7.76		
	10	5	5	5	5	5																				
	15	5	5	5	5	5																				
50	24	5	5	5	5	5	29.8	29.8	i 24.5	29.7	29.9	20.2	20.3	i 20.1	20.0	20.1	7.6	6.1	i 7.2	6.9	6.9	7.98	7.77	i 7.98	7.81	7.80
	8	5	5	5	5	5			f 30.0					f 20.2					f 6.5					f 7.77		
	17	5	5	5	5	5																				
	11	5	5	5	5	5																				
100	12	5	5	4	4	4	29.8	29.8	i 29.5	29.7	29.9	20.2	20.3	i 20.1	20.0	20.1	7.7	6.2	i 7.2	6.9	6.8	8.05	7.81	i 7.98	7.85	7.81
	4	5	5	5	5	5			f 30.0					f 20.2					f 6.5					f 7.78		
	1	5	5	5	5	5																				
	19	5	5	5	5	5																				
200	23	5	4	4	4	4	29.8	29.8	i 29.5	29.8	30.0	20.1	20.2	i 20.1	19.9	20.2	7.7	6.3	i 7.0	6.9	6.8	8.05	7.81	i 7.98	7.85	7.81
	13	5	5	5	5	4			f 30.1					f 20.3					f 6.5					f 7.80		
	14	5	4	4	4	4																				
	18	5	5	5	5	4				29.6																
400	9	5	0	—	—	—	29.7	29.7	i 29.4	~~29.6~~ Ⓑ	29.7	20.1	20.3	i 20.1	20.2	20.2	7.8	6.4	i 7.1	7.1	6.8	8.05	7.83	i 7.97	7.82	7.86
	16	5	2	0	—	—			f 29.9					f 20.3					f 6.5					f 7.80		
	7	5	0	—	—	—																				
	5	5	2	1	1	1																				
800	3	5	0	All dead			29.6	29.5	i —	—	—	20.2	20.5	i —	—	—	7.8	6.6	i —	—	—	8.05	7.85	i —	—	—
	21	5	0						f —					f —					f —					f —		
	6	5	0																							
	20	5	0																							

Rand # QC: JBS
Initial Counts QC'd by: AC
Initiated by: JBS

Environmental Chamber: C

Animal Source/Date Received: ABS 9/7/19
Age at Initiation: 15days

Animal Acclimation Qualifiers (circle all that apply): Q22 / Q23 / [✓ Q24] / none

	Feeding Times				
	0	24	48	72	96
AM:	--	0850	0935	1040	0900
PM:	1630	--	--	--	--

Comments: i = initial reading in fresh test solution, f = final reading in test chamber prior to renewal
Organisms fed prior to initiation, circle one ([✓ y] n) Ⓐ Q18 JBS 9/10/19
Ⓑ Q18 HH 9/13/19

QC Check: AC 9/16/19

Final Review: EG 9/17/19

Enthalpy Analytical. 4340 Vandever Avenue. San Diego, CA 92120.

WOOD AQUATIC TOXICOLOGY LABORATORY
TOXICITY REPORT

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Acute Toxicity Testing Results for Shelter Island Yacht Basin - Total Maximum Daily Load Monitoring

Sample Collection: September 9, 2019
Project Number: 1715100624

Submitted to:

Wood Environment & Infrastructure Solutions, Inc.
9210 Sky Park Court, Ste. 200
San Diego, CA 92123

Testing Performed by:

wood.

Wood Environment & Infrastructure Solutions, Inc.
Aquatic Toxicology Laboratory
4905 Morena Blvd., Suite 1304
San Diego, California 92117

The Wood aquatic toxicology laboratory is certified by the State of California Department of Health Services – Environmental Lab Accreditation Program (ELAP) under Certificate Number 3010. All test results were obtained following EPA Protocol guidelines and internal QA Program requirements. The data and test results have been reviewed and verified by the following laboratory representative:

Verified by: Steve Carlson **Date:** 10-2-19.

INTRODUCTION

Multiple ambient water samples were collected from San Diego Bay in August 2019, and acute toxicity tests were performed to satisfy the annual monitoring requirements for the Shelter Island Yacht Basin (SIYB) dissolved copper Total Maximum Daily Load (TMDL) program. Upon completion of the acute tests, one of the sample sites (SIYB-4) resulted in a toxic response. Additional follow-up acute tests on this sample site were performed to confirm whether toxicity is persistent and whether a Toxicity Identification Evaluation (TIE) is necessary. A new sample of the SIYB-4 site was collected on September 9, 2019. In addition, a sample was collected from a reference site (SIYB-REF) for comparison. Wood Environment & Infrastructure Solutions, Inc. (Wood) has an internal aquatic toxicity testing laboratory located in San Diego, California. Both samples were sent to the Wood laboratory to perform acute toxicity tests with the Pacific topsmelt test species. Acute tests were initiated on September 10, 2019. The following report presents the results of these acute tests.

MATERIALS & METHODS

Sample Information

Wood's Client:	Port of San Diego
Wood's Project Name:	Shelter Island Yacht Basin Annual TMDL Monitoring
Wood's Project Number:	1715100624
Monitoring:	Follow-up Acute Testing, September 2019
Sample IDs:	SIYB-4 and SIYB-REF
Sample Collection Date, Time:	9/9/2019, 08:15 – 09:00
Sample Receipt Date, Time:	9/9/2019, 11:00
Sample Collection Method:	Grab samples
Water Quality Measurements:	See Table 1. (measured upon sample receipt)

Table 1. Water Quality Measured Upon Sample Receipt

Sample ID	Temp. (℃)	pH (units)	DO (mg/L)	Salinity (ppt)	Alkalinity (mg/L)	TRC (mg/L)
SIYB-4	2.0	7.97	7.7	34.2	132	<0.02
SIYB-REF	1.0	8.07	7.9	34.4	132	<0.02

DO = dissolved oxygen, TRC = total residual chlorine

Pacific Topsmelt Acute Survival Test Specifications

Test Period:	9/10/2019, 16:15 to 9/14/2019, 14:15
Test Organism:	*Atherinops affinis* (Pacific topsmelt)
Organism Source; Age at start:	Aquatic BioSystems (Fort Collins, CO); 13-days old
Test Procedure and Endpoint:	96-hour static-renewal acute survival test
Test Concentrations:	100% each sample, plus Control
Replicates/Number of Organisms:	6 replicates/5 fish per replicate (30 fish/conc.)
Sample Treatments Tested:	Untreated, 0.2µm filtered, and 20µm filtered
Controls Tested:	Lab Control (untreated), 0.2µm Filter Control, and 20µm Filter Control
Control Water Used:	Natural seawater collected from the inlet at Scripps Institution of Oceanography (34 ppt)
USEPA Protocol:	EPA/821/R-02/012, 2002 Acute Manual
Test Acceptability Criteria:	≥90% mean survival in the control
Statistical Software:	CETIS™ v1.9.3.0
Reference Toxicant Test:	LC, 25, 50, 100, 200, and 400 µg/L copper

RESULTS

Test results were evaluated using two USEPA methods of analysis. The results were first analyzed using the standard approach (USEPA Acute Manual, 2002) to develop a No Observed Effect Concentrations (NOEC). Then, the results were analyzed using the EPA Test of Significant Toxicity (TST) approach, as referenced in USEPA 2010. The TST approach applies a modified t-Test that accounts for the statistical power of the test and the magnitude of the biological effect in determining the presence of toxicity. The instream waste concentration (IWC) is the 100% sample. The IWC is compared to the Control for statistical analysis. The TST results in a "Pass" if there are no biologically significant effects with the sample (non-toxic), or it will result in a "Fail" if there are significant effects (toxic).

During this round of acute tests, no toxicity was observed in the untreated samples for both sites SIYB-4 and SIYB-REF. In addition, no toxicity was observed in both the 0.2µm filtered and 20µm filtered samples. All sample treatments resulted in a NOEC of 100% sample and all TST analyses resulted in a "Pass." Test results for the untreated samples are summarized in Table 2. The results for both 0.2µm filtered and 20µm filtered samples are summarized in Table 3 and 4. The full statistical analyses and test results are presented in Appendix A. Raw bench data can be found in Appendix B, and a list of data qualifier codes is in Appendix C. Sample receipt information and chain of custody forms can be found in Appendix D.

Table 2. Summary of Acute Test Results for: Untreated Samples

Sample ID (Untreated)	Mean Survival (%)	Percent Effect (%)	NOEC (%)	TST Analysis (Pass/Fail)
Lab Control	93.3	baseline		
SIYB-4	93.3	0.0	100	Pass
SIYB-REF	93.3	0.0	100	Pass

Percent Effect = the % effect compared to the control. A negative value indicates a positive effect (out-performed).
NOEC = the highest concentration tested that results in No Observed Effect.
TST = Test of Significant Toxicity; a "Pass" indicates no toxicity was observed with the sample.

Table 3. Summary of Acute Test Results for: 0.2 µm-filtered Samples

Sample ID (0.2µm filtered)	Mean Survival (%)	Percent Effect (%)	NOEC (%)	TST Analysis (Pass/Fail)
Filter Control	93.3	baseline		
SIYB-4	96.7	-3.6	100	Pass
SIYB-REF	93.3	0.0	100	Pass

Percent Effect = the % effect compared to the control. A negative value indicates a positive effect (out-performed).
NOEC = the highest concentration tested that results in No Observed Effect.
TST = Test of Significant Toxicity; a "Pass" indicates no toxicity was observed with the sample.

Table 4. Summary of Acute Test Results for: 20 µm-filtered Samples

Sample ID (20µm filtered)	Mean Survival (%)	Percent Effect (%)	NOEC (%)	TST Analysis (Pass/Fail)
Filter Control	96.7	baseline		
SIYB-4	93.3	3.5	100	Pass
SIYB-REF	96.7	0.0	100	Pass

Percent Effect = the % effect compared to the control. A negative value indicates a positive effect (out-performed).
NOEC = the highest concentration tested that results in No Observed Effect.
TST = Test of Significant Toxicity; a "Pass" indicates no toxicity was observed with the sample.

QUALITY ASSURANCE

Samples were received in good condition the same day as collected. The acute test procedure was initiated the following day and within the 36-hour holding time limit. The Lab Control and both Filter Controls met test acceptability criteria (TAC) of 90% or greater survival. All testing procedures followed EPA protocol guidelines, and no deviations were required during testing.

A concurrent reference toxicant test was conducted with copper. This test also met the TAC. However, the median lethal effect concentration (LC_{50}) was more than three standard deviations below the historical control chart mean for the laboratory. This may partly be explained by the lab only having 7 data points (20 is recommended) on the control chart for this test method and the coefficient of variance (CV) is very low. However, the low LC_{50} value may indicate this batch of topsmelt were more sensitive to copper than the typical historical response. A summary of the reference toxicant results is presented in Table 5. Raw data, statistical analysis, and control charts for the reference toxicant test can be found in Appendix E. All test results were deemed valid for reporting.

Table 5. Summary of Copper Reference Toxicant Test Results

Test Species & Endpoint	NOEC (µg/L)	LC_{50} (µg/L)	Historical LC_{50} ± 2SD range (µg/L)	CV (%)
Acute Pacific Topsmelt 96-hr Survival	50	88.0	134 – 244	15.0

NOEC = the highest concentration tested that results in No Observed Effect.
LC_{50} = the concentration expected to cause a lethal effect to 50% of the test organisms.
Historical LC_{50} = the mean LC_{50} for previous tests by the lab, presented as a range of ± two standard deviations.

REFERENCES

Tidepool Scientific Software, 2001-2015. CETIS: Comprehensive Environmental Toxicity Information System software, version 1.9.3.0.

USEPA 2002. U.S. Environmental Protection Agency. Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms. 5th Edition. EPA/821/R-02/012. USEPA, Office of Water, Washington, DC.

USEPA 2010. Test of Significant Toxicity Implementation Document (EPA/833/R-10/003). The USEPA, Office of Wastewater Management, Washington, DC.

APPENDIX A

Acute Pacific Topsmelt Test

CETIS Statistical Analyses

Untreated Samples

CETIS Summary Report

Report Date: 20 Sep-19 09:35 (p 1 of 1)
Test Code: 19-09-014 | 19-3348-0335

Pacific Topsmelt 96-h Acute Survival Test — **Wood E&IS**

Batch ID:	05-7080-1589	**Test Type:**	Survival (96h)	**Analyst:**	
Start Date:	10 Sep-19 16:~~30~~ 15	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	sw ~~Diluted Natural Seawater~~ Not Applicable
Ending Date:	14 Sep-19 14:~~30~~ 15	**Species:**	Atherinops affinis	**Brine:**	Not Applicable
Duration:	94h	**Source:**	Aquatic Biosystems, CO	**Age:**	13d

Sample ID:	13-0494-1321	**Code:**	19-W0105, 19-W0106	**Client:**	Wood Environment and Infastructure
Sample Date:	09 Sep-19 08:15	**Material:**	Ambient Sample	**Project:**	Untreated Samples
Receipt Date:	09 Sep-19 11:00	**Source:**	Shelter Island Yacht Basin		
Sample Age:	32h	**Station:**	SIYB-4		

Comments:
Sample Sites: 100% = SIYB-4; R = SIYB-REF

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
11-8317-4414	96h Survival Rate	TST-Welch's t Test	0.0017	Receiving Water passed 96h survival rate
00-8635-8460	96h Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.7273	Receiving Water passed 96h survival rate
00-8788-6916	96h Survival Rate	TST-Welch's t Test	0.0017	100% passed 96h survival rate
11-7300-4414	96h Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.7273	100% passed 96h survival rate

96h Survival Rate Summary

Conc-%		Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	(REF)	R	6	0.9333	0.8249	1.0000	0.8000	1.0000	0.0422	0.1033	11.07%	0.00%
0		LC	6	0.9333	0.8249	1.0000	0.8000	1.0000	0.0422	0.1033	11.07%	0.00%
100	(SIYB-4)		6	0.9333	0.8249	1.0000	0.8000	1.0000	0.0422	0.1033	11.07%	0.00%

96h Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6
0	R	0.8000	1.0000	1.0000	1.0000	1.0000	0.8000
0	LC	1.0000	1.0000	0.8000	0.8000	1.0000	1.0000
100		0.8000	1.0000	1.0000	0.8000	1.0000	1.0000

Analyst: SC QA: SW 10/1/19

CETIS Analytical Report

LC vs. SIYB-4

Report Date:	20 Sep-19 09:35 (p 1 of 4)
Test Code:	19-09-014 | 19-3348-0335

Pacific Topsmelt 96-h Acute Survival Test **Wood E&IS**

Analysis ID:	11-7300-4414	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.9.3
Analyzed:	20 Sep-19 9:33	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Comments:

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	100% passed 96h survival rate	11.77%

Wilcoxon Rank Sum Two-Sample Test

Control	vs	Conc-%	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		100	39	n/a	2	10	Exact	0.7273	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.151221	0.0151221	10			
Total	0.151221		11			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1	14.94	1.0000	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.6081	0.8025	1.3E-04	Non-Normal Distribution

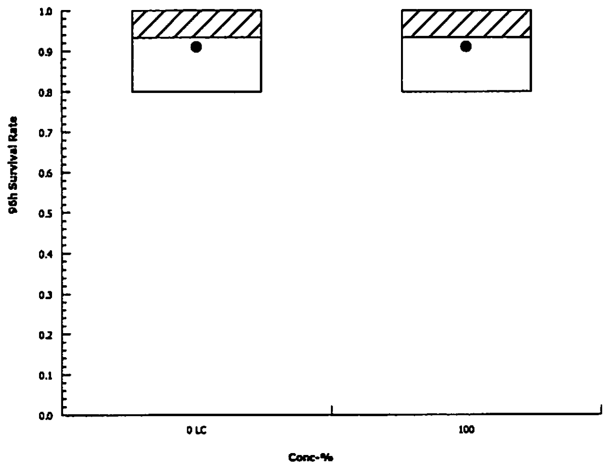
96h Survival Rate Summary

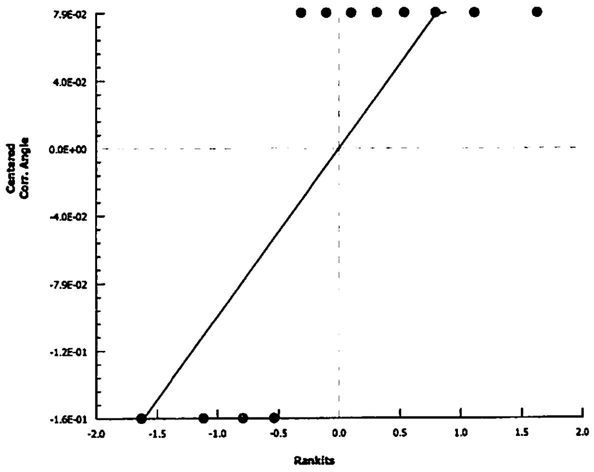
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	6	0.9333	0.8249	1.0000	1.0000	0.8000	1.0000	0.0422	11.07%	0.00%
100		6	0.9333	0.8249	1.0000	1.0000	0.8000	1.0000	0.0422	11.07%	0.00%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	6	1.266	1.137	1.395	1.345	1.107	1.345	0.0502	9.71%	0.00%
100		6	1.266	1.137	1.395	1.345	1.107	1.345	0.0502	9.71%	0.00%

Graphics





Analyst: SC QA: JW 10/1/19

CETIS Analytical Report

LC vs. SIYB-4 (TST)

Report Date:	20 Sep-19 09:35 (p 2 of 4)
Test Code:	19-09-014 | 19-3348-0335

Pacific Topsmelt 96-h Acute Survival Test — **Wood E&IS**

Analysis ID:	00-8788-6916	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.9.3
Analyzed:	20 Sep-19 9:34	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Comments:

Data Transform	Alt Hyp	TST_b	Comparison Result
Angular (Corrected)	C*b < T	0.8	100% passed 96h survival rate

TST-Welch's t Test

Control	vs	Control II	Test Stat	Critical	DF	P-Type	P-Value	Decision(α:10%)
Lab Control		100*	3.938	1.383	9	CDF	0.0017	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.151221	0.0151221	10			
Total	0.151221		11			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1	14.94	1.0000	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.6081	0.8025	1.3E-04	Non-Normal Distribution

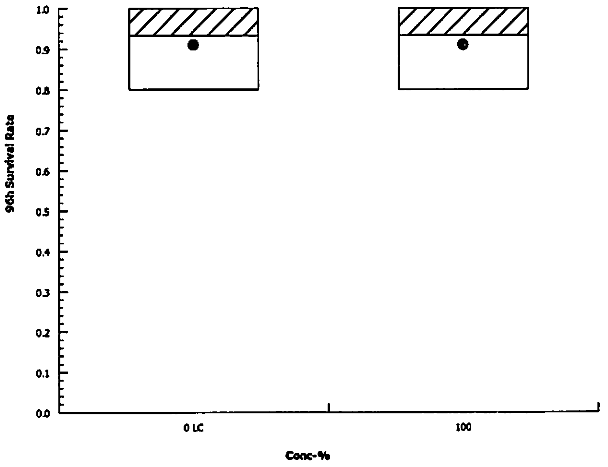
96h Survival Rate Summary

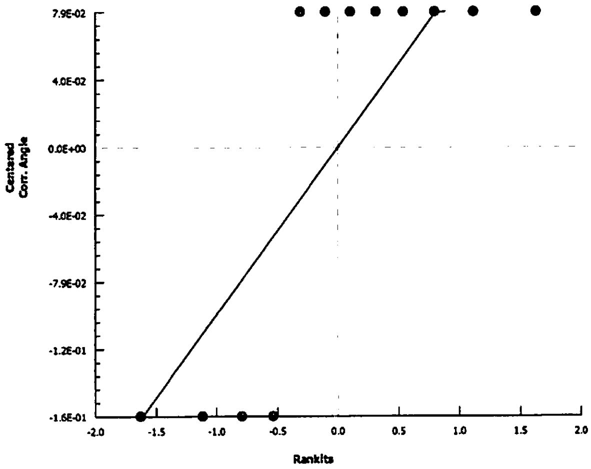
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	6	0.9333	0.8249	1.0000	1.0000	0.8000	1.0000	0.0422	11.07%	0.00%
100		6	0.9333	0.8249	1.0000	1.0000	0.8000	1.0000	0.0422	11.07%	0.00%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	6	1.266	1.137	1.395	1.345	1.107	1.345	0.0502	9.71%	0.00%
100		6	1.266	1.137	1.395	1.345	1.107	1.345	0.0502	9.71%	0.00%

Graphics





Analyst: SC QA: JW 10/1/19

CETIS Analytical Report

LC vs. SIYB-REF

Report Date:	20 Sep-19 09:35 (p 3 of 4)
Test Code:	19-09-014 | 19-3348-0335

Pacific Topsmelt 96-h Acute Survival Test **Wood E&IS**

Analysis ID:	00-8635-8460	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.9.3
Analyzed:	20 Sep-19 9:34	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Comments:

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	Receiving Water passed 96h survival rate	11.77%

Wilcoxon Rank Sum Two-Sample Test

Control	vs	Control II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		(REF)Receiving Water	39	n/a	2	10	Exact	0.7273	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.151221	0.0151221	10			
Total	0.151221		11			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1	14.94	1.0000	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.6081	0.8025	1.3E-04	Non-Normal Distribution

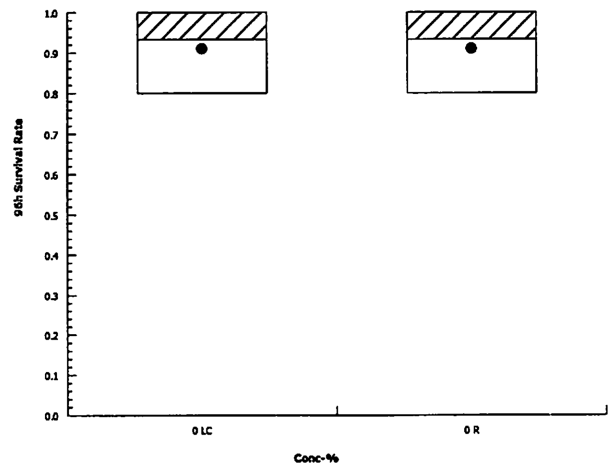
96h Survival Rate Summary

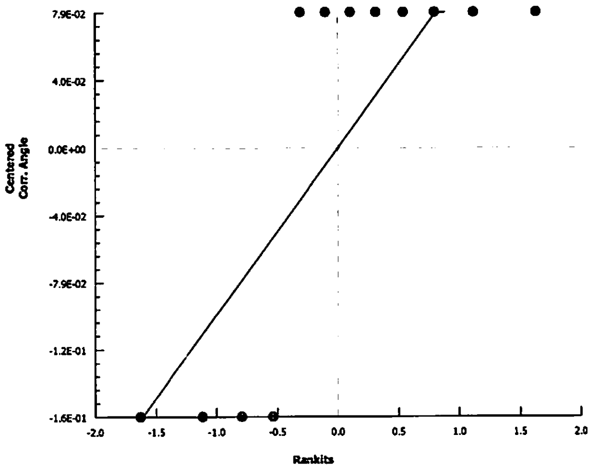
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	R	6	0.9333	0.8249	1.0000	1.0000	0.8000	1.0000	0.0422	11.07%	0.00%
0	LC	6	0.9333	0.8249	1.0000	1.0000	0.8000	1.0000	0.0422	11.07%	0.00%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	R	6	1.266	1.137	1.395	1.345	1.107	1.345	0.0502	9.71%	0.00%
0	LC	6	1.266	1.137	1.395	1.345	1.107	1.345	0.0502	9.71%	0.00%

Graphics





Analyst: SC QA: JVV 10/1/19

CETIS Analytical Report

LC vs. SIYB-REF (TST)

Report Date: 20 Sep-19 09:35 (p 4 of 4)
Test Code: 19-09-014 | 19-3348-0335

Pacific Topsmelt 96-h Acute Survival Test **Wood E&IS**

Analysis ID:	11-8317-4414	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.9.3
Analyzed:	20 Sep-19 9:35	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Comments:

Data Transform	Alt Hyp	TST_b	Comparison Result
Angular (Corrected)	C*b < T	0.8	Receiving Water passed 96h survival rate

TST-Welch's t Test

Control	vs	Control II	Test Stat	Critical	DF	P-Type	P-Value	Decision(α:10%)
Lab Control	(REF)	Receiving Water	3.938	1.383	9	CDF	0.0017	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.151221	0.0151221	10			
Total	0.151221		11			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1	14.94	1.0000	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.6081	0.8025	1.3E-04	Non-Normal Distribution

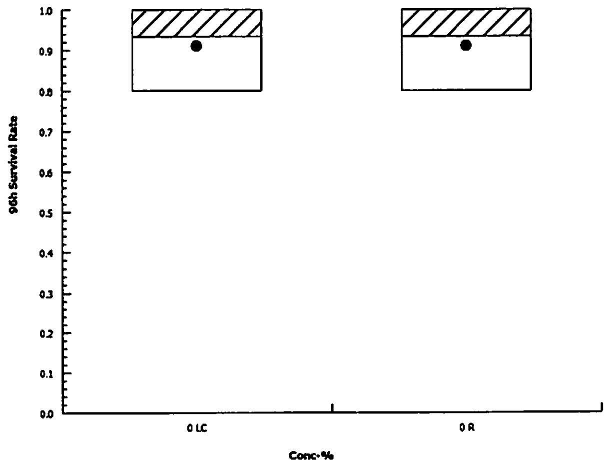
96h Survival Rate Summary

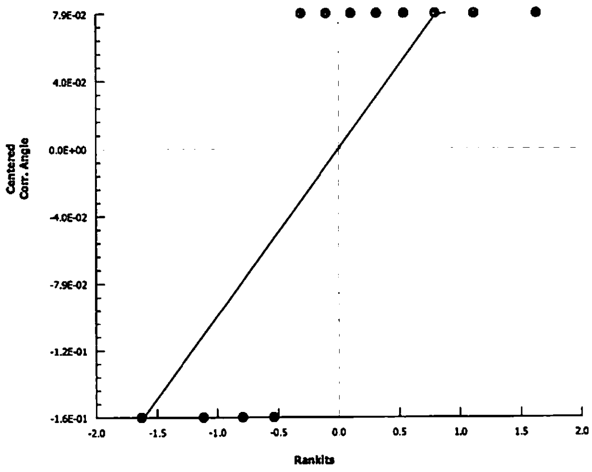
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	R	6	0.9333	0.8249	1.0000	1.0000	0.8000	1.0000	0.0422	11.07%	0.00%
0	LC	6	0.9333	0.8249	1.0000	1.0000	0.8000	1.0000	0.0422	11.07%	0.00%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	R	6	1.266	1.137	1.395	1.345	1.107	1.345	0.0502	9.71%	0.00%
0	LC	6	1.266	1.137	1.395	1.345	1.107	1.345	0.0502	9.71%	0.00%

Graphics





Analyst: SC QA: JW 10/1/19

Filtered Samples

CETIS Summary Report

Report Date: 20 Sep-19 10:06 (p 1 of 1)
Test Code: 19-09-014f | 15-5844-8656

Pacific Topsmelt 96-h Acute Survival Test — **Wood E&IS**

Batch ID:	18-5018-8941	**Test Type:**	Survival (96h)	**Analyst:**	
Start Date:	10 Sep-19 16:~~30~~ 15	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	JW ~~Diluted Natural Seawater~~ Not Applicable
Ending Date:	14 Sep-19 14:~~30~~ 15 JW	**Species:**	Atherinops affinis	**Brine:**	Not Applicable
Duration:	94h	**Source:**	Aquatic Biosystems, CO	**Age:**	13 d

Sample ID:	20-4324-6783	**Code:**	19-W0105f, 19-W0106f	**Client:**	Wood Environment and Infastructure
Sample Date:	09 Sep-19 08:15	**Material:**	Ambient Sample	**Project:**	Filtered Samples
Receipt Date:	09 Sep-19 11:00	**Source:**	Shelter Island Yacht Basin		
Sample Age:	32h	**Station:**	SIYB-4		

Comments:

Sample IDs: F1 = 0.2um Filter Control; F2 = 20um Filter Control; R1 = REF 0.2um filtered; R2 = REF 20um filtered; 100 = SIYB-4 0.2um filtered; and 101 = SIYB-4 20um filtered.

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
17-6411-3066	96h Survival Rate	TST-Welch's t Test	0.0017	REF 0.2um filter passed 96h survival rate
19-1594-0859	96h Survival Rate	TST-Welch's t Test	3.1E-04	REF 20um filter passed 96h survival rate
09-8436-9559	96h Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.7727	REF 20um filter passed 96h survival rate
18-5836-7485	96h Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.7273	REF 0.2um filter passed 96h survival rate
06-0438-9734	96h Survival Rate	TST-Welch's t Test	2.9E-04	100% passed 96h survival rate
09-6304-6040	96h Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.9091	100% passed 96h survival rate
19-1891-7068	96h Survival Rate	TST-Welch's t Test	0.0029	101% passed 96h survival rate
07-3633-6262	96h Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	101% passed 96h survival rate

96h Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	F1	6	0.9333	0.8249	1.0000	0.8000	1.0000	0.0422	0.1033	11.07%	0.00%
0	F2	6	0.9667	0.8810	1.0000	0.8000	1.0000	0.0333	0.0817	8.45%	-3.57%
0	R1	6	0.9333	0.8249	1.0000	0.8000	1.0000	0.0422	0.1033	11.07%	0.00%
0	R2	6	0.9667	0.8810	1.0000	0.8000	1.0000	0.0333	0.0817	8.45%	-3.57%
100		6	0.9667	0.8810	1.0000	0.8000	1.0000	0.0333	0.0817	8.45%	-3.57%
101		6	0.9333	0.8249	1.0000	0.8000	1.0000	0.0422	0.1033	11.07%	0.00%

96h Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6
0	F1	0.8000	1.0000	0.8000	1.0000	1.0000	1.0000
0	F2	1.0000	1.0000	1.0000	1.0000	0.8000	1.0000
0	R1	1.0000	0.8000	1.0000	1.0000	1.0000	0.8000
0	R2	1.0000	1.0000	0.8000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000	0.8000	1.0000
101		0.8000	1.0000	0.8000	1.0000	1.0000	1.0000

Analyst: SC QA: JW 10/1/19

CETIS Analytical Report

0.2FC vs. SIYB-4 (0.2µm)

Report Date:	20 Sep-19 10:06 (p 1 of 8)
Test Code:	19-09-014f | 15-5844-8656

Pacific Topsmelt 96-h Acute Survival Test **Wood E&IS**

Analysis ID:	09-6304-6040	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.9.3
Analyzed:	20 Sep-19 10:02	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Comments:

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	100% passed 96h survival rate	10.74%

Wilcoxon Rank Sum Two-Sample Test

Control	vs	Conc-%	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
0.2um Filter		100	42	n/a	2	10	Exact	0.9091	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0047257	0.0047257	1	0.3846	0.5490	Non-Significant Effect
Error	0.122867	0.0122867	10			
Total	0.127593		11			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.6	14.94	0.6186	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.7008	0.8025	8.6E-04	Non-Normal Distribution

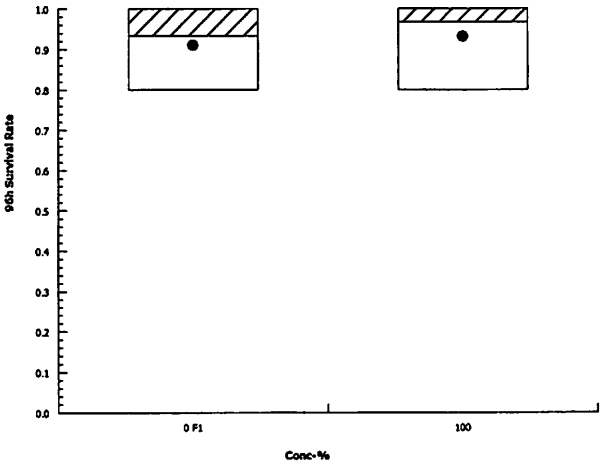
96h Survival Rate Summary

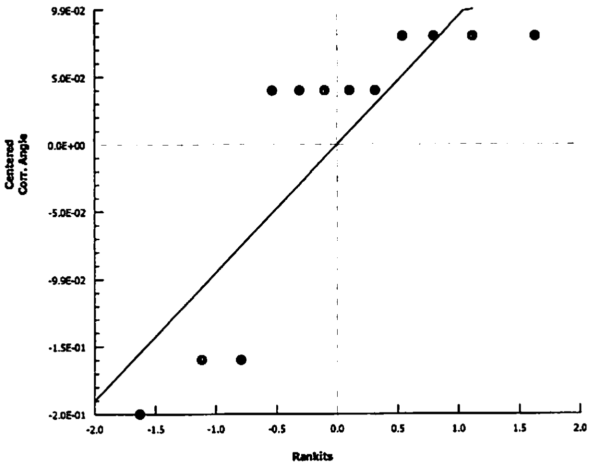
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	F1	6	0.9333	0.8249	1.0000	1.0000	0.8000	1.0000	0.0422	11.07%	0.00%
100.		6	0.9667	0.8810	1.0000	1.0000	0.8000	1.0000	0.0333	8.45%	-3.57%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	F1	6	1.266	1.137	1.395	1.345	1.107	1.345	0.0502	9.71%	0.00%
100		6	1.306	1.204	1.408	1.345	1.107	1.345	0.03969	7.45%	-3.14%

Graphics





Analyst: SC QA: JW 10/1/19

CETIS Analytical Report

0.2FC vs. SIYB-REF (0.2µm)

Report Date:	20 Sep-19 10:06 (p 2 of 8)
Test Code:	19-09-014f | 15-5844-8656

Pacific Topsmelt 96-h Acute Survival Test — **Wood E&IS**

Analysis ID:	18-5836-7485	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.9.3
Analyzed:	20 Sep-19 10:03	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Comments:

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	REF 0.2um filter passed 96h survival rate	11.77%

Wilcoxon Rank Sum Two-Sample Test

Control	vs	Control II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
0.2um Filter		REF 0.2um filter	39	n/a	2	10	Exact	0.7273	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.151221	0.0151221	10			
Total	0.151221		11			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1	14.94	1.0000	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.6081	0.8025	1.3E-04	Non-Normal Distribution

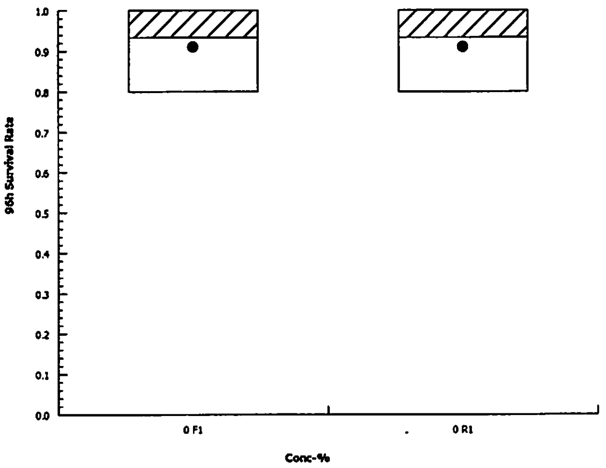
96h Survival Rate Summary

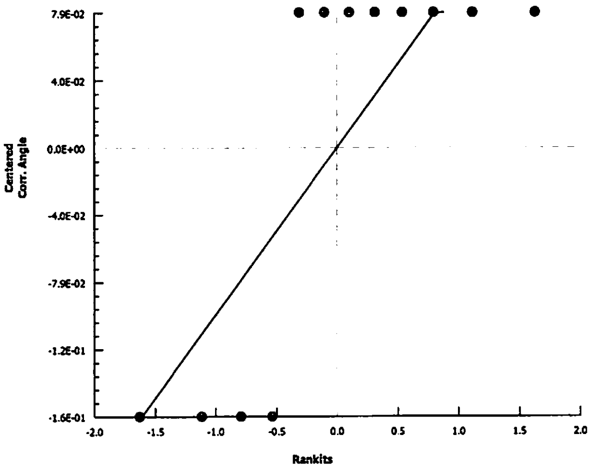
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	F1	6	0.9333	0.8249	1.0000	1.0000	0.8000	1.0000	0.0422	11.07%	0.00%
0	R1	6	0.9333	0.8249	1.0000	1.0000	0.8000	1.0000	0.0422	11.07%	0.00%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	F1	6	1.266	1.137	1.395	1.345	1.107	1.345	0.0502	9.71%	0.00%
0	R1	6	1.266	1.137	1.395	1.345	1.107	1.345	0.0502	9.71%	0.00%

Graphics





Analyst: SC QA: JW 10/1/19

CETIS Analytical Report

20FC vs SIYB-4 (20µm)

Report Date:	20 Sep-19 10:06 (p 3 of 8)
Test Code:	19-09-014f | 15-5844-8656

Pacific Topsmelt 96-h Acute Survival Test — **Wood E&IS**

Analysis ID:	07-3633-6262	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.9.3
Analyzed:	20 Sep-19 10:03	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Comments:

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	101% passed 96h survival rate	10.87%

Wilcoxon Rank Sum Two-Sample Test

Control	vs	Conc-%	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
20um Filter		101	36	n/a	2	10	Exact	0.5000	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0047257	0.0047257	1	0.3846	0.5490	Non-Significant Effect
Error	0.122867	0.0122867	10			
Total	0.127593		11			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.6	14.94	0.6186	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.7008	0.8025	8.6E-04	Non-Normal Distribution

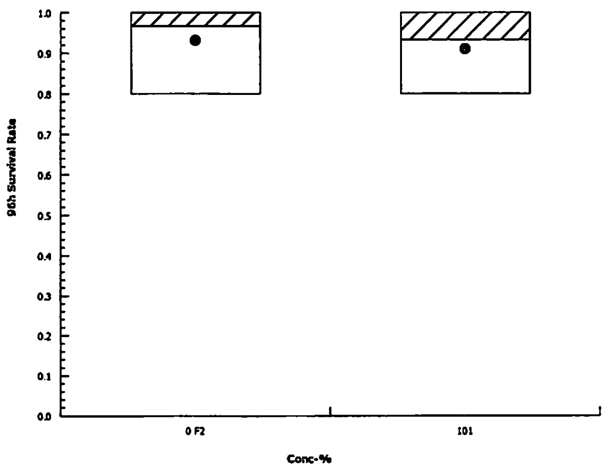
96h Survival Rate Summary

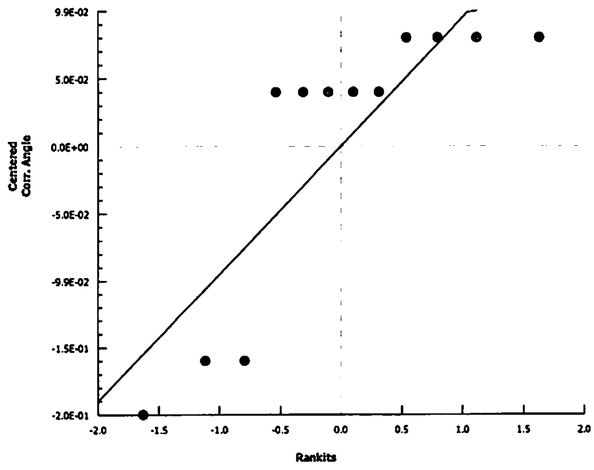
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	F2	6	0.9667	0.8810	1.0000	1.0000	0.8000	1.0000	0.0333	8.45%	0.00%
101		6	0.9333	0.8249	1.0000	1.0000	0.8000	1.0000	0.0422	11.07%	3.45%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	F2	6	1.306	1.204	1.408	1.345	1.107	1.345	0.03969	7.45%	0.00%
101		6	1.266	1.137	1.395	1.345	1.107	1.345	0.0502	9.71%	3.04%

Graphics





Analyst: SC QA: JW 10/1/19

CETIS Analytical Report

20FC vs. SIYB-REF (20um)

Report Date:	20 Sep-19 10:06 (p 4 of 8)
Test Code:	19-09-014f | 15-5844-8656

Pacific Topsmelt 96-h Acute Survival Test — **Wood E&IS**

Analysis ID:	09-8436-9559	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.9.3
Analyzed:	20 Sep-19 10:04	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Comments:

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	REF 20um filter passed 96h survival rate	9.87%

Wilcoxon Rank Sum Two-Sample Test

Control	vs	Control II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
20um Filter		REF 20um filter	39	n/a	2	10	Exact	0.7727	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.0945132	0.0094513	10			
Total	0.0945132		11			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1	14.94	1.0000	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.4647	0.8025	9.8E-06	Non-Normal Distribution

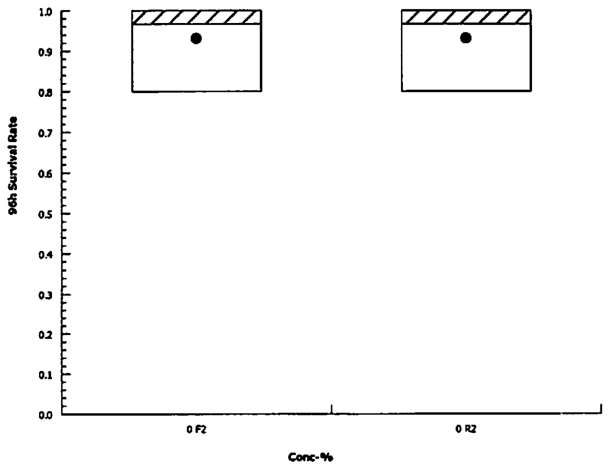
96h Survival Rate Summary

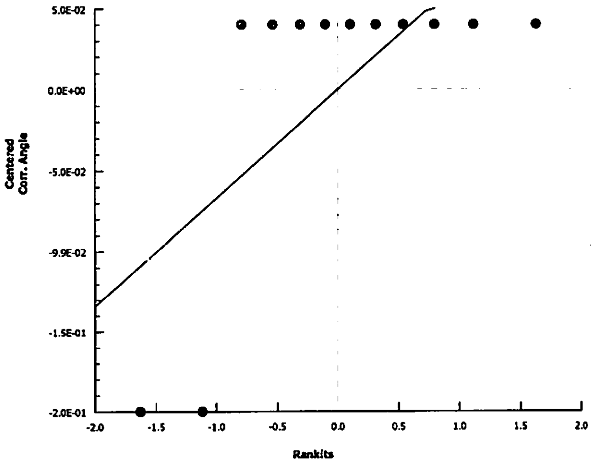
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	F2	6	0.9667	0.8810	1.0000	1.0000	0.8000	1.0000	0.0333	8.45%	0.00%
0	R2	6	0.9667	0.8810	1.0000	1.0000	0.8000	1.0000	0.0333	8.45%	0.00%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	F2	6	1.306	1.204	1.408	1.345	1.107	1.345	0.03969	7.45%	0.00%
0	R2	6	1.306	1.204	1.408	1.345	1.107	1.345	0.03969	7.45%	0.00%

Graphics





Analyst: SL QA: JW 10/1/19

CETIS Analytical Report

0.2FC vs. SIYB-4 (0.2µm) w/ TST

Report Date:	20 Sep-19 10:06 (p 5 of 8)
Test Code:	19-09-014f | 15-5844-8656

Pacific Topsmelt 96-h Acute Survival Test **Wood E&IS**

Analysis ID:	06-0438-9734	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.9.3
Analyzed:	20 Sep-19 10:05	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Comments:

Data Transform	Alt Hyp	TST_b	Comparison Result
Angular (Corrected)	C*b < T	0.8	100% passed 96h survival rate

TST-Welch's t Test

Control	vs	Control II	Test Stat	Critical	DF	P-Type	P-Value	Decision(α:10%)
0.2um Filter		100*	5.187	1.383	9	CDF	2.9E-04	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0047257	0.0047257	1	0.3846	0.5490	Non-Significant Effect
Error	0.122867	0.0122867	10			
Total	0.127593		11			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.6	14.94	0.6186	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.7008	0.8025	8.6E-04	Non-Normal Distribution

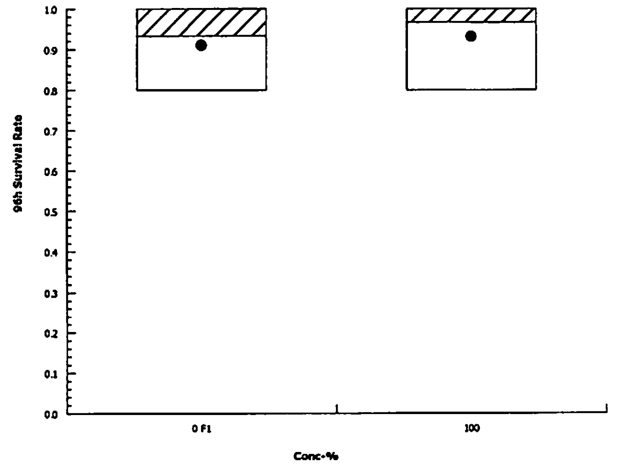
96h Survival Rate Summary

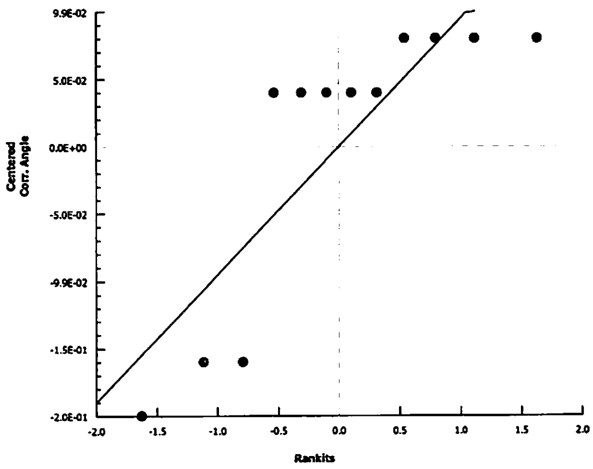
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	F1	6	0.9333	0.8249	1.0000	1.0000	0.8000	1.0000	0.0422	11.07%	0.00%
100		6	0.9667	0.8810	1.0000	1.0000	0.8000	1.0000	0.0333	8.45%	-3.57%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	F1	6	1.266	1.137	1.395	1.345	1.107	1.345	0.0502	9.71%	0.00%
100		6	1.306	1.204	1.408	1.345	1.107	1.345	0.03969	7.45%	-3.14%

Graphics





Analyst: SC QA: 10/1/19

CETIS Analytical Report

0.2FC vs. SIYB-REF(0.2um) w/TST

Report Date: 20 Sep-19 10:06 (p 6 of 8)
Test Code: 19-09-014f | 15-5844-8656

Pacific Topsmelt 96-h Acute Survival Test — **Wood E&IS**

Analysis ID:	17-6411-3066	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.9.3
Analyzed:	20 Sep-19 10:05	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Comments:

Data Transform	Alt Hyp	TST_b	Comparison Result
Angular (Corrected)	C*b < T	0.8	REF 0.2um filter passed 96h survival rate

TST-Welch's t Test

Control	vs	Control II	Test Stat	Critical	DF	P-Type	P-Value	Decision(α:10%)
0.2um Filter		REF 0.2um filter	3.938	1.383	9	CDF	0.0017	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.151221	0.0151221	10			
Total	0.151221		11			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1	14.94	1.0000	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.6081	0.8025	1.3E-04	Non-Normal Distribution

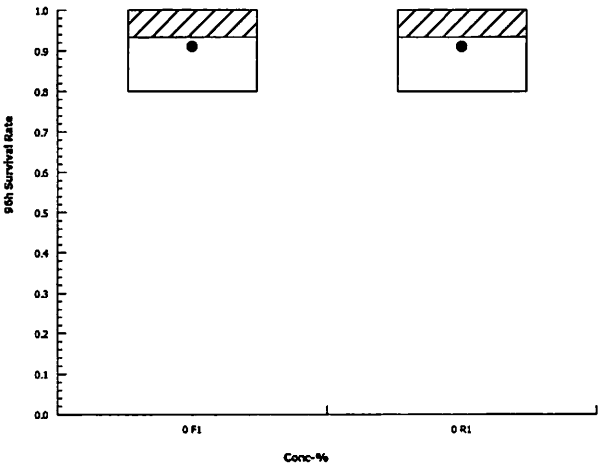
96h Survival Rate Summary

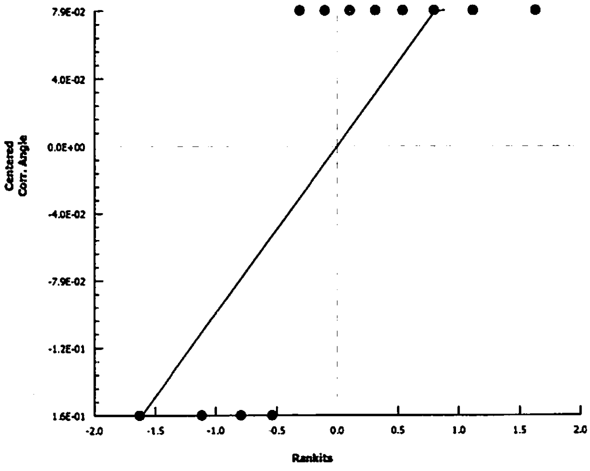
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	F1	6	0.9333	0.8249	1.0000	1.0000	0.8000	1.0000	0.0422	11.07%	0.00%
0	R1	6	0.9333	0.8249	1.0000	1.0000	0.8000	1.0000	0.0422	11.07%	0.00%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	F1	6	1.266	1.137	1.395	1.345	1.107	1.345	0.0502	9.71%	0.00%
0	R1	6	1.266	1.137	1.395	1.345	1.107	1.345	0.0502	9.71%	0.00%

Graphics





Analyst: SC QA: 10/1/19

CETIS Analytical Report

20FC vs. SI4B-4 (20um) w/ TST

Report Date:	20 Sep-19 10:06 (p 7 of 8)
Test Code:	19-09-014f | 15-5844-8656

Pacific Topsmelt 96-h Acute Survival Test — **Wood E&IS**

Analysis ID:	19-1891-7068	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.9.3
Analyzed:	20 Sep-19 10:05	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Comments:

Data Transform	Alt Hyp	TST_b	Comparison Result
Angular (Corrected)	C*b < T	0.8	101% passed 96h survival rate

TST-Welch's t Test

Control	vs	Control II	Test Stat	Critical	DF	P-Type	P-Value	Decision(α:10%)
20um Filter		101*	3.728	1.397	8	CDF	0.0029	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0047257	0.0047257	1	0.3846	0.5490	Non-Significant Effect
Error	0.122867	0.0122867	10			
Total	0.127593		11			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.6	14.94	0.6186	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.7008	0.8025	8.6E-04	Non-Normal Distribution

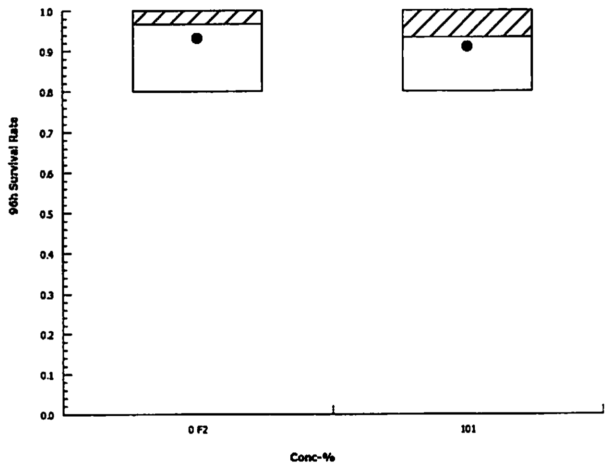
96h Survival Rate Summary

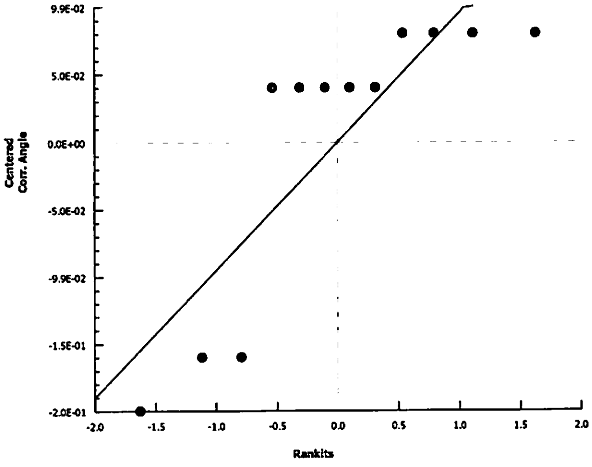
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	F2	6	0.9667	0.8810	1.0000	1.0000	0.8000	1.0000	0.0333	8.45%	0.00%
101		6	0.9333	0.8249	1.0000	1.0000	0.8000	1.0000	0.0422	11.07%	3.45%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	F2	6	1.306	1.204	1.408	1.345	1.107	1.345	0.03969	7.45%	0.00%
101		6	1.266	1.137	1.395	1.345	1.107	1.345	0.0502	9.71%	3.04%

Graphics





Analyst: SC QA: JW 10/1/19

CETIS Analytical Report

20FC vs. SIYB-REF (20µm) w/TST

Report Date:	20 Sep-19 10:06 (p 8 of 8)
Test Code:	19-09-014f | 15-5844-8656

Pacific Topsmelt 96-h Acute Survival Test **Wood E&IS**

Analysis ID:	19-1594-0859	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.9.3
Analyzed:	20 Sep-19 10:06	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Comments:

Data Transform	Alt Hyp	TST_b	Comparison Result
Angular (Corrected)	C*b < T	0.8	REF 20um filter passed 96h survival rate

TST-Welch's t Test

Control	vs	Control II	Test Stat	Critical	DF	P-Type	P-Value	Decision(α:10%)
20um Filter		REF 20um filter*	5.137	1.383	9	CDF	3.1E-04	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0	0	1	0	1.0000	Non-Significant Effect
Error	0.0945132	0.0094513	10			
Total	0.0945132		11			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1	14.94	1.0000	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.4647	0.8025	9.8E-06	Non-Normal Distribution

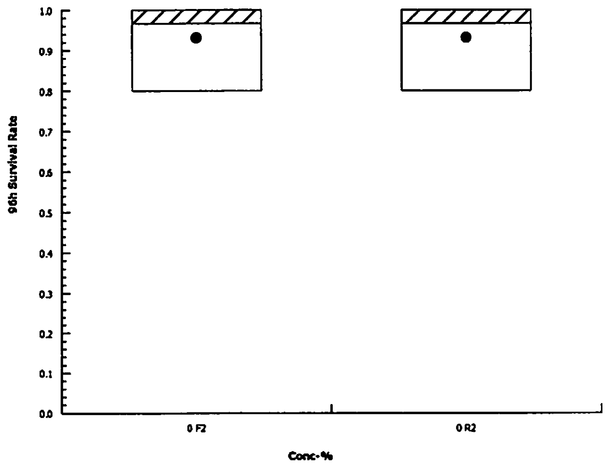
96h Survival Rate Summary

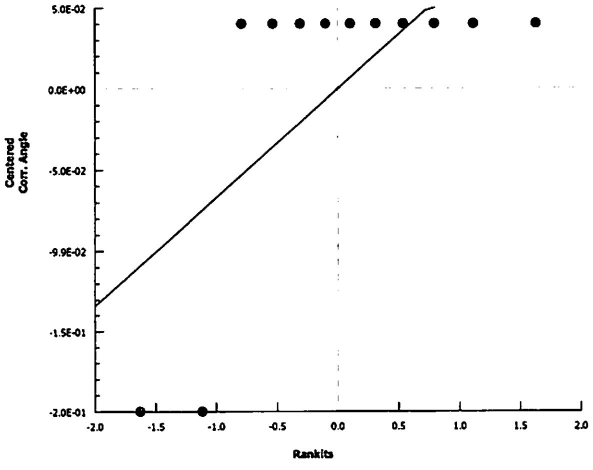
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	F2	6	0.9667	0.8810	1.0000	1.0000	0.8000	1.0000	0.0333	8.45%	0.00%
0	R2	6	0.9667	0.8810	1.0000	1.0000	0.8000	1.0000	0.0333	8.45%	0.00%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	F2	6	1.306	1.204	1.408	1.345	1.107	1.345	0.03969	7.45%	0.00%
0	R2	6	1.306	1.204	1.408	1.345	1.107	1.345	0.03969	7.45%	0.00%

Graphics





Analyst: Sc QA: JW 10/1/19

APPENDIX B

Raw Bench Data: SIYB-4 & SIYB-REF

Summary Results for 96-hr Marine Acute Test

Client: Wood Environment & Infrastructure Solutions
Project ID: POSD - SIYB TMDL Acute Monitoring (Untreated Samples)
Species *Atherinops affinis* (Pacific topsmelt)

Sample ID	Replicate	Survival Counts					96 hr % Survival	96 hr Mean % Survival	96 hr % Effect to Control
		0 hr	24 hr	48 hr	72 hr	96 hr			
Lab Control	A	5	5	5	5	5	100	93.3	NA
	B	5	5	5	5	5	100		
	C	5	5	5	5	4	80		
	D	5	5	5	4	4	80		
	E	5	5	5	5	5	100		
	F	5	5	5	5	5	100		
SIYB-4	A	5	5	5	5	4	80	93.3	0.0
	B	5	5	5	5	5	100		
	C	5	5	5	5	5	100		
	D	5	5	5	5	4	80		
	E	5	5	5	5	5	100		
	F	5	5	5	5	5	100		
SIYB-REF	A	5	5	5	5	4	80	93.3	0.0
	B	5	5	5	5	5	100		
	C	5	5	5	5	5	100		
	D	5	5	5	5	5	100		
	E	5	5	5	5	5	100		
	F	5	5	5	4	4	80		

NA = Not Applicable

QC Check: 9-19-19

Final Review: JW 10/1/19

Wood Aquatic Toxicology Lab, 4905 Morena Blvd, Ste. 1304, San Diego, CA 92117

Summary Results for 96-hr Marine Acute Test

Client: Wood Environment & Infrastructure Solutions
Project ID: POSD - SIYB TMDL Acute Monitoring (Filtered Samples)
Species *Atherinops affinis* (Pacific topsmelt)

Sample ID	Replicate	Survival Counts					96 hr % Survival	96 hr Mean % Survival	96 hr % Effect to Control
		0 hr	24 hr	48 hr	72 hr	96 hr			
Filter Control (0.2µm)	A	5	5	5	4	4	80	93.3	NA
	B	5	5	5	5	5	100		
	C	5	5	4	4	4	80		
	D	5	5	5	5	5	100		
	E	5	5	5	5	5	100		
	F	5	5	5	5	5	100		
Filter Control (20µm)	A	5	5	5	5	5	100	96.7	NA
	B	5	5	5	5	5	100		
	C	5	5	5	5	5	100		
	D	5	5	5	5	5	100		
	E	5	5	5	5	4	80		
	F	5	5	5	5	5	100		
SIYB-4 (0.2µm)	A	5	5	5	5	5	100	96.7	-3.6
	B	5	5	5	5	5	100		
	C	5	5	5	5	5	100		
	D	5	5	5	5	5	100		
	E	5	5	5	4	4	80		
	F	5	5	5	5	5	100		
SIYB-4 (20µm)	A	5	5	4	4	4	80	93.3	3.4
	B	5	5	5	5	5	100		
	C	5	5	4	4	4	80		
	D	5	5	5	5	5	100		
	E	5	5	5	5	5	100		
	F	5	5	5	5	5	100		
SIYB-REF (0.2µm)	A	5	5	5	5	5	100	93.3	0.0
	B	5	5	4	4	4	80		
	C	5	5	5	5	5	100		
	D	5	5	5	5	5	100		
	E	5	5	5	5	5	100		
	F	5	5	5	4	4	80		
SIYB-REF (20µm)	A	5	5	5	5	5	100	96.7	0.0
	B	5	5	5	5	5	100		
	C	5	5	5	4	4	80		
	D	5	5	5	5	5	100		
	E	5	5	5	5	5	100		
	F	5	5	5	5	5	100		

NA = Not Applicable

QC Check: Jc 9-19-19 Final Review: Jw 10/1/19

Wood Aquatic Toxicology Lab, 4905 Morena Blvd, Ste. 1304, San Diego, CA 92117

96hr Marine Acute Test with 48hr Renewal

Client: Wood - POSD
Project ID: Shelter Island TMDL
Test No. 19-09-014, 015

Test Species: *Atherinops affinis* (topsmelt)
Start Date/Time: 9/10/2019 1615
End Date/Time: 9/14/2019 1415

Sample ID (100%)	Rep	Counts 0	24	48	72	96
Lab Control	A	5	5	5	5	5
	B	5	5	5	5	5
	C	5	5	5	5	4
	D	5	5	5	4	4
	E	5	5	5	5	5
	F	5	5	5	5	5
Filter Control (0.2µm)	A	5	5	5	4	4
	B	5	5	5	5	5
	C	5	5	4	4	4
	D	5	5	5	5	5
	E	5	5	5	5	5
	F	5	5	5	5	5
Filter Control (20µm)	A	5	5	5	5	5
	B	5	5	5	5	5
	C	5	5	5	5	5
	D	5	5	5	5	5
	E	5	5	5	5	4
	F	5	5	5	5	5
SIYB-4 (untreated)	A	5	5	5	5	4
	B	5	5	5	5	5
	C	5	5	5	5	5
	D	5	5	5	5	4
	E	5	5	5	5	5
	F	5	5	5	5	5
SIYB-REF (untreated)	A	5	5	5	5	4
	B	5	5	5	5	5
	C	5	5	5	5	5
	D	5	5	5	5	5
	E	5	5	5	5	5
	F	5	5	5	4	4
Tech Initials:		SC	AG	SC	SC	JW

Water Quality	Parameter	0	24	48f	48i	72	96
Lab Control	Temp. (°C)	20.2	20.8	20.9	209	20.9	21.0
	Salinity (ppt)	33.8	34.0	34.2	34.4	34.4	34.5
	pH (units)	7.97	7.80	7.77	8.00	7.72	7.70
	DO (mg/L)	6.9	6.4	6.4	6.7	6.4	6.0
Filter Control (0.2µm)	Temp. (°C)	20.9	21.0	20.8	20.2	20.8	21.0
	Salinity (ppt)	33.9	33.9	34.1	33.9	34.1	34.3
	pH (units)	7.98	7.80	7.75	7.98	7.72	769
	DO (mg/L)	7.1	6.3	6.3	7.9	6.4	6.2
Filter Control (20µm)	Temp. (°C)	20.4	20.9	20.9	20.0	20.8	21.0
	Salinity (ppt)	33.8	34.1	34.1	34.4	34.5	34.6
	pH (units)	7.98	7.83	7.78	8.06	7.74	773
	DO (mg/L)	6.9	6.4	6.4	7.0	6.4	6.2
SIYB-4 (untreated)	Temp. (°C)	20.6	20.9	20.8	20.3	20.8	20.6
	Salinity (ppt)	34.5	34.4	34.6	34.7	34.8	34.4
	pH (units)	7.96	7.86	7.81	7.98	7.76	776
	DO (mg/L)	7.9	6.5	6.6	7.9	6.5	6.3
SIYB-REF (untreated)	Temp. (°C)	20.8	20.9	20.8	20.5	20.9	20.5
	Salinity (ppt)	34.3	34.5	34.7	34.5	34.6	34.7
	pH (units)	8.01	7.85	7.80	8.02	7.75	7.77
	DO (mg/L)	8.2	6.6	6.5	8.0	6.4	6.3
	Tech Initials:	SC	AG	gm	SC	JW	JW

Date Animals Received: 9/6/19 ABS
Age of Animals at Test Start: 13 days

Feedings	0	24	48	72	96
Initials (AM):	—	JW	CG	GM	JW
Initials (PM):					

Comments:

QC Check: 9-19-19

Final Review: JW 10/1/19

Wood Environmental Toxicology Lab, 4905 Morena Blvd, Ste. 1304, San Diego, CA 92117

96hr Marine Acute Test with 48hr Renewal

Client: Wood - POSD
Project ID: Shelter Island TMDL
Test No. 19-09-014, 015

Test Species: *Atherinops affinis* (topsmelt)
Start Date/Time: 9/10/2019 1615
End Date/Time: 9/14/2019 1415

Sample ID (100%)	Rep	Counts 0	24	48	72	96
SIYB-4 (0.2µm filtered)	A	5	5	5	5	5
	B	5	5	5	5	5
	C	5	5	5	5	5
	D	5	5	5	5	5
	E	5	5	5	4	4
	F	5	5	5	5	5
SIYB-REF (0.2µm filtered)	A	5	5	5	5	5
	B	5	5	4	4	4
	C	5	5	5	5	5
	D	5	5	5	5	5
	E	5	5	5	5	5
	F	5	5	5	4	4
SIYB-4 (20µm filtered)	A	5	5	4	4	4
	B	5	5	5	5	5
	C	5	5	4	4	4
	D	5	5	5	5	5
	E	5	5	5	5	5
	F	5	5	5	5	5
SIYB-REF (20µm filtered)	A	5	5	5	5	5
	B	5	5	5	5	5
	C	5	5	5	4	4
	D	5	5	5	5	5
	E	5	5	5	5	5
	F	5	5	5	5	5
	A					
	B					
	C					
	D					
	E					
	F					
	Tech Initials:	SC	AG	SC	SC	JW

Water Quality Parameter	0	24	48f	48i	72	96
Temp. (°C)	20.5	20.8	20.8	20.3	20.9	20.3
Salinity (ppt)	34.5	34.4	34.8	34.7	34.8	35.0
pH (units)	7.91	7.86	7.83	7.96	7.75	7.79
DO (mg/L)	7.0	6.6	6.7	7.9	6.8	6.6
Temp. (°C)	20.3	20.9	20.8	20.3	20.7	20.4
Salinity (ppt)	34.3	34.4	34.6	34.5	34.6	34.7
pH (units)	7.92	7.84	7.78	8.00	7.78	7.79
DO (mg/L)	7.2	6.5	6.6	7.8	6.5	6.3
Temp. (°C)	20.2	20.8	20.7	20.4	20.7	20.5
Salinity (ppt)	34.5	34.6	34.8	34.5	34.7	34.8
pH (units)	7.97	7.88	7.80	8.00	7.80	7.80
DO (mg/L)	8.0	6.8	6.5	8.0	6.9	6.2
Temp. (°C)	20.1	20.8	20.7	20.2	20.7	20.3
Salinity (ppt)	34.3	34.4	34.6	34.5	34.5	34.5
pH (units)	8.02	7.90	7.80	7.98	7.80	7.81
DO (mg/L)	8.2	~~8~~ 6.8 SC	6.4	7.9	6.8	6.3
Temp. (°C)						
Salinity (ppt)						
pH (units)						
DO (mg/L)						
Tech Initials:	SC	AG	GM	SC	JW	JW

Date Animals Received: 9/6/19 ABS
Age of Animals at Test Start: 13 days

Feedings	0	24	48	72	96
Initials (AM):	—	JW	CG	GA	JW
Initials (PM):					

Comments:

QC Check: 9-19-19

Final Review: JW 10/1/19

Wood Environmental Toxicology Lab, 4905 Morena Blvd, Ste. 1304, San Diego, CA 92117

APPENDIX C

List of Data Qualifier Codes

Data Qualifier Codes

QC1: Temperatures out of recommended range; corrective action taken

QC2: Temperatures out of recommended range; no action taken, test terminated

QC3: Test initiated on aeration due to anticipated drop in dissolved oxygen

QC4: Dissolved oxygen percent saturation <110

QC5: Survival counts not recorded due to poor visibility

QC6: Inadequate sample volume remaining; 50% renewal performed

QC7: Inadequate sample volume remaining; no renewal performed

APPENDIX D

Sample Receipt Information & Chain of Custody Form

Sample Check-In: Effluent/Water

Wood Aquatic Toxicology Laboratory
4905 Morena Blvd, Ste. 1304
San Diego, CA 92117

Client: Wood – POSD
Project Name: SIYB TMDL Monitoring
Sample ID: SIYB-4 and SIYB-REF
Test ID No.: 19-09-014, 015

Sample ID (or A, B, C):	SIYB-4	SIYB-REF		
Sample Number:	19-W0105	19-W0106		
Collection Date & Time:	9/9/19 0815	9/9/19 0900		
Receipt Date & Time:	9/9/19 1~~0~~900 SC	9/9/19 1100		
Total Sample Volume (L):	20L	20L		
Receipt Temperature (°C):	2.0	1.0		
Appropriate Temp (Yes/No)[1]:	Y	Y		
pH (units):	7.97	8.07		
DO (mg/L):	7.7	7.9		
Conductivity (µS/cm)[2]:	–	–		
Salinity (ppt):	34.2	34.4		
Alkalinity (mg/L):	132	132		
Hardness (mg/L)[2]:	–	–		
Total Chlorine (mg/L)[3]:	<0.02	<0.02		
Free Chlorine (mg/L)[3]:	–	–		
Technician Initials:	AG	AG		

Notes:	Sample Descriptions[4]:
[1] Temperature should be 0 - 6°C if received > 24 hours past collection	SIYB-4 = Clear + Colorless
[2] Only measured on samples with less than 3 ppt salinity	SIYB-REF = Clear + Colorless
[3] If total chlorine is above 0.10 mg/L, the free chlorine will be measured	
[4] Description: Clear & Colorless used if no debris, odor, or color present	

Test Organism: Topsmelt ~~Dilution~~ JW Control Water: [✓ Nat-SW], Art-SW, RW, DMW, Other________ Salinity 34 ppt
Additional Control:________________________ Salinity______

Test Organism:____________ Dilution Water: Nat-SW, Art-SW, RW, DMW, Other________ Salinity______
Additional Control:________________________ Salinity______

Test Organism:____________ Dilution Water: Nat-SW, Art-SW, RW, DMW, Other________ Salinity______
Additional Control:________________________ Salinity______

Additional Comments:

Initial QC: SC 9-19-19
Final Review: JW 10/1/19

wood.

Wood Aquatic Toxicology Lab
4905 Morena Blvd, Ste. 1304
San Diego, CA 92117
Phone: (858) 299-5368

Chain of Custody Form

Page 1 **of** ____

Client/Send Report To:

Company Wood E & I Solutions, Inc.
Address 9210 Sky Park Court, Suite 200
San Diego, CA 92123
Contact/PM Barry Snyder/Corey Sheredy
Phone Number 858-300-4316
Email Address corey.sheredy@woodplc.com

Project Information (if needed):

Project Name Annual SIYB TMDL Monitoring
Project No. 1715100624
PO Number ____

Personal Cooler Shipped:
Return Requested: YES____ **NO**____.

Analysis Requested
(write out or use codes below)

Sample ID	Collection Date	Collection Time	Sample Volume	Sample Type: Grab/Comp.	Sample Number (for lab use)	Aa-a							Receipt Temp (°C)
SIYB-4	9/9/2019	0815	20L	Grab		X							2.0
SIYB-REF	9/9/2019	0900	20L	Grab		X							1.0

Samples Collected By:
CCS/MS

Additional Comments:
See attached email for details.

Samples Shipped via:
Condition Upon Receipt:

Relinquished/Shipped By:
Signature: Marisa Swiderski
Print Name: Marisa Swiderski
Date/Time: 09/09/2019 1100

Received By:
Signature:
Print Name: Jeff Van Voorhis
Date/Time: 09/09/19 1100

Relinquished By:
Signature:
Print Name:
Date/Time:

Received By:
Signature:
Print Name:
Date/Time:

Test Codes (marine):

Mp-c: Chronic Kelp
Hr-dv: Chronic Abalone
Aa-a: Acute Topsmelt
Aa-c: Chronic Topsmelt
Mb-a: Acute Menidia/Silverside
Mb-c: Chronic Menidia/Silverside
Ab-a: Acute Mysid Shrimp
Ab-c: Chronic Mysid Shrimp
Sp-c: Chronic Urchin Fertilization
Sp-dv: Chronic Urchin Development
Mg-dv: Chronic Mussel Development
Other: Write out the test organism

Test Codes (freshwater):

Cd-a: Acute Ceriodaphnia
Cd-c: Chronic Ceriodaphnia
Pp-a: Acute Fathead Minnow
Pp-c: Chronic Fathead Minno
Sc-c: Chronic Green Algae
Ha-a: Acute Hyalella amphipod
Ha-c: Chronic Hyalella amphipod
T-22: CA Title 22 Hazardous Waste

APPENDIX E

Reference Toxicant Test

Statistical Analysis, Control Chart, and Raw Data

CETIS Summary Report

Report Date: 20 Sep-19 09:17 (p 1 of 1)
Test Code: 190910aara | 00-1845-1071

Pacific Topsmelt 96-h Acute Survival Test **Wood E&IS**

Batch ID:	14-6911-1861	**Test Type:**	Survival (96h)	**Analyst:**	
Start Date:	10 Sep-19 16:30	**Protocol:**	EPA/821/R-02-012 (2002)	**Diluent:**	Diluted Natural Seawater
Ending Date:	14 Sep-19 14:30	**Species:**	Atherinops affinis	**Brine:**	Not Applicable
Duration:	94h	**Source:**	Aquatic Biosystems, CO	**Age:**	13d

Sample ID:	02-6410-4309	**Code:**	190910aara	**Client:**	Internal
Sample Date:	10 Sep-19	**Material:**	Total Copper	**Project:**	
Receipt Date:	10 Sep-19	**Source:**	Reference Toxicant		
Sample Age:	16h	**Station:**			

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	NOEL	LOEL	TOEL	TU	PMSD ✓
16-7708-7102	96h Survival Rate	Dunnett Multiple Comparison Test	50	100	70.71		18.4%

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	µg/L	95% LCL	95% UCL	TU ✓
18-3128-5862	96h Survival Rate	Spearman-Kärber	LC50	88.01	73.5	105.4	

96h Survival Rate Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	4	0.9500	0.7909	1.0000	0.8000	1.0000	0.0500	0.1000	10.53%	0.00%
25		4	0.9500	0.7909	1.0000	0.8000	1.0000	0.0500	0.1000	10.53%	0.00%
50		4	0.9000	0.7163	1.0000	0.8000	1.0000	0.0577	0.1155	12.83%	5.26%
100		4	0.2500	0.0909	0.4091	0.2000	0.4000	0.0500	0.1000	40.00%	73.68%
200		4	0.1000	0.0000	0.2837	0.0000	0.2000	0.0577	0.1155	115.47%	89.47%
400		4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%

96h Survival Rate Detail

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	LC	0.8000	1.0000	1.0000	1.0000
25		0.8000	1.0000	1.0000	1.0000
50		0.8000	1.0000	0.8000	1.0000
100		0.2000	0.4000	0.2000	0.2000
200		0.0000	0.2000	0.0000	0.2000
400		0.0000	0.0000	0.0000	0.0000

Analyst: SC QA: JW 10/1/19

CETIS Analytical Report

Report Date:	20 Sep-19 09:17 (p 1 of 1)
Test Code:	190910aara | 00-1845-1071

Pacific Topsmelt 96-h Acute Survival Test **Wood E&IS**

Analysis ID:	16-7708-7102	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.9.3
Analyzed:	20 Sep-19 9:17	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	C > T	50	100	70.71		18.37%

Dunnett Multiple Comparison Test

Control	vs	Conc-µg/L	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		25	0	2.356	0.209	6	CDF	0.8000	Non-Significant Effect
		50	0.6725	2.356	0.209	6	CDF	0.5273	Non-Significant Effect
		100*	8.662	2.356	0.209	6	CDF	1.4E-06	Significant Effect
		200*	10.63	2.356	0.209	6	CDF	8.3E-07	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.41016	0.85254	4	54.39	<1.0E-37	Significant Effect
Error	0.235132	0.0156755	15			
Total	3.64529		19			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	0.2004	13.28	0.9953	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.8921	0.866	0.0294	Normal Distribution

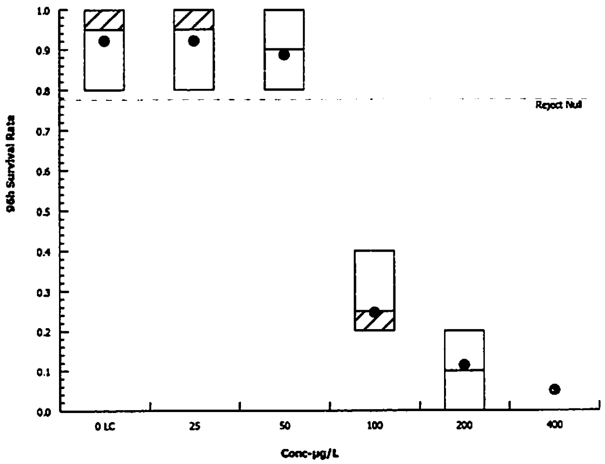
96h Survival Rate Summary

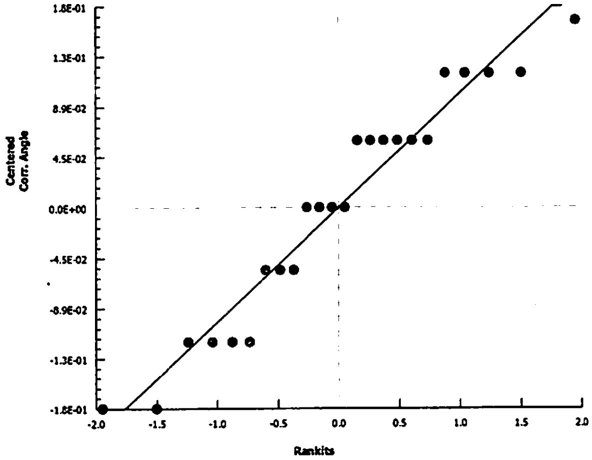
Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	4	0.9500	0.7909	1.0000	1.0000	0.8000	1.0000	0.0500	10.53%	0.00%
25		4	0.9500	0.7909	1.0000	1.0000	0.8000	1.0000	0.0500	10.53%	0.00%
50		4	0.9000	0.7163	1.0000	0.9000	0.8000	1.0000	0.0577	12.83%	5.26%
100		4	0.2500	0.0909	0.4091	0.2000	0.2000	0.4000	0.0500	40.00%	73.68%
200		4	0.1000	0.0000	0.2837	0.1000	0.0000	0.2000	0.0577	115.47%	89.47%
400		4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%

Angular (Corrected) Transformed Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	4	1.286	1.096	1.475	1.345	1.107	1.345	0.05953	9.26%	0.00%
25		4	1.286	1.096	1.475	1.345	1.107	1.345	0.05953	9.26%	0.00%
50		4	1.226	1.007	1.445	1.226	1.107	1.345	0.06874	11.21%	4.63%
100		4	0.5189	0.343	0.6948	0.4636	0.4636	0.6847	0.05527	21.30%	59.64%
200		4	0.3446	0.1258	0.5634	0.3446	0.2255	0.4636	0.06874	39.90%	73.20%
400		4	0.2255	0.2255	0.2256	0.2255	0.2255	0.2255	0	0.00%	82.46%

Graphics





Analyst: 5C QA: JW 10/1/19

CETIS Analytical Report

Report Date: 20 Sep-19 09:17 (p 1 of 1)
Test Code: 190910aara | 00-1845-1071

Pacific Topsmelt 96-h Acute Survival Test **Wood E&IS**

Analysis ID:	18-3128-5862	**Endpoint:**	96h Survival Rate	**CETIS Version:**	CETISv1.9.3
Analyzed:	20 Sep-19 9:17	**Analysis:**	Untrimmed Spearman-Kärber	**Official Results:**	Yes

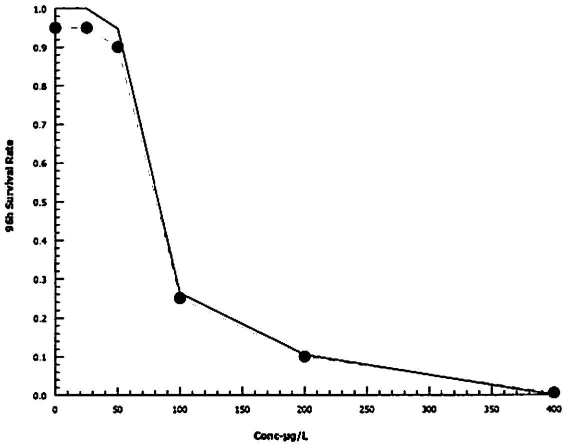
Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	LC50	95% LCL	95% UCL
Control Threshold	0.05	0.00%	1.945	0.03913	88.01	73.5	105.4

96h Survival Rate Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-µg/L	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	LC	4	0.9500	0.8000	1.0000	0.1000	10.53%	0.0%	19/20	0.95	0.0%
25		4	0.9500	0.8000	1.0000	0.1000	10.53%	0.0%	19/20	0.95	0.0%
50		4	0.9000	0.8000	1.0000	0.1155	12.83%	5.26%	18/20	0.9	5.26%
100		4	0.2500	0.2000	0.4000	0.1000	40.00%	73.68%	5/20	0.25	73.68%
200		4	0.1000	0.0000	0.2000	0.1155	115.50%	89.47%	2/20	0.1	89.47%
400		4	0.0000	0.0000	0.0000	0.0000		100.0%	0/20	0	100.0%

Graphics



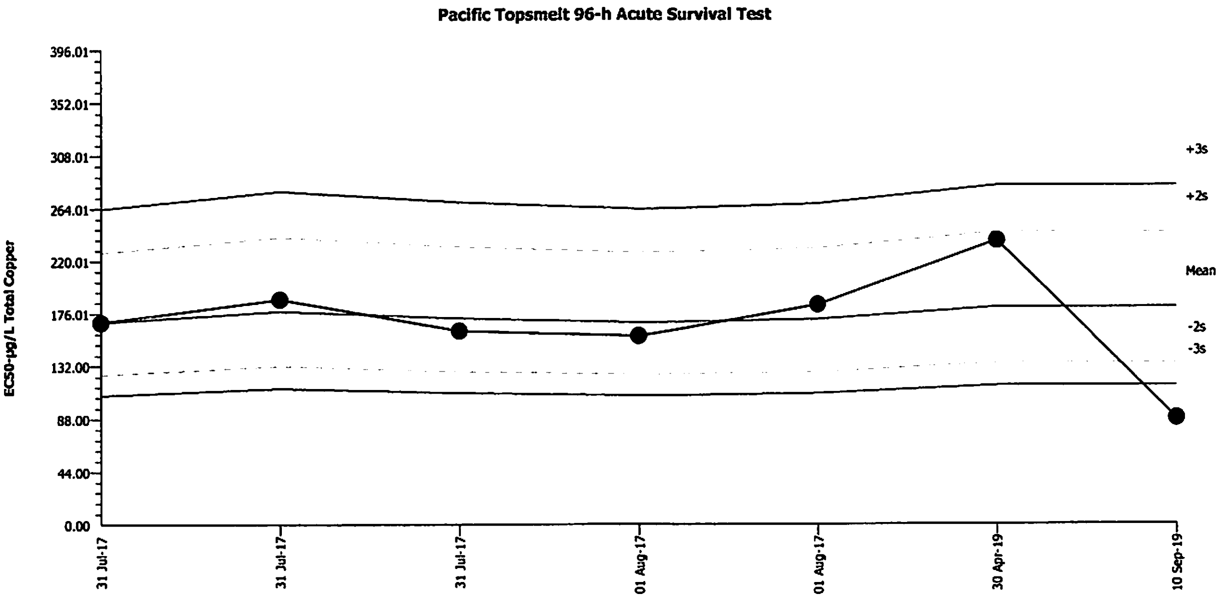
Analyst: SC QA: JW 10/1/19

CETIS QC Plot

Report Date: 20 Sep-19 09:20 (1 of 1)

Pacific Topsmelt 96-h Acute Survival Test **Wood E&IS**

Test Type:	Survival (96h)	**Organism:**	Atherinops affinis (Topsmelt)	**Material:**	Total Copper
Protocol:	EPA/821/R-02-012 (2002)	**Endpoint:**	96h Survival Rate	**Source:**	Reference Toxicant-REF



Mean:	180.5	**Count:**	6	**-2s Warning Limit:**	133.9	**-3s Action Limit:**	115.3
Sigma:	n/a	**CV:**	15.00%	**+2s Warning Limit:**	243.5	**+3s Action Limit:**	282.8

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2017	Jul	31	16:00	168.3	-12.24	-0.4696			19-5584-5627	06-5699-4422
2			31	16:10	187.7	7.16	0.2601			08-6518-1949	12-2976-8720
3			31	16:20	161.5	-19.03	-0.7452			16-0803-3194	14-0325-5692
4		Aug	1	14:20	156.9	-23.63	-0.9384			21-0766-0876	04-5806-5680
5			1	14:30	183.1	2.583	0.09502			08-2262-5738	12-8323-6897
6	2019	Apr	30	15:00	236.6	56.01	1.807			01-1235-0968	05-2157-6049
7		Sep	10	16:30	88.01	-92.54	-4.806	(-)	(-)	00-1845-1071	18-3128-5862

Analyst: SC QA: JW 10/1/19

96hr Marine Acute Test with 48hr Renewal

Client: Internal
Project ID: Ref Tox
Test No. 190910aara

Test Species: *Atherinops affinis*
Start Date/Time: 9/10/2019 1630
End Date/Time: 9/14/2019 1430

Sample ID (µg/L Cu)	Rep	Counts 0	Counts 24	Counts 48	Counts 72	Counts 96	Parameter	WQ 0	WQ 24	WQ 48f	WQ 48i	WQ 72	WQ 96
Lab Control	A	5	5	4	4	4	Temp. (°C)	20.7	21.1	21.1	20.9	21.0	21.0
	B	5	5	5	5	5	Salinity (ppt)	29.1	29.1	29.2	29.3	29.3	29.4
	C	5	5	5	5	5	pH (units)	7.94	7.73	7.69	7.99	7.71	7.66
	D	5	5	5	5	5	DO (mg/L)	7.0	6.5	6.3	7.0	6.8	6.0
25	A	5	5	5	4	4	Temp. (°C)	20.8	21.0	20.8	20.9	20.9	20.9
	B	5	5	5	5	5	Salinity (ppt)	29.1	29.1	29.3	29.3	29.4	29.4
	C	5	5	5	5	5	pH (units)	7.93	7.74	7.72	7.99	7.72	7.64
	D	5	5	5	5	5	DO (mg/L)	7.2	6.6	6.7	7.1	6.5	5.9
50	A	5	5	5	4	4	Temp. (°C)	20.9	20.9	20.8	20.8	20.9	20.8
	B	5	5	5	5	5	Salinity (ppt)	29.1	29.2	29.4	29.3	29.3	29.4
	C	5	5	5	5	4	pH (units)	7.92	7.74	7.71	7.98	7.72	7.66
	D	5	5	5	5	5	DO (mg/L)	7.1	6.4	6.4	7.1	6.4	6.2
100	A	5	4	2	2	1	Temp. (°C)	20.9	20.9	20.9	20.9	20.9	20.6
	B	5	3	3	2	2	Salinity (ppt)	29.1	29.1	29.2	29.3	29.3	29.3
	C	5	3 2 4	1	1	1	pH (units)	7.91	7.73	7.72	7.96	7.75	7.70
	D	5	5	1	1	1	DO (mg/L)	7.1	6.4	6.4	7.1	6.6	6.5
200	A	5	3	0	–	–	Temp. (°C)	21.0	20.9	20.8	20.9	20.9	20.5
	B	5	2	2	2	1	Salinity (ppt)	29.5	29.1	29.3	29.3	29.3	29.3
	C	5	2	1	1	0	pH (units)	7.87	7.75	7.76	7.92	7.80	7.76
	D	5	3	1	1	1	DO (mg/L)	7.2	6.7	6.9	7.2	6.9	6.9
400	A	5	0				Temp. (°C)	21.0	21.0				
	B	5	0		All		Salinity (ppt)	29.0	29.1				
	C	5	0		Dead		pH (units)	7.79	7.73				
	D	5	0				DO (mg/L)	7.2	6.8				
	A						Temp. (°C)						
	B						Salinity (ppt)						
	C						pH (units)						
	D						DO (mg/L)						
	Tech Initials:	SC	AI	SC	JW	JW	Tech Initials:	SC	AG	gm	SC	JW	JW

Date Animals Received: 9/6/19 ABS
Age of Animals at Test Start: 13 days

Feedings	0	24	48	72	96
Initials (AM):	–	JW	CG	AR	JW
Initials (PM):					

Comments:

QC Check: 9-19-19

Final Review: JW 10/1/19

Wood Environmental Toxicology Lab, 4905 Morena Blvd, Ste. 1304, San Diego, CA 92117

APPENDIX E

CORRESPONDENCE AND AGENCY MEMORANDA

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LETTER FROM THE REGIONAL BOARD REGARDING COMMENTS ON 2012 SIYB TMDL MONITORING AND PROGRESS REPORT

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Attachment A

California Water Boards

Edmund G. Brown Jr.

Matthew Rodriquez

California Regional Water Quality Control Board, San Diego Region

July 26, 2013

Mr. Wayne Darbeau
President/CEO
San Diego Unified Port District
3165 Pacific Highway
San Diego, CA 92101

<u>In reply refer to:</u>
Place ID:650648:WChiu

Subject: Comments on 2012 Shelter Island Yacht Basin Total Maximum Daily Load Monitoring and Progress Report

Mr. Darbeau:

In accordance with Provision A.3 of Investigative Order No. R9-2011-0036, as amended, the San Diego Unified Port District (Port District) submitted the *2012 Shelter Island Yacht Basin Total Maximum Daily Load Monitoring and Progress Report* (Report) to the California Regional Water Quality Control Board, San Diego Region (San Diego Water Board) on March 29, 2013. The San Diego Water Board has reviewed the Report and offers the following comments.

Compliance with Dissolved Copper Total Maximum Daily Load (TMDL)

The Shelter Island Yacht Basin (SIYB) TMDL includes the following compliance schedule:

Stage	Required Dissolved Copper Load Reduction	Compliance Date
1	0%	December 1, 2007
2	10%	December 1, 2012
3	40%	December 1, 2017
4	76%	December 1, 2022

The Port District's *Shelter Island Yacht Basin TMDL Implementation Compliance Monitoring Plan* (Monitoring Plan) proposed utilizing data associated with the conversion of boat hulls from copper based anti-fouling paints (AFPs) to alternative AFPs for the purpose of determining compliance with the first load reduction required by the December 1, 2012 compliance date. Based on the data submitted and information provided in the Report, the 10 percent reduction in dissolved copper loading required to demonstrate compliance with the SIYB TMDL by the December 1, 2012 compliance date was achieved.

Because of the progress that the Port District has been able to achieve by implementing the *Shelter Island Yacht Basin Dissolved Copper Total Maximum Daily Load Implementation Plan*

Attachment A

(Implementation Plan), the San Diego Water Board continues to support the dissolved copper load reduction approach described in the Implementation Plan. Converting boat hulls to alternative AFPs with little or no copper is still expected to have the greatest effect on reducing dissolved copper loads discharged to SIYB.

As long as the Port District continues implementing the Implementation Plan and demonstrates progress toward attainment of the dissolved copper load reduction required by the December 1, 2017 compliance date, the San Diego Water Board will continue to forego using its regulatory authority to implement the SIYB TMDL by regulating the discharge of dissolved copper to SIYB under waste discharge requirements (WDRs), conditional waivers of WDRs, waste discharge prohibitions, or through the issuance of enforcement actions. The San Diego Water Board will re-evaluate its regulatory options for implementing the SIYB TMDL after reviewing and considering each subsequent Annual Monitoring and Progress Report.

Monitoring Program Modification Recommendations

In the Report, the Port District recommended several modifications to the monitoring and data collection for the monitoring program, including the following:

a. Remove the free copper ion activity measurement from future monitoring because of the lack of USEPA guidance and time constraints caused by the instrument calibration process;

b. Include the Test of Significant Toxicity (TST) calculation as an additional statistical analysis for reporting toxicity data;

c. Remove the collection of hull registration data (i.e., vessel registration numbers) because of concerns expressed that this information may become part of a public document; and

d. To more accurately calculate the amount of copper loading to SIYB, allow the assumption that vessels with aged copper AFPs have a copper release (i.e. leaching or loading) rate similar to low copper AFPs (0.45 kg/yr) because the research (provided in Appendix E in the Report) indicates copper leach rates degrade over time, particularly after the first 2-3 years after application.

The information and documentation provided to support the Port District's recommendations to modify the monitoring and data collection for the monitoring program are acceptable to the San Diego Water Board. Please revise the Monitoring Plan in accordance with the recommended modifications described and submit it to the San Diego Water Board by September 30, 2013.

In closing, the San Diego Water Board appreciates the Port District's continued leadership and efforts towards achieving the required dissolved copper load reductions in SIYB.

Attachment A

In the subject line of any response, please include the reference number Place ID:650648:wchiu. For questions or comments, please contact Wayne Chiu by phone at 858-637-5558, or by email at wchiu@waterboards.ca.gov.

Respectfully,

David W. Gibson
Executive Officer

DWG:dtb:esb:wc

cc: Bay Club Marina
2131 Shelter Island Drive
San Diego, California 92106

Half Moon Anchorage
2131 Shelter Island Drive
San Diego, California 92106

San Diego Yacht Club
1011 Anchorage Lane
San Diego, California 92106

Shelter Island Marina
2051 Shelter Island Drive
San Diego, California 92106

Silver Gate Yacht Club
2091 Shelter Island Drive
San Diego, California 92106

Southwestern Yacht Club
2702 Qualtrough Street
San Diego, California 92106

Tech Staff Info & Use	
Order No.	R9-2001-0036
Party (GT/CIWQS) ID	NA
File No.	NA
WDID	NA
NPDES No.	NA
Reg. Measure ID	NA
Place ID	650648
Person ID	NA
Inspection ID	NA

LETTER TO THE REGIONAL BOARD REQUESTING VERIFICATION OF 2017 INTERIM COMPLIANCE

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PORT of
SAN DIEGO
Waterfront of Opportunity

June 28, 2018

California Regional Water Quality Control Board
San Diego Region
2375 Northside Drive, Suite 100
San Diego, CA 92108-2700
Attn: Mr. Wayne Chiu,

Subject: Request for verification of interim and final compliance targets for the Shelter Island Yacht Basin Dissolved Copper Total Maximum Daily Load Monitoring (TMDL)

Dear Mr. Chiu,

We thank you for meeting with the San Diego Unified Port District (Port) and Shelter Island Master Leaseholders Group (SIMLG) on May 24, 2018 to discuss the progress on the Shelter Island Yacht Basin TMDL and receive the findings from the 2017 TMDL Monitoring and Progress Report (2017 Report). We appreciate your time and commitment to this project.

As presented in the 2017 Report and discussed at the meeting, the District and the SIMLG continue to make diligent efforts to implement best management practices and reduce copper loads. We believe we continue to be in compliance with the TMDL. Moreover, as presented in the 2017 Report, a 45.4% load reduction was documented which surpasses the 2017 interim load reduction compliance target of 40%. It is our understanding from that meeting, that the 2017 interim target has been achieved. In addition, we also clarified that compliance with the final TMDL phase is the requirement to reduce copper loading to 567kg/yr., a 76% load reduction.

Having a clear understanding of compliance is critical as we approach the final phase of this TMDL and set our sights on successfully meeting the 76% loading reduction requirement. As such, the District is providing this letter to (1) memorialize our discussion at the May 24th meeting, and (2) respectfully request written confirmation from the Regional Board for the following items:

1. Confirmation that the 45.4% load reduction identified in 2017 Report and its supporting data satisfies the 2017 interim compliance target.
2. Confirmation of the final compliance target (567 kg/yr. copper loading) and compliance expectations (compliance based on copper loading).

We look forward to receiving your response. On behalf of the District we appreciate your continued support and participation and look forward to working with you as we embark on the final phase of this TMDL.

Please feel free to contact me at (619) 725-6073 or Kelly Tait at (619) 686-6372 if you have any questions on the TMDL Report or any other copper reduction efforts the District is undertaking.

Respectfully,

Karen Holman
Director, Environmental Protection
San Diego Unified Port District

KH/aa
CC via email:
Randa Coniglio, Jason H. Giffen, Kelly Tait, John Carter, Port
Shelter Island Master Leaseholders Group
Sharon Cloward, SDPTA

D2#1525641

LETTER FROM THE REGIONAL BOARD REGARDING REVIEW OF 2017 SIYB TMDL

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CALIFORNIA
Water Boards

Edmund G. Brown Jr.
Governor

Matthew Rodriquez
Secretary for
Environmental Protection

San Diego Regional Water Quality Control Board

September 11, 2018

Karen Holman
Director, Environmental Protection
San Diego Unified Port District
3165 Pacific Highway
San Diego, CA 92101

In reply refer to / attn:
CW-650648:jhaas

Via email only: kholman@portofsandiego.org

Subject: REVIEW OF 2017 MONITORING REPORT, SHELTER ISLAND YACHT BASIN COPPER TMDL

Dear Ms. Holman,

Staff of the California Regional Water Quality Control Board, San Diego Region (San Diego Water Board) have reviewed the 2017 TMDL Monitoring and Progress Report (2017 Report) submitted in March 2018 regarding progress on the Shelter Island Yacht Basin Dissolved Copper Total Maximum Daily Load (Shelter Island TMDL). The Shelter Island Yacht Basin is a popular recreational marina located in the north end of San Diego Bay. The San Diego Water Board appreciates the San Diego Unified Port District (Port District) efforts to protect and restore water quality so that the Basin's water can support beneficial uses for people and wildlife.

The most sensitive beneficial uses of the Yacht Basin's waters are those designated for protection of marine aquatic life and aquatic dependent wildlife. Those beneficial uses are threatened or impaired due to elevated levels of dissolved copper. Copper used in antifouling paints to prevent buildup of marine organisms on a vessel's hull can leach into the environment where, even at low concentrations, it is toxic to a variety of aquatic organisms and is persistent in the environment. The combination of the large number of recreational vessels and reduced tidal flushing at Shelter Island Yacht Basin has resulted in concentrations of dissolved copper that exceed numeric water quality objectives for dissolved copper and narrative water quality objectives for toxicity and pesticides.

Twenty-two years ago (in 1996), the San Diego Water Board placed the Shelter Island Yacht Basin on the Clean Water Act Section 303(d) List of Water Quality Limited Segments due to elevated levels of dissolved copper in the water column. The San Diego Water Board adopted the Shelter Island TMDL in 2005, and the USEPA granted final approval of the TMDL in February 2006.

The TMDL calculated and established a loading capacity for dissolved copper discharges into the Shelter Island Yacht Basin of 1.6 kilograms/day or 567 kilograms/year. That meant that a 76 percent overall reduction of residual copper loading to the Yacht Basin would be required to restore the marine aquatic life and aquatic dependent wildlife beneficial uses. The TMDL established a phased compliance schedule for achieving that reduction as follows:

Interim Loading Targets for Attainment of the TMDL			
Stage	Time Period	Percent Reduction from Current Estimated Loading	Estimated Interim Target Loading (kg/year of dissolved Cu)
Stage 1	Years 1-2	0%	n/a
Stage 2	Years 2-7	10%	1,900
Stage 3	Years 7-12	40%	1,300
Stage 4	Years 12-17	76%	567

The TMDL schedule was based on a timeline intended to minimize adverse economic impact to the boating community from the transition to alternative boat hull paints that were less toxic than the paints used when the TMDL was adopted in 2005. The TMDL schedule recognized that within 15 years, new boats docked in the Yacht Basin could reasonably be painted with nontoxic or less toxic coatings, and that the copper coating on existing boats could reasonably be replaced with nontoxic or less toxic coatings during routine hull stripping.

Notably, in 2013 Governor Brown signed Assembly Bill 425 (Atkins) and directed the Department of Pesticide Regulation (DPR) to establish a leach rate for copper-based antifouling paints to protect aquatic environments from the effects of exposure to copper-based antifouling paints. In January 2018 DPR issued its final decision to establish a maximum allowable copper leach rate of 9.5 µg/cm^2/day for all copper-based antifouling paint and coating products labeled for use on recreational vessels. DPR's new restrictions on copper-based antifouling paints and coatings became effective as of July 1, 2018.[1]

The Port District's 2017 Report marks the end of Stage 3 of the interim loading targets, and suggests that overall the Yacht Basin is meeting the 40 percent reduction target as a result of improved use of best management practices and vessel conversions to less toxic hull coatings.

Thus, in large part to the leadership of the Port District, loadings of dissolved copper have been significantly reduced even prior to the new DPR rule. With DPR's copper paint regulations newly in effect, both the Port District and the San Diego Water Board expect to see reductions in dissolved copper over the next few years.

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[1] Information on DPR's program is at https://www.cdpr.ca.gov/docs/registration/reevaluation/chemicals/antifoulant_paints.htm

(footnote continued on next page)

The 2017 Report also provides some water quality measurements to assess the status of the beneficial uses. Consistent with results of previous years, the 2017 data show dissolved copper continues to exceed the Water Quality Objectives at most sampling locations,[2] although only the two stations farthest inside the basin had statistically significant effects on developing mussel larvae (stations SIYB-1 and SIYB-2, see Attachment 1). While the dissolved copper loading rates are an indicator of progress toward TMDL attainment, ultimately water quality data as reported to the USEPA pursuant to Clean Water Act sections 305b and 303d will determine whether the beneficial uses are attained.

Both the Port District and the San Diego Water Board have recognized that the new DPR paint regulations cannot solely be relied upon to achieve the TMDL's final target and restore the impaired beneficial uses.[3] Ongoing and additional efforts by the Port District to ensure best management practices for paints and associated marina activities, combined with the new DPR regulations, provide a pathway for success. The San Diego Water Board has confidence in the Port District's leadership toward achieving the TMDL targets and restoring the beneficial uses.

For further questions regarding the Shelter Island TMDL, please contact Jeremy Haas at 619-521-3009 or Jeremy.Haas@waterboards.ca.gov.

Respectfully,

JAMES G. SMITH
Assistant Executive Officer

JGS:jch

Attachment: Shelter Island Yacht Basin Sampling Locations, from 2017 Report

cc via email:
Kelly Tait, San Diego Unified Port District
Sharon Cloward, San Diego Unified Port District Tenants Association
Ruth Kolb, City of San Diego
Sue Keydel, USEPA Region IX
Jeremy Haas, Cynthia Gorham, Laurie Walsh, Wayne Chiu, San Diego Water Board

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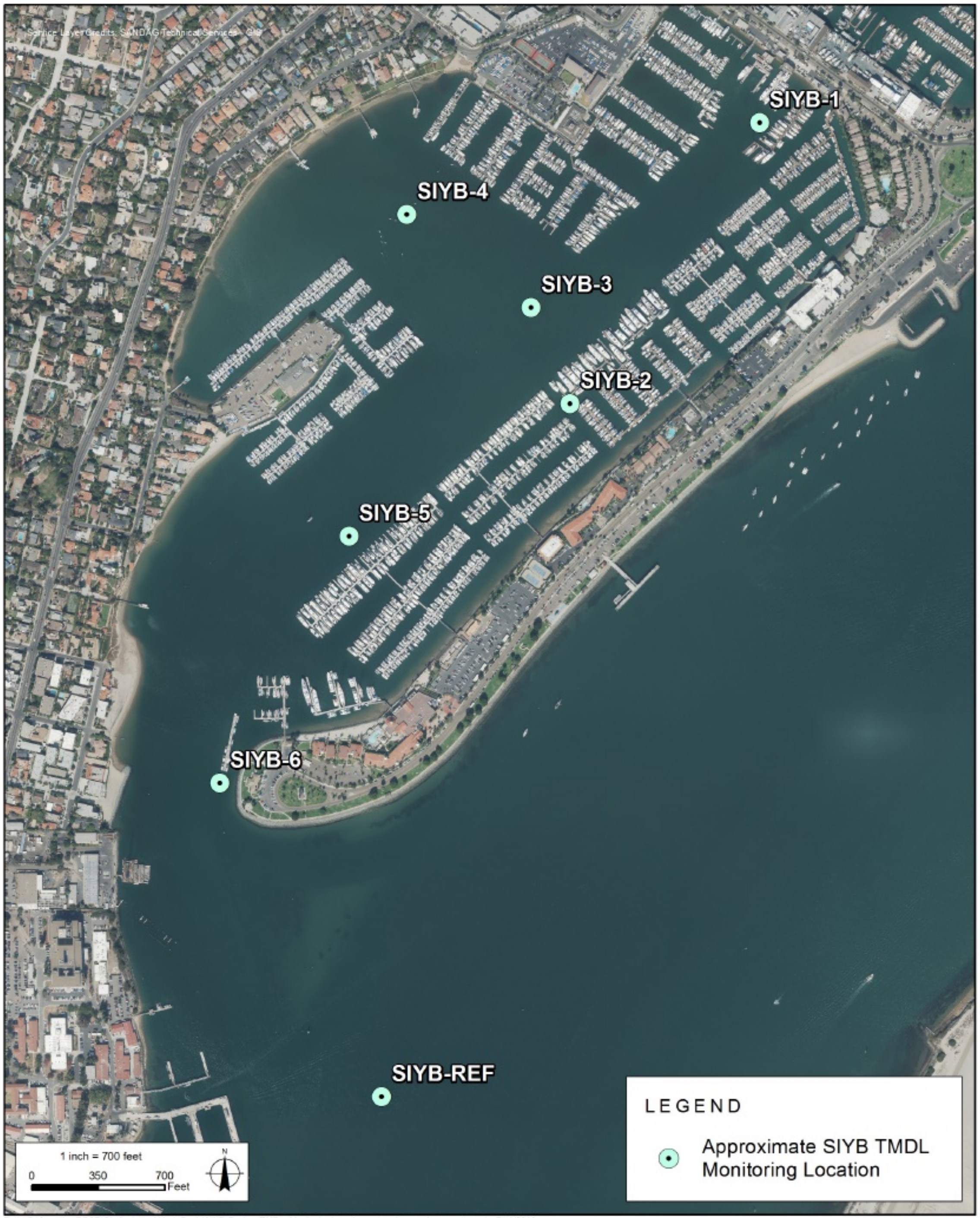
[2] Five of the six sampling stations exceeded the California Toxics Rule (CTR) criterion continuous concentration (CCC) water quality objective (WQO) of 3.1 μg/L, and four of the six stations exceeded the CTR acute criterion maximum concentration (CMC) WQO (4.8 μg/L).

[3] See Feb. 24, 2015 letter to DPR from the Port District and San Diego Water Board.

Attachment: Shelter Island Yacht Basin sampling locations. Figure 2-1 from the 2017 Report



Path: Q:\Aquatics\POSD\ShelterIsland\YachtBasin\MXD\Review\TMDL_MonitoringLocations_overview.mxd, corey.sheredy 7/11/2016

Figure 2-1. Shelter Island Yacht Basin TMDL Sampling Station Locations

REGIONAL BOARD EXECUTIVE OFFICER'S REPORT
(OCTOBER 2018)

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and viable ecological habitat. These activities, in combination with military land use activities and natural environmental conditions, have the potential to cause contaminated soil to become airborne and accumulate in areas where impacts to human and ecological receptors could occur, such as the military housing, school, and playground just east of the Agricultural Fields.

Discharges from the West Agricultural Fields and Maintenance Facility Compound to the Creek, Estuary, and Pacific Ocean pose a threat to water quality, designated beneficial uses, and ecological and human receptors. San Diego Water Board staff will continue efforts to stop these discharges and will update the Board as new information becomes available.

4. Shelter Island Yacht Basin Dissolved Copper TMDL Meets Stage 3 Milestone on Time

Staff Contact: Jeremy Haas

The Shelter Island Yacht Basin is a popular recreational marina located in the north end of San Diego Bay. Twenty-two years ago (in 1996), the San Diego Water Board placed the Shelter Island Yacht Basin on the Clean Water Act Section 303(d) List of Water Quality Limited Segments due to elevated levels of dissolved copper in the water column. The San Diego Water Board adopted the Shelter Island TMDL in 2005, and the USEPA granted final approval of the TMDL in February 2006. Since then the San Diego Unified Port District (Port District) has been working with marinas and the boating community in the Yacht Basin to reduce copper loading. Earlier this year, the Port District submitted the 2017 annual report on the progress of the Shelter Island TMDL.

The Shelter Island Yacht Basin

The Port District's 2017 Report demonstrates that overall the Yacht Basin is meeting the 40 percent reduction target set by the San Diego Water Board as an interim loading target to be met by 2018. The Port attributes the success to improved use of best management practices and vessel conversions to less toxic hull coatings.

The most sensitive beneficial uses of the Yacht Basin's waters are those designated for protection of marine aquatic life and aquatic dependent wildlife. Those beneficial uses are threatened or impaired due to elevated levels of dissolved copper. Copper used in antifouling paints to prevent buildup of marine organisms on a vessel's hull can leach into the environment where, even at low concentrations, it is toxic to a variety of aquatic organisms and is persistent in the environment.

The TMDL required that a 76 percent overall reduction of residual copper loading to the Yacht Basin to restore the marine aquatic life and aquatic dependent wildlife beneficial uses. The TMDL established a phased compliance schedule for achieving that reduction as follows:

Interim Loading Targets for Attainment of the Shelter Island Yacht Basin Dissolved Copper TMDL			
Stage	Time Period	Percent Reduction from Current Estimated Loading	Estimated Interim Target Loading (kg/year of dissolved Cu)
Stage 1	Years 1-2	0%	n/a
Stage 2	Years 2-7	10%	1,900
Stage 3	Years 7-12	40%	1,300
Stage 4	Years 12-17	76%	567

Notably, in 2013 Governor Brown signed Assembly Bill 425 (Atkins) and directed the Department of Pesticide Regulation (DPR) to establish a leach rate for copper-based antifouling paints to protect aquatic environments from the effects of exposure to copper-based antifouling paints. In January 2018 DPR issued its final decision to establish a maximum allowable copper leach rate of 9.5 µg/cm^2/day for all copper-based antifouling paint and coating products labeled for use on recreational vessels. DPR's new restrictions on copper-based antifouling paints and coatings became effective as of July 1, 2018.[4]

The 2017 Annual Report also provides some water quality measurements to assess the status of the beneficial uses. Consistent with results of previous years, the 2017 data show dissolved copper continues to exceed the Water Quality Objectives at most sampling locations,[5] although only the two stations farthest inside the basin had statistically significant effects on developing mussel larvae (stations SIYB-1 and SIYB-2, see Attachment 1). While the dissolved copper loading rates are an indicator of progress toward TMDL attainment, ultimately water quality data as reported to the USEPA pursuant to Clean Water Act sections 305b and 303d will determine whether the beneficial uses are attained.

Both the Port District and the San Diego Water Board have recognized that the new DPR paint regulations cannot solely be relied upon to achieve the TMDL's final target and restore the impaired beneficial uses. Ongoing and additional efforts by the Port District to ensure best management practices for paints and associated marina activities, combined with the new DPR regulations, provide a pathway for success.

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[4] Information on DPR's program is at https://www.cdpr.ca.gov/docs/registration/reevaluation/chemicals/antifoulant_paints.htm

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[5] Five of the six sampling stations exceeded the California Toxics Rule (CTR) criterion continuous concentration (CCC) water quality objective (WQO) of 3.1 µg/L, and four of the six stations exceeded the CTR acute criterion maximum concentration (CMC) WQO (4.8 µg/L).

In conclusion, in large part to the leadership of the Port District, loadings of dissolved copper have been significantly reduced even prior to the new DPR rule. With DPR's copper paint regulations newly in effect, reductions in dissolved copper should be observed over the next few years.

5. Partnering for a Cleaner River Bed, San Diego River

Staff Contact: Sheila Christine McQuaid Moran

It all started with a question – Can the Water Board help? Even though we were not sure how, our answer was "yes" because this project spoke directly to the Water Board's mission "to protect, enhance, and restore the quality of California's water resources" and aligned with the goals of our region's Practical Vision. In the end, not only was it possible, it made a significant impact and strengthened meaningful relationships with public and private partners.

What were we asked to do? The San Diego River Park Foundation (Foundation) needed us to combine services with the California Department of Fish and Wildlife (CDFW) to provide temporary dumpsters for the cleanup efforts of the Foundation to remove thousands of pounds of trash left behind after law enforcement cleared out a large transient encampment along the river in April 2017. Media coverage at the time provided perspective of what the Foundation was facing with this cleanup. One of the articles stated the encampment spanned almost an acre along the San Diego River near the 5900 block of Fairmont Avenue and was filled with tents, trash, waste, and what appeared to be a chop shop for stolen bicycles.[6] Another article estimated that encampment held about 50 tons of trash.[7] Both shared concerns for human health hazards and destruction of the habitat in that area as debris went right up to the edge of the river.

While we could not offer staff to assist in the cleanup, we could find funds to help with proper disposal of the waste. This would be a new type of partnership for us and required review and input from the State Water Board Division of Administrative Services (DAS). Initially, we considered the dumpsters and waste hauling to be a service, which could be done with a fairly simple service order. However, upon review of our request, DAS suggested the activities better aligned with the purposes of the State Board's Cleanup and Abatement Account (CAA) managed by the Division of Financial Assistance (DFA). Switching course and working with DAS, DFA, the Foundation, and potential contractors, we rapidly secured $4,836.00 to cover up to six dumpsters for the cleanup and disposal of waste from the large abandoned encampment during the period of May 17, 2017 – June 30, 2017 (see June 2017 EO Report).

Our continued task beyond the initial setup of funding was to manage the CAA contract and be a liaison between the Foundation and our contractor, EDCO Disposal Corporation (EDCO), to coordinate the delivery and removal of the dumpsters during the last month and a half of Fiscal Year 16. However, the contractor unexpectedly decided not to charge for tonnage fees. As a result, money left from the original cleanups in Fiscal Year 16 could support cleanups further down the river to the end of Fiscal Year 17 (June 2018). We coordinated dumpsters for a few more events until we estimated funds would be fully expended. Again, EDCO, the contractor, surprised us by listing all the dumpsters provided in Fiscal Year 17 as donations instead of

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[6] https://www.10news.com/news/volunteers-clean-up-massive-homeless-encampment-along-san-diego-river-in-mission-valley

[7] https://www.kpbs.org/news/2017/apr/26/volunteers-clean-large-san-diego-homeless-camp/

MARINA AND YACHT CLUB SELF-CERTIFICATION FORMS

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Marina Self-Certification Form
February 3, 2020

I certify that the 2019 Bay Club Hotel & Marina LP vessel hull paint data submitted to the Port of San Diego for the Shelter Island Yacht Basin Dissolved Copper TMDL Annual Report has been prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I further acknowledge that I will retain all records gathered in preparation for this report for a period of five (5) years following my submittal of the data to the Port.

Michael J. Ardelt

Michael J.
Ardelt
General Manager
Bay Club Hotel & Marina
LP

Marina Self-Certification Form
February 27, 2020

I certify that the 2019 [Crows Nest Yachts] vessel hull paint data submitted to the Port of San Diego for the Shelter Island Yacht Basin Dissolved Copper TMDL Annual Report has been prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I further acknowledge that I will retain all records gathered in preparation for this report for a period of five (5) years following my submittal of the data to the Port.

Patricia
Gibbons
Office Manager
Crows Nest Yachts

Marina Self-Certification Form
February 3, 2020

I certify that the 2019 [Gold Coast Anchorage] vessel hull paint data submitted to the Port of San Diego for the Shelter Island Yacht Basin Dissolved Copper TMDL Annual Report has been prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I further acknowledge that I will retain all records gathered in preparation for this report for a period of five (5) years following my submittal of the data to the Port.

Katherine Leisey

Katherine
Leisey
Marina Manager
Gold Coast Anchorage

Half
Moon
MARINA

Marina Self-Certification Form

February 4, 2020

I certify that the 2019 Half Moon Marina vessel hull paint data submitted to the Port of San Diego for the Shelter Island Yacht Basin Dissolved Copper TMDL Annual Report has been prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I further acknowledge that I will retain all records gathered in preparation for this report for a period of five (5) years following my submittal of the data to the Port.

Brad Oliver
Marina Manager
Half Moon Marina

2303 Shelter Island Drive, San Diego, Ca 92106 – 619.224.3401

Marina Self-Certification Form
[Add Date] 3/3/2020

Kona Kai Marina
I certify that the 2019 [INSERT MARINA NAME] vessel hull paint data submitted to the Port of San Diego for the Shelter Island Yacht Basin Dissolved Copper TMDL Annual Report has been prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I further acknowledge that I will retain all records gathered in preparation for this report for a period of five (5) years following my submittal of the data to the Port.

NAME Adam Veves
POSITION/TITLE Dock Master
COMPANY NAME Kona Kai Marina

X

Marina Self-Certification Form
March 2, 2020

I certify that the 2019 La Playa Yacht Club vessel hull paint data submitted to the Port of San Diego for the Shelter Island Yacht Basin Dissolved Copper TMDL Annual Report has been prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I further acknowledge that I will retain all records gathered in preparation for this report for a period of five (5) years following my submittal of the data to the Port.

Frank Taliaferro
Commodore
La Playa Yacht Club

Marina Self-Certification Form
February 4, 2020

I certify that the 2019 San Diego Yacht Club vessel hull paint data submitted to the Port of San Diego for the Shelter Island Yacht Basin Dissolved Copper TMDL Annual Report has been prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I further acknowledge that I will retain all records gathered in preparation for this report for a period of five (5) years following my submittal of the data to the Port.

Ty Olsen
Dockmaster
San Diego Yacht Club

Marina Self-Certification Form
February 3, 2020

I certify that the 2019 Shelter Island Marina vessel hull paint data submitted to the Port of San Diego for the Shelter Island Yacht Basin Dissolved Copper TMDL Annual Report has been prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I further acknowledge that I will retain all records gathered in preparation for this report for a period of five (5) years following my submittal of the data to the Port.

Joe Ravitch
Dockmaster
Shelter Island Marina

Marina Self-Certification Form
2/6/20

I certify that the 2019 Silver Gate Yacht Club's vessel hull paint data submitted to the Port of San Diego for the Shelter Island Yacht Basin Dissolved Copper TMDL Annual Report has been prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I further acknowledge that I will retain all records gathered in preparation for this report for a period of five (5) years following my submittal of the data to the Port.

Celeste Leginski Celeste Leginski

Club Manager
Silver Gate Yacht Club

Marina Self-Certification Form
February 7, 2020

I certify that the 2019 Southwestern Yacht Club vessel hull paint data submitted to the Port of San Diego for the Shelter Island Yacht Basin Dissolved Copper TMDL Annual Report has been prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I further acknowledge that I will retain all records gathered in preparation for this report for a period of five (5) years following my submittal of the data to the Port.

Andrew Scott
Club Manager
Southwestern Yacht Club

Marina Self-Certification Form
2-27-2020

I certify that the 2019 [Tonga Landing] vessel hull paint data submitted to the Port of San Diego for the Shelter Island Yacht Basin Dissolved Copper TMDL Annual Report has been prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I further acknowledge that I will retain all records gathered in preparation for this report for a period of five (5) years following my submittal of the data to the Port.

DocuSigned by:
994F3F54AC80460...

2/27/2020

NAME	Ross Tefft
POSITION/TITLE	President
COMPANY NAME	Silver Seas Yachts

APPENDIX F

SHELTER ISLAND YACHT BASIN TMDL CONCEPTUAL MODEL REVIEW (WOOD AND DUDEK, 2019)

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SHELTER ISLAND YACHT BASIN
TOTAL MAXIMUM DAILY LOAD (TMDL) CONCEPTUAL MODEL REVIEW

Prepared for:
San Diego Unified Port District

Prepared by:

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September 2019

Wood Project No. 1715100622

EXECUTIVE SUMMARY

This Total Maximum Daily Load (TMDL) Conceptual Model Review technical document presents findings to support updates to the Shelter Island Yacht Basin (SIYB) copper TMDL conceptual model. The TMDL Conceptual Model Review includes a comparative analysis of the 2005 TMDL Instantaneous Model and best available science life cycle conceptual model (Earley et al., 2013) for copper loading contribution calculations from copper antifouling paint leaching and in-water hull cleaning activities. Key findings suggest adaptive management measures to vessel hull cleaning frequency and adjustments to implementation practices may lead to copper load reductions and water quality improvements to meet SIYB TMDL requirements.

Vessel hulls are commonly coated with copper antifouling paints that release copper and inhibit growth of fouling organisms. Periodic hull cleaning occurs throughout a paint's life cycle to maintain smooth bottom surface. Environmental loading associated with continuous dissolution of copper antifouling paint and periodic cleaning activities result in copper levels that exceed water quality regulatory criteria in SIYB. Shelter Island Yacht Basin is subject to TMDL regulatory compliance requirements to reduce copper loading by 76% from the estimated 2005 loading level by the year 2022.

The TMDL conceptual model identified that passive leaching of copper antifouling paints account for up to 93% (2,000 kilograms/year [kg/yr]) of annual copper loading to SIYB (Regional Water Quality Control Board [Regional Board], 2005). An additional 5% (100 kg/yr) of annual copper loading was attributed to periodic hull cleaning events in the 2005 TMDL conceptual model. The TMDL conceptual model utilizes assumptions of instantaneous and static copper release closely correlated in time with hull cleaning events (hereafter, '2005 TMDL Instantaneous Model').

More recent technical analyses (Earley et al., 2013) suggest copper release rates following periodic hull cleaning events may provide greater than a 5% relative contribution to annual loading over an estimated three-year paint life cycle (hereafter, 'Life Cycle Dynamic Model'). Applicable *in situ* measurements indicate a volatile timeframe of increased and dynamic copper release in the 30 days following hull cleaning events. Data indicate an active phase of copper loading and toxicity following hull cleaning events due to increased release of bioavailable free copper ions. The Life Cycle Dynamic Model accounts for copper volatility spikes in the days following hull cleaning events that gradually decline to a steady state because of biofilm development and other processes.

Recent changes to the California Code of Regulations by the Department of Pesticide Regulation (DPR) establish a maximum allowable copper leach rate for copper antifouling paint products registered in California for use on recreational vessels (DPR Rule). Implementation of the DPR Rule includes registration and sales restrictions for paints that exceed the maximum allowable copper leach rate. Additional DPR copper mitigation strategies include in-water hull cleaning best management practices and frequency limitations, product label updates, improved information for boater and boatyard awareness, and incentive programs for vessel hull paint conversion.

Key findings from this TMDL Conceptual Model Review technical document include:

- Comparative analysis of the 2005 TMDL Instantaneous Model and the Life Cycle Dynamic Model finds that the total and per-vessel loads are consistent between the models. In addition, when running the models using the 2018 SIYB TMDL Annual Report's vessel tracking data, the predicted annual copper load shows a less than 8% variation between the 2005 TMDL Instantaneous Model (1,152 kg/yr) and Life Cycle Dynamic Model (1,241 kg/yr) approach.
- The Life Cycle Dynamic Model suggests hull cleaning activities contribute greater than 5% of the annual copper loads to SIYB. Increased volatility and dynamic copper release for 30-day periods following hulling cleaning activity can vary the contribution of hull cleaning-related loading from 5% to more than 40% of annual copper load per vessel. A number of complex environmental processes may influence the copper dissolution rate, bioavailability, and toxicity of copper-based antifouling paint in the marine environment. This Life Cycle Dynamic Model best captures these processes, while concurrently providing the best representation of the boating practices and real-time use conditions observed in SIYB and other marina basins.
- Current loading estimates using recent SIYB vessel information suggest the final TMDL numeric copper loading target of 567 kg/yr may not be met by 2022 without modifications to vessel cleaning frequency.
- Low hull-cleaning frequency (twice per year or less) and implementation of the DPR Rule may reduce SIYB annual copper loading to below the final TMDL target. Given the increased loading attributed to hull cleaning as projected in the Life Cycle Dynamic Model, it is likely that water quality improvement will be observed with adjustments to hull cleaning frequencies.
- Additional feasibility analysis is needed to determine the operational viability of in-water hull cleaning frequency reduction strategies and other adaptive management measures.
- Ongoing water quality monitoring in SIYB is necessary to verify effectiveness of any hull cleaning frequency reduction measures and progress towards final TMDL numeric goals.

This TMDL Conceptual Model Review confirms that copper loading is associated with a continuous dissolution of copper antifouling paint and periodic cleaning activities to refresh the paint surface. This finding demonstrates that the recent Life Cycle Dynamic Model and the robust data analyses set forth within that model, provide total load calculations that are consistent with the TMDL and best represent real-time use conditions occurring in marina basins. As such, it stands to reason that the Life Cycle Dynamic Model developed by Earley et al. (2013) is appropriate and should be viewed as a scientifically credible and acceptable approach to update the 2005 TMDL Instantaneous Model.

At this time, it is recommended that the SIYB TMDL Conceptual Model be updated to (1) incorporate the loading assumptions provided in Earley et al. (2013)'s Life Cycle Dynamic Model, and (2) use the Life Cycle Dynamic Model moving forward for annually calculating copper loads for TMDL compliance and reporting purposes.

1.0 Introduction

Shelter Island Yacht Basin (SIYB) waters contain dissolved copper concentrations that have exceeded the dissolved copper numeric water quality objective (WQO) as well as the toxicity and pesticides narrative WQOs. These water quality conditions may threaten and impair the wildlife habitat and marine habitat beneficial uses in the basin (San Diego Regional Water Quality Control Board [Regional Board], 2005). Because of this exceedance, SIYB was placed on the list of impaired water bodies compiled pursuant to federal Clean Water Act (CWA) Section 303(d). As part of the Total Maximum Daily Load (TMDL) process, a conceptual model was developed to assign loading estimates to various copper sources in SIYB and resolve this impairment by requiring loading of dissolved copper into SIYB waters to be reduced. As stated in the TMDL, to achieve compliance by 2022, the copper load must be reduced to an annual load of 567 kilograms per year (kg/yr).

Recreational marine vessels moored in harbors and marinas are subject to biofouling that includes attachment and growth of aquatic organisms. Vessel hulls are commonly coated with copper-based paints that act as a toxicant to release copper and inhibit growth of fouling organisms. Periodic hull cleaning occurs throughout the coating life cycle to maintain smooth bottom surface. Environmental loading associated with continuous dissolution of antifouling paint and periodic cleaning activities to refresh the paint surface result in copper levels that exceed water quality regulatory criteria in SIYB.

The TMDL conceptual model (hereafter referred to as the ‘2005 TMDL Instantaneous Model’) identifies that copper antifouling paint sources contribute the majority of dissolved copper loading to SIYB (Table 1-1). The greatest source of loading is the passive leaching of copper antifouling paint applied to the vessels moored in SIYB, accounting for approximately 93% (2,000 kg/yr of copper) of total loading. The TMDL conceptual model identifies that the in-water hull cleaning of the copper antifouling paints accounts for approximately 5% (100 kg/yr of copper) of loading (Regional Board, 2005). Other sources[1] were found to be nominal in the TMDL Conceptual Model.

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[1] As stated in the Regional Board Technical Report, dissolved copper loading from urban runoff is marginal compared with loading from the other anthropogenic sources, at approximately 1% (30 kg/year) of the total load. In addition, copper is found naturally in seawater, and background loading accounts for approximately 1% (30 kg/yr). Direct atmospheric deposition was also determined to be a relatively insignificant contributor of dissolved copper, accounting for less than 1% (3 kg/yr) of the total load. Lastly, sediment was found to act primarily as a sink, rather than a source, of dissolved copper under current loading conditions to SIYB. This finding is of concern because of the likelihood of long-term contamination of sediment by copper (Regional Board, 2005).

Table 1-1.
SIYB Dissolved Copper Sources (Regional Board, 2005)

Source	Estimated Mass Load to SIYB (kg/yr)	Contribution to SIYB (Percent Dissolved Copper)
Passive Leaching	2,000	93
Hull Cleaning	100	5
Urban Runoff	30	1
Background	30	1
Direct Atmospheric Deposition	3	<1
Sediment	0	0
Total	2,163	100

Regional Board, 2005
Notes: kg/yr = kilogram(s) per year; SIYB = Shelter Island Yacht Basin

In addition, it has been further demonstrated that in-water hull cleaning can lead to sediment impacts. Previous reports have identified that a large amount of particle loading of copper occurs during hull cleaning and these particles can be deposited on the bay floor, even when in-water hull cleaning follows standard best management practice (BMP) protocols (Wood, 2019b; AMEC Earth & Environmental, 2006). Other studies (e.g., 2013 Regional Harbor Monitoring Program) have shown that sediments in marinas have elevated levels of copper that exceed the guideline values for sediment quality and that benthic communities are impacted as well (Amec Foster Wheeler Environment & Infrastructure, Inc., 2016). Although the current SIYB TMDL is for water quality only, other similar TMDLs in California, primarily in Newport Beach and Marina Del Rey, include copper load reductions for both water and sediment. Therefore, management strategies related to in-water hull cleaning of copper antifouling paints may result in an improvement of both water and sediment quality and could also reduce the potential for further copper-related sediment cleanups.

Per Investigative Order R9-2011-0036, the conceptual model for the TMDL should be refined and updated as new data becomes available. Recent scientific findings indicate that the current loading assumptions for in-water hull cleaning and passive leaching may need to be re-evaluated. This Total Maximum Daily Load (TMDL) Conceptual Model Review technical document presents findings to support SIYB TMDL conceptual model updates, as detailed herein.

Recently, a study conducted by the Navy Space and Naval Warfare Systems (SPAWAR) evaluated leach rates resulting from both the act of in-water hull cleaning and its residual effects following the active cleaning of the hull (i.e. the life cycle of a paint). This study entitled, *"Life Cycle Contributions of Copper from Vessel Painting and Maintenance Activities"* (Earley et al., 2013) (henceforth referred to as the Life Cycle Dynamic Model) utilized *in situ* data collection methods and best available science to evaluate copper loading and potential environmental impacts associated with in-water hull cleaning. This study measured copper release rates following periodic hull cleaning events to better understand the relative contribution of passive leaching and in-water hull cleaning to annual loading over an estimated three-year paint life cycle. It serves as the best available science to date.

The purpose of this TMDL Conceptual Model Review is to reassess the 2005 TMDL Instantaneous Model to determine whether the SIYB TMDL copper targets may be achieved by reducing or eliminating in-water hull cleaning while considering updated hull cleaning load contributions based on more recent scientific findings.

This TMDL Conceptual Model Review includes a comparative analysis of the 2005 TMDL Instantaneous Model and best available science from the Life Cycle Dynamic Model (Earley et al., 2013) for copper loading contribution calculations from copper antifouling paint leaching and in-water hull cleaning activities. This technical evaluation summarizes relevant findings from SIYB-related in-water hull cleaning studies, conducts a cross-comparison of loading allocations, and uses this information to model various in-water hull cleaning scenarios. Key findings suggest adaptive management measures to vessel hull cleaning frequency and adjustments to implementation practices may lead to copper load reductions and water quality improvements to meet SIYB TMDL requirements.

2.0 Copper Load Contributions

This section summarizes the copper load contributions and load allocations that have been presented in two separate load allocation approaches, the 2005 TMDL Instantaneous Model based on the TMDL technical analysis (Regional Board, 2005) and the Life Cycle Dynamic Model based on the Earley et al. (2013) study. The TMDL technical analysis provided the basis for the current copper load assumptions that identify the load allocations for each source category (Table 1-1) and are used to calculate the annual SIYB TMDL copper load (Wood, 2019a) The Earley et al. (2013) study was conducted in support of Assembly Bill 425 to provide scientific information to support the California Department of Pesticide Regulation's (DPR) setting of a maximum dissolved copper leach rate for copper antifouling paints.

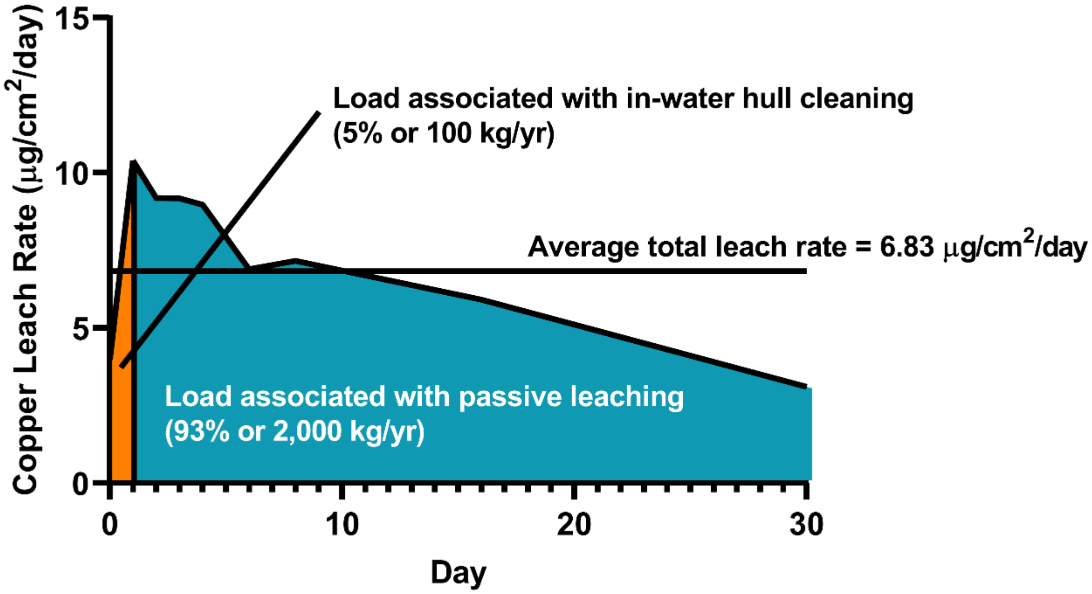
2.1 2005 TMDL Instantaneous Model (Regional Board, 2005)

The 2005 TMDL Instantaneous Model identifies a 2,163 kg/yr baseline load of dissolved copper to SIYB. A total of 98% of the load was attributable to (1) passive leaching of copper from copper antifouling paints on vessels, and (2) in-water hull-cleaning activities (Regional Board, 2005). Passive leaching was assumed to contribute 93% (2,000 kg/yr) in the 2005 TMDL Instantaneous Model, and hull cleaning events, considered static one day event(s) were assumed to contribute approximately 5% (100 kg/yr) of the total annual SIYB copper load (Figure 2-1). The average total leach rate was identified as 6.83 µg/cm^2/day (see Appendix A). Other sources, including urban runoff, background, and aerial deposition account for approximately 2% (63 kg/yr) of the total load and, as stated earlier, are not further examined as part of this comparative analysis.

2.1.1 Annual SIYB TMDL Monitoring and Report – Current Copper Load Calculation Methods

The SIYB TMDL annual copper load and load reduction efforts are currently assessed by tracking the number of vessel hulls painted with high-leach copper paint, lower copper paint (DPR Category I or low-copper), aged-copper paint, or non-copper paint, as well as vessel slip occupancy rates in SIYB. Several assumptions from the 2005 TMDL Instantaneous Model are particularly relevant to this annual load calculation: (1) the TMDL identified the number of vessels (or slips within SIYB) as 2,363; (2) vessel hull length is 12.2 meters, with a beam width of 3.4 meters; (3) 50% of all SIYB vessels are coated with epoxy copper-based paints and 50% are coated with copper-based vinyl paints; and (4) vessel hulls are cleaned using standard BMPs, i.e., 14 cleanings per year using BMP materials (Regional Board, 2005). Using this information, the TMDL identified an annual per-vessel copper load of 0.88 kg/yr, rounded to 0.9 kg/yr for high-leach copper paints.

Figure 2-1. Graphical Representation of 2005 TMDL Instantaneous Model



Note: Leach rate curve derived from Table 2 of Earley et al. (2013) (for epoxy paints using BMPs)

The TMDL also identified a transition to nontoxic and less-toxic hull paints as a potential management strategy to lower loading into the basin. The Port SIYB TMDL Implementation Plan (Weston Solutions, 2011) and the Regional Board in a letter dated July 26, 2013 (Regional Board, 2013) accepted that lower copper paints (those with less than 40% copper or low-leach copper paints, now referred to as DPR Category I paints) and aged paints (defined as paints applied to vessels without reapplication for a period of 3 years) would be given a loading calculation of half the amount of a full copper load (0.45 kg/yr) when calculating annual copper loading and assessing compliance with the TMDL.

The annual SIYB Dissolved Copper TMDL Monitoring and Progress Report includes an annual update of copper load in the basin using specific loading assumptions, as described above, and calculated based on the number of vessels reported, their occupancy rate, and the type of paint used on each vessel. Loading calculations from the 2018 report (Wood, 2019a) are provided in Table 2-1.

Table 2-1.
2018 SIYB Copper Load Using TMDL Assumptions

Vessel Hull Paint Category	Number per Category	Average Time Occupied	Copper Load per Vessel (kg/yr) [a, b]	Total Copper Load (kg/yr)
Copper or Unknown (Assumed Copper)	772	85.9%	0.9	597
DPR Category I (Low Leach)	672	93.3%	0.45	282
Low-Copper (Confirmed)	23	83.8%	0.45	8.67
Low-Copper (Unconfirmed)	12	94.0%	0.9	10.2
Aged-Copper Paint	541	90.3%	0.45	220
Non-Copper (Confirmed or Not Painted)	101	90.4%	0	0
Non-Copper (Unconfirmed)	8	91.1%	0.9	6.56
Vacant Slips (Yacht Clubs and Marinas) (Note: vacant slips are not included in the total vessel count below)	99	--	--	0
Port Fleet (Confirmed Non-Copper)	17	100%	0	0
Port Transient Dock (Assumed to be Copper)	28	61.8%	0.9	15.6
Port Weekend Anchorage (Copper or Unknown and Assumed to be Copper)	40	33.5%	0.9	12.1
Total Slips (All SIYB Vessels + Vacant Slips)	***2,313***	**--**	**--**	***1,152***

Notes:
% = percent; DPR = Department of Pesticide Regulation; kg/yr = kilogram(s) per year; SIYB = Shelter Island Yacht Basin
[a] Copper load per vessel is composed of the individual loads from passive leaching and hull cleaning used by the TMDL (2005).
[b] Wetted-hull surface area used was 35.3 m^2 (12.2-meter length and 3.4-meter beam width).

2.2 Life Cycle Dynamic Model (Earley et al., 2013)

The Life Cycle Dynamic Model is based on a study prepared for SPAWAR as part of the DPR copper paint re-evaluation that also analyzed contributions from in-water hull cleaning (Earley et al., 2013). The study evaluated the contributions of copper into the water from the painting and maintenance (i.e., in-water hull cleaning) that occur over an assumed 3-year paint life cycle.

The study utilized *in situ* data collection methods to measure copper release following cleaning events. Study data indicated periods of volatile elevated copper release during the active phase of cleaning a vessel (i.e., instantaneous release) and in the two- to three day period following. Dynamic, elevated copper leach rates then slowly declined for a period of approximately 30 days post-cleaning or "surface refreshment". After approximately 30 days, the copper leach rate approaches a "pseudo steady state" (Figure 2-2). Earley at al. (2013) identified an average pseudo steady state leach rate of 3.36 micrograms per square centimeter per day (µg/cm^2/day) from day 30 continuing to the end of their assessment period (day 92). A critical difference between this study and the TMDL Technical Report was the foundational assumption that the loading resulting from a cleaning event is not entirely instantaneous, as suggested by the TMDL.

Without cleaning, the 3-year life cycle load is estimated to be 4,170 micrograms per square centimeter (µg/cm^2). With hull cleaning (according to the scenario[2] depicted in Figure 2-3), the Life Cycle Dynamic Model estimated the 3-year life cycle copper load per vessel[3] coated with high-leach copper paint is 7,084 µg/cm^2 over 1,095 days (or 6.47 µg/cm^2/day, see Appendix A), which equates to 0.97 kg/yr per vessel. In this Life Cycle Dynamic Model, approximately 0.40 kg/yr (41%) of the total annual copper load was associated with cleaning (including the cleaning event itself as well as the subsequent increase in post-cleaning leach rate), while approximately 0.57 kg/yr (59%) was attributed to passive loading. The Life Cycle Dynamic Model also identified the loading from the active cleaning event to be approximately 1% and 3% for BMP and non-BMP cleaning, respectively.

In addition to copper leach rate estimates, the Life Cycle Dynamic Model also addressed the potential for toxicity to be caused by increases in free copper ions associated with in-water hull cleaning activities. Earley et al. (2013) stated, "… in terms of the toxicity of copper as interpreted by the concentration of Cu^{2+}, cleaning appears to have more of an effect than initial paint exposure [IE], despite the lower dissolved copper release rates associated with cleaning vs IE." In addition, Earley et al. (2013) concluded, "The data show that copper released during CEs [cleaning events] can cause periodic toxicity that may persist until the free copper ion concentrations drop back down to ambient conditions."

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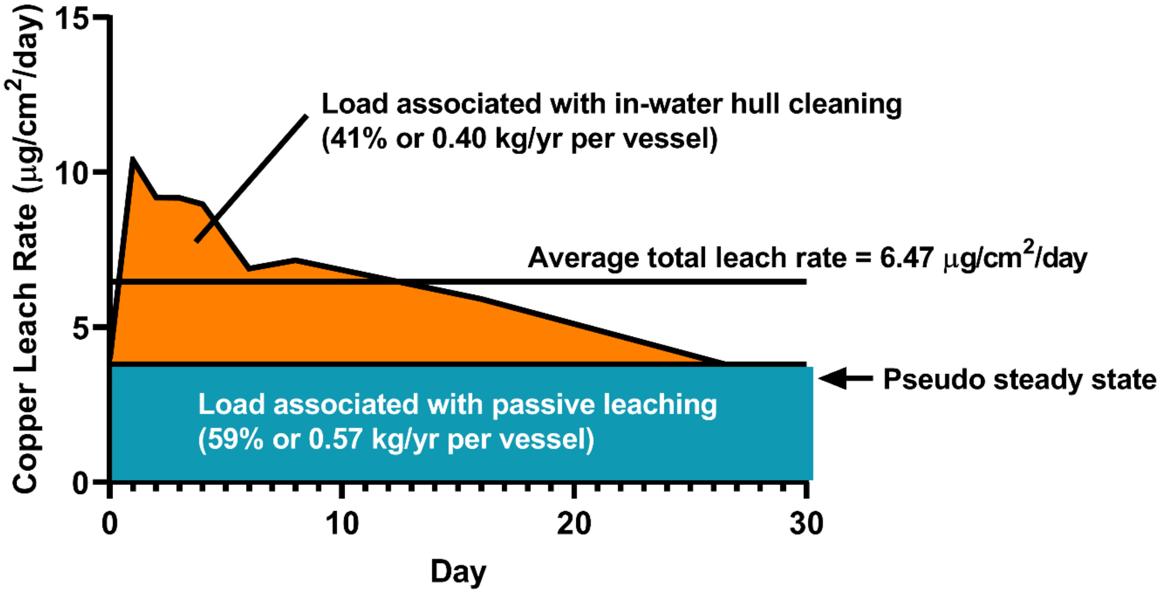
[2] These scenarios include the initial exposure loading, 28- and 21-day life cycle loading and leach rate spikes as a result of cleaning activities (Earley et al., 2013).

[3] Assumes that the vessel hull (12.2-meter length and 4-meter beam width) is coated with copper-based epoxy paint and is cleaned using standard BMPs (i.e., 14 cleanings per year using soft-pile carpet).

Figure 2-2. Graphical Representation of Life Cycle Dynamic Model



Note: Leach rate curve derived from Table 2 of Earley et al. (2013) (for epoxy paints using BMPs)

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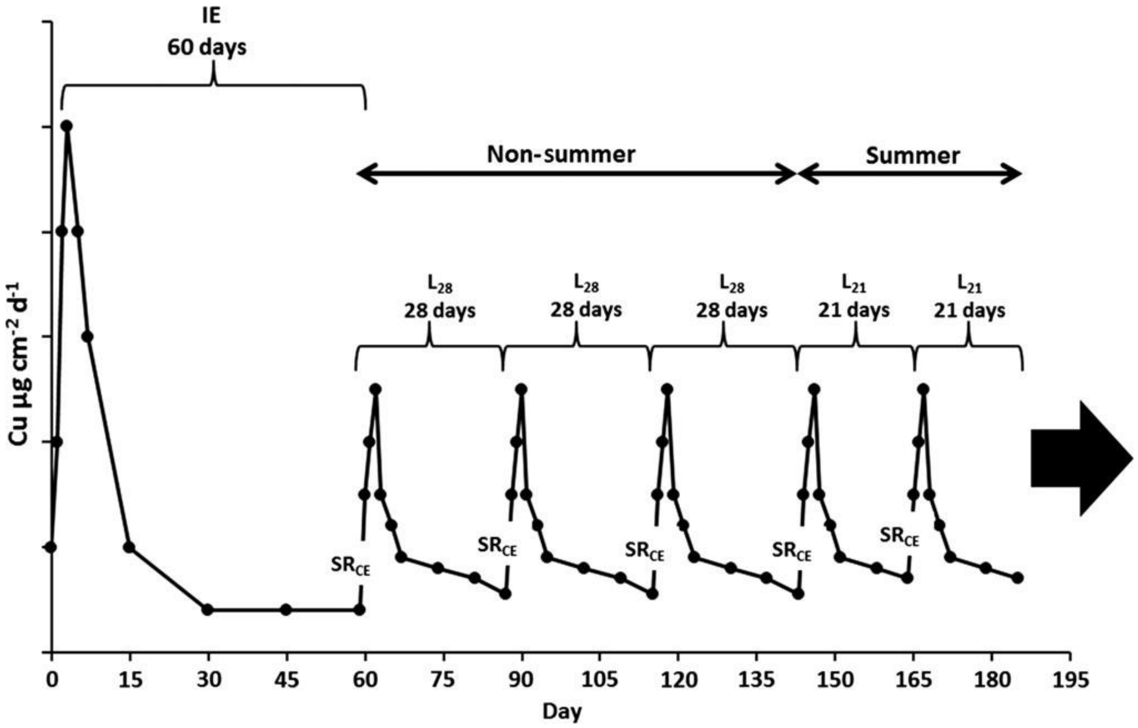
Figure 2-3. Earley et al. (2013) Leach Rates under Different Loading Scenarios (Initial Exposure [IE], 28 and 21-Day Life Cycle Loading)



Credit: Earley et al. (2013)

2.2.1 Projected 2018 SIYB TMDL Copper Load using Earley et al. (2013) Load Assumptions

For comparison purposes, this TMDL Conceptual Model Review evaluated the annual copper load derived from the Life Cycle Dynamic Model using the same process for calculating the SIYB TMDL copper loads annually. For this calculation, the Life Cycle Dynamic Model's per-vessel copper load of 0.97 kg/yr for high-leach copper paints was considered. Vessel data was taken from the 2018 report (Wood, 2019a). Loading calculations are provided in Table 2-2. The calculated total copper load using the Life Cycle Dynamic Model's assumptions is slightly higher (1,241 kg/yr) compared to the total copper load based on the TMDL Instantaneous Conceptual Model (1,152 kg/yr); however, this is to be expected given the difference between annual per-vessel copper loads (0.97 kg/yr for Earley et al. [2013] versus 0.9 kg/yr for the TMDL). Overall, the predicted total copper load shows a less than 8% variation between the two studies at 1,152 kg/yr (TMDL) and 1,241 kg/yr (Earley et al., 2013), respectively.

2.3 Comparisons between the TMDL Instantaneous Model and the Life Cycle Dynamic Model

The TMDL Instantaneous Model and the Life Cycle Dynamic Model both closely examine copper contributions from copper antifouling paints, namely from the cleaning and passive leaching phases of the paint. This TMDL Conceptual Model Review compares some of the foundational assumptions of these studies. Upon careful review, both the TMDL and Earley et al. (2013) analyses identify the actual load from the active cleaning to be relatively small (5% for the TMDL and 1% for the Earley et al. [2013] study[4]), and the total annual per-vessel load to be comparable (0.9 kg/yr and 0.97 kg/yr), respectively. In addition, both studies acknowledge the industry standard for cleaning to be 14 events per year (i.e., every 21 days during summer months and every 28 days during non-summer months). Appendix A presents a summary of leach rate and copper load calculations using information from the 2005 TMDL Instantaneous Model and the Life Cycle Dynamic Model.

Figures 2-1 and 2-2 present the loading projections described in the respective studies. Both figures similarly indicate the sharp increase in loading that occurs when a cleaning event occurs. Of greater importance, however, is ability of these figures to demonstrate the two models' different interpretations of the copper load attributed to in-water hull cleaning activities versus passive leaching. The 2005 TMDL Instantaneous Model identifies the cleaning-attributed load as an instantaneous event (Figure 2-1), while the Life Cycle Dynamic Model recognizes that cleaning is part of the entire life cycle; following the initial cleaning-associated load, a continuing increased load is experienced for a prolonged time period after each cleaning event (Figure 2-2).

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[4] For cleaning events using BMPs on epoxy paints.

Table 2-2.
Projected 2018 SIYB Copper Load Using Earley et al., 2013 Assumptions

Vessel Hull Paint Category	Number per Category	Average Time Occupied	Copper Load per Vessel (kg/yr) [a, b]	Total Copper Load (kg/yr)
Copper or Unknown (Assumed Copper)	772	85.9%	0.97	643
DPR Category I (Low Leach)	672	93.3%	0.485	304
Low-Copper (Confirmed)	23	83.8%	0.485	9.35
Low-Copper (Unconfirmed)	12	94.0%	0.97	10.9
Aged-Copper Paint	541	90.3%	0.485	237
Non-Copper (Confirmed or Not Painted)	101	90.4%	0	0
Non-Copper (Unconfirmed)	8	91.1%	0.97	7.07
Vacant Slips (Yacht Clubs and Marinas) (Note: vacant slips are not included in the total vessel count below)	99	--	--	0
Port Fleet (Confirmed Non-Copper)	17	100%	0	0
Port Transient Dock (Assumed to be Copper)	28	61.8%	0.97	16.8
Port Weekend Anchorage (Copper or Unknown and Assumed to be Copper)	40	33.5%	0.97	13.0
Total Slips (All SIYB Vessels + Vacant Slips)	***2,313***	***--***	***--***	***1,241***

Notes:
% = percent; DPR = Department of Pesticide Regulation; kg/yr = kilogram(s) per year; SIYB = Shelter Island Yacht Basin

[a] Copper load per vessel is composed of the individual loads from passive leaching and hull cleaning used by Earley et al. (2013).

[b] Wetted-hull surface area used was 41.1 m^2 (12.2-meter length and 4-meter beam width).

Another key difference between the two models is the average beam width used to estimate the "wetted-hull surface area." The 2005 TMDL Instantaneous Model uses a beam width of 3.4 meters, while the Life Cycle Dynamic Model uses 4 meters. This factor is then applied to every vessel, resulting in annual per-vessel loads of 0.9 and 0.97 kg/yr, respectively. As such, the overall vessel size used in Life Cycle Dynamic Model will always yield a higher load per vessel due to the wider beam width used in the calculation. Because the "wetted-hull surface" area is such an integral component of the load calculation, this difference in wetted-hull surface area alone is enough to adjust the per-vessel load and address the variability between the two models.

Table 2-3 presents the total annual copper load into SIYB according to 1) the 2005 TMDL Instantaneous Model, and 2) the Life Cycle Dynamic Model using Earley et al. (2013)'s per vessel load value (0.97 kg/yr). A third column analyzes the TMDL per vessel load value (0.9 kg/yr) using the Life Cycle Dynamic Model's load assumptions. Each of these calculated loads assumes that vessels are cleaned according to the current industry-accepted cleaning frequencies (14 times per year; every 21 days during summer months and every 28 days during non-summer months) and that the number of vessels used is the same.

Table 2-3 shows that, while the interpretation of the copper load attributed to in-water hull cleaning and passive leaching varies greatly between the two models, the total annual copper loads attributable to vessels are similar. In addition, the third column highlights that when projecting the TMDL's overall copper load (0.9 kg/yr) into the Life Cycle Dynamic Model, the overall loading remains consistent, regardless of the model applied.

As discussed herein, copper loading is associated with a continuous dissolution of copper antifouling paint and periodic cleaning activities to refresh the paint surface. This repeated periodic hull cleaning occurs throughout the paint's life cycle to maintain a smooth bottom surface. The Life Cycle Dynamic Model accounts for the copper volatility spikes in the days immediately following hull cleaning events that gradually decline to a steady state because of biofilm development and other processes. This model realistically mimics the boating practices and conditions observed in SIYB and other marina basins.

This finding demonstrates that the recent Life Cycle Dynamic Model and the robust data analyses set forth within that model, provide total load calculations that are consistent with the TMDL and best represent real-time use conditions occurring in marina basins. As such, it stands to reason that the Life Cycle Dynamic Model developed by Earley et al. (2013) is appropriate and should be viewed as a scientifically credible and acceptable approach to update the 2005 TMDL Instantaneous Model.

Table 2-3. 2005 TMDL Instantaneous Model and Life Cycle Dynamic Model Comparisons of Passive and In-Water Hull Cleaning Copper Load Contributions to SIYB

Parameter/Calculation	Calculation	2005 TMDL Instantaneous Model	Life Cycle Dynamic Model (Earley et al., 2013)	Life Cycle Dynamic Model using TMDL TAL_v
Average wetted-hull surface area[a]	S	35.3 m^2	41.1 m^2	35.3 m^2
Number of vessels (using the 2018 SIYB TMDL Report Vessel Count)	N_v	2,214	2,214	2,214
Total annual per-vessel copper load	$TAL_v = TAL / N_v = TL * S * 365 \text{ days/year} / 10^9 \mu g/kg$	0.9 kg/yr for high-leach copper paints 0.45 kg/yr for low-leach or low-copper paints	0.97 kg/yr for high-leach copper paints 0.485 kg/yr for low-leach or low-copper paints	0.9 kg/yr for high-leach copper paints 0.45 kg/yr for low-leach or low-copper paints
Annual passive load for all 2018 SIYB vessels	$A_{PL} = (PL * S * N_v * 365 \text{ days/year}) / 10^9 \mu g/kg$	1,101 kg/yr	730.0 kg/yr	677.5 kg/yr
Annual IWHC load for all 2018 SIYB vessels	$A_{IWHC} = (IWHC * S * N_v * 365 \text{ days/year}) / 10^9 \mu g/kg$	51.2 kg/yr	510.9 kg/yr	474.2 kg/yr
Total annual copper load for all 2018 SIYB vessels[b]	$TAL = A_{PL} + A_{IWHC}$	1,152 kg/yr	1,241 kg/yr	1,152 kg/yr

Notes:

[a] The average wetted-hull surface area during the 2018 monitoring year was 38.3 m^2. The TMDL uses an average wetted-hull surface area of 35.3 m^2, while Earley et al. (2013) uses 41.1 m^2.

[b] Includes average occupancy rate of approximately 88%.

A_{PL} = annual passive load; A_{IWHC} = annual in-water hull-cleaning load; IWHC = in-water hull cleaning leach rate; kg/yr = kilograms per year; m^2 = square meters; N_v = number of vessels; PL = passive leach rate; S = wetted-hull surface area; TAL = total annual copper load; TAL_v = total annual per-vessel copper load; TL = total average leach rate

3.0 Modeling Potential In-Water Hull Cleaning Scenarios

Because the Life Cycle Dynamic Model provides a realistic prediction of the anticipated loading from in-water hull cleaning over time, this process could be used to predict loading outcomes based on adjustments to cleaning frequencies and also to measure total loading for TMDL compliance purposes.

To evaluate how changes in the hull cleaning frequency may affect the copper load to SIYB, total annual copper loads were run through both model approaches and calculated for six different hull cleaning frequency scenarios, shown in Table 3-1.

Table 3-1. Hull Cleaning Frequency Scenarios

Cleaning Frequency	Number of Annual Cleanings Per Vessel
Current BMP cleaning frequency[1]	14
Monthly	12
Bimonthly	6
Quarterly	4
Semiannual	2
None	0

[1] Cleaning frequency identified in TMDL and Earley et al., (2013)

For this assessment, hull cleaning frequency scenarios were first run through the TMDL Instantaneous Model (i.e. static 93%:5% allocation for passive leaching and hull cleaning, respectively) to calculate annual loads associated with each cleaning frequency. Next, Equation 4 from the Life Cycle Dynamic Model was used to calculate the annual copper load for each hull cleaning frequency scenario. For the Life Cycle Dynamic Model, both the TMDL (0.9 kg/yr) and Earley et al. (2013) (0.97 kg/yr) total per-vessel load assumptions were evaluated for each hull cleaning frequency scenario.

Calculations were performed using, as a standard, the number of vessels and paint type distribution from the 2018 vessel tracking data provided in the 2018 SIYB TMDL Annual Report (Wood, 2019a). Further, it was assumed that each vessel was cleaned using standard BMPs (i.e., 14 cleanings per year using materials such as soft-pile carpet).

3.1 Copper Load Scenario Estimates using 2018 SIYB Vessel Data

The total annual copper load to SIYB was extrapolated for each hull cleaning frequency scenario using the per-vessel loads from each model and the 2018 vessel tracking and occupancy data[5] provided in the 2018 SIYB TMDL Annual Report (Wood, 2019a). These SIYB copper loading estimates are provided in Table 3-2 and depicted in Figure 3-1.

Table 3-2. Copper Loading Estimates for Various Hull Cleaning Frequencies Using the TMDL Instantaneous and Life Cycle Dynamic Models

Cleaning Frequency	**Number of Annual Cleanings**	**2005 TMDL Instantaneous Model**	**Life Cycle Dynamic Model**	
		TMDL Load of 0.9 kg/yr**	**TMDL Load of 0.9 kg/yr****	**Earley et al. (2013) Load of 0.97 kg/yr***
Current BMP cleaning frequency	14	1,152	1,152	1,241
Monthly	12	1,144	1,103	1,188
Bimonthly	6	1,122	890	959
Quarterly	4	1,115	819	883
Semiannual	2	1,108	748	806
None	0	1,100	677	730

Note:
*Uses an average wetted-hull surface of 41.1 m^2 (Earley et al., 2013).
** Uses an average wetted-hull surface of 35.3 m^2, as described in the TMDL (Regional Board, 2005).
The TMDL requires that copper loads be reduced to an annual load of 567 kilograms per year (kg/yr).
Bold values denote compliance with the TMDL load requirements.

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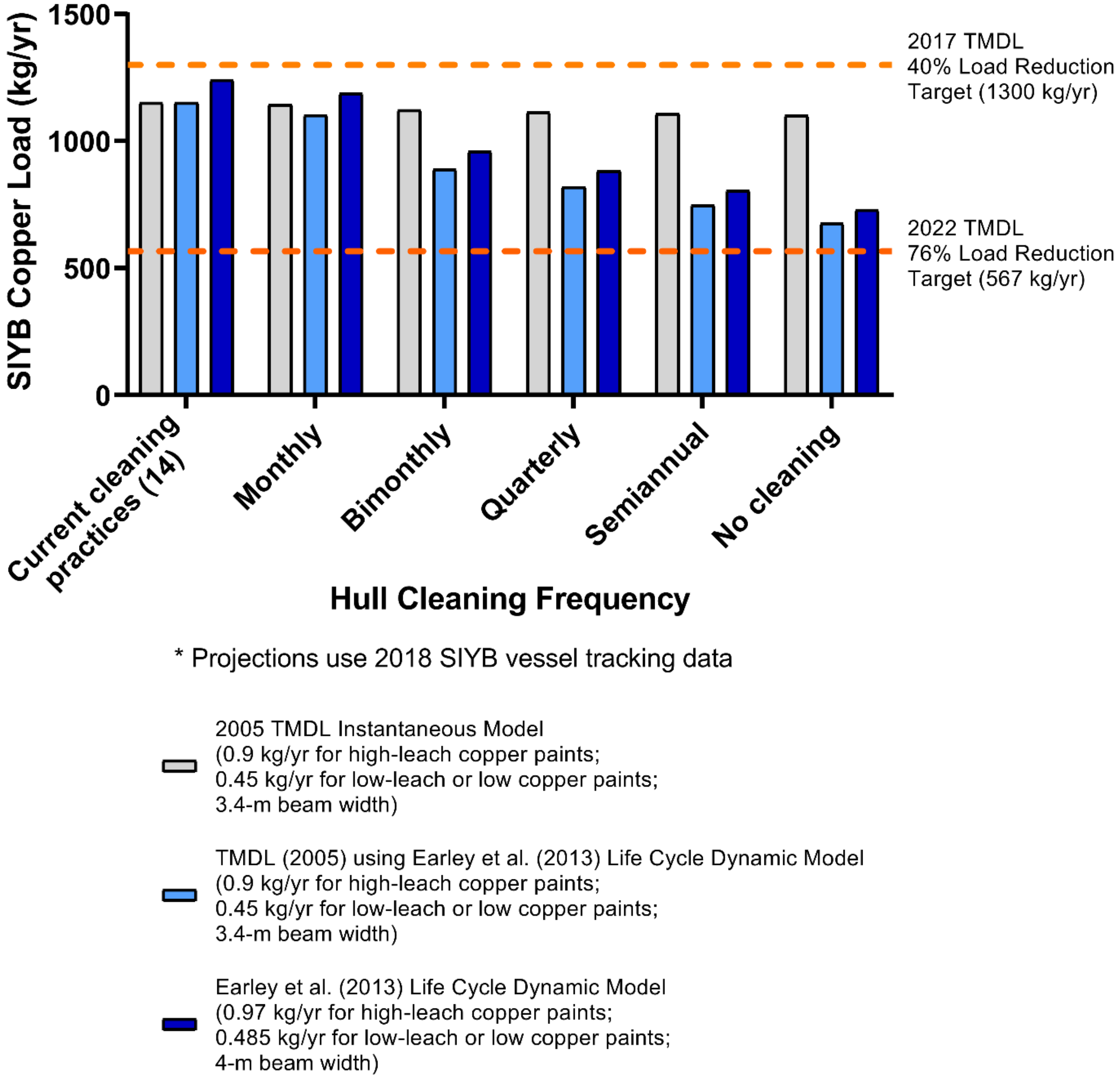
[5] The 2018 SIYB TMDL Annual Report reported 2,214 vessels within SIYB and an average occupancy rate of 88%.

Figure 3-1. Copper Loading Estimates for Different Hull Cleaning Frequencies Using the 2005 TMDL Instantaneous and Life Cycle Dynamic Models*



* Projections use 2018 SIYB vessel tracking data

3.2 Predicting Future Load Scenarios

On July 1, 2018, the DPR's adopted Section 6190 of Title 3, California Code of Regulations (DPR Rule) went into effect. This rule established a maximum allowable copper leach rate for copper-based antifouling paint products registered in California for use on recreational vessels. Assuming full realization of the DPR rule, all vessels in SIYB will be coated with low-leach copper paints (DPR Category I paints) or will have aged copper paint[6], both of which, for purposes of calculating copper loading, contribute a copper load equal to half the load of high-leach copper paints.

For the scenarios presented below, the total annual copper load to SIYB was extrapolated, assuming that all high-leach copper paints were phased out as a result of the fully-realized DPR Rule. As such, these calculations used the half-load copper allocation for each vessel that was accepted by the Regional Board (2013). Calculations were then performed using per-vessel half-loads from each study and the 2018 vessel tracking data (Wood, 2019a), following the same process as described in Section 3.1, above. Copper loading estimates for SIYB after full realization of the DPR Rule are provided in Table 3-3 and depicted in Figure 3-2.

The scenario modeling presented above quantifies (1) the annual copper load to SIYB using the 2005 TMDL Instantaneous Model and Life Cycle Dynamic Model, and (2) the load reduction that could be realized using various hull cleaning frequencies. As indicated in both Figures 3-1 and 3-2, reducing hull cleaning frequency using the Life Cycle Dynamic Model would provide a significant and more realistic copper load reduction compared to the TMDL's static assumptions. In particular, there appears to be a noted inflection point at which a greater reduction would occur with cleaning frequencies of every other month (bimonthly) or less often.

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[6] In the 2012 SIYB Monitoring and Progress Report, the Port recommended using a half-load calculation (0.45 kg/yr) for vessels with aged-copper paint for future loading calculations. This recommendation was based on numerous studies that show copper leaching rates are significantly diminished over the life cycle of hull paints. In a letter dated July 26, 2013, the Regional Board agreed with this concept, and stated, "To more accurately calculate the amount of copper loading to SIYB, allow the assumption that vessels with aged-copper AFPs have a copper release (i.e., leaching or loading) rate similar to low-copper AFPs (0.45 kg/yr) because the research (provided in Appendix E in the 2012 Shelter Island Yacht Basin TMDL Monitoring and Progress Report) indicates copper leach rates degrade over time, particularly after the first 2–3 years after application."

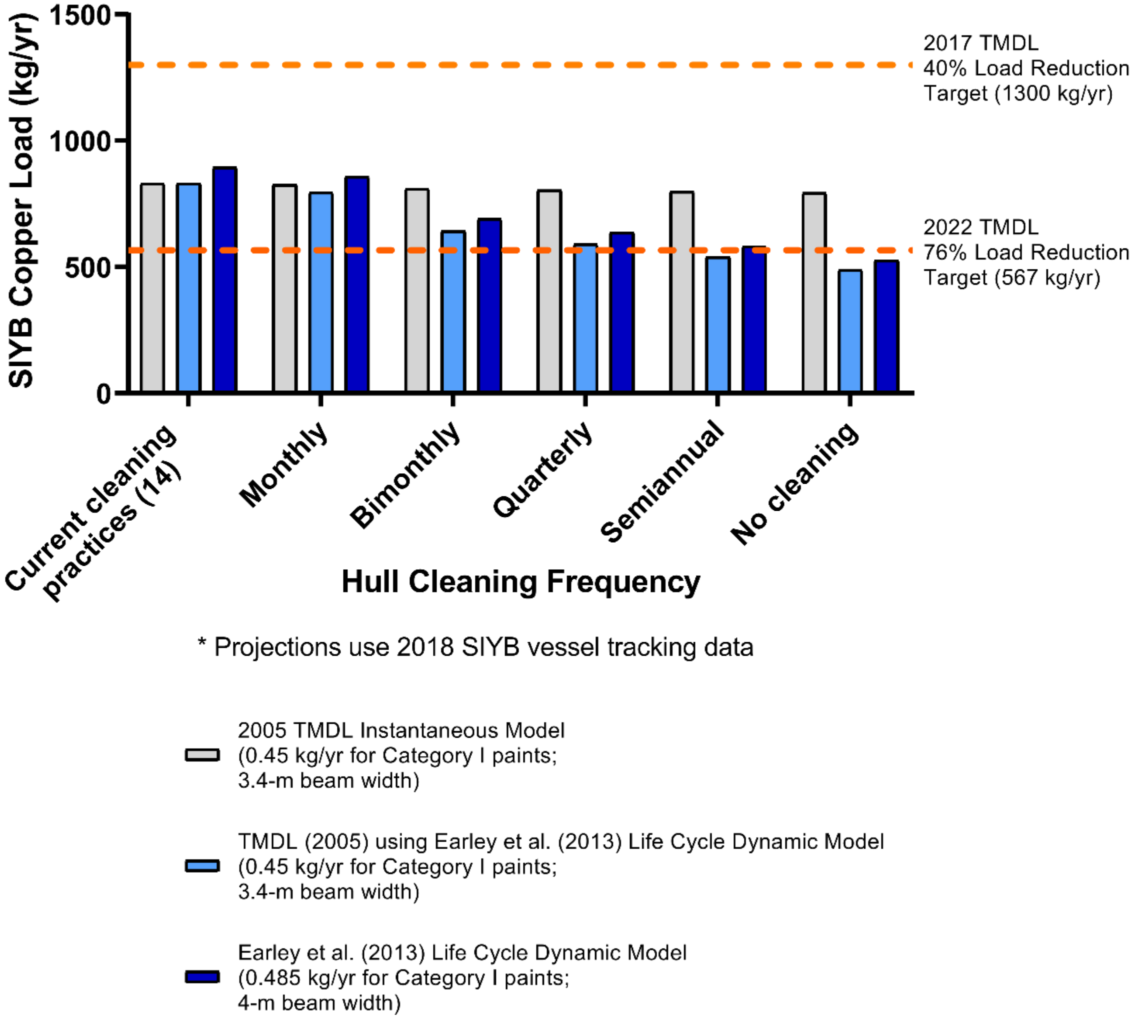
Table 3-3. Copper Loading Estimates for Various Hull Cleaning Frequencies Using TMDL Instantaneous and Life Cycle Dynamic Models after Fully-Realized DPR Rule

Cleaning Frequency	Number of Annual Cleanings	2005 TMDL Instantaneous Model	Life Cycle Dynamic Model	
		TMDL-Accepted Low Leach Load of 0.45 kg/yr**	TMDL-Accepted Low Leach Load of 0.45 kg/yr**	Earley et al. (2013) Low Leach Load of 0.485 kg/yr*
Current BMP cleaning frequency	14	831	831	895
Monthly	12	826	796	857
Bimonthly	6	810	642	692
Quarterly	4	805	591	637
Semiannual	2	799	**540**	582
None	0	794	**489**	**527**

Note:
Projections use 2018 SIYB TMDL vessel tracking data
*Uses an average wetted-hull surface of 41.1 m^2 (Earley et al., 2013).
** Uses an average wetted-hull surface of 35.3 m^2, as described in the TMDL (Regional Board, 2005).
The TMDL requires that copper loads be reduced to an annual load of 567 kilograms per year (kg/yr).
Bold values denote compliance with the TMDL load requirements.

The results also indicate that, by assuming full realization of the DPR Rule and reducing cleaning frequencies to either two cleanings per year or no cleanings per year, when looking at the life cycle of a vessel's copper paint, the 76% copper load reduction required by the TMDL compliance may be achieved (Figure 3-2). Based upon the refined copper load contributions presented in this evaluation, it appears the load reduction that may be realized by changes in hull cleaning frequency would likely have a more substantial reduction than originally anticipated using the TMDL Instantaneous Model, and an update to this model approach is necessary at this time. This finding raises the importance and value of addressing changes in hull cleaning practices as a key strategy to achieve the required load reduction needed to meet the SIYB dissolved copper TMDL final compliance target.

Figure 3-2. Copper Loading Estimates for Various Hull Cleaning Frequencies Using TMDL Instantaneous and Life Cycle Dynamic Models after Fully-Realized DPR Rule*



* Projections use 2018 SIYB vessel tracking data

4.0 Conclusions, Additional Considerations, and Recommendations

This TMDL Conceptual Model Review technical document presents findings to support updates to the SIYB TMDL's Conceptual Model. The 2005 TMDL Instantaneous Model is based on source analysis and other data and information collected prior to 2005 that suggests the primary source of dissolved copper loads discharging to SIYB is associated with boat hulls coated with copper antifouling paints (Regional Board, 2005). The 2005 TMDL Instantaneous Model is static and assumes passive leaching contributes 93% of the total annual copper load directly into the water column with an additional 5% of the total annual copper load discharged during the active phase of in-water hull cleaning of boat hulls coated with copper antifouling paints.

SIYB TMDL-related technical report directives require the TMDL's conceptual model to be updated as SIYB characterization data becomes available (Regional Board, 2005). More recent and best available scientific technical analyses (Earley et al., 2013) support a conceptual model update to account for dynamic shifts in the relative contribution of passive leaching and hull cleaning that represent real-time conditions of annual copper loading in SIYB. Application of the Earley et al., (2013) Life Cycle Dynamic Model findings in SIYB suggest adaptive management measures to vessel hull cleaning frequency and adjustment to implementation practices may lead to copper load reductions and water quality improvements to meet TMDL requirements.

The robust comparative analyses that were completed in this TMDL Conceptual Model Review suggest consistent total and per-vessel annual load results between the 2005 TMDL Instantaneous Model and the Life Cycle Dynamic Model approach. Predicted annual copper loads show a less than 8% variation between the 2005 TMDL Instantaneous Model (1,152 kg/yr) and Life Cycle Dynamic Model (1,241 kg/yr), which is largely attributable to the difference in vessel dimensions used for the two models (i.e. beam width of 3.4 meters and 4.0 meters, respectively). However, the Life Cycle Dynamic Model approach suggests hull cleaning activities contribute greater than 5% of the annual copper loads to SIYB due to increased volatility and dynamic copper release for 30-day periods following hull cleaning activities. Hull cleaning-related loading can range from 5% to more than 40% of annual copper load per vessel in the Life Cycle Dynamic Model. A number of complex environmental processes may influence the copper dissolution rate, bioavailability and toxicity of copper-based antifouling paint in the marine environment. The Life Cycle Dynamic Model best captures these processes, while concurrently providing the best representation of the boating practices and real-time use conditions observed in SIYB and other marina basins.

Shelter Island Yacht Basin is subject to TMDL regulatory compliance requirements to reduce copper loading by 76% from the estimated 2005 loading level by the year 2022. Both the TMDL Instantaneous Model and the Life Cycle Dynamic Model suggest that controls to limit passive leaching and copper contribution from in-water hull cleaning of copper antifouling paint will be needed to meet the final TMDL 567 kg/yr copper load compliance target.

Recent changes by the California DPR establish a maximum allowable copper leach rate for copper antifouling paint products registered in California for use on recreational vessels. Restrictions for registration and sales of copper antifouling paints that exceed the maximum allowable copper leach rate are in place for phased implementation in California over the next few years. This will likely assist in reducing copper loads in SIYB. Additional copper mitigation strategies suggested by DPR such as in-water hull cleaning BMPs and frequency limitations, product label updates, improved boater and boatyard awareness and incentive programs for vessel hull paint conversion are all strategies that could be considered to meet the final TMDL numeric target (Department of Pesticide Regulation, 2014).

The Life Cycle Dynamic Model suggests programmatic in-water hull cleaning implementation adjustments may have a greater benefit than previously calculated as part of the 2005 TMDL Instantaneous Model. Low hull-cleaning frequency (twice per year or less) of copper antifouling paints may reduce SIYB annual copper loading to below the final TMDL target. Given the increased loading attributed to hull cleaning as projected in the Life Cycle Dynamic Model, it is likely that water quality improvement will be observed with step-wise adjustments to hull cleaning frequencies.

Further, while not analyzed as part of this TMDL Conceptual Model Review, it has also been demonstrated that in-water hull cleaning can lead to sediment impacts. Previous reports have identified that a large amount of particle loading of copper occurs and these particles can be deposited on the bay floor, even when in-water hull cleaning follows standard BMP protocols (Wood, 2019b; AMEC Earth & Environmental, 2006). Therefore, adjustments to in-water hull cleaning of copper paints may result in an improvement of both water and sediment quality and could also reduce the potential for copper-related sediment remediation.

Additional feasibility analyses will be needed to determine the operational viability of in-water hull cleaning frequency reductions in SIYB and other adaptive management measures. The Life Cycle Dynamic Model predicts that vessels cleaned outside of SIYB that are re-berthed shortly after a cleaning event may still contribute to copper loading due to increased volatility and dynamic release of bioavailable and toxic free copper ion processes post-cleaning. Further, feasibility studies for implementation of cleaning frequency management strategies are necessary to assess resource needs and enforcement capability.

Ongoing water quality monitoring in SIYB will be necessary to verify effectiveness of DPR Rule implementation, potential hull cleaning frequency reduction management measures, and progress towards final TMDL numeric goals. It is acknowledged that model-driven copper loading estimates may not linearly relate to concurrent changes in copper concentrations in field samples and improvements to water quality in SIYB. Accordingly, ongoing water quality monitoring can assess effectiveness of in-water hull cleaning frequency adjustments and other management measures to attain water quality objectives and meet the final TMDL numeric target.

This TMDL Conceptual Model Review confirms that copper loading is associated with a continuous dissolution of copper antifouling paint and periodic cleaning activities to refresh the paint surface. This finding demonstrates that the recent Life Cycle Dynamic Model and the robust data analyses set forth within that model, provide total load calculations that are consistent with the TMDL and best represent real-time use conditions occurring in marina basins. As such, it stands to reason that the Life Cycle Dynamic Model developed by Earley et al. (2013) is appropriate and should be viewed as a scientifically credible and acceptable approach to update the 2005 TMDL Instantaneous Model.

At this time it is recommended that the SIYB TMDL Model be updated to (1) incorporate the loading assumptions provided in Earley et al. (2013)'s Life Cycle Dynamic Model, and (2) use the Life Cycle Dynamic Model moving forward for annually calculating copper loads for TMDL compliance and reporting purposes.

5.0 Foundational Data Assumptions used in this Analysis

The following assumptions were made when performing calculations in this technical evaluation:

TMDL, 2005

- 50% of the boats painted with epoxy paints, 50% painted with hard vinyl
- Epoxy leaching rate (7.1 µg/cm^2/day) was obtained from U.S. Navy (Valkirs et al., 2003) and Southern California Coastal Water Research Project (SCCWRP) (Schiff et al., 2003) publications
- Vinyl paint leaching rate (5.9 µg/cm^2/day) estimated from the SCCWRP study only
- Average passive leaching rate = (7.1 µg/cm^2/day + 5.9 µg/cm^2/day)/2 = 6.5 µg/cm^2/day (annual load = 1,962 kg/yr)
- Hull cleaning assumed average dissolved copper emissions rate (both types of paint) = 8.5 µg/cm^2/day (annual load = 98.4 kg/yr) (Schiff et al., 2003)
- 14 cleanings per year (21-day/28-day cleaning routine)
- 50% of cleanings use BMPs
- Defines hull cleanings emissions as “instantaneous” one-day events
- Average boat beam width: 3.4 meters
- DPR Category I and low-copper paints assumed to have a half-load copper allocation for each vessel.

Earley et al., 2013

- 100% Epoxy copper paint, 100% BMP hull cleaning, 6.47 µg/cm^2/day back-calculated from 3-year life cycle (7,084 µg/cm^2/3yrs, Table 5 in report)
- BMP practices: soft carpet cleaning, 21-day/28-day cleaning pattern
- Average boat beam width: 4 meters
- DPR Category I and low-copper paints assumed to have a half-load copper allocation for each vessel

6.0 References

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Conceptual Model Review
Wood Project No. 1715100622
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Appendix A

Leach Rate and Copper Load Calculations for the 2005 TMDL Instantaneous Model and Life Cycle Dynamic Model

Appendix Table A-1. Dissolved Copper Load Estimates in Shelter Island Yacht Basin

Parameter / calculation	TMDL, 2005	Earley et al., 2013
PL = passive leach rate	6.5 μg/cm^2/day, estimated from Valkirs *et al*., 2003 & Schiff *et al*., 2003	3.81 μg/cm^2/day[a], Back-calculated from 3 yr life cycle (4,170 μg/cm^2/3yrs, table 5)
IWHC = in-water hull cleaning leach rate	8.5 μg/cm^2/event, estimated from Schiff *et al*., 2003; counted as a 1 day "instantaneous" event, equates to 0.33 μg/cm^2/day assuming 14 cleanings/yr	2.66 μg/cm^2/day[a], back-calculated from 3 yr life cycle (2,914 μg/cm^2/3yrs, table 5)
TL = total average leach rate = (PL + IWHC)	6.83 μg/cm^2/day	6.47 μg/cm^2/day[a], back calculated from 3 yr life cycle (7084 μg/cm^2/3yrs, table 5)
N_v = number of vessels	2,363, maximum number of vessels in SIYB, 100% occupancy assumed	-
L = average boat length	12.2 meters	12.2 meters
B = average beam width	3.4 meters	4 meters
S = wetted-hull surface area = L * B * 0.85	352,580 cm^2	414,800 cm^2 [b]
A_{PL} = annual passive load = (PL * S * N_v * 365 days/yr)/10^9	1,977 kg/yr, rounded to 2,000 kg/yr in TMDL report	1,363 kg/yr [c] 1,159 kg/yr [d]
A_{IWHC} = annual IWHC = (IWHC * S * N_v * 365 days/yr)/10^9	100 kg/yr	952 kg/yr [c] 809 kg/yr [d]
TAL = total annual vessel load = A_{PL} + A_{IWHC}	2,000 kg/yr + 100 kg/yr = 2100 kg Cu/yr	2,315 kg/yr [c] 1,968 kg/yr [d]
TAL_v = Total annual per-vessel dissolved copper load = TAL / N_v = (TL * S * 365 days/yr)/10^9	0.88 kg/yr, rounded to 0.9 kg/yr in TMDL report	0.97 kg/yr [c] 0.83 kg/yr [d]

[a] Assume epoxy-based copper paint and BMP

[b] This value is rounded off. The value used in load estimate calculations in Section 3 above is 410,631 cm^2 (per Earley et al. (2013))

[c] Using TMDL N_v = 2,363 and Earley et al. 2013, Beam width = 4 meters.

[d] Using TMDL N_v = 2,363 and TMDL, Beam width = 3.4 meters.

APPENDIX G

COMMENTS RECEIVED DURING PORT'S IN-WATER HULL CLEANING OUTREACH EFFORTS

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Number	Name	Comment
1	Alec Charters	To Whom It May Concern, I have read the Ordinance 2681, Ordinance Amending San Diego Unified Port District Code Section 4.14, Regulation of Inwater Hull Cleaning. Based on the evidence presented, there does not seem to be enough support that these measures will be effective at limiting the copper contamination. Further, there appears to be limited evidence that this level of copper has had an appreciably negative impact on the marine life. Below I briefly address each of these points. I suspect that regulation and licensing will do little to reduce the copper levels in the bay. There is a contention amongst hull-cleaning divers that infrequently cleaned hulls are not good for the longevity of the bottom paint or for the environmental exposure to the paint. Infrequent cleaning requires more aggressive scrubbing to properly reduce the bio-load on the hull. More frequent cleaning, particularly in the warmer summer months, is needed to keep the bio-load to a level where it can be removed with light cleaning. In addition, it has been reported (Resolution R9-2005-0019) that hull cleaning has very little impact on the copper concentration as a whole when compared to the amount produced by passive leaching of bottom paint. It would be good to have support that reducing the frequency of hull cleaning would have an appreciable impact before added cost and regulation to the boat owners and divers. (continued on next page)

Number	Name	Comment
1	Alec Charters	(continuous from previous page) It seems clear that copper has a toxic effect on many organisms but it is unclear what the existing concentration levels have had on marine life. The reports suggest that the concentration of copper in the bay appears to be stable and is consistent with other heavily populated marinas in California. I was not able to find any specific or recent studies that showed a conclusive and appreciable impact on the marine organism that inhabit the San Diego bay. The 2005 study seemed inconclusive and limited in its findings. The San Francisco study on marine life in the bay concluded that existing copper levels did not appreciably impact the marine organisms. This type of study should be conducted to determine the primary premise that these current levels of copper are reducing the marine organisms in the San Diego bay. If the science supports that copper concentrations are having a defined and appreciable negative impact on the marine life, then I am in favor of regulation that limits and controls the level of human introduced copper into the bay. My assessment of the proposed rule leads me to believe that this will not have much of an impact and will be an undue cost and burden on the boat owners and divers. Thank you for your time and consideration. **Alec Charters**, boat owner, biologist and concerned citizen.

Number	Name	Comment
2	Alicia Gibson	To Whom it may concern: PI have read with dismay the proposed amendment to the Ordinance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, unworkable and costly regulation. It has clearly been drafted by people who have little or no understanding of boating or boat maintenance. I urge you to rather consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. As boaters we support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. Respectfully, Alicia Gibson S/v Good Feel'in Half Moon Marina

Number	Name	Comment
3	Allan & Khris Hobbs	I wish to say that our family absolutely opposes any proposed measures to restrict in water hull cleaning. Allan & Khris Hobbs Point Loma

Number	Name	Comment
4	Allan T Bombard	To Whom it may concern: It's hard to believe that someone would actually submit the proposed amendment to the Ordinance for regulating in-water-hull-cleaning. Clearly, the proposed changes will result in an inflexible, unworkable and costly regulation. The proposal been drafted by non-sailors who have little or no understanding of boating or boat maintenance. It makes far more sense, is a much easier to assess, the option of **site-specific testing** in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. First and foremost, from a scientific basis, this testing should initially be conducted prior to the adoption of the draconian measures in the proposed amendment. This approach to site-specific testing has already been successfully adopted by other waterfront communities, including San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. Thank you for your time and thoughtful consideration. **Allan T Bombard, JN** Past Commander, San Diego Sail & Power Squadron; Colonel, USAF (Ret)

Number	Name	Comment
5	Andrea K. Seddig	To Whom it may concern: I have read with dismay the proposed amendment to the Ordnance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, unworkable and costly regulation. It has clearly been drafted by people who have little or no understanding of boating or boat maintenance. I urge you to consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. As boaters we support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. Andrea K. Seddig SGYC Member

Number	Name	Comment
6	Andrea Lyon	(12/11/2019 Email subject line from Andrew Lyon says:) Proposed hull cleaning rules will result in much greater fuel consumption and resulting air pollution from all boats with engines, power or sail. Perhaps renewed efforts to control pollution from vehicles on streets on which the storm drains run into t...

Number	Name	Comment
7	Anne Eubanks	To Whom it may concern: I have read with much dismay and angst the proposed amendment to the Ordinance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, unworkable and costly regulation. It has clearly been drafted by people who have little or no understanding of boating or boat maintenance. I urge you to rather consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. As boaters we support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing costly regulations that may not be necessary. The Port of San Diego should be a leader in how things are done correctly, not wrong. Anne Eubanks Jeanneau 44DS owner Shelter Island

Number	Name	Comment
8	Baron Sams	Whom it may concern: I have read with dismay the proposed amendment to the Ordnance for regulating in-water-hull-cleaning. This program does not work for me. I have been boating for over 40 years. A well maintain and clean hull leaves a smaller footprint on our ecosystem. Because it requires less abrasive action to keep a boat clean. So the bottom paint last longer. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. Respectfully submitted, Baron Sams Port Captain Silver Gate Yacht Club.

Number	Name	Comment
9	Barry Swartz	Sirs, Restricting the cleaning of boat hulls while in the water is a highly regressive proposition. Most San Diego boat owners are not the wealthy barons that non-boat owners perceive them to be. Forcing boats to be hauled for cleaning not only unfairly ”taxes” boat owners, but is also unnecessary. Modern hull paints in combination with minimalist cleaning techniques now in place have mitigated environmental concerns. Regressive policies such as in-water hull cleaning restriction will negatively effect the local economy, for little to no benefit. Witness the folly of assessing “luxury” taxes on the sale of boats in California in the early eighties whose net affect was to put most California pleasure boat manufacturers out of business. Do not fall prey to the provenly false perception that all boat owners are rich and can absorb any additional costs that are thrown at them. We cannot. Barry Swartz Modest sized boat owner at SWYC

Number	Name	Comment
10	Becky Costello	Whom it may concern: I have read with dismay the proposed amendment to the Ordnance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, unworkable and costly regulation. It has clearly been drafted by people who have little or no understanding of boating or boat maintenance. I urge you to consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. As boaters we support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. Thank You, Becky Costello

Number	Name	Comment
11	Bill Gardner	The new ablative paints are a joke. I have to scrub my boat every 2 1/2 weeks in summer and monthly thereafter. Harbors are not meant to mimic an aquarium. Copper is needed. Do not outlaw it. Do not outlaw cleaning Bill Gardner SWYC

Number	Name	Comment
12	Bill Raschick	(from 12/5/2019 9:23 pm email from Bill Raschick) Let's started with some facts . (1) Bottom paint Leaches out most of its Anti fouling usefulness in two years. After the first two years Bottom Paint is pretty much depleted. (2) Another fact is that: After a bottom painting with a copper based bottom paint ; a plush pile carpet or a white scotch bright pad will only be capable of remove fouling for just 6-months.. After this 6-months period a white scotch bright pad or a plush pile carpet will just not get the job done. Attempting a cleaning with, only these tool, will result in the hull still to be covered with fowling growth At your meeting at Bay Club on the 4th of December. You had multiple divers advising you that using a White Scotch Bright pad or a Plush Pile Carpet (only) will result in boat hull to still be covered with Fouling Sea Growth. Your propose ordnance of only White Scotch Bright Pads or pulse pile Capet is **Flawed** and **Wrong** The Recreational Boating Community will not be served from such an Ordinance. When Coral Growth attaches to a Sail Boats Rudder It will loses staring when Coral Growth attaches to a Power Boats Hull its speed is decreased and it's fuel consumption increases. (continued on next page)

Number	Name	Comment
12	Bill Raschick	(continued from previous page) (from 12/5/2019 9:23 pm email from Bill Raschick) Recommend The Port suit up Phil Barlow and task him with, using a white scotch bright pad , to clean a boat hull with two year old bottom paint. (and) Then get his input about how well or not how well, he was unable to remove the fouling with that White pad. A Memoranda submitted by Bill Raschick an Alpha One diver with years and years of hands on knowledge of cleaning boat hulls in the water (from "Rotary Brush Memo" word document attached to 12/5/2019 1:10 pm email from Bill Raschick) Memo about (The Rotary Brush) Hull Cleaning System The Rotary Brush Is Not A Mechanical Beast operated by a Lazy Diver who does not want to work hard to clean his customers Boat Hull. (continued on next page)

Number	Name	Comment
12	Bill Raschick	(continued from previous page) (from “Rotary Brush Memo” word document attached to 12/5/2019 1:10 pm email from Bill Raschick) If the Rotary Brush was destroying bottom paint; Do you really think us Divers who use The Rotary Brush would intentionally remove Bottom Paint? No, Bottom Paint is a Hull Cleaners friend. Wither cleaning by Hand or Rotary Brush, Divers want That Bottom Paint to last and to keep on Leaching out Copper and to keep Salt Water Fouling off the hulls . Now for what The Rotary Brush is It is a tool that extends the (Useful Working Life) of Bottom Paint. Bottom Painting has caused our Bay to have an over load of dissolved copper Because The Rotary Brush extends the useful working life of Bottom Paint, Less Bottom Paint will need to be applied. Therefor *CLEANING WITH THE ROTARY BRUSH MEANS- LESS -COPPER IS RELEASED INTO OUR BAY* (continued on next page)

Number	Name	Comment
12	Bill Raschick	(continued from previous page) (from “Rotary Brush Memo” word document attached to 12/5/2019 1:10 pm email from Bill Raschick) Did You Know Alpha One Diving cleans more than 10 customers who have not Bottom Painted in over 5-years. That is remarkable because of after 2-years Copper Bottom Pant will have lost most of it’s Copper due leaching/dissolving. With The Rotary Brush We still can get their hulls 100% free of fowling at every cleaning. Did you hear As of July 2019 the only Bottom Paint that will be approve for sale will have a much lower leach rate than the Bottom Paint currently sold. What that means is that Divers using The Rotary Brush can better cope with the weaker Paints than Divers Cleaning Hulls with hand held scrubbers only. With Rotary Brushing. *Boaters and the Environment are better Served* (text from 12/5/2019 1:10 pm email from Bill Raschick) Memo #3 When we were at your resent IWHC work shop at Bay Club (continued on next page)

Number	Name	Comment
12	Bill Raschick	(continued from previous page) (text from 12/5/2019 1:10 pm email from Bill Raschick) Tony Raschick an Alpha One Diver asked one of you managers {why are you, The Port, restricting the use of a Rotary Brush to clean Boats in the water} He was told that::that restriction came from The Department of Pesticide Regulations . I have been fallowing publications & orders from the DPR and I have not seem any order that would restrict the use of a Rotary Brush to clean biocide bottom paint. Am I Mistaken or does such an order exist? Could you please send me send me that quote or where I could look it up myself. Assuming there is no such order from the DPR I will ask the question again. What is the source of your reasoning that a Rotary Brush is harmful to biocide paint? When you open and read the attachment you will be given reasons why every diver should be cleaning with a Rotary Brush. You could say more Brushing means Less copper in the Bay Memo #3 from an experienced & knowledgeable hull cleaner with years and years of Hands On hull cleaning . Bill Raschick an Alpha One Diver (continued on next page)

Number	Name	Comment
12	Bill Raschick	(continued from previous page) (attachment from 12/9/2019 9:33 am from Bill Raschick) Dear Director: Please find attached That Memo stating why Divers should be using a Rotary Brush to clean Sea Fowling from Boat Hulls. It also explains why Boaters and the Environment are better served when Divers use The Rotary Brush to Clean Boat Hulls Sincerely William Raschick (12/10/2019 8:00 am email from Bill Raschick) Good Morning Mr. Vice President The purposed Ordnance directs that the only cleaning tools to be used to remove fouling is a White Scotch Bright Pad or a piece of a Plush Carpet. **I am hull cleaning knowledgeabl**e and have had **Hands On Experience** using these two tools. They will only remove the fouling (after a painting with a biocide bottom pain) for the first 6 months. Bottom paint works because it leaches out its copper and after two years bottom paint is very much depleted and these tools will not remove fouling for the full two years of the useful life if a bottom painting. They be increasingly useless after the first 6-month of a bottom painting. (continued on next page)

Number	Name	Comment
12	Bill Raschick	(continued from previous page) Relying on these two tools to remove growth for the full two years of the useful life of a bottom painting is **A BIG MISTAKE.** The purposed ordnance also prohibits the use of a Rotary Brush on Biocide Paint **ALSO A BIG MSTAKE.** **Every hull cleaner** should be using a Rotary Brush. In the attachment I explain why the boating community and the environment is better served when Hull Cleaners use a Rotary Brush to clean A note from Bill Raschick a Alpha One Diver

Number	Name	Comment
13	Bill Rocco	My name is Bill Rocco: CEO Aquarius Yacht Services and former president and founding member of California Professional Divers Association (CPDA) I have several comments and concerns regarding new IWHC permit proposal. I have read the 2018 Wood and Dudek report as well as the Ken Shiff and Spa-wars reports. The bottom line for me is that the CPDA BMP program was working and when the SDPD created the IWHC permit it negated the effectiveness of Science proven IWHC BMP's, Further the new DPR recommendations go against common sense methods for proper hull cleaning protocols which benefit the boater and the environment, further more the notion that the mechanical brush system should be disallowed contradicts the findings of the Spa-wars study which concluded the soft bristle brush to be less abrasive than the WHITE PAD. The new IWHC recommendations will make it impossible for an experienced diver to clean the hull properly due to the extremely heavy fouling conditions in the Shelter Island Yacht Basin year round. Frequent hull cleaning using the least abrasive cleaning method reduces copper pollution and EXTENDS THE LIFE OF COPPER BASED ANTI-FOULING PAINT. (continued on next page)

Number	Name	Comment
13	Bill Rocco	(continued from previous page) If the intention of the SDPD IWHC permit is to mitigate copper loading and meet the fourth tier of the SIYB TMDL common sense tells me the only way this goal can be achieved is to reduce the number of boat hulls with copper biocide bottom paint. Underwater hull cleaning BMP's will not stop the passive leaching and the 76% copper reduction will not be achieved by 2022. It is also my opinion that requiring San Diego Marinas, Boat yards, Hull Cleaners and Boaters to mitigate elevated copper levels in the Shelter Island Yacht Basin is impossible when the rest of the world is using DPR approved copper biocide paint products. I think our boating community and boating industries as well as our local economy would be better served if our SDPD would take actions with the state and local waterboards to reverse the Copper TMDL reduction program. Sincerely and Respectfully Bill Rocco (text from 12/30/2019 2:10 pm email from Bill Rocco) thanks! correction our goal for voluntary certification was 75% not 95% in region 9 as I recall.

Number	Name	Comment
14	Billy D Sprouse	To Whom it may concern: I have read with dismay the proposed amendment to the Ordnance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, unworkable and costly regulation. It has clearly been drafted by people who have little or no understanding of boating or boat maintenance. It also ignores the seasonality of required cleaning requiring more often cleaning in the summer months due to the rapid growth of organisms because of the warmer water. I urge you to rather consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. As boaters we support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. Regards, Billy D Sprouse

Number	Name	Comment
15	Bob Couzens	12-17-19 To Whom it may concern: I have read with dismay the proposed amendment to the Ordnance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, unworkable and costly regulation. It has clearly been drafted by people who have little or no understanding of boating or boat maintenance. I urge you to rather consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. As boaters we support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. ______________________________ Bob Couzens Silver Gate Yacht Club Member: 1094

Number	Name	Comment
16	Bob Michels	To Whom it may concern: Here we go again. I have read with dismay the proposed amendment to the Ordnance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, unworkable and costly regulation. It has clearly been drafted by people who have little or no understanding of boating or boat maintenance. I urge you to consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. As boaters we support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. Take Care! Bob Michels

Number	Name	Comment
17	Brad Oliver	In speaking to some of my tenants who have never painted their boat hulls, they would like the proposed hull paint decals to also reflect boats who have never been painted. Thank you. Brad Oliver Marina Manager – Safety Director – Lost & Found Humphreys Half Moon Bay Inn – Half Moon Marina

Number	Name	Comment
18	Brent Nielsen	To Whom it may concern: I have read with dismay the proposed amendment to the Ordnance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, unworkable and costly regulation. It has clearly been drafted by people who have little or no understanding of boating or boat maintenance. I urge you to consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. As boaters we support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. Brent Nielsen S/V Zephyr Home Port - San Diego

Number	Name	Comment
19	Brian Downing	To Whom it may concern: I have read with dismay the proposed amendment to the Ordnance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, unworkable and costly regulation that may cause permanent damage to our boat. Most boaters pay to have their boat bottoms cleaned by professional divers. We try to clean the bottom of our boat as infrequently as possible so as to not waste money, or cause prematurely wear off of our antifouling paint. So, naturally we only clean our boat when absolutely needed. Throughout the year, the cleaning frequency may need to be less than once per month depending on many different environmental conditions and the level activity of marine micro-organisms. So, to limit the cleaning to once per month by law or ordinance may have damaging effects to our vessels which may lead to financial liability for the Port of San Diego. I also fail to see how the Port could possible enforce such an ordinance without spending millions of dollars on additional staff and 24/7 inspections around San Diego Bay marinas and moorings. (continued on next page)

Number	Name	Comment
19	Brian Downing	(continued from previous page) Perhaps this proposed amendment has been drafted by people who may not have a detailed and thorough understanding of boating or boat maintenance. I urge you to consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the measures in the proposed amendment. As boaters we support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. I believe this makes for better policy to develop data based on scientific research before developing regulations that may not be necessary, will cause negative financial impact on San Diego boaters, and be unenforceable by the Port of San Diego. Regards, Brian Downing Silver Gate Yacht Club

Number	Name	Comment
20	Bruce King	Hi Port Commissioners.. If no regular hull cleaning goes on... Boats will have to haul out more frequently... Applying more bottom paint. Scraping and killing organisms a plenty. The bottom of my boat... A fiberglass 1979 pGrand Banks 42 was last Hauled out at Driscoll Mission Bay for bottom paint in 2012... That's 7 years. Going on 8.... And I'm not done yet using the paint still on the boat. Still good enough to go another year.. I'm told. . That means Less refuse and paint cans to the landfill..less air pollution from spraying paint around... Less fresh paint killing organisms.... Than annual scrape and paint. My diver comes once a month in winter... Twice a month in summer he cleans my bottom with a rag... He doesn't kill anything.. You need to rethink your consideration of restricting bottom cleaning... It's better than the alternatives. Thanks Bruce King Life member Southwestern YC. San Diego

Number	Name	Comment
21	Carlos Contreras	To Whom it may concern: I have read with dismay the proposed amendment to the Ordnance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, unworkable and costly regulation. It has clearly been drafted by people who have little or no understanding of boating or boat maintenance. I urge you to rather consider the option of Site-Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. As boaters we support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. Thank you Carlos Contreras

Number	Name	Comment
22	Carol More	I am strongly opposed to the proposed restrictions against in-water cleaning of hulls. The proposal would require a hall -out at a boat yard to clean a hull. This is prohibitively expensive.for most boat owners. Additionally, San Diego boat yards are inadequate to meet the need of the proposed legislation. Better to restrict the products used to clean hulls. I think most boaters support requirements that require environmentally friendly cleaning products and would comply restrictions of this nature. Carol More Owner, 38 ft Powerboat San Diego County resident

Number	Name	Comment
23	Charlie & Gloria Knezevich	To Whom it may concern: I have recently read with dismay the proposed amendment to the Ordnance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, unworkable and costly over-regulation. And it clearly appears to have been drafted by people who have little or no understanding of boating or boat maintenance. And I urge you to strongly consider the option of "Site Specific Testing" in the San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. And, as boaters we support Site Specific Testing.This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better sense, and better policy implementation to develop data on an issue before developing regulations that may not be necessary? Charlie & Gloria Knezevich [SGYC]

Number	Name	Comment
24	Carl & Patty Kaiser	Ladies/Gentlemen, I am writing you as a boat owner and operator with our boat moored at the Kona Kai Marina in San Diego. It has come to our attention that there is a movement to regulate or ban the cleaning of boat bottoms in San Diego. Without a harbor-wide study of various specific areas, and each area's level of toxicity to marine life, it seems nonsensical to paint the entire San Diego harbor area as being dangerous to marine life. Additionally, highly regulating or outright banning hull cleaning as it is done presently negatively impacts San Diego in two different ways. First- hundreds of individuals and numerous businesses make a living plying the boat bottom cleaning trade. My guess would be hundreds of thousands of dollars are spent each month within the entirety of San Diego- all of that money goes directly into the local economy. Needlessly regulating, or outright banning, the hull cleaning business would put hundreds of San Diegans out of a job and numerous San Diego businesses would close. The economic impact would be significant. Second- a clean boat bottom is an efficient boat bottom. That translates directly into less gasoline or diesel fuel consumed by boaters, and a cleaner environment enjoyed by all San Diegans. Boat owners should be encouraged to keep their hulls as clean as possible, and applauded when they do. (continued on next page)

Number	Name	Comment
24	Carl & Patty Kaiser	(continued from previous page) Every day that we're on the docks of our marina we see children fishing. They catch fish daily, and even lobster when lobster is in season. There are thousands of boats in the Shelter Island area- almost all of which have their hulls dived, cleaned, and inspected on a regular basis. All of that activity has seemed to have no impact on the marine life that those children pull out all the time. Unless someone can show through a valid study that some area of San Diego has been turned into a marine waste land through the actions of boat bottom divers, my suggestion would be to leave well enough alone. San Diego's harbor areas are clean, teeming with marine life, and invite the kind of water related recreation that a great coastal city takes pride in. Boating is an enormous industry here in San Diego, and no one wants clean water to recreate in more than San Diego boaters. Folks- Don't fix it if it ain't broke. Thank you for listening. Yours, Carl & Patty Kaiser "BABE"- Kona Kai Marina

Number	Name	Comment
25	Chris Kelly	To Whom it may concern: I have read with dismay the proposed amendment to the Ordnance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, unworkable and costly regulation. It has clearly been drafted by people who have little or no understanding of boating or boat maintenance. I urge you to consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. As boaters we support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. Chris Kelly

Number	Name	Comment
26	Cindy Kincer	To Whom it may concern: I have read the proposed amendment to the Ordnance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, and costly regulation. Please consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the extreme measures in the proposed amendment. Boaters support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. It makes for better policy to develop data on an issue before developing regulations that may not be necessary. Sincerely, Cindy Kincer

Number	Name	Comment
27	CJ Floyd	(from 12/13/2019 6:30 pm email from CJ Floyd) To Whom it may concern: I have read with dismay the proposed amendment to the Ordnance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, unworkable and costly regulation. It has clearly been drafted by people who have little or no understanding of boating or boat maintenance. I urge you to consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. As boaters we support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. Member's name CJ Floyd

Number	Name	Comment
28	Clark Hardy	To San Diego Port District: I have read with dismay the proposed amendment to the Ordnance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, unworkable and costly regulation. It has clearly been drafted by people who have little or no understanding of boating or boat maintenance. I urge you to rather consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. As boaters we support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. Clark Hardy

Number	Name	Comment
29	Cleve Hardaker	To Whom it may concern: I have read with dismay the proposed amendment to the Ordnance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, unworkable and costly regulation. It has clearly been drafted by people who have little or no understanding of boating or boat maintenance. I urge you to rather consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. As boaters we support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. Cleve Hardaker Catalina 30 Sailboat Shelter Island

Number	Name	Comment
30	Clint Stiles	To Whom it may concern: I have read with dismay the proposed amendment to the Ordnance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, unworkable and costly regulation. It has clearly been drafted by people who have little or no understanding of boating or boat maintenance. I urge you to consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. As boaters we support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. Clint Stiles

Number	Name	Comment
31	Craig Stephens	To Whom it may concern: I have read with dismay the proposed amendment to the Ordinance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, unworkable and costly regulation. It has clearly been drafted by people who have little or no understanding of boating or boat maintenance. I urge you to rather consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. As boaters we support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. Thank you, Craig Stephens

Number	Name	Comment
32	Dan Olsen	I have been a active California boater for over fifty years. This proposed restriction to not allow hulls to be cleaned in the water is WRONG!!!! It would mean the END of the boating industry in California!!! Please stop this madness before it is too late!!!!!! Dan Olsen San Diego California boater And a California VOTER !!!!!!!!!!!!!!!!! us

Number	Name	Comment
33	Dan Thompson	To Whom it May Concern: I have read with dismay the proposed amendment to the Ordinance for regulating in-water-hullcleaning. The proposed changes will result in an inflexible, unworkable and costly regulation. It has clearly been drafted by people who have little or no understanding of boating or boat maintenance. I urge you to rather consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. As boaters we support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. Dan Thompson

Number	Name	Comment
34	DAVID F. ENDERT, JR.	12/19/2019 To Whom it may concern: I have read with dismay the proposed amendment to the Ordnance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, unworkable and costly regulation. It has clearly been drafted by people who have little or no understanding of boating or boat maintenance. I urge you to rather consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. As boaters we support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. DAVID F. ENDERT, JR.

Number	Name	Comment
35	Dave Simmons	(from 12/11/2019 1:12 pm email from Dave Simmons) Please read the enclosed letter. I was Port Captain when the TMDL was first proposed. We have provn again and again our present hull cleaning is not responsible for healthy water problems. I am sure the port has many mlre important issues and much more than that, your healthy income could be affected when boat owners lose interest because of increased costy measures that do nothing to improve our beautiful bay. I'm sure you re going to see this letter from thers but please read mine-and besides it's prettier than you'll see elewhere. Dave Simmons SGYC # 527 Slip E-20 "Artesano" 43' Hatteras (from “Port Proposal for Unnecessary Regulations” attachment in 12/11/2019 1:12 pm email from Dave Simmons) To Whom it may concern: I have read with dismay the proposed amendment to the Ordnance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, unworkable and costly regulation. It has clearly been drafted by people who have little or no understanding of boating or boat maintenance. (continued on next page)

Number	Name	Comment
35	Dave Simmons	(continued from previous page) I urge you to rather consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. As boaters we support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. Dave Simmons SGYC # 527 Slip E20SGYC Hatteras 43 Doc:576781

Number	Name	Comment
36	David Etonia	If we cannot clean our vessels we will be forced to break the law. Tell us or give us an alternative . Yours, David Etonia SWYC Member for 38 years.

Number	Name	Comment
37	David R. Dixon	To Whom It May Concern: I have read with dismay the proposed amendment to the Ordinance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, unworkable and costly regulation. It has clearly been drafted by people who have little or no understanding of boating or boat maintenance. I urge you to rather consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. As boaters we support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. It is my understanding that the Port of San Diego is considering making changes to the “In water hull bottom cleaning services” companies operational procedures. (continued on next page)

Number	Name	Comment
37	David R. Dixon	(continued from previous page) Having owned numerous watercraft, both fresh water and salt water craft since 1974, and having experienced cleaning the hull bottom myself and having utilized hull cleaning services from several different companies I am very much aware of the process and the issues surrounding same. It is my understanding that the UPD is proposing amendment to the Ordinance for regulating in-water-hull-cleaning wherein those changes will result in an inflexible, unworkable and costly regulation for boaters. The proposed changes are obviously written by those with little or NO boat maintenance experience. Here is what will happen: (continued on next page)

Number	Name	Comment
37	David R. Dixon	(continued from previous page) Currently "In water hull bottom cleaning services" utilize either manually driven or water driven BRUSHES to remove the GROWTH from the bottom paint on the boat hulls. What is removed is the natural growth and organisms common to the waters in San Diego Bay. They are sensitive to the potential of their services removing the bottom paint from the hulls as a result of either aggressive use of the brushes and/or the use of abrasives. It is expensive to have the bottom paint replaced on watercraft, and in particular those watercraft that must be 'hauled' by a boat yard and have said paint replaced by that yard, and as a long time owner, and SCUBA diver, I am sensitive to excessive removal of the bottom paint and the costs associated with replacing same, plus unnecessary pollution that will result from the resulting process. Should these in-water-hull-cleaning companies be driven out of business, the resulting process will be to physically 'haul' the boat out of the water, remove the growth by mechanical sanding and/or scraping by the boat owner or by persons hired by the boat owner, such as a boat yard, which will ALSO remove the bottom paint, which also contains metallic particles. This debris that would be removed, combined with the organisms also removed, will be either intentionally or incidentally find its way into the waters adjacent to where the boat was hauled. (continued on next page)

Number	Name	Comment
37	David R. Dixon	(continued from previous page) This removal process creates pollution to the waters that you are intending to protect! Again, in closing, I urge you to re-evaluate your proposal. Kind regards for a joyous holiday season. David R. Dixon President, Four-D Enterprises, Inc.

Number	Name	Comment
38	David Richards	To Whom it may concern: I have read with dismay the proposed amendment to the Ordnance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, unworkable and costly regulation. It has clearly been drafted by people who have little or no understanding of boating or boat maintenance. I urge you to consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. As boaters we support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. David Richards Fandango owner -- David Richards San Diego, Ca 92109

Number	Name	Comment
39	David Scott	12/18/2019 To Whom it may concern: I have read with dismay the proposed amendment to the Ordnance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, unworkable and costly regulation. It has clearly been drafted by people who have little or no understanding of boating or boat maintenance. I urge you to rather consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. As boaters we support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. David Scott

Number	Name	Comment
40	Dean A. West	To Whom it may concern; Please scrap the extreme idea of banning in-water hull cleaning in any area of San Diego Bay. This is a misguided effort. Recreational boating in the State of California has a greater than $20,000,000,000 annual economic impact to the the state's coffers, and employs tens of thousands of workers. Increasing costs and inconvenience for boaters (resident and transient) in the Port of San Diego, to effect questionable reductions in aquatic copper levels, is only going to drive the boaters elsewhere, and in all likelihood, out of California. In addition, many will choose not to clean regularly, and therefore will burn much more fuel than they normally would, due to significant decreases in efficiency as a result of the drag on the bottom from the growth. This will increase vessel exhaust emissions, as well as the associated costs of lower fuel economy, and lower operational speeds. It will also effectively eliminate sailboat racing on San Diego Bay on boats other than trailerable sailboats, so going forward, picture postcard scenes of colorful sailboats used to hype the Bay economy, are going to be farcical and dated. (continued on next page)

Number	Name	Comment
40	Dean A. West	(continued from previous page) Because of the SDUPD's short-sightedness in not planning for, nor encouraging the construction of significant out-of-water rack boat storage (the newly constructed, small capacity, rack at the old Kettenburg site noted), there are not close-by alternatives for the boaters who wish to have a boat without bottom paint (other than trailer boats). As is true everywhere else in the world there is saltwater, boat and ship bottoms must be cleaned and/or coated with anti marine-growth bottom paints. Therefore, boaters have to have antifouling bottom paint, and they have to get the boat bottoms cleaned. Transient vessels, who call on San Diego for services or just to enjoy the region, contribute huge amounts of revenue to the local economy. These vessels are operated and directed by savvy captains, professional management companies, international charter firms, brokerage firms, and knowledgeable owners. Word of this San Diego-only folly will travel the globe in nanoseconds, and the result will be the by-passing of San Diego by these transient vessels, and the boatyards, service facilities, craftsmen, marinas, brokers, suppliers and purveyors, rental car companies, hotels, restaurants, and fuel docks, among others, will immediately feel the negative result of this extreme dictate. Yet another unintended consequence of radical regulation. (continued on next page)

Number	Name	Comment
40	Dean A. West	(continued from previous page) Please address your efforts elsewhere, this ill-conceived action is going to have a serious negative impact on San Diego's waterfront economy. I would argue that your responsibility is to your tenants, who supply you with the revenues that fund the SDUPD coffers. These revenues enable you to afford your perks and staff, such as those now intent on making life much more costly and restrictive for these very same rent and fee paying tenants. The marine trade industry is going to fight you on this issue. It doesn't have to be this way. Please reconsider this radical regulation. Sincerely, Dean A. West San Diego yacht broker since 1980 Vice-President, California Yacht Brokers Association

Number	Name	Comment
41	Dennis Jackson	To Whom it may concern: I have read with dismay the proposed amendment to the Ordnance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, unworkable and costly regulation. It has clearly been drafted by people who have little or no understanding of boating or boat maintenance. I urge you to rather consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. As boaters we support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. Member's name: Dennis Jackson (continued on next page)

Number	Name	Comment
41	Dennis Jackson	(continued from previous page) P.S.: While I am opposed to the amendments if this is adopted then Section 1.f.1.ii (stickers) should address the specific size, format, wording and durability of said stickers so that they will be uniform among applicators and not deteriorate/fade/fall off during a specific amount of time. Additionally, the requirement for applicators to maintain records of vessels painted is a duplication of requirements already in effect. Such records/information is collected annually by marinas, at least by yacht clubs in SIYB, and forwarded to the Port. Applying this requirement to public marinas (if not already required) would close the loop and provide information that is exclusive to boats within the Ports zone of interest…. Also, the amendment does not exclude materials that the Department of Pesticide Regulation has deemed environmentally safe. Paradise C-30/873 Coronado, CA

Number	Name	Comment
42	Derek Gauger	To whom it may concern - I recently learned that the Port is considering limiting boat bottom cleaning to once per month. This is of great concern to myself and all of my friends who own boats in SD. During the summer months, it is imperative to maintain a bottom cleaning schedule that is more frequent due to the water temperature and the bio organism level present in SD waters which is known as one of the most aggressive towards boat bottoms in the State and perhaps anywhere in the country. Regulation to limit the frequency of bottom cleaning will likely not reduce the amount of copper contaminants in our precious waters for a number of reasons. One, most boats other than racing purpose sailboats, use hard coat bottom paints; racing sailboats typically use ablative paints but certainly not all of them. Most of the boats are not racing sailboats…all power boats and cruising / pleasure sailboats nearly exclusively use hard coat bottom paints because they last longer. However, in the summer months, if the frequency of bottom cleaning was limited to monthly, more aggressive scrubbing and scraping will need to occur to keep the bottoms free of aggressive organisms like the tube worms typical in our waters. This more aggressive cleaning will actually increase the amount of copper released into the water as simple scrubbing will not clean the bottoms and scraping will need to occur which breaks down the hard coat surface of the paint. (continued on next page)

Number	Name	Comment
42	Derek Gauger	(continued from previous page) With regards to dissolved copper content of our waters, a better approach would be to eliminate ablative paints and allow for proper cleaning schedules. Also, since the copper content of bottom paint is regulated in California and is much less than it used to be, my understanding is that the problem is likely a result of years past as opposed to a current problem of additional copper being leached from boat bottoms. Additionally, it's more likely that the more prevalent source of copper is from waste water discharge and storm water drainage into the Bay; I believe this is what was found many years ago in San Francisco Bay. Simple specific site testing of the waters will likely prove this point and would be a more scientific approach to resolve the issue. The SF Bay test resolved this and that was 20 years ago when the copper content in bottom paints was at a much higher content than today's CA approved bottom paints and when ablative style paints were the norm. Another unintended consequence of restricting bottom washing frequency will be far more frequent bottom paint replacement. This only brings more copper into the CA environment and more VOCs into the air as a result. Derek Gauger SD Resident and Boat Owner Kona Kai Marina

Number	Name	Comment
43	Diane Burke	To Whom it may concern: I have read with dismay the proposed amendment to the Ordnance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, unworkable and costly regulation. It has clearly been drafted by people who have little or no understanding of boating or boat maintenance. I urge you to rather consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. As boaters we support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. Diane Burke Jeanneau 44DS Half Moon Marina

Number	Name	Comment
44	Don Laverty	Port of San Diego, I have a 30' sailboat in Shelter Island yacht basin. I clean the bottom myself before every race in the late spring, summer, and fall. In the winter, I don't race, so I clean monthly. The paint on my hull is a hard vinyl paint. I have found that the more often I clean, the less aggressive I have to scrub the paint. It's more of a wipe. I believe the proposed plan to limit cleaning to monthly will not have any effect on copper reduction, because it will require more aggressive scrubbing of the paint on the hull. Sincerely, Don Laverty SWYC

Number	Name	Comment
45	Don Mumby	To Whom it may concern: I have read with dismay the proposed amendment to the Ordnance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, unworkable and costly regulation. It has clearly been drafted by people who have little or no understanding of boating or boat maintenance. I urge you to consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. As boaters we support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. Don Mumby Rear Commodore Silver Gate Yacht Club

Number	Name	Comment
46	Doug Bintliff	Hello, The proposed amendment to the ordinance for regulating in-water hull cleaning is inflexible, unworkable, and costly. It must have been drafted by people with little or no understanding of boating or boat maintenance. Site Specific Testing in San Diego to determine harm to marine organisms is a more effective and workable solution. This approach has successfully been followed in San Francisco, where copper levels were determined to be non-toxic. Certainly it is better policy to develop data on an issue before developing draconian measures that may not be necessary. As a lifelong boater, I support Site Specific Testing, which will protect marine organisms, rather than crippling boating in San Diego Bay. Thank you for your attention. Respectfully, Doug Bintliff

Number	Name	Comment
47	Doug Tyrone	Whom it may concern: I read with dismay the proposed amendment to the Ordinance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, unworkable and costly regulation. The regulation has certainly been drafted by individuals who have little or no understanding of boating or boat maintenance. I urge you to consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being adversely affected. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. As boaters we support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data driven results on an issue before developing regulations that may not be necessary. Respectfully submitted.

Number	Name	Comment
48	Dr. H. P. Schmid	To Whom it may concern: I have read with dismay the proposed amendment to the Ordnance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, unworkable and costly regulation. It has clearly been drafted by people who have little or no understanding of boating or boat maintenance. I urge you to consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. As boaters we support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. H. P. Schmid Member SilverGate Yacht Club

Number	Name	Comment
49	Drew Bernet	To Whom it may concern: I am aware that you are considering an ordinance or amendment to an ordinance which is designed to regulate in-water-hull-cleaning. As always when a seemingly good idea is proposed, there are very often unintended consequences. The proposed ordinance will result in unworkable, costly regulation which ultimately will cause more environmental pollution than the problem you are attempting to solve. Ordinances written by people who have spent little/no understanding or experience of the subject matter, boating and boat maintenance in this instance are likely to create non-sensical unworkable unenforceable regulations. A workable alternative would be a method of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. As has been proven in previous Regional Water Quality Board(RWQB) investigations (and resulting private La Playa scientific testing), broad brush dictates are quickly proven faulty when actual science is applied. Additionally, with currently approved boat bottom paints necessitate more frequent cleaning during warm water months. Not cleaning a dirty bottom increases the drag of the hull as it moves through the water. Thus more power is required to move the boat resulting in more fuel use and release of pollutants into the environment. (continued on next page)

Number	Name	Comment
49	Drew Bernet	(continued form previous page) Scientific testing should be conducted prior to the adoption of the draconian measures in the proposed ordinance. The location of the test points is extremely important. RWQB tests inexplicably favored zones near street drainage pipes. Street runoff carries high levels of brake lining copper dust. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Do scientific and thorough testing BEFORE writing ordinances. Drew Bernet Life long boater and resident of San Diego

Number	Name	Comment
50	Ed Guanill	To Whom it may concern: I have read with dismay the proposed amendment to the Ordnance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, unworkable and costly regulation. It has clearly been drafted by people who have little or no understanding of boating or boat maintenance. I urge you to consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. As boaters we support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. Please see my attached letter. -- Ed Guanill

Number	Name	Comment
51	Edward and Mary Denaci	To Whom it may concern: I have read with dismay the proposed amendment to the Ordnance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, unworkable and costly regulation. It has clearly been drafted by people who have little or no understanding of boating or boat maintenance. I urge you to rather consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. As boaters we support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. Edward and Mary Denaci Grand Banks 36 Powerboat Shelter Island

Number	Name	Comment
52	Edward Denali	Statement to Port of Commission The “copper reduction issue” has become a copper elimination program. An examination of the data posted on the Port of San Diego websites includes the problem Shelter Island Yacht Basin and several marinas that have reported copper, but no data that is current. The Port of San Diego, by making the cleaning of ablative copper bottoms illegal has made the use of ablative copper bottoms on slow boats such as sailboats and many power boats irrational. In a short amount of time, the boat will be unusable due to hard and soft growth. The Port has made the use of hard copper bottoms a problem due to the constraint in the number of times the boat may be cleaned. Frequent cleaning of a hard copper bottom during the hot summer months reduces the need for scraping to remove well developed hard growth. Reduced cleaning intervals causes what the Port seems to want to avoid, and requires more frequent painting. Additionally, forcing a delay of 90 days after painting regardless of the water temperature will simply give the growth a head start. This delay violates the data that is on the Port’s website developed by the Port. This data suggests that newly painted boats should be untouched for up to 90 days except where growth is noted during the cleaning of shafts and propellers. The recommendation was very flexible. Why is this draconian measure being applied to areas outside the one “hot spot”? Where is the requirement? (continued on next page)

Number	Name	Comment
52	Edward Denali	(continued from previous page) That said, why is there even a focus on Shelter Island Yacht Basin. That is a manmade basin deliberately designed to accommodate private and commercial vessels. The bottom is dredged periodically to provide the necessary depth. It is by no stretch of the imagination a nursery for fish.

Number	Name	Comment
53	Ethan Cromwell	Greetings Port of San Diego, I am Ethan Cromwell, owner of Carolina Dive Service and a diver with years of experience with "In Water Hull Cleaning". I have worked in California waters, notably in San Francisco bay and I have experience with the types of marine fouling and marine growth that exist there. I'm writing today to make public comment on a few areas of concern I see with the proposed regulations and I hope that my experience and opinions might lend some insight to all concerned into a few things that I think should be addressed here. I understand the purpose of this proposal is to protect the water-ways and ecosystems in and around the Port of San Diego from excessive copper accumulations from marine based paints as they are released during the actual hull cleaning process. I fully support the idea of protecting our environment and I agree with the premise behind these proposals, however I think there are a few relevant factors that need to be acknowledged before any effective regulations can be put in place. (continued on next page)

Number	Name	Comment
53	Ethan Cromwell	(continued from previous page) Firstly, marine growth can vary considerably from place to place. Limiting hull cleaning to once a month may work in some areas but may not be appropriate in others as barnacles can grow back in a matter of weeks under the right circumstances and many dive services tailor their service schedules for individual boats as needed based on growth history and the boats paint condition and individual needs. Secondly, It's my professional opinion that regulating divers to the use of white pads, microfiber cloth, or soft pile carpet to remove marine fouling (as seen on page 7 of the proposed BMP Standards) will not effectively address cleaning certain common types of hard-growth such as barnacles. As barnacles grow they further adhere to the boats paint and they tend to remove even more paint and potentially release more copper into the water than would be released by using plastic or metal scrapers to remove these barnacles while they are still small. (continued on next page)

Number	Name	Comment
53	Ethan Cromwell	(continued from previous page) I would go as far as to suggest that regularly cleaning a boat using the proper tools (which includes metal scrapers and various abrasive pads) in the hands of an experienced diver will release far less copper into the environment than if we prohibit hull cleaners from actually removing the marine fouling at an early stage in its development, which often is difficult and potentially damaging to the paint without proper scrapers. When boats are serviced regularly they can be kept fairly clean of marine growth. If boats are not serviced regularly barnacle build-up is likely. And if barnacle build-up occurs a metal scraper is one of the best tools I've found to remove them cleanly from a boat, ideally when they are still small and they can be removed with relatively little to no impact to the copper paint. They need to be removed early and often otherwise they will release more copper into the water when they are allowed to fully mature on the surface of the hull where they embed and attach themselves to the paint. (continued on next page)

Number	Name	Comment
53	Ethan Cromwell	(continued from previous page) In conclusion, I agree with the proposals intent to protect the environment but my experience suggests that prohibiting the use of metal/plastic scrapers, certain mechanical tools, and a complete ban on hull cleaning for ablative paints could be counter-productive as the proper tools (metal scrapers and abrasive pads) in the hands of experienced hull cleaners can actually save paint and reduce abrasion and damage to copper based paints when removing hard-growth on a boats hull. I hope my opinions give you something to consider in regards to these proposed regulations. We both share the same desire to protect our environment, and I hope my words lend you deeper insight into this issue. Sincerely, -Ethan Cromwell

Number	Name	Comment
54	Fred Kimmel	Failure to allow in water cleaning will destroy numerous businesses and jobs. Hence less taxes It will lead to paints that are incredibly toxic. It will result in disrespect of law and lawmakers who already viewed with contempt. It is an idea that has never been properly tested. It will discourage boating and kill more jobs and industry. It will lead to lawlessness as people who can dive do there own cleaning. It’s a simple idea that will not solve a complex problem. It will force boaters to move boats to other states. I could think of many more reasons for dismissing this idea but it’s so absurd it’s not worth the effort. FRED R Kimmel Atty at law. Ps. Major litigation.

Number	Name	Comment
55	Gail Davie	To Whom it may concern: I have read with dismay the proposed amendment to the Ordnance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, unworkable and costly regulation. It has clearly been drafted by people who have little or no understanding of boating or boat maintenance. I urge you to consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. As boaters we support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. Gail Davie

Number	Name	Comment
56	Gary L. Kantor	Ladies and gentlemen: I am strongly opposed to any restriction of in water hull cleaning in the San Diego Harbor. I currently have a 22’ boat located at the Southwestern Yacht Club. The cost of removing it regularly for cleaning would preclude such a process, and the inability to keep it clean would be problematic and require more frequent hull painting and refinishing. I would encourage your precluding any such restriction for such recreational vessels. Gary L. kantor,M.D.

Number	Name	Comment
57	Gary Luccio	To Whom it may concern: I have read with dismay the proposed amendment to the Ordnance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, unworkable and costly regulation. It has clearly been drafted by people who have little or no understanding of boating or boat maintenance. I urge you to rather consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. As boaters we support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. Gary Luccio Vessel Owner San Diego Bay

Number	Name	Comment
58	Gary Morris	To Whom it may concern: I have read with dismay the proposed amendment to the Ordnance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, unworkable and costly regulation. It has clearly been drafted by people who have little or no understanding of boating or boat maintenance. I urge you to consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. As boaters we support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. Gary Morris, USCG Licensed Master SV Islero

Number	Name	Comment
59	Gary T. Peterson	(12/10/2019 4:13 pm email from Gary Peterson) To Whom it May Concern: Having attended the last public workshop on December 4, 2019, I cannot believe the Port is ready move forward with a vote to implement the proposed amendment to the Ordinance for regulating in-water-hull cleaning. It was apparent from reading the proposed amendment and from the discussions at the workshop that virtually none of the recommendations and suggestions from the prior public workshop were either considered or taken seriously. The universal reaction from all of the industry experts, marina managers, and boat owners who attended the workshop, is this rush to adopt the proposed amendment will create an enforcement nightmare and expense and probably will not solve the problem. The proposed changes will result in an inflexible, unworkable and costly regulation. It has clearly been drafted by people who have little or no understanding of boating or boat maintenance. I urge you to rather consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. (continued on next page)

Number	Name	Comment
59	Gary T. Peterson	(continued from previous page) As boaters we support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. Gary T. Peterson (12/16/2019 10:12 pm email from Gary Peterson) Thanks Kelly…just hope they'll slow down the process and review alternatives! As an very active boater and member of the Coast Guard Auxiliary, there is no one more than me who wants to improve our bay. However, the proposed changes probably won't work and alternatives need to be studied. We really appreciate the work of the committee and hope as a joined group we can demonstrate to the State that we are working on the issue. I would love to work with the Port on this project and ask that you let me know if there's anything I can assist you with. (continued on next page)

Number	Name	Comment
59	Gary T. Peterson	(continued from previous page) All the best, Gary Gary T. Peterson

Number	Name	Comment
60	George Roland	I am writing to voice my opposition to limiting the hull cleaning of sailboats in San Diego. Having owned, and raced multiple sailboats in San Diego, I am concerned on the impact of this proposed limitation on our sport. Most divers will confirm that frequent hull cleanings on race boat actually make the paint last longer since growth isn't allowed to attach to the hull. This allows frequent cleanings to be less aggressive on the hull paint, making it last longer. Especially in the summer months, with the warm water, limiting hull cleaning to once a month will force racing boats to redo their bottom paint more often, and it will also create an unfair advantage to programs that are able to pay to have their boat hauled out before races to have their bottom cleaned out of the water, getting around this limitation. I propose to exempt sailboats that can show they participate in at least 10 days of racing in San Diego per year. Most boats that race this amount or more most likely have sprayed on, harder bottom paints. This would allow the racers to still clean their hulls more frequently (especially in the warmer water months when racing is more frequent), but limit the vast majority of cruising and recreational boats to the one cleaning/month being proposed. Thank you for your time and for listening to public comments on this issue. George Roland Santa Cruz 37 "Minotaur" SDYC slip A-22

Number	Name	Comment
61	George Woodley	I have carefully read the proposed regulations regarding hull cleaning and find them to be totally unrealistic solutions. I think it would do the port well to query the hull cleaners first before establishing rules that they can not possibly comply with. Plastic scraping will do nothing to solve any problem except taking more time to do the job. Charging for unnecessary permits only enlarges the coffers of the port without achieving any purpose other than to ultimately cost the taxpayer more to have their boat cleaned. Regulating the times a boat can be cleaned each month is very restrictive. There are those who never use their boats and don't need to have them cleaned regularly (or at all.) And there are those who use them regularly and have an extra cleaning done before a long trip so they can save on fuel and consequently emissions. Do you have a plan to share "cleaning credits" between those who never clean their boats and those that clean them 2 or 3 times per month in the summer? And what about this "label" that you plan to put on the boat? Will it be a QRCode? It sounds like, at the moment, it is to be a piece of paper stuck to the side of the boat, like the ones you see in restaurant bathrooms that the diver writes on. Boy, what a fiasco that will turn out to be. Not to mention how it will look stuck to the side of my $20,000 paint job. (continued on next page)

Number	Name	Comment
61	George Woodley	(continued from previous page) The fact is you need to reevaluate the process and proposed regulations if you are really serious about improving water quality in the bay. Educate the yards on how to apply non-copper paints and educate the divers on how to properly care for them. Respectfully submitted, George Woodley Jr. Staff Commodore Silver Gate Yacht Club The following are notes regarding the subject: **The Port's new Bottom Paint & Cleaning regulations need your comments - before 12/23** **Their accelerated schedule calls for the Board to approve on Jan 9, 2020 and become effective on Feb. 8, 2020 - there is no more time.** ****************** **Well, the Port is at it again. It's time for the boat owners to stand up and be counted. I expect we all missed the final "Public Engagement" opportunity which was last held Wednesday 12/4 at the Bay Club. These rules apply to all vessels in the Port, not just Shelter Island Basin.** (continued on next page)

Number	Name	Comment
61	George Woodley	(continued from previous page) Boaters, you still have time to comment before the 12/23 cut-off to the Port at: hullcleaning@portofsandiego.org I suggest that you compose a quick email comment that expresses your concerns. I've noted my four items below, labeled A, B, C, & D. --------------------- **QUICK LINKS TO PORT WEBSITE AND DOCUMENTS** Here is the PowerPoint set of slides that summarize the new regulations. It's easier to read than the 'red-lined' version of the actual regulations: https://pantheonstorage.blob.core.windows.net/environment/December-2-3-4-2019-IWHC-Regulation-Draft-Red-Line-Public-Meeting-FINAL.pdf The following link is the red-line version of the proposed regulations for Bottom Paint and In Water Hull Cleaning (IWHC) https://pantheonstorage.blob.core.windows.net/environment/Redline-Port-of-San-Diego-Proposed-Draft-IWHC-Ordinance-Amendment.pdf (continued on next page)

Number	Name	Comment
61	George Woodley	(continued from previous page) Here is the general website page for this effort by the Port of San Diego: https://www.portofsandiego.org/environment/environmental-protection/copper-reduction-program ---------------------- **MY QUICK READ OF THE REGULATION AND ITS IMPACT** I've copied a segment of the relevant new rules for paint & bottom cleaning - see below. I suggest you look closely at #5, #6 & #7 - **A. Item #5 = We can no longer use ablative bottom paint and do In-Water Hull Cleaning (IWHC), unless you keep (and clean) your boat out of the water.** Ablative paint is soft and principally used on boats that may be stored out of water because hard bottom paints will oxidize and become ineffective. Ablative paints are also used on some sailing hulls because it reduces slimy buildup (but typically not used on high speed, planing boats). (continued on next page)

Number	Name	Comment
61	George Woodley	(continued from previous page) **B. Item #6 = The non-specific description of prohibiting "mechanical means to perform IWHC" may be interpreted as banning the use of mechanical metal scrapers anywhere underwater.** Elsewhere in the document they specifically mention the careful use of plastic scrapers only to be used in the removal of hard growth to avoid damaging the paint. Would this prohibit the use of metal scrapers for cleaning hard growth off metal parts that are not coated with bottom paint? This regulation is not clear enough. I'm certain that my last bottom paint job included painting of rudders, struts and trim tabs which didn't last. My diver (and my own experience) demonstrates that only metal scrapers and wire brushes effectively clear hard growth on the metal parts. The new "Prop Speed" slick coatings also don't last very long on planing boats or those much above trolling speeds. **C. Item #7 = No copper-painted vessel can be cleaned more than once-per-month.** I know that the crusty white worms need to be cleaned off 2x/month in the summer - so we'll be paying for the service but not get the running surface cleaned - only the metal parts - unless #6 entirely prohibits the use of scrapers. I know that we also arranged special cleanings just before long trips - those are not allowed if it would violate the 1x/month restriction. (continued on the next page)

Number	Name	Comment
61	George Woodley	(continued from previous page) **D. Earlier in the new regulations (Page 3), they also require a new sticker be placed on every hull near the VIN number (typically starboard transom area) - it needs to show the make of bottom paint, the date of application and a bunch of other 'stuff'.** I'm sure it will be very attractive too. But, given the sticker has no specific requirements for longevity, these stickers may end up being simple paper tags that quickly age and fall off. Honestly, they should be small, permanent-type stickers that are QR or Bar Codes linked to specific a Port data website where the data is maintained. **Finally, all these certification, training, documentation and equipment requirements on the hull cleaning process will most certainly increase the maintenance price to the recreational and commercial boating community. Fouled hulls and ineffective cleaning will certainly decrease the fuel efficiency of vessels. The impact of recreational vessel bottom paint is still debated, so the environmental value of these efforts is in question. The Port's prior effort to promote alternative paint had been reported to be ineffective for a variety of reasons. There needs to be more time to adequately address the magnitude of this proposed change to an established and long-standing maintenance of hulls.** (continued on next page)

Number	Name	Comment
61	George Woodley	(continued from previous page) ***Excerpt from page 5 of the proposed regulations:*** ----------------- The following prohibitions apply to IWHC, including, as indicated, specific prohibitions applicable to IWHC of any vessel having a Copper-Based Antifouling Paint or Coating: 1. No BusinessPerson, other than an Individual Vessel Owner, shall perform In-Water Hull CleaningIWHC within the District's jurisdiction without first having secured an In-Water Hull Cleaningan IWHC Permit from the District. 2. No Person shall perform IWHC that results in a visible paint plume or cloud. 3. No Person shall perform IWHC in a manner that causes or contributes to a condition of nuisance or water quality impairment. 4. No Person shall perform IWHC in a manner that would violate any applicable law or regulation. **5. No Person shall perform IWHC on a vessel that is painted or coated with Copper-Based Antifouling Paint or Coating identified as an Ablative Paint or Coating.** **6. No Person shall use rotary or mechanical means to perform IWHC on a vessel that is painted or coated with Copper-Based Antifouling Paint or Coating.** **7. No Person shall cause or allow IWHC to be performed on a vessel having a Copper-Based Antifouling Paint or Coating more than once per month per vessel.** (continued on next page)

Number	Name	Comment
61	George Woodley	(continued from previous page) 8. No Person shall perform IWHC for the first ninety (90) days following a new application of a Copper-Based Antifouling Paint or Coating. 9. No Person shall perform IWHC on a vessel having a Copper-Based Antifouling Paint or Coating without complying with the following Best Management Practices:

Number	Name	Comment
62	Gerry Cope	The environment regulates the frequency of bottom cleaning. Tube worms caused significant problems a Summer ago and delayed cleaning could inflict terrible damage to a boat. Don’t over regulate nature

Number	Name	Comment
63	Gregory F Lussky	December 20, 2019 Gregory F Lussky "Cat Paws" Silver Gate Yacht Club 2091 Shelter Island Drive, San Diego, CA 92106 To Whom it may concern: I have read with dismay the proposed amendment to the Ordnance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, unworkable and costly regulation. It has clearly been drafted by people who have little or no understanding of boating or boat maintenance. I urge you to consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. As boaters we support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. Gregory F Lussky

Number	Name	Comment
64	Harman Cadis	To Whom it may concern: I have read with dismay the proposed amendment to the Ordnance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, unworkable and costly regulation. It has clearly been drafted by people who have little or no understanding of boating or boat maintenance. I urge you to rather consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. As boaters we support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. Best Regards, Harman Cadis

Number	Name	Comment
65	Harold O'Neal	To Whom it may concern: I have read with dismay the proposed amendment to the Ordnance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, unworkable and costly regulation. It has clearly been drafted by people who have little or no understanding of boating or boat maintenance. I urge you to consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. As boaters we support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. Harold O'Neal Silver Gate Yacht Club

Number	Name	Comment
66	Harry and Janet Zanville	We will be out-of-state when the public meetings are scheduled and this is our only opportunity to make our comments and pose questions concerning the draft IWHC ordinance. First, I did not see any mention in the ordinance of epoxy bottom paints. We are not technical experts but have more than 40 years experience, world-wide, with our five boats, including substantial experience with bottom paints. We understand that epoxy bottom paint with some cooper content not to be an ablative paint. I cannot discern from the language of the draft ordinance whether the Port proposes to distinguish between ablative and epoxy bottom paints. They are substantially different in our experience. Second, your definitions seem to apply to individual boat owners: not to corporate boat owners. If I am reading your definitions correctly, it raises the question of whether the Port knows that some boats are owner by corporations, partnerships, and government entities. And, if it was intentional, can there be a legitimate basis to exclude all owners from compliance except individuals? We are in favor of uniform application of the law: isn't the Port? Third, there seems to be some inconsistency from section to section about whether ablative an copper based are treated equally and in some cases whether they are treated interchangeability. Does the Port believe it appropriate to clarify those inconsistencies? (continued on next page)

Number	Name	Comment
66	Harry and Janet Zanville	(continued from previous page) Fourth, the limit of once per month for bottom cleaning is inappropriate for racing sailboats whose bottoms are entirely or mostly epoxy based paint with some copper content. Such cleaning is more like a polish process and does not produce the kind of 'clouds' in the water of bottom paint the Port may find unacceptable. The minimum contribution to copper in the water from such minimal cleaning is likely neither has been measured or competently statistically calculated. Perhaps the Port is unaware of the economic impact of the racing community on the local port economy of San Diego. Fifth, we are not involved in the management of our yacht club or any marina. But it seems to us, as experienced business managers, that the burden being proposed on yacht clubs is unreasonable. The Port proposes that each yacht club is to report violations within one business day. Yet yacht club has, like any business, is a collective knowledge: what any one person might 'know', is legally presumed to be known by the entire organization. That is not the real world. It is simple to imagine a boat bottom being cleaned late in an afternoon, noticed by someone low in the organization's org-chart, not reported until a few days later depending on schedule, weather, etc., and not seen by a manager for a few more days depending on their schedules and other vicissitudes. (continued on next page)

Number	Name	Comment
66	Harry and Janet Zanville	(continued from previous page) Sixth, there is a huge variation of knowledge and English-language literacy in the population of bottom bottom cleaners. And holding yacht clubs responsible for perfect communication of definition of tasks, execution of those tasks, monitoring of those tasks, and reporting functions — much less in one business day — is far too much to expect. Perhaps the Port could, with some introspection, ask itself whether it could be held to the same standards. In my experience, the Port would not pass that test. (i.e., the Port response to cruise ship excessive smoke emission usually is met with either indifference or delayed response). Please know that we applaud all reasonable efforts to improve the quality of our water, air, and land. We hope that the Port will approach this with our comments in mind. Feel free to email us to discuss if you'd like. Harry and Janet Zanville S/V Finesse

Number	Name	Comment
67	Ian Storer	To whom it concerns... I am a professional yacht captain, and also a professional sailboat racer. My takes... Fo the cruising boats that I look after I recommend that the hulls be cleaned every 6-8 weeks, so the paint lasts longer, and the loss in sailing performance is barely noticeable, unless you are lined up with a boat with a freshly cleaned bottom. For racing sailboats, where 1/10th of a knot loss in boat speed is just not acceptable then we clean the hull no later than the day before racing, and usually twice a month. As racing boats generally use thinner coats of bottom paint (weight) and are smoother harder paints, there is not much paint lost to the water. 98% of the private vessels in San Diego bay never race ! (continued on next page)

Number	Name	Comment
67	Ian Storer	(continued from previous page) As nearly all brake pads on cars have copper as a major ingredient, even ceramic and 'organic', and the brake pads work by friction, eroding the pads as dust which is lost to the surrounding environment, which is flushed int the local coastal waters at every rainfall, this is the largest source of copper in our local waters. If the storm water run off was caught and processed the way that the boatyards have to do, then there is no point in stopping yachts from hull cleaning. Obviously the Port Authority has no inclination to treat all the runoff Cost would be ($100Millions !??!) so before limiting the infinitesimal gains in water copper content from hull cleaning, they should chase the San Diego City streets department to clean up that act. Also, the US Navy still uses TBT antifouling paint, long since banned for private use. The tin in these paints id many times more toxic than the modern copper paints, and with the dozens of Navy ships in San Diego bay, not to mention the Navy's cleaning and painting operations carried out within the harbor, it looks as if the SDPA is chasing the low hanging fruit here, instead of going after the major sources of the water contaminants... (continued on next page)

Number	Name	Comment
67	Ian Storer	(continued from previous page) Please let me know if my thoughts on this matter carry any weight. A response to the decisions at your up coming meeting would be appreciated. If you send me the details of when tis meeting will take place, I will attend to hear for myself. Thanks for reading my views on this. Sincerely, Ian H. Storer. -- Ian Storer

Number	Name	Comment
68	Ivan Batanov	To Whom it may concern: I have read with dismay the proposed amendment to the Ordinance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, unworkable and costly regulation. It has clearly been drafted by people who have little or no understanding of boating or boat maintenance. I urge you to rather consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. As boaters, we support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. -- Ivan Batanov, MS, MBA PHRF San Diego Fleet Chair

Number	Name	Comment
69	J. Vassos	Further, if boaters don't clean their hulls regularly then there would be additional drag from the marine growth causing eventual damage to their hulls and inefficiencies when motoring about resulting in an increase in fuel consumption. Next, consider the financial impact for the hull cleaning services which would be driven out of business as a result of this foolish ordinance. Additionally, boaters would be forced to have their boat hauled out much more frequently driving up their costs and irritation since the local boat yards cannot accommodate the enormous influx of boaters trying to get their boats in the boat yard for more frequent cleaning. It's bad enough already trying to schedule a haul out. The only upside would be for boat yards who would naturally see their business volume and consequently income increase on the backs of recreational boaters. I suppose this would be a plus for politicians who would likely gain favor and contributions from that sector. In closing, this proposed ordinance is poorly considered, short sighted and inconsiderate of the boating public and business which would be negatively affected. I strongly advise that consideration of this ordinance be abandoned in its totality. Regards, J. Vassos

Number	Name	Comment
70	J.A. Butterfield	12/11/2019 To Whom it may concern: I have read with dismay the proposed amendment to the Ordnance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, unworkable and costly regulation. It has clearly been drafted by people who have little or no understanding of boating or boat maintenance. I urge you to rather consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. As boaters we support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. J.A. Butterfield SGYC

Number	Name	Comment
71	Jackie & Jack Armstrong	To Whom it may Concern: The proposed amendment to the ordinance for regulating hull cleaning is a crippling move. It is obvious that it was drafted by people who do not have a complete understanding of boat maintenance.It is a nitch service and understandable that there is little knowledge, but all the more reason to seek consultants before imposing a draconian regulation. An alternate approach would be to use Site Specific Testing, as was done in San Francisco. As written, this amendment would make it impossible to continue our business and impossible for the boat owners to have their vessels maintained- perhaps resulting in far fewer clients in the marinas and definitely less services providers- if any. We care deeply about the wildlife and water quality. This is not the answer to a problem we are not even sure we have. Please deny this amendment and implement the Site Specific Testing. Depending on the results, rewrite the amendment as appropriate. Sincerely, Jackie & Jack Armstrong owners of Jack's in the Harbor *~cleaning hulls for over 15 years~*

Number	Name	Comment
72	Jacques Naviaux	Dear Port Authority, Please do not restrict hull cleaning in San Diego Bay. Doing so will likely create more environmental issues from more frequent applications of bottom paint to the energy used for haul outs. Thank you for listening to our concerns. Respectfully submitted, Jacques Naviaux Member of Southwestern Yacht Club

Number	Name	Comment
73	James Bailey	I have read the proposed amendment to the Ordinance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, unworkable and costly regulation. It has clearly been drafted by people who have little or no understanding of boating or boat maintenance. I urge you to rather consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. I may have been misinformed, but from what I understand only 3 of over 500 water tests came back with elevated copper levels. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. As boaters we support Site Specific Testing and environmental safety, but feel this decision is irrationally unsupported by the tests that have been conducted. Site specific testing has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. James Bailey

Number	Name	Comment
74	James Schmidt	This proposed law is totally lacking common sense. Hull cleaning should be done on regular basis. Boats over 30ft. would require lifting the boat at a yacht yard which is expensive and time consuming. It would shrink and change yachting in San Diego.for ever. James Schmidt

Number	Name	Comment
75	Janet Jacobs	To whom it may concern, In the water hull cleaning is the only practical way to keep recreational boats in a safe condition. Each time the hull is cleaned growth is removed which if left unchecked can foul equipment and over time degrade the paint on the hull. The divers who perform this service check all of the through hull fittings to make certain they are sound. They also check the zincs which are necessary to keep metal fittings from disintegrating due to salt water erosion. If this regular service is not performed, it can lead to a boat taking on water through one of the many through hull holes should a fitting fail. I have been boating for decades and have always had my boats maintained by a qualified hull cleaning service. Numerous times they have alerted me to zincs needing replacement, hull paint at the end of its life, or a metal fitting needing replacement. Keeping the hull free from marine growth optimizes my boat’s performance in the water and regular maintenance keeps it in a safe condition. Please do not impose impractical regulations banning in the water hull cleaning. Best regards, Janet Jacobs Member Southwestern Yacht Club

Number	Name	Comment
76	Jason Ellis	Dear Sir/Madam, I have reviewed the proposed amendment and unfortunately it causes concern for me keeping a vessel in San Diego Bay, which we have done for several decades. My family and I are staunch supporters of the environment, but we believe that scientific testing as detailed in Site Specific Testing Procedures is the correct way to ensure if there is impact to marine life; not a carte blanch ordinance which will make it nearly impossible to keep the maintenance of a vessel in San Diego. I am not sure how many private vessels reside in San Diego Bay, but looking at the number of marinas and yacht clubs, and then looking at the industry that supports boat/yacht maintenance throughout San Diego County, it is a significant part of our local economy. Instituting regulation that is beyond what is needed, and I recall the once short-lived extra boaters tax, it doesn't just harm boat owners, it impacts the lives of honest hard-working workers that are both in the water diving as well as on the shore performing maintenance, and so many in between including store keepers. Further, there are so many exclusions including those for commercial and military vessels – why is that? Please balance your approach to marine safety with Site Specific testing, and not this one size fits all approach as outlined in the amendment. We definitely appreciate your objective, but it has gone off course. Thank you, Jason Ellis Boat Owner Shelter Island Yacht Basin

Number	Name	Comment
77	Julie and Brook Frank	To Whom it may concern: I have read with dismay the proposed amendment to the Ordnance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, unworkable and costly regulation. It has clearly been drafted by people who have little or no understanding of boating or boat maintenance. I urge you to consider the option of Site-Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. As boaters we support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. Sincerely, Julie and Brook Frank Silver Gate Yacht Club Members Harbor Sailboat Members

Number	Name	Comment
78	Jason Soule	My name is Jason Soule, dive supervisor for Aquarius Yacht Services. I am qualified and certified, in the industry for 8 years cleaning hulls and doing underwater mechanics, teaching and training, and performing quality control. I am writing to comment on the public hearings this Dec. A realistic approach to bottom cleaning can look like this: 0-75 Days- Metal parts only-High spike in copper release Next 16 months- White pad-Copper release levels out Next 16 months- Blue Pad-Copper release declines Next16 months- Brown pad-Copper declines and paint dies This is proven to work effectively on a 15x/year schedule First I would like to address the fact that the subject of copper depletion has not been talked about. As Bottom paint ages with time the active chemicals leach out… so over time the copper output is less, therefore creating an environment more susceptible to growth. In other words the older the paint, the less copper, the more hard growth. More hard growth requires either more frequent cleanings or more aggressive measures. Next… Cleaning once per month. The growth cycle for most of the hard growth that we see (the white worms and the red coral) is such that in the winter 4 weeks is good timing. It allows us to easily remove these growths before they become fixed into the surface, damaging them with scarification and impregnation. (continued on next page)

Number	Name	Comment
78	Jason Soule	(continued from previous page) In the summer months (May-Oct.) because of the rising water temperatures this growth rate accelerates exponentially, forcing us to speed up our schedule to every 3 weeks. This only works out to 3 more cleans per year but it allows hull cleaners to remain gentle, keeping the paint on the boats. A diver should be able to give a properly maintained boat a nice gentle wipe to remove any growth. You don't want a diver to have to aggressively scrub the paint because hard growth has attached. Now about the point source… The best way to effectively lower the TMDL to an acceptable level is to quit allowing so much copper into the water. The copper is there from the paint. Lower the copper level in the paint, the copper levels in the bay go down. If you all lower the levels of copper in the paint, then we , as hullcleaners, will adjust our business accordingly. We do our best to provide a great service for our clients while being as gentle on the environment as possible. We don't have any control over what product our clients cover their hulls with, we just clean them the best we can. I think its important that you understand, the longer we can keep a clients paint rated good, the easier our job is. It truly is in our best interest to keep the paint on the boat in good working order and the way to do that is through proper maintenance in a timely fashion.

Number	Name	Comment
79	Jeb Gray	To Whom It May Concern: I am aware of the proposed restriction for the cleaning of copper bottom boats that is being considered. I ask that you consider tabling this initiative until such time as more information and research into the issue can be accomplished. I am both an avid sailor and a concerned environmentalist. While I most assuredly would like to maintain our beautiful harbor and not impact our sea life, it appears that this restriction may not accomplish this goal while other—less intrusive methods—would. For example, training divers could make a far greater impact on the copper levels than this restriction and this did not appear to be considered. Additionally, while it is alarming that copper levels increased for the first time in a dozen years, it appears that this increase was not specific to any particular yacht basin but rather the levels are unusually increased this year within the Bay as a whole. It may be that other environmental factors have created an unusual occurrence this year, just as we saw unusually warm waters off our coast 18 months ago. Thank you for considering my comments and hopefully agreeing to look into this issue from more than a single perspective. There may be a diverse number of ways to reduce copper levels in our waters that will be more effective than this restriction. Sincerely, Jeb Gray Director Southwestern Yacht Club

Number	Name	Comment
80	Jeff Bates	Sirs, I don't support the proposed amendment to the Ordinance for regulating in-water-hull-cleaning. It would literally make owning my small boat no longer possible; the boat stays in the water 24/7 and so the hull must be cleaned in the water. Instead, why not consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed? As a boater, I would support the Site Specific testing. They did this in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary and that cause drastic consequences for small boat owners, like myself. Thank you for your consideration, Jeff Bates Southwestern Yacht Club Member

Number	Name	Comment
81	Jeff Hamann	Rumor has it that you are planning to restrict in water hull cleaning. Are you crazy? I have my boat cleaned once a month. The cost of pulling the boat out of the water would be astronomical. Please be reasonable. Jeff Hamann/Pelagic Duet

Number	Name	Comment
82	Jeff Herriman	Please communicate my rejection of this action to restrict hull cleaning. New paints, surface preparations and barrier coats. Have contributed to removing contaminating the environment. Marine growth on boat hulls is normal as is removing the growth and composting naturally as it has and always occur in nature. Boaters have taken amazing steps to maintain healthy practices. This type of legislation restricting hull maintenance is ludicrous. Please restrict political grandstanding where it is not needed. Jeff Herriman

Number	Name	Comment
83	Jerry M. Lewis	To whom it may concern, The proposed changes to once a month limit for cleaning boats with copper-based antifouling paints is unacceptable, inflexible and will be costly. I moved to the San Diego area from the San Francisco Bay Area in early 2017 and know that the Bay Area performs Site Specific Testing. It is suspected that the copper levels there are similar to San Diego waters, completely non-toxic. I keep my Catalina 27 boat ***Kudzu 2*** in a slip at Southwestern Yacht Club and race in the Cortez Racing Association and other area races all year long on San Diego Bay and offshore. I have the bottom cleaned twice a month during the summer racing season because a clean bottom is fast! Please do the due diligence and gather data by Site Specific Testing before developing regulations that will result in unnecessary costs! **Do the right thing – site test first before implementing any easy-way-out regulations.** Best regards, Jerry M. Lewis

Number	Name	Comment
84	Jim Bailey	I have read the proposed amendment to the Ordinance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, unworkable and costly regulation. It has clearly been drafted by people who have little or no understanding of boating or boat maintenance. I urge you to rather consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. I may have been misinformed, but from what I understand only 3 of over 500 water tests came back with elevated copper levels. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. As boaters we support Site Specific Testing and environmental safety, but feel this decision is irrationally unsupported by the tests that have been conducted. Site specific testing has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. Jim Bailey

Number	Name	Comment
85	Jodi & Kirby Watson	To Whom it may concern: We have read the proposed amendment to the Ordinance for regulating in-water-hull-cleaning. The proposed changes will result in inflexible, unworkable and costly regulation. There seems to have been little or no understanding of boating or boat maintenance when this new ordinance was written. **For example, if this ordinance passes, we would have to lift our boat out of the water every few weeks - for a 50' foot sailboat, weighing 17 tons, that is not a realistic or workable solution - it would cost us thousands of dollars a year.** We strongly urge you to consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of these measures in the proposed amendment. As boaters, we support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Thank you for approaching this with common sense and science before passing legislation that may be unnecessary. Jodi & Kirby Watson Members of Silver Gate Yacht Club & responsible liveaboard sailboat owners

Number	Name	Comment
86	Joe Cibit	December 23,2019 To Whom it may concern: I have read with dismay the proposed amendment to the Ordnance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, unworkable and costly regulation. It has clearly been drafted by people who have little or no understanding of boating or boat maintenance. I urge you to consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. As boaters we support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. Joe Cibit, Member Silver Gate Yacht Club

Number	Name	Comment
87	Joel C. Henscheid	To Whom it may concern: I have read the proposed amendment to the Ordinance for regulating in-water-hull-cleaning and am very concerned by it. It directly affects me as a boat owner of a boat that currently receives in-water hull cleaning. The proposed changes will result in an inflexible, unworkable and costly regulation. It has clearly been drafted by people who have little or no understanding of boating, or boat maintenance; especially hull cleaning. I urge you to instead consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. As boaters we support Site Specific Testing because it makes sense and is a workable solution. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. Thank you, Joel C. Henscheid San Diego CA.

Number	Name	Comment
88	John Houts	To whom it may concern: I have owned various boats in San Diego harbor for nearly 40 years. All have required in water hull cleaning. I have reviewed the proposed changes for cleaning painted boat bottoms. I have been to your web site. It is immediately apparent that a great deal of time and money has been spent. This is simply ridiculous. The following economic constraints, among others, take care of any issues without further regulations: Boat yards will only apply approved paints. Boat divers will only clean in a way that is safe and economically feasible. No new regulation is required. Boat owners will not tolerate divers who destroy their expensive bottom paint with improper cleaning. All boat owners want their bottom paint to last and do the job of preventing growth. Restricting IWHC is not necessary. IWHC is self restricted. All divers perform the absolute minimum cleaning to protect the paint an indeed all surfaces beneath the boat, metal or otherwise. Boat owners will pay divers for IWHC so that their boats can leave the slip/mooring and move without the drag of growth. Boat owners have IWHC performed so that they can use their boats and protect their investment. If the boat owner is not using the boat for more than a wine bar, the owner will not clean the bottom and the boat will eventually grow to the bottom and not move, no harm no foul. (continued on next page)

Number	Name	Comment
88	John Houts	(continued from previous page) The entire issue needs no further regulation. The Port should not waste money and resources. The individuals who drafted this nonsense are the usual government self sustaining bureaucrats who add nothing of value to our lives in San Diego. John Houts

Number	Name	Comment
89	John Pinto	Dear Port of San Diego, As a 43-year San Diego boater, a veteran of two transpac sails from San Diego to Hawaii, a long-time member of Southwestern Yacht Club, a former biologist at The Salk Institute and a senior citizen living on a fixed budget, I write to ask that you temper plans to impose new restrictions (which will translate into new costs) on recreational boating. Please do what you can to balance commendable efforts to clean up our waterfront with the practical budgetary constraints of middle-class boaters. It would be a shame to inhibit opportunities for the next generation of San Diegans of limited means to enjoy our ocean resources. The smaller boats that we operate --with much smaller environmental footprints--should enjoy some measure of regulatory relief. Warm regards, John Pinto (Member #85 Southwestern Yacht Club / Owner of "Castella")

Number	Name	Comment
90	John R. Donaldson	Dear ladies or gentlemen, I've been the owner of yachts in San Diego for the last quarter-century. I have always been diligent about all aspects of boat sanitation, including keeping my hull free of the scum that engenders fouling. This fouling would greatly increase the boat's resistance to forward motion, thus essentially ruining the pleasure of operating a yacht. This is particularly true of sailboat hulls of the nature of my boat. With respect to power boats, this added resistance to forward motion obviously would cause dramatic increases in the fuel burned when operating the vessel with the coincident increased pollution. Getting the boat hauled to drydock for anti-fouling paint replacement at regular intervals does not eliminate the need for monthly in-water hull cleaning. I urge you to steer clear of any new restriction of in-water hull cleaning of yachts. Very respectfully, John R. Donaldson Southwestern Yacht Club

Number	Name	Comment
91	Judy Mc Kean	To Whom it may concern: I have read with dismay the proposed amendment to the Ordnance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, unworkable and costly regulation. It has clearly been drafted by people who have little or no understanding of boating or boat maintenance. I urge you to consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. As boaters we support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. Judy Mc Kean – Realtor

Number	Name	Comment
92	KATHERINE E. ENDERT	12/19/2019 To Whom it may concern: I have read with dismay the proposed amendment to the Ordnance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, unworkable and costly regulation. It has clearly been drafted by people who have little or no understanding of boating or boat maintenance. I urge you to rather consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. As boaters we support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. KATHERINE E. ENDERT

Number	Name	Comment
93	Keith Ericson	To Whom it may concern: I have read with much dismay and angst the proposed amendment to the Ordinance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, unworkable, and costly regulation. It has clearly been drafted by people who have little or no understanding of boating or maintaining boats. I urge you to rather consider the option of Site Specific Testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. As boaters we support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing costly regulations that may not be necessary. The Port of San Diego should be a leader in how things are done correctly, not wrongly. keith (continued on next page)

Number	Name	Comment
93	Keith Ericson	(continued from previous page) What we must do to combat the greatest threats to our way of life: 1. End our Government's aggressive interventionist Foreign Policy. 2. Radically reduce deficit spending. 3. Reduce the National Debt. 4. Establish a "Manhattan" like project to minimize climate change in conjunction with all nations. Why do we have a two party system? Because the two parties wants us to have a two party system. And it has been leading us and continues to lead us down the road away from liberty, peace, and prosperity. Keith Ericson

Number	Name	Comment
94	Kenneth Kaplan	To Whom It May Concern: I am an environmentalist. However, the proposed hull cleaning restrictions is an odious infringement on me as a recreational boater and without any valid scientific effectiveness on the condition of our precious water. I am strongly opposed it and believe there are many more meaningful ways to positively influence to health of water such as effectively addressing the filthy, and harmful, discharge from the Tijana River. Thank you for your consideration, Kenneth Kaplan

Number	Name	Comment
95	Ken Levi	To Whom it may concern: I have read with dismay the proposed amendment to the Ordnance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, unworkable and costly regulation. It has clearly been drafted by people who have little or no understanding of boating or boat maintenance. I urge you to rather consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. As boaters we support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. Thank you Ken Levi

Number	Name	Comment
96	Larry LaPrade	Are you crazy? There is no way you own a boat. Stop this madness. Why don't you get rid of the navy? LARRY

Number	Name	Comment
97	Larry B. Pascoe	To Whom it may concern: I have read with dismay the proposed amendment to the Ordnance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, unworkable and costly regulation. It has clearly been drafted by people who have little or no understanding of boating or boat maintenance. I urge you to consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. As boaters we support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. Regards, Larry B. Pascoe Member SGYC Owner 36 ft. Sailboat

Number	Name	Comment
98	Lee Sharp	To whom it may concern, Boating is an important part of our San Diego culture. I read that there are approximately 30,000 boats in San Diego county. Many of these boats are in the water at various marinas and the only way to maintain the hull is by having it cleaned regularly. There are no toxic chemicals used in this process, so I do not understand the objection to hull cleaning. Regards, Lee Sharp

Number	Name	Comment
99	Leonard Stepien	(12/8/2019 1:16 pm email from Leonard Stepien) Regarding: BMP Program Provider Contracting BMP provider is highly controversial and should not include any group or individual diver from the current hull cleaning community in the San Diego Port District Area. In the past, there was an attempt by Association to introduce such training and it was rejected by a vast majority of divers. It is a bias and provides a possibility of corruption. Before you make any final decision in that matter, please take it under consideration. BMP Service contractor should not be associated with any current hull cleaning business in San Diego Port District Area. Sincerely, Independent Professional Divers of California (12/23/2019 3:42 pm email from Leonard Stepien) Please be advise that CPDA does not represent diving companies/ services as it claims on the list provided to the Port of San Diego. Independent Professional Divers of California

Number	Name	Comment
100	Lisa and Jim Bailey	Hello, I have been following this along and feel it's time to express my concerns. My family and I strongly agree with environmental protection, especially when it comes to our little piece of heaven here in San Diego. Our primary concern is that this will obviously have a strong economic impact on boaters in Southern California. Bottom painting a boat is not cheap and the harsher you clean a boat hull (sporadic long cleaning times), the more you will have to paint it. This becomes a cycle that can have a strong effect on metals in the water around us. We have researched non copper based paints and we have yet to find a cost efficient substitute. The main concern we have is that we have not seen the scientific data to justify this drastic of government involvement. Our minds can be swayed easily if this data were released and we could understand that samples were taken during various times of current and tidal conditions. Example: What were the exact conditions during high copper levels? Were measurements taken after the next current change? Is how deep were samples taken? Was there a specific location that had greater impact and the data behind the tests of those areas? We absolutely agree that divers have a major impact on this (and we have seen way too many divers that have no idea of how to properly clean a boat hull (use of steel wool, metal scrapers, steel and brass brushes). Education before regulation would be our first preferred government involvement. (continued on next page)

Number	Name	Comment
100	Lisa and Jim Bailey	(continued from previous page) Could you all please be transparent and supply the scientific data behind reason of all of this? We fully support clean bay initiatives as long as these are based on scientific studies that support these efforts, but our main concern is that this is another "good idea fairy" call to arms based on less than needed government involvement. There are so many other areas in the bay that need your attention. Just send someone along to look every morning at what the boats moored in Americas Cup Harbor are spilling at night. This also goes for boats throughout the various marinas. Focus should be on preserving our waters from true threats like dumped fuel, oil, varnish and the like. Thank you for your attention to this email and we hope you'll understand the need for proper regulatory efforts based on science and not ideas. Best, Lisa and Jim Bailey

Number	Name	Comment
101	Lou Lepis	I understand there is a bill afoot to restrict "in-water" cleaning of boats. My family and I have been life long boaters in San Diego since 1982, we have used our boat at SWYC for that same amount of time, raising our children on San Diego Bay. In water cleaning is a "necessary" part of monthly boat maintenance, we religiously haul our boat every three years, and have the bottom painted with state-of-the-art, environmentally friendly paint (more costly than regular paint). This would be detrimental to our passion and sport. I urge you to reconsider this policy and consider we are taxpayers in San Diego and have the right to maintain our sailboat (which we have owned for 34 years!) to the high standard we've enjoyed these past three decades. Thank you for your consideration – Lou Lepis (S/V Euphoria) SWYC.

Number	Name	Comment
102	Lynette Byles	(unable to open attachment to 12/14/2019 7:53 pm email from Lyn Byles) Lyn Byles

Number	Name	Comment
103	LYNETTE MARIE SCOTT	12/18/2019 To Whom it may concern: I have read with dismay the proposed amendment to the Ordnance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, unworkable and costly regulation. It has clearly been drafted by people who have little or no understanding of boating or boat maintenance. I urge you to rather consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. As boaters we support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. LYNETTE MARIE SCOTT

Number	Name	Comment
104	Mark Berdan	Your new ordinance to restrict boat bottom cleaning to once per month is unreasonable and foolish. It's one thing to wipe slime off the boat bottom but if you go too long then barnacles and other growth will make cleaning that much harder. People will have to scrub their boats twice which will release even more bad stuff into the water. I encourage you to enact the site specific testing as performed in the SF Bay area to determine whether or not there is even an issue with the current situation causing any undo harm. Thank you, Mark Berdan, CLU, ChFC

Number	Name	Comment
105	Mark Fleming	Port of San Diego, As a boat owner and tax payer in San Diego I would like to comment that restricting the cleaning of growth from the hull of boats to once a month would result in increased boat fuel consumption, damage to hulls, fittings, and transducers, as well as increasing the frequency to apply new bottom paint. I strongly encourage the Port to evaluate other alternatives before enacting a knee jerk ordinance that could result in damage to property, increased fuel use, and the possibility of additional polluting of the bay from an increase in the application of new bottom paint to repair removal of excess growth in summer months. Sent from my iPhone Very respectfully, Mark Fleming

Number	Name	Comment
106	Mark Gold	To Whom it may concern: I have read with dismay the proposed amendment to the Ordnance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, unworkable and costly regulation. It has clearly been drafted by people who have little or no understanding of boating or boat maintenance. I urge you to consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. As boaters we support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. Mark Gold MD

Number	Name	Comment
107	Mark Heine	To whom it may concern, These proposed restrictions are a bad idea. They are a simple solution to a problem which will create more environmental damage than they solve. No boat owner wants to clean their hull more often than necessary, but a dirty hull tremendously adds to fuel burned, and thus impacts the rest of the environment. Small boat owners will increasingly opt to keep their boats out of the water, increasing the amount of times a tow vehicle and trailer will travel back and forth to the water, adding more carbon to the atmosphere and road congestion. There has to be a better way to keep our bays healthy, Mark Heine

Number	Name	Comment
108	Marlan Hoffman	To: San Diego Unified Port District From: Marlan Hoffman, California Professional Divers Association, BMP Chairman Becki Wolters, Director Subject: Port of San Diego In Water Hull Cleaning (IWHC) Permit/Ordinance Proposal **Introduction** The California Professional Divers Association (CPDA) is a non-profit organization formed 1999 in response to the California Non-Point Source Pollution Control Program, Management Measure 4.2e (NPS 1998, MM4.2e). In that State Water Resources Control Board (SWRCB) Manual it stated 95% of the in-water hull cleaning is to be performed by BMP certified divers. The NPS Manual further directed regional implementation beginning in San Diego, Region 9. The CPDA developed in water Best Management Practices (BMP) based on that manual and the Clean Water Act (CWA) designing a comprehensive BMP program to educate and promote clean water activities in the State of California. The CPDA through its program provides a standard to the professional diving community in which all services performed underwater are unified in the same practices. The primary goal of this education is the reduction or elimination of toxic chemicals and to reduce discharges from hull cleaning activities on antifouling bottom paints. (continued on next page)

Number	Name	Comment
108	Marlan Hoffman	(continued from previous page) In the last two decades the CPDA has trained over 500 divers and currently teaches its science backed BMPs for Los Angeles County Beaches and Harbors, City of Santa Barbara and in the San Francisco Bay Area. **Background and Timeline:** January 2000 to 2012 the CPDA held BMP classes that trained and certified over 200 divers in San Diego. Marinas and Hull Cleaners voluntarily participated in these classes. Copper levels in Shelter Island Basin were reduced to 5ug/L during that period. In November 2011 the San Diego Unified Port District (SDUPD) In Water Hull Cleaning (IWHC) ordinance went into effect. The IWHC Permit program was meant to achieve compliance with regulatory requirements to reduce copper in the bay and the copper impaired Shelter Island Yacht Basin. During this period no CPDA BMP training was held in San Diego because divers only participated in the SDUPD IWHC mandatory program. A major component of the SDUPD program was the hull cleaning companies would train their own hull cleaners in BMPs. Unfortunately, the individual company BMP approach did not work, Copper Levels rose and are currently above 6ug/L. (continued on next page)

Number	Name	Comment
108	Marlan Hoffman	(continued from previous page) In 2012, a study to assess the Shelter Island TMDL was conducted in order to identify copper (leaching and hull cleaning) contributions and formulate a copper reduction plan in Shelter Island Yacht Basin. In that study (Earley 2013) it was determined that using the CPDA BMPs over non BMPs reduced dissolved copper contributions by more than seventy percent (1.77ug cm2 **vs** 6.6ug cm2) and particulate copper by more than eighty percent (10.4ug cm2 **vs** 66.6ug cm2) coming from hull cleaning activities. On July 1st, 2018 the California Department of Pesticides Regulations (DPR) mandated reformulations of Antifouling Bottom Paints to reduce the bottom paints copper leach rate discharge. The new lower leach rates were promulgated to slow the amount of copper coming into the water column from passive leaching. The SDUPD adopted the use and application of the DPRs Category I paints with <9.5ug/cm2/day. There are 81 bottom paints on that list available for use. December 2019: SDUPD IWHC permit is temporally suspended until a new program can be implemented. Divers are operating off old permit. No new permits are currently being issued. (continued on next page)

Number	Name	Comment
108	Marlan Hoffman	(continued from previous page) **San Diego Unified Port Proposed Program** The proposed SDUPD IWHC follows the Department of Pesticides Regulation (DPR) recommendations and drafted language that mandates cleaning boat bottoms no more than 12 times annually with a soft pad (White pad). They (DPR and SDUPD) conclude that the numbered reduction of hull cleaning events with this methodology would mathematically lower the copper levels in the water column. This approach is not appropriate for every bottom paint or with aged paint and is not a proper BMP. Hull Paints will fail prematurely The SDUPD IWHC permit has no standardized BMP training. The issuing of permits without an established criterion that BMPs used would decidedly reduce copper and promote proper boat maintenance is misguided and premature. Without established standardized BMPs, hull cleaners that are less likely to recognize the paints they are working with and thus inadvertently damage paint over time. Considering these factors, dissolved and particulate copper levels will rise The SDUPD IWHC permit does not allow for the increase of HC frequency as the bottom paint ages. (continued on next page)

Number	Name	Comment
108	Marlan Hoffman	(continued from previous page) High Copper Hard Epoxy AF bottom paint leach rates significantly reduce after 6 months. Once the paint reaches a lower leach rate discharge, the practice of cleaning monthly with a white pad is an impractical cleaning strategy. Requiring the AF bottom paint to be cleaned with a white pad without adjusting HC frequency over time is not taking into consideration the age and type of AF bottom paint being used and thus is not a BMP. The proper approach is that on this Bottom paint (Ex: >1 years on Ultra Epoxy AF) divers should increase the HC frequency in lieu of using more aggressive cleaning methods (the use of coarse pads). This produces the minimum amount of copper discharge during the HC event and still lets the AF bottom paint function during its lowest leach rate period. In this scenario, divers can extend the functional lifespan of bottom paints 5 to 6 years. This BMP and HC strategy has the largest effect on reducing copper in the water column over time. (continued on next page)

Number	Name	Comment
108	Marlan Hoffman	(continued from previous page) Hard Epoxy Leaching AF Bottom Paint BMP requires the paint's pores to be clean (removing all marine fouling before its maturation) for the coating to be effective. The proposed SDUPD in water hull cleaning permit will cause premature paint failure, more heavily fouled boats and a likely increase in haul out and bottom paint events. The direct result of this cleaning method is an increase in dissolved copper. The CPDA when researching and writing Best Management Practices found that many factors effect copper discharge. A BMP was determined to extend the life of the bottom paint, reduce copper discharge and promote vessel safety and performance. The SDUPD prohibits HC ablative bottom paints. San Diego Boat Yards bottom paint applications continue to indicate that only the highest copper (Category I) Hard Epoxy Antifouling Bottom Paints are being applied to pleasure craft boats. This use of higher leach rate copper essentially reduces our ability to lower the copper levels in the Shelter Island Yacht Basin. (continued on next page)

Number	Name	Comment
108	Marlan Hoffman	(continued from previous page) The DPR approved (Category I) 81 paints in San Diego. On that list there are numerous lower copper alternatives. Using these lower copper paints and cleaning them properly systematically lowers the source copper and follows a long known accepted practice of pollution prevention. Utilizing a range of lower copper paints allow boatyards, boat owners and divers to employ a range of solutions with proper BMPs. . **Conclusion** The Shelter Island copper TMDL reduction is an enormous undertaking. The SDUPD IWHC program is not likely to achieve the Federal standard of 3.1 ug/L. The science behind proper bottom paint maintenance does not support the SDUPD cleaning methods. In a perfect scenario, the permit would prohibit any further use of new copper bottom in paint Shelter Island Yacht Basin for a period of 2 years while the SDUPD is trying to comply with the TMDL limit. Short of this and because the SDUPD ran an ineffective IWHC program, we now have an incredibly short window in which to achieve results. Oversimplifying the solution down to12 Hull Cleaning events per year is just not a good answer. (continued on next page)

Number	Name	Comment
108	Marlan Hoffman	(continued from previous page) The SDUPD should get in step with all other California Regions and allow all Category I paints including lower copper to be HC and immediately implement the CPDAs science backed BMPs. This will place into use standards that have been proven to produce copper reduction. In those BMPs, it educates participants in recognition (of the polluting source) and then applies practices that reduce the polluting factor to a maximum degree. When dealing with bottom paints, factors vary greatly (Time or Frequency between cleanings, Coating Characteristics and Age, Water Temperature and Condition, Sun Exposure and time of year). All in water hull cleaning BMPs need to address these variances. The SDUPD proposed in water hull cleaning permit does not address these variances. Thank you Marlan Hoffman, BMP Chairman and Becki Wolters, Director California Professional Divers Association

Number	Name	Comment
109	Marty McGee	To Whom it Concerns: I have read with dismay the proposed amendment to the Ordnance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, unworkable and costly regulation. It has clearly been drafted by people who have little or no understanding of boating or boat maintenance. I urge you to consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. As boaters we support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. There are thousands of boaters who will be affected. Before you do this you need to sit down with a significant group of boaters, the boat cleaning industry, and the paint manufacturers. You need to show them credible research that identifies the severity of the problem if science can determine that there is one. Then a long term, cost effective solution should be agreed upon with enough lead time for everyone to make the changes. (continued on next page)

Number	Name	Comment
109	Marty McGee	(continued from previous page) In the meantime why don't you make a plan to deal with all of the boat people on moorings in the bay who flush their toilets every day and night. That is certainly a bigger and more certain mess than copper may be. Those boaters must be made to bring their boat in weekly to do a pump-out and show proof that they did it. They should also be required to have an inspector verify that they have a holding tank, that it is working, and that their overboard toilet discharge has been eliminated. Cleaning up that mess would be a far more impactful improvement to the water quality in the bay. Marty McGee

Number	Name	Comment
110	Marvin Benson	Well said! Common sense should rule....but the beauocrats have a vested interest and habit of ignoring same On Sat, Dec 14, 2019, 12:20 PM John Houts < > wrote: To whom it may concern: I have owned various boats in San Diego harbor for nearly 40 years. All have required in water hull cleaning. I have reviewed the proposed changes for cleaning painted boat bottoms. I have been to your web site. It is immediately apparent that a great deal of time and money has been spent. This is simply ridiculous. The following economic constraints, among others, take care of any issues without further regulations: Boat yards will only apply approved paints. Boat divers will only clean in a way that is safe and economically feasible. No new regulation is required. Boat owners will not tolerate divers who destroy their expensive bottom paint with improper cleaning. All boat owners want their bottom paint to last and do the job of preventing growth. Restricting IWHC is not necessary. IWHC is self restricted. All divers perform the absolute minimum cleaning to protect the paint an indeed all surfaces beneath the boat, metal or otherwise. (continued on next page)

Number	Name	Comment
110	Marvin Benson	(continued from previous page) Boat owners will pay divers for IWHC so that their boats can leave the slip/mooring and move without the drag of growth. Boat owners have IWHC performed so that they can use their boats and protect their investment. If the boat owner is not using the boat for more than a wine bar, the owner will not clean the bottom and the boat will eventually grow to the bottom and not move, no harm no foul. The entire issue needs no further regulation. The Port should not waste money and resources. The individuals who drafted this nonsense are the usual government self sustaining bureaucrats who add nothing of value to our lives in San Diego. John Houts

Number	Name	Comment
111	Mary Little	To Whom it may concern: I have read with dismay the proposed amendment to the Ordnance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, unworkable and costly regulation. It has clearly been drafted by people who have little or no understanding of boating or boat maintenance. I urge you to consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. As boaters we support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. Mary Little

Number	Name	Comment
112	Mary and Ralph Salerno	Against this new proposal for limit of hull cleaning. This will kill the industry of boating as we know it. Mary and Ralph Salerno

Number	Name	Comment
113	Matt Schmidt	To the port of San Diego: I have read with dismay the proposed amendment to the Ordinance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, unworkable and **costly regulation.** It has clearly been drafted by people who have little or no understanding of boating or boat maintenance. I urge you to rather consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. As boaters we support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. Thank you for your consideration Matt Schmidt Member of the SWYC Owner of 39' Sailing Vessel

Number	Name	Comment
114	Matthew Peterson	To whom it may concern, Having read the proposed changes to the in-water hull cleaning regulations in the Port of San Diego, I'd like to make a few comments: 1.- Relatively frequent (and therefore) gentle cleanings are better for anti fouling paint and the environment than less frequent, more abrasive cleanings. By mandating a hull cleaning frequency that is significantly less frequent than is now currently employed, boat hulls will become more foul than previously and require more abrasive cleaning tools and techniques to remove this fouling. This absolutely means more paint being removed from the hull. 2.- There is no data that indicates that the in-water cleaning of ablative paints is more polluting than the cleaning of any other type of anti fouling paint. Creating regulations based upon uninformed opinion is a poor way to formulate sound environmental policy. 3.- By mandating which cleaning media can be used, you ensure that some boats will not be properly cleaned because excessively foul boats cannot be cleaned with a white pad etc. This will of course increase those boat's fuel consumption, carbon emissions and likelihood of transporting invasive species to other ports. 4.- There is no data that indicates that properly-used mechanical brush systems remove more paint or otherwise cause more pollution than cleaning by hand. Again, you are suggesting regulations that are based on uniformed opinion. (continued on next page)

Number	Name	Comment
114	Matthew Peterson	(continued from previous page) 5.- The amount of record-keeping and reporting that the amendment proposes is onerous and seemingly unnecessary. Small, one-man operations will likely have difficulty complying. 6.- I suspect that the Port does not have the legal authority to dictate to legitimate, licensed businesses the type of labor they use. I refer specifically to the apparent restriction on the use of independent contractors and I would expect some litigation to ensue should the Port proceed with this. The bottom line that these changes appear to be nothing more than another attempt by Port to give the appearance of trying to reduce copper loading in our waterways rather than a serious attempt at doing that. These proposed changes will not only fail to bring the impaired water bodies into compliance with federal water quality standards, but will cause financial hardship to many hardworking members of the waterfront community and create fewer maintenance option for their customers. I urge you to reconsider these proposed changes. Matthew Peterson FastBottoms Hull Diving California Professional Divers Association California Clean Boating Network

Number	Name	Comment
115	Melisa McCloskey	Restrictions need to be minimal in this area. Not everyone can afford to regularly haul their boats out for cleaning, most hulls are cleaned monthly. If people cannot do that in the water they are likely to forgo resulting in overall poor maintenance. Further, if people cannot maintain their boats they may choose to sell reducing the overall boating industry in San Diego. Melisa McCloskey

Number	Name	Comment
116	Michael Kirchgestner	Whom it may concern: I have read with dismay the proposed amendment to the Ordnance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, unworkable and costly regulation. It has clearly been drafted by people who have little or no understanding of boating or boat maintenance. I urge you to consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. As boaters we support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. Michael Kirchgestner Commodore Point Loma Yacht Club

Number	Name	Comment
117	Michael Ratz	To Whom it may concern: I have read with dismay the proposed amendment to the Ordnance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, unworkable and costly regulation. It has clearly been drafted by people who have little or no understanding of boating or boat maintenance. I urge you to consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. As boaters we support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. Michael Ratz

Number	Name	Comment
118	Mick Laver	To Whom it may concern: I have read with dismay the proposed amendment to the Ordnance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, unworkable and costly regulation. It has clearly been drafted by people who have little or no understanding of boating or boat maintenance. I urge you to consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment.As boaters we support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. Thank you for your consideration, Mick Laver S/V CINNAMON Bay Club Hotel and Marina

Number	Name	Comment
119	Michael Elovitz	To Whom it May Concern: I have read the proposed amendment to the Ordinance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, unworkable and costly regulation. It's obvious the authors have little or no understanding of boating or boat maintenance. I urge you to consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the proposed amendment. As boaters we support a healthy marine environment and Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Doesn't it make more sense to develop data before developing regulations that may prove to be costly and unnecessary? Best Regards, Michael Elovitz, CPMR, CSP President W6EGZ

Number	Name	Comment
120	Mike Pease	Greetings, In the last meeting I met you with Van Johnson before Thanksgiving I had brought along a new and old white pad to show and tell you about the pad, and comparing it to carpet. The white pad was better in performance, how its made, and the ability to clean better than carpet. We also stated that neither the white pad or carpet was good for boats with over 1 year life. This was brought up numerous times at the last Bay Club meeting, and that using these after new paint is over 1 year will not work and contribute more copper to the water. I received an email from Bill Raschick Alpha One Diving going into more detail about this subject. His details on the subject are correct and I agree with them. After hearing all this input from the professionals who do it every day, what are you going to do with this valuable input. This input has not changed since the process has started. What are your plans going forward with what we can use to clean the Hull. Mike Pease Marine Maintenance

Number	Name	Comment
121	Myron C. Lyon	The proposed rules for cleaning hulls will make it impossible to keep hulls clean. If the running surfaces of boat hulls are allowed to accumulate growth, it will require more fuel to be burned by boats with engines, power or sail. This will result in more air pollution. Controlling pollutants from automobile brakes which collect on the streets, and then are washed into the bay would be more effective than allowing boat hulls to be fouled. Thank you, Myron C. Lyon

Number	Name	Comment
122	Nancie Lafferty	To Whom it may concern: I urge you to consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the proposed Regulations. Shelter Island has already drastically reduced its copper load and the proposed regulations are onerous to boaters, divers, boat yards and marina operators for little real purpose. As boaters we support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. Thank you, Nancie Lafferty Silver Gate Yacht Club

Number	Name	Comment
123	Nancy Truesdail	Whom it may concern: I have read with dismay the proposed amendment to the Ordnance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, unworkable and costly regulation. It has clearly been drafted by people who have little or no understanding of boating or boat maintenance. I urge you to consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. As boaters we support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. Sincerely, Nancy Truesdail, B.A., B.S.N., R.N

Number	Name	Comment
124	Nathan Loveland	To Whom it May Concern: I have read with dismay the proposed amendment to the ordinance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, unworkable, and costly regulation that will restrict aspects of the economic eco system that revolves around San Diego maritime community. It has clearly been drafted by policy makers who do not clearly understand the economics of boating or boat maintenance. The Port of San Diego website indicates this is an administrative review. For further understanding there should be scientific research before policy changes. Rather, I urge you to consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. Once the data has been collected and a baseline established, polices can then address the specific results. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment, which will put divers out of work, cause boat owners to use unprecedented means of cleaning hulls, and reduce the amount of boating that takes place on San Diego bay. As boaters we support Site Specific Testing. (continued on next page)

Number	Name	Comment
124	Nathan Loveland	(continued from previous page) This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. How will one ever know the effectiveness of the regulations if baseline data has not been established. The SIYB is any area that suffers from low water change. Tide changes do not adequately flush the waters from the SIYB. The Port of San Diego should spend more time researching ways to allow more flow and water change behind Shelter Island, which will reduce the residual elements left behind by boaters. This will increase the amount of sea life that grows, lives and traverses the SIYB. Nathan Loveland

Number	Name	Comment
125	Paul Hedberg	The proposed Hull Cleaning Ordinance seems to be quite ill-conceived for the following reasons and probably many more. 1. Lack of scientific evidence connecting the process of privately owned boat hull cleaning and the levels of heavy metals in the bay waters. 2. Does this apply to commercial and government vessels? 3. Numerous racing sailboat owners have NO bottom paint on their boats and therefore need to have their boats cleaned weekly. These boats are obviously NOT contributing to any possible heavy metal concentrations anywhere. 4. How was a monthly schedule selected as the appropriate interval? Why not 2, 3, 4, 5, 6 week intervals? Bottom fouling growth is directly related to the water temperatures and nutrient levels which vary throughout the year. So a once monthly fits all schedule seems shortsighted. 5. How will this ordinance possibly be enforced? 6. Will boats be able to travel out to sea or other ports to be cleaned? For these and probably other reasons I believe this ordinance to be short-sighted and ill-conceived waste of public funds. Thank you for considering these issues, -- *Paul*

Number	Name	Comment
126	Paul Hemond	To Whom it may concern: I have read with dismay the proposed amendment to the Ordinance for regulating in-water-hull-cleaning. It has clearly been drafted by people who have little or no understanding of boating or boat maintenance. During this past summer with the ever increasing water temperatures, I was seeing hard coral on my bottom 2 weeks after my diver cleaned my boat's bottom. This was on copper-based paint that was less than 1 year since application. If we are forced to limit cleaning to once per month, not only will boats have extensive growth but, due to the accumulation, delayed cleaning might actually cause damage to the hull surface. The proposed regulation would have a huge detrimental impact to sailboat racing in San Diego. Any boat stored in a wet slip in San Diego would be at a significant disadvantage with an extremely dirty bottom when racing against boats stored on trailers. There would be no reason to race a boat stored in the water if this regulation is implemented. I urge you to consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. (continued on next page)

Number	Name	Comment
126	Paul Hemond	(continued from previous page) Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary and which have a serious impact to the boating public. Sincerely, Paul Hemond Boat Owner

Number	Name	Comment
127	Paul Mitchell	To Whom it may concern: I have read with dismay the proposed amendment to the Ordnance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, unworkable and costly regulation. Already, most boat owners, marinas and maintenance workers are trying their best to keep pollution from bottom paint at a minimum. The proposed rules, while going after the minority of offenders, will put unneeded and unnecessary burdens on yacht clubs, marinas, divers and boat owners. I urge you to consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. As boaters we support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. Paul Mitchell Catalina 36 owner

Number	Name	Comment
128	Paul Scott	If the concern is bay pollution You've got lot of large ships who leach off all types of toxins. The cruise ships running there machinery when in Port, the unmonitored liveaboards pumping overboard at the moorings the port has...just look at the boats some are living and it's obvious they never move to the pump outs or pay for pump outs. Requiring licenses for divers is a good idea... everyone else is rrand insurance for divers that dive on yachts at Marina's should be something the Marina's should mandate as they use their docks After all, they require coverage from the boat owners to pay to slip their boats. Paul Scott

Number	Name	Comment
129	Pax Tisdale	To Whom it may concern: I have read with dismay the proposed amendment to the Ordnance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, unworkable and costly regulation. It has clearly been drafted by people who have little or no understanding of boating or boat maintenance. I urge you to rather consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. As boaters we support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. Pax Tisdale

Number	Name	Comment
130	Phil Kinnison	To Whom it may concern: I have read with dismay the proposed amendment to the Ordnance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, unworkable and costly regulation. It has clearly been drafted by people who have little or no understanding of boating or boat maintenance. I urge you to rather consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. As boaters we support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. Phil Kinnison

Number	Name	Comment
131	R. Taylor Coffroth	To Whom it may concern: I have read with dismay the proposed amendment to the Ordnance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, unworkable and costly regulation. It has clearly been drafted by people who have little or no understanding of boating or boat maintenance. I urge you to consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. As boaters we support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. R. Taylor Coffroth

Number	Name	Comment
132	Randy Ames	I recently attended your public opinion meetings concerning limiting hull cleaning to a once per month maximum. Boatowners need more frequent cleanings to avoid additional applications of copper paint. Frequent gentle cleanings will produce far less impact. Removing large amounts of growth with once monthly cleanings will have a greater impact. This this ordinance may make the situation worse and cause unintended consequences beyond the copper levels. It appears divers will be required to use disposable plastic scrapers. These plastic scrapers will scrape bits of plastic into the ocean as they are softer than metal scrapers. Once they break, they will end up in the land fill. Properly used metal scrapers are more durable and do not dissolve into the ocean. Limiting a diver’s choice of cleaning tools to ineffective options will make proper cleanings impossible. Has the Port done any practice using the proposed methods on boats to see if using carpet and plastic tools can properly clean a hull? During the summer months growth will become thick between cleanings. This thick coating will significantly reduce performance due to drag. Boatowners will use more fossil fuel thereby increasing pollution and global warming. The Port staff present at the meetings failed provide workable alternatives to copper based paints. I spoke with several shipyards only to find there are no viable alternatives to copper-based paint. (continued on next page)

Number	Name	Comment
132	Randy Ames	(continued from previous page) Even if theses unworkable regulations are imposed, there is no clear evidence that these measures will dramatically reduce copper in the bay. It appears most of your toxicity level studies use a Mediterranean mussel species which is not even present in San Diego Bay. Why not do some studies using native plants and animals to determine if current levels are actually a problem? Please review what this measure does to recreational boating in San Diego Bay before rushing to a rash decision. The marine industry provides significant funding to the Port. If these constituents suffer financially Port funding will be greatly reduced. Best Regards, Randy Ames, Small Boat Owner

Number	Name	Comment
133	Rebecca Witters	Please do NOT restrict inwater hull cleaning. This would sure eliminate our family boating. Please Rebecca Witters

Number	Name	Comment
134	R. F. Horton	To Whom it may concern: I have read with dismay the proposed amendment to the Ordnance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, unworkable and costly regulation. It has clearly been drafted by people who appear to have little or no understanding of boat maintenance. I urge you to consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. As sailor and scientist, I support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. R. F. Horton - Stardancer4

Number	Name	Comment
135	Richard Hohol	To the San Diego Port Commissioners: I own a 40 ft sailing vessel berthed in the Shelter Island Yacht Basin. I use the boat regularly and race in the Harbor approximately twice per month. The following are several comments / questions on the proposals: 1. What percentage of the Bay pollutants can be identified as caused by recreational sailors? The issue that many of the commercial, military and transient vessels are exempt from the proposed restrictions does not reduce their contribution to the total Bay pollution. 2. What percentage of the total Bay pollution will be reduced if the restrictions are implemented? The boating community has seen no comprehensive analysis of the total Bay pollution by contributing element and how any changes would, by analysis, change this situation. 3. In line with the previous two items - what is the Commission doing or planning to reduce the contribution to Bay pollution by commercial, military or transient vessels (such as cruise ships)? 4. My understanding is that many of the paints that contribute most to dissolved metals in the water have been either banned or reformulated to reduce these effects. Has this been fully considered by the Commission? 4. With respect to the specific proposals, as I understand them: (continued on next page)

Number	Name	Comment
135	Richard Hohol	(continued from previous page) 4a. Reducing the frequency of hull cleaning beyond what is necessary to control slime and growth is counterproductive. Once growth starts to expand it is necessary to clean the hull more often and more vigorously to avoid a buildup that may damage underwater surfaces and equipment as well as promote peeling of the painted surfaces. 4b. At this time it appears that hull cleaning about every three weeks in the summer months and every four weeks during the rest of the year is sufficient to maintain reasonable hull cleanliness. Once per month, which is not a regular schedule, can reach five weeks some months which will, as noted above, lead to excessive underwater growth between cleanings. 4c. The use of finer grade (white) cleaning pads compared to the medium (green) pads will only increase the amount of time the hull cleaners work on a given boat because to achieve the same level of cleanliness they will have to work on the hulls longer. It will not be acceptable for them to leave boats at some lower level of completion because it will then be necessary to revisit them more often to avoid the issue mentioned in 4a above. (continued on next page)

Number	Name	Comment
135	Richard Hohol	(continued from previous page) 4d. Placing restrictions and documentation requirements on the marine workers will increase their costs significantly and reduce their efficiency so that the costs of hull cleaning paid by the boat owners may increase significantly. Has the Commission estimated the economic effect on the Bay users? Respectfully, Richard Hohol

Number	Name	Comment
136	Richard Krantz	To Whom it may concern: I have read with dismay the proposed amendment to the Ordnance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, unworkable and costly regulation. It has clearly been drafted by people who have little or no understanding of boating or boat maintenance. I urge you to rather consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. As boaters we support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. Richard Krantz Catalina 320 Shelter Island

Number	Name	Comment
137	Rick Pluth	To Whom it may concern: I have read with dismay the proposed amendment to the Ordinance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, unworkable and costly regulation. It has clearly been drafted by people who have little or no understanding of boating or boat maintenance. I urge you to rather consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. As boaters we support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. Rick Pluth

Number	Name	Comment
138	R.L.Watts	This looks like another attack on “rich” boat owners. Please no more restrictions. Boats are actually an enhancement. The small fish love when I clean off the small stuff. I’m 75 and still able to clean my own boat using currently approved practices. Respectfully, R.L.Watts

Number	Name	Comment
139	Ron Roberts	Dear Karen and Kelly: I have been in the business for 40 years and the oldest continuous hull cleaner in San Diego. I have attended both Bay Club meetings and have read the ports responses to the questions. Divers were challenging the 3 month wait after new paint as it will allow hard growth that can only be removed with a scraper. The reason was not explained to you. The hard growth you have been aware of is white tube worm coral. This coral (hard growth) does not grow on antifouling paint unless the paint is old and ineffective. Waiting 3-5 months before cleaning paint was recommended to my customers in the past. What we have been recently dealing with is barnacals. In the past we only had to deal these barnacals when a boat has been in Mexico, however, his has changed. (continued on next page)

Number	Name	Comment
139	Ron Roberts	(continued from previous page) This invasive species is new to divers this year on San Diego only boats and they grow on the newly formulated antifouling paints in less than one month. Even on freshly painted boats, with water temperatures around 70 degrees. Not sure their growth rate in cooler waters-probably will slow as most growth does. Not sure if this problem will get worse in the future. Am sure it needs do be looked into. The boat yards (call Wayne Morrison) and Petit are aware of this problem. Hope this helps. Sincerely, Ron Roberts Star Marine Service.

Number	Name	Comment
140	Robert A. Seddig	To Whom it may concern: I have read with dismay the proposed amendment to the Ordnance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, unworkable and costly regulation. It has clearly been drafted by people who have little or no understanding of boating or boat maintenance. I urge you to consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. As boaters we support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. Robert A. Seddig SGYC Member

Number	Name	Comment
141	Robert Curry	To whom it may concern; Restricting hull cleanings to once monthly will cause serious fouling issues in the summer months. Imposing more restrictions on hull cleaners will not reduce the environmental impact of cleaning. All it will do is artificially drive up the cost of cleaning. Sincerely, Robert Curry San Diego, CA

Number	Name	Comment
142	Robert J. Decesari	To Whom it may concern: I have read with dismay the proposed amendment to the Ordnance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, unworkable and costly regulation. It has clearly been drafted by people who have little or no understanding of boating or boat maintenance. I urge you to consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. As boaters we support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. Sincerely, Robert J. Decesari, Capt.USN (Ret.) Silver Gate Yacht Club Member

Number	Name	Comment
143	Robert Witters	SD Port I have had a boat in the water in San Diego for over 40 years. Banning in water hull cleaning makes no sense at all. I'm all for better paint and techniques but banning in water hull cleaning will kill private boating. Robert Witters

Number	Name	Comment
144	Ron Griffin	To Whom it may concern at the San Diego Port District: I have read with concern the proposed amendment to the Ordnance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, unworkable and costly regulation. It has had to have been drafted by people who have little or no understanding of boating or boat maintenance. I urge you to rather consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. As boaters we support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. This is a terrible, bureaucratic mistake! Ron Griffin 40 year Owner, 43 foot sailboat

Number	Name	Comment
145	Roy Hubecky	To Whom it may concern: I have read with dismay the proposed amendment to the Ordnance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, unworkable and costly regulation. It has clearly been drafted by people who have little or no understanding of boating or boat maintenance. I urge you to consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. As a boater, I support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. Sincerely, Roy Hubecky

Number	Name	Comment
146	Samuel F. Dale	To The Port of San Diego: I have read with dismay the proposed amendment to the Ordnance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, unworkable and costly regulation. It has clearly been drafted by people who have little or no understanding of boating or boat maintenance. I urge you to rather consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. As boaters we support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. Best Regards, Samuel F. Dale

Number	Name	Comment
147	Sandy Hardaker	To whom it may concern: There are probably several thousand boats in San Diego Bay. They range in value from a few thousand dollars up to several million dollars. Owners of these boats have a powerful interest in the proper maintenance of their property in order to preserve the value of their investment. It appears that the Port of San Diego in its wisdom is trying to impose restrictions upon these owners to limit how they determine proper maintenance. This does not sit well with any of us. Boat-owners know their boats and what is needed to care for them. There are many variations in what needs to be done. Please withdraw this awful proposal and allow the divers and owners to take care of their boats as they see fit. Sandy Hardaker

Number	Name	Comment
148	Scott Murdock	Port of San Diego- Just wanted to let you know that adding restrictions to in-water boat hull cleaning would have a major impact on businesses in both San Diego Bay and Mission Bay. Boaters spend millions of dollars in the San Diego economy and are already complying with many strict water pollution regulations. All of us boat owners have a stake in maintaining our bays and waterways. However, if new/cost prohibitive regulations are enacted, you will see reduction in people willing to pay the price for enjoying the waterfront in San Diego. Please do not make changes that will have a significant financial impact on boat owners. The state of California is running people out fast enough without attacking law-abiding boat owners. Thanks for your consideration. Scott Murdock Boat Owner in San Diego for over 20 years.

Number	Name	Comment
149	Sheila Clevenger	To Whom it may concern: I have read with dismay the proposed amendment to the Ordnance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, unworkable and costly regulation. It has clearly been drafted by people who have little or no understanding of boating or boat maintenance. I urge you to consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. As boaters we support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. Sheila Clevenger Member - Silver Gate Yacht Club

Number	Name	Comment
150	Stephen Pepper	I oppose reducing hull cleaning in San Diego bay. Recreational boat owners are always on the environmental hit list and I'm tired of it. How about restricting the commercial boat builders the cruise ships, the fishing fleet and the Nave. Leave us alone. Stephen Pepper

Number	Name	Comment
151	Steve Kincer	To Whom it may concern: I have read the proposed amendment to the Ordnance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, and costly regulation. Please consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the extreme measures in the proposed amendment. Boaters support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. It makes for better policy to develop data on an issue before developing regulations that may not be necessary. Sincerely, Steve Kincer

Number	Name	Comment
152	Stuart Seymour	(12/12/2019 12:10 pm email from Stuart Seymour) I attended the commissioners meeting earlier this week. It seems like the new proposed regulation is not very popular and that non copper based paint doesn't work as intended, I would agree. The hull cleaning limit will drive me back to a more harmful paint. Presently I have had a non biocide paint on my 30 ft sailboat for about 5 yrs. I did this at the in 2014 because I felt it was the right thing to do. I was instructed to get it cleaned every 2 weeks which I have done by going to a monthly cleaning I will have to get a better anti fouling paint. Presently I am not sure what that paint might be but I will look for one that will keep growth off my bottom to limit the cleaning to monthly. Thank you for your consideration Stu Seymour Saoirse SGYC (12/12/2019 12:12 pm email from Stuart Seymour) To Whom it may concern: I have read with dismay the proposed amendment to the Ordnance for regulating in-water-hull-cleaning. (continued on next page)

Number	Name	Comment
152	Stuart Seymour	(continued from previous page) (12/12/2019 12:12 pm email from Stuart Seymour) The proposed changes will result in an inflexible, unworkable and costly regulation. It has clearly been drafted by people who have little or no understanding of boating or boat maintenance. I urge you to consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. As boaters we support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. F Stuart Seymour SGYC

Number	Name	Comment
153	Stuart Klein	To the port of San Diego The proposed amendment to the Ordinance for regulating in-water-hull-cleaning will result in a completely unjust, unnecessary and unworkable regulation. It has clearly been drafted by people who have little or no understanding of bottom maintenance and modern technology available in the field. For example I, as an environmentally conscientious boater use a bottom paint that contains no heave metals at all. Is it fair to forbid me from getting my bottom cleaned in the water? I urge you to rather consider the option of Site Specific testing in San Diego Bay to determine whether marine critters are actually being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. As boaters we support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. Thank you for your consideration. Stuart Klein

Number	Name	Comment
154	Susan Coffroth	To Whom it may concern: I have read with dismay the proposed amendment to the Ordnance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, unworkable and costly regulation. It has clearly been drafted by people who have little or no understanding of boating or boat maintenance. I urge you to rather consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. As boaters we support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. Susan Coffroth SGYC

Number	Name	Comment
155	Terry Endert	See “?” at top of table…

Number	Name	Comment
156	Thomas Taliaferro	To Whom it may concern: I have read with dismay the proposed amendment to the Ordnance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, unworkable and costly regulation. It has clearly been drafted by people who have little or no understanding of boating or boat maintenance. I urge you to rather consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. As boaters we support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. Thomas Taliaferro

Number	Name	Comment
157	TJ Hammons	I'M a recreational boat owner who keeps my 36 foot sailboat in the Shelter Island basin. Having read the proposed amendment to the Ordinance for regulating in-water-hull-cleaning, it appears to me that it will generate an inflexible, unworkable and costly regulation. And was most likely drafted by individuals who have little or no understanding of boating or boat maintenance. There are very few people who are more concerned with the water quality of San Diego Bay than the recreational boat owners who spend the majority of the leisure time on the water. It seems to me that the proposed amendment is a carpet bombing approach when a surgical strike would be more effective and still accomplish the goal of reducing the copper levels in the bay. I urge you to rather consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. As boaters we support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. Sincerely, TJ Hammons Owner, Sailing Vessel *Spirit of Constellation* CAPT, SC, USN, (Ret)

Number	Name	Comment
158	Tom Jacobs	(12/22/2019 email from Tom Jacobs) Ladies and Gentlemen, Some questions regarding the proposed restriction on hull cleaning and restriction on the livelihood of the people that clean bottoms. 1. Please present the science and data behind the need for such a proposal. 2. Please present the technical qualifications of the people proposing this restriction in hull cleaning. 3. Has an economic impact study regarding the reduction in cleaning, the effect on the hull cleaning companies and the employees of these companies been conducted? 4. If this proposal were to go into effect what is the economic negative impact on the local community? 5. What is the cost to the port of San Diego and method of enforcement? 6. Please present the current vs. the proposed 30 day cleaning cycle as a benchmark vs. other harbors and bays in California and other USA coastal regions. 7. Does the proposed 30 day cycle fall within one standard deviation of the other harbors and bays in California and other USA coastal regions? Oysters, other shell fish, bait fish and bottom fish are the canaries of the bay. Study the rocks and rip rap of the bay and you will find the oysters, shell fish, bait fish and bottom fish are thriving. If copper were a problem the aquatic life would not be thriving. (continued on next page)

Number	Name	Comment
158	Tom Jacobs	(continued from previous page) (12/22/2019 email from Tom Jacobs) This looks like a regulation looking for a problem to solve where there is no problem that can be backed up by data or empirical evidence. Please reply with data and answers to my seven questions to my email address. Thank you for the opportunity to comment and question the proposal. When can I expect the data set? Best regards, Tom Jacobs (12/30/2019 email from Tom Jabobs) Hi, As a follow up to the earlier email wanted to stress that most all of the boaters in San Diego Bay want a clean, safe bay for use by all. We all have a mutual interest in continuing make San Diego a great place for our residents and visitors. All of the slip holders on the bay and the transient cruisers tend to be ecologically minded and follow the rules of seamanship, safety and the appropriate registration, state or federal documentation. Two items do need the attention of the Port. (continued on next page)

Number	Name	Comment
158	Tom Jacobs	(continued from previous page) (12/30/2019 email from Tom Jacobs) 1. The police dock pump out dock and fender system has been in disrepair for the past two years. A few fenders are missing, temporary fixes of hanging fenders have been in place for two years. From 2014 to late 2017 the availability and operation of the pump outs was near 100%. In the past year and a half 30% of the time one of the pump outs is not operational. The police dock is one of the main pump out facilities at the south end of the bay. We all need to keep the facility in high operational state and the dock in a state of repair that people will not be reluctant to bring their boat to the pump out facility. 2. Vagabond boats. The bay is home to many vagabond wandering boats that do not have a slip or licensed mooring. These boats are an un policed hazard for the following reasons. A. Illegal discharge of liquid and solid sewage. Undercover of darkness boats anchored in La Playa do discharge waste. We can smell it. B. Most all of the boats do not meet basic USCG safety standards. Many do not meet basic construction standards and are a fire hazard. C. Few of the boats have adequate ground tackle to withstand over 10 knots of wind. Many have broken loose and with no or barely operation engines pose a hazard to boats moored in La Playa on in slips along Shelter Island. (continued on next page)

Number	Name	Comment
158	Tom Jacobs	(continued from previous page) (12/30/2019 email form Tom Jacobs) D. Many of the boats do not have sails or engine power and are towed place to place. Again making them a hazard to navigation. F. Many of the boats, the larger ones have had oil slick trails around them. Most do not practice clean oil free bilge practices as are required by the marinas and yacht clubs in the bay. **Hull Cleaning** One more question regarding the data on hull cleaning. Is there a report that separates copper from boat bottoms and copper from brake dust residue that washes into the bay from the roadways around the bay? Other studies have shown that a contributor to copper in bays has been from roadway run off. Best regards, Tom Jacobs

Number	Name	Comment
159	Tom Mckinney	Being able to clean a boat in the slip and clean it well is an essential part of boat ownership. The dirt, debris and filth on my boat would have fallen in the ocean anyways if the boat wasnt there. The additional use if soap and chemicals is negligible to the bay vs the effect of storm run offs. More over the net environmental effect of repairing damage caused by not being able to adequately clean the boat will outstrip any gains by limiting cleaning options Tom Mckinney

Number	Name	Comment
160	Tony Dileva	To Whom it may concern: I have read with dismay the proposed amendment to the Ordnance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, unworkable and costly regulation. It has clearly been drafted by people who have little or no understanding of boating or boat maintenance. I urge you to rather consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. As boaters we support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary.

Number	Name	Comment
161	Tony Ward	To Whom it may concern As a scientist, I am strongly supportive of protecting the environment. However, I recently read the proposed amendment regarding regulating in-water-hull-cleaning and it frankly is concerning to me on two levels – both as a scientist and as a sailor. First, I would like to think that we can all agree that policy should be based on **relevant** data. From what I read in the 2014 paper where tests were conducted near SPAWAR pier this, while a reasonable study, seems to have been broadly extrapolated based on presumed maintenance frequencies etc. As I read in the public comments there are many divers who see boat bottoms lasting multiple years (3-4) with light touch cleaning. From personal experience I have managed to limit re-painting and hauling to once every 4 years in the near 18 years of boat ownership here – the assumptions of cycle time appear to be overly aggressive to push an agenda. Secondly, I gather from colleagues in the SF bay area that they were able to work through this issue up there by doing site specific testing, which showed that in SF Bay (where the copper levels similar to those identified in SD Bay exist) that those levels were actually determined to be **non-toxic** after doing a thoughtful study. (continued on next page)

Number	Name	Comment
161	Tony Ward	(continued from previous page) As a sailor, the proposed changes are overly onerous/aggressive and appears to have been drafted with limited or no understanding of actual boat maintenance. I am concerned that the end result will be a non-viable and unnecessarily costly regulation which will impact the ability of many to enjoy the bay. It's also reasonable to expect that this be enough an economic disincentive such that small boaters in particular re-consider boat ownership at all. This would knock effect on would negatively impact the entire marine please industry and potentially ultimately cause San Diego some job loss. Something to consider when its time for re-election. Therefore, I urge you to give consideration to doing two things: a) site specific testing here in San Diego Bay to determine the facts on whether marine fauna within the relevant locations are actually being harmed, and b) do a more thorough survey on bottom cleaning habits as the vast majority – from my perspective are not operating on an 18 mo cycle. Then, please do present the data complete with proposals on how best to address those specific problems, based on the site specific data collected, and combined with the relevant community involvement as far as cleaning surveys etc. This would be supportive of taking a policy action. Either independently appears to be based largely on excel calculations and aggressive assumptions. (continued on next page)

Number	Name	Comment
161	Tony Ward	(continued from previouspage) Finally, if action is warranted on the basis of facts fairly collected and presented as above, then I suspect that most boaters will do the right thing. Sincerely, Tony Ward SWYC

Number	Name	Comment
162	Walter Gaines	To whom it may concern: We have been made aware of the proposed amendment to the Ordinance for regulating diver cleaning of boat hulls. If this ordinance is adopted, it will be impossible for boaters to maintain hulls in our marinas. How can we keep our boats in marinas without underwater maintenance? The ordinance prevents the use of "mechanical tools" and the use of cleaning ablative paints. How in the world is this supposed to work? This is totally ridiculous. The ordinance appears to be the product of cubicle occupants who have little or no understanding of boating or boat maintenance. I urge you to consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. We support site-specific testing, and we support collaboration between our marina and environmental authorities. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. Walter Gaines

Number	Name	Comment
163	Warren Goldfarb	To Whom it may concern: I have read with dismay the proposed amendment to the Ordnance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, unworkable and costly regulation. It has clearly been drafted by people who have little or no understanding of boating or boat maintenance. I urge you to consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. As boaters we support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. Sincerely, Warren Goldfarb -- Thanks, Warren Goldfarb

Number	Name	Comment
164	Will Sparks	To Whom it may concern: I have read with dismay the proposed amendment to the Ordinance for regulating in-water-hull-cleaning. The proposed changes will result in an inflexible, unworkable and costly regulation. It has clearly been drafted by people who have little or no understanding of boating or boat maintenance. I urge you to rather consider the option of Site Specific testing in San Diego Bay to determine whether marine organisms that actually reside there are being harmed. This testing should be conducted prior to the adoption of the draconian measures in the proposed amendment. As boaters we support Site Specific Testing. This approach has been followed in San Francisco where copper levels similar to San Diego Bay were determined to be non-toxic. Surely it makes for better policy to develop data on an issue before developing regulations that may not be necessary. Will Sparks

Number	Name	Comment
165	William Morrison III	No/ you crazy

APPENDIX H

RENTUNDER BOATWASH PILOT PROJECT WATER QUALITY MONITORING STUDY - PHASE 1 TECHNICAL MEMORANDUM

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FINAL

RENTUNDER BOATWASH PILOT PROJECT WATER QUALITY MONITORING STUDY

PHASE 1 TECHNICAL MEMORANDUM

Prepared for:
San Diego Unified Port District

Prepared by:
Wood Environment & Infrastructure Solutions, Inc.
9210 Sky Park Court, Suite 200
San Diego, California 92123

June 2019

Wood Project No. 1715100615

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ACRONYMS AND ABBREVIATIONS

AFP	antifoulant paint
Amec Foster Wheeler	Amec Foster Wheeler Environment & Infrastructure, Inc.
BEI	Blue Economy Incubator
BMP	best management practice
Boatwash	Rentunder Drive-In Boatwash
Boatwash Pilot Study	Rentunder Drive-In Boatwash Water Quality Monitoring Study
COC	chain-of-custody
Cu	copper
ELAP	Environmental Laboratory Accreditation Program
ID	identifier
NA	not applicable
NR	not recorded
NWP	Nationwide Permit
PDF	Portable Data Format
pH	hydrogen ion concentration
PM	project manager
Port of San Diego or Port	San Diego Unified Port District
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
Regional Board	San Diego Regional Water Quality Control Board
RFP	request for proposal
SAP	Sampling and Analysis Plan
SD	standard deviation
SIYB	Shelter Island Yacht Basin
SM	Standard Method
TMDL	total maximum daily load
TSS	total suspended solids
TST	Test of Significant Toxicity
USEPA	United States Environmental Protection Agency
Weck	Weck Laboratories, Inc.
Wood	Wood Environment & Infrastructure Solutions, Inc. (formerly Amec Foster Wheeler Environment & Infrastructure, Inc.)
YSI	YSI Incorporated

UNITS OF MEASURE

%	percent
±	plus or minus
°C	degree(s) Celsius
µg/L	microgram(s) per liter
mg/kg	milligram(s) per kilogram
mg/L	milligram(s) per liter
NTU	nephelometric turbidity unit(s)
pH	hydrogen ion concentration
ppt	part(s) per thousand

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1.0 INTRODUCTION

This report presents the results of the Phase 1 Rentunder Drive-In Boatwash (Boatwash) Water Quality Monitoring Study (Boatwash Pilot Study) conducted from July 2018 through April 2019. This water quality investigation was designed to evaluate use of the Boatwash as a potential alternative to current in-water hull cleaning practices. This study was completed in April 2019 through the combined efforts of the San Diego Unified Port District (Port) and Wood Environment & Infrastructure Solutions, Inc. [1] (Wood).

The objective of the Boatwash Pilot Study is to answer the following questions:

1. *What are the concentrations of dissolved and total copper within and directly outside the Boatwash after a typical business day (i.e., after multiple cleaning events)?*
2. *What is the quantity of particulate debris that the Boatwash captures, and what is the copper concentration of this debris?*
3. *What impact do the cleaning methods of the Boatwash have on the leach rates of commonly used Category I antifoulant paints (AFPs)?* [2]

These questions were addressed through the following tasks:

- Collection and analysis of water for total and dissolved copper, and in situ measurement of physical parameters;
- Toxicity testing using bivalve larvae;
- Collection and analysis of particulate debris that settled in the bottom of the Boatwash; and
- A dome study quantifying the copper leach rate resulting from Boatwash cleaning methods.

1.1 Background

Since the adoption of the Shelter Island Yacht Basin (SIYB) Total Maximum Daily Load (TMDL) for dissolved copper in 2005, the Port has evaluated several methods of reducing dissolved copper contributions to the water column in SIYB and San Diego Bay. The TMDL primarily attributes most of the dissolved copper load in SIYB to leaching from copper-based AFPs, and secondarily from the in-water cleaning of hulls coated with AFPs. In 2015, Port staff began exploring alternative technologies and project concepts to assist in the removal of copper from the water and alternatives to traditional in-slip hull cleaning methods. In April 2016, the Port published a request for proposal (RFP) for innovative hull-cleaning methods and copper

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[1] Wood Environment & Infrastructure Solutions, Inc. was formerly known as Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler).

[2] This question was addressed in the Dome Study Data Report (Coastal Monitoring Associates, 2019), provided in Appendix G.

remediation technologies. In June 2017, the Board of Port Commissioners authorized a two-year pilot study to demonstrate the Boatwash technology through the Blue Economy Incubator (BEI).

The Boatwash can accommodate recreational vessels up to 53 feet in length, where the vessel drives into its enclosed basin and is cleaned by mechanical scrubbers for a period of approximately 30 minutes. The entire cleaning process is conducted within the enclosed basin of the Boatwash, which is designed to retain residual debris and particulate matter. When the cleaning is complete, the gate of the Boatwash is lowered enough to clear the hull or keel of the vessel, minimizing the potential for copper to flow into the harbor. The vessel is then manually guided out of the Boatwash. The Boatwash basin is cleaned out using a remotely controlled and/or diver-operated suction pump on a regular basis.

In addition to being accepted into the Port's BEI as a two-year pilot study, Rentunder obtained permission under the United States Army Corps of Engineers Nationwide Permit (NWP) 5, which allows the deployment of Scientific Measurement Devices pursuant to Section 10 of the Rivers and Harbors Act. Additionally, the NWP 5 is precertified for the 401 Water Quality Certification. As part of the 401 Certification, a water quality monitoring plan was submitted to the San Diego Regional Water Quality Control Board (Regional Board) to evaluate any potential discharge (see Appendix A).

2.0 COLLECTION METHODS AND ANALYSIS

This section describes the methods for the water quality monitoring component (Phase 1a) of the Boatwash Pilot Study, including sampling methodology, sample collection and handling, analytical and toxicity test methods, and project-specific quality assurance (QA) and quality control (QC) procedures used during water quality monitoring.

2.1 Sampling Events

Phase 1a of the Boatwash Pilot Study included three controlled cleaning events and concurrent water quality and particulate sample collection. Each controlled cleaning event simulated a "typical Boatwash business day," generally defined as the cleaning of 5 to 10 vessels. The Boatwash was not in operation during nonsampling days, with the exception of one day during the Dome Study cleaning event. [3] Prior to each sampling event, boats were coordinated and assigned a cleaning date and time. Hull paint type was noted for each boat during the selection process (Table 2-1); ablative paints were not considered for the Boatwash Pilot Study.

Table 2-1.
Category I Paint Types Used During the Boatwash Pilot Study

Vessel Type	Paint Name	Date Painted
Bavaria 46'	Interlux Ultra	January 2018
27' Cobia Center Console	Interlux Ultra	March 2017
32' Catalina	Zspar Bottom Pro Gold	February 2018
36' custom powerboat	Ultra Red	March 2017
15' Boston Whaler	Interlux Ultra	February 2015
38' Hunter Sail	Z Spar the Protector VOC Hard	April 2018
40' Californian	Interlux Ultra	Not known
Catalina 270	Pettit Marine paint Trinidad SR	May 2016

The first Boatwash cleaning event (Event 1) was conducted on July 17, 2018, in accordance with the project Sampling and Analysis Plan (SAP) and Quality Assurance Project Plan (QAPP) dated May 2018 (Amec Foster Wheeler, 2018) (Appendix A). Eight boats were cleaned using the mechanical brushes of the Boatwash during this event. Follow-up water chemistry and toxicity samples were collected on August 16, 2018, 30 days after the Event 1 cleaning event.

The second and third cleaning events (Events 2 and 3) were modified from the original SAP in an addendum (Appendix B), based on the results of Event 1 and requests made to the Port during a follow-up meeting with the Regional Board on September 20, 2018. During Event 2 (conducted on October 23, 2018), seven boats were cleaned inside the Boatwash basin by an in-water hull cleaner (i.e., a diver) approved under the Port In-Water Hull Cleaning Permit using standard hull-cleaning best management practices (BMPs) rather than using the mechanical Boatwash brushes. During Event 3 (conducted on March 27, 2019), five boats were cleaned in the Boatwash

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[3] The Boatwash was in operation on December 7, 2018, to clean the single vessel used for the Dome Study. However, no water quality monitoring events for Phase 1a occurred around this time.

following the same protocol used during Event 1. To further evaluate water quality trends immediately following the cleaning events, additional post-cleaning follow-up sampling was added to Events 2 and 3, including the following:

1. One full set of water quality samples (i.e., a sample collected at each station) two hours after the cleaning event (i.e., T5);
2. One full set of samples per day for three days after the cleaning event (Post-Event Days 1, 2, and 3); and
3. One full set of samples one week and two weeks after the cleaning event (Post-Event Days 7 and 14). Toxicity samples were also collected on Day 14 for Events 2 and 3.

2.2 Sample Collection Methods

Water quality samples were collected at four station locations (described further in Section 2.2.1) for five iterations (described in Section 2.2.2) during each cleaning event. Water samples were analyzed for total and dissolved copper and total suspended solids (TSS).

2.2.1 Sampling Stations

Samples were collected from surface water (i.e., 1 meter below the surface) and bottom water (i.e., 2.2-meter depth) at two stations inside the Boatwash basin (Basin-1 and Basin-2 [4]) and two stations directly outside of the Boatwash gate (Gate-1 and Gate-2 [5]). Sampling locations are listed in Table 2-2 and depicted in Figure 2-1.

Table 2-2.
Station Locations

Station ID	Location
Gate-1	Immediately outside and adjacent to Boatwash gate (west)
Gate-2	Immediately outside and adjacent to Boatwash gate (east)
Basin-1	Boatwash basin (forward, towards Boatwash brushes)
Basin-2	Boatwash basin (aft, towards Boatwash gate)

Notes:
ID = identifier

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[4] Referred to as BWB-2 and BWB-1, respectively, in the SAP

[5] Referred to as BWG-1 and BWG-2, respectively, in the SAP

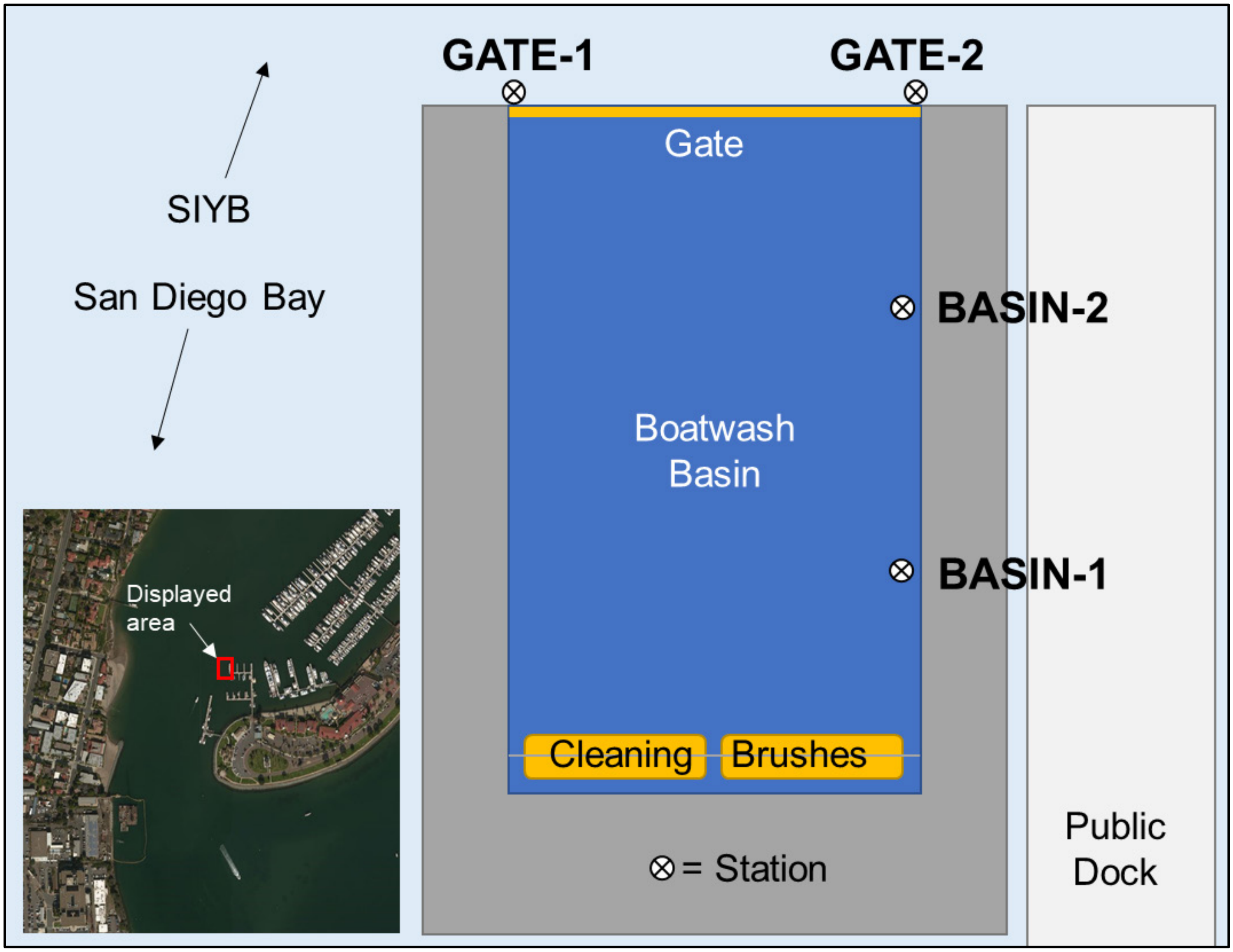

Figure 2-1. Boatwash Pilot Study Sampling Locations

2.2.2 Collection Schedule

Cleaning events occurred on July 17, 2018 (Event 1), October 23, 2018 (Event 2), and March 27, 2019 (Event 3). Samples were collected at five different times during each cleaning event, including before the cleaning event (T0), after the first boat was cleaned (T1), after the first boat was released (T2), after the last boat was cleaned (T3), and after the last boat was released (T4). The detailed sample collection scheme is provided in Table 2-3.

In addition, follow-up sampling was conducted for each cleaning event. For Event 1, follow-up samples were collected 30 days after the cleaning event (P30). For Events 2 and 3, follow-up samples were collected two hours (T5) after the last boat cleaning of the day, and one day (P1), two days (P2), three days (P3), one week (P7), and two weeks (P14) after each respective cleaning event.

Table 2-3. Sample Collection Scheme

Series	Sequence Code	Timing Description	Collected During		
			Event 1	Event 2	Event 3
Background	T0	Water quality samples collected prior to the start of the Boatwash business day.	X	X	X
Start of Business Day – Post-Cleaning	T1	Water quality samples collected following the cleaning of the first vessel of the day. Samples were collected prior to gate opening (for vessel release).	X	X	X
Start of Business Day – Post-Release	T2	Water quality samples collected following the exit of the first cleaned vessel. Samples were collected within 5 minutes of the vessel exit or as soon as the area was considered safe for sample collection.	X	X	X
End of Business Day – Post-Cleaning	T3	Water quality samples collected following the cleaning of the last vessel of the day. Samples were collected prior to gate opening (for vessel release).	X	X	X
End of Business Day – Post-Release	T4	Water quality samples collected following the exit of the last cleaned vessel. Samples were collected within 5 minutes of the vessel exit or as soon as the area was considered safe for sample collection.	X	X	X
Two Hours-Post End of Business Day (Events 2 and 3 only)	T5	Water quality samples collected approximately two hours after the last cleaned vessel exited the Boatwash.	Not collected	X	X

2.2.3 Water Quality Monitoring

Water samples were collected at each station from the Boatwash platform using a Niskin bottle and “clean-hands” techniques. Upon collection, water samples were transferred to labeled containers for analysis of total and dissolved copper and TSS. Water collected for the dissolved copper analysis was filtered in the field and preserved immediately upon arrival at the laboratory. Field measurements of hydrogen ion concentration (pH), temperature, and salinity of the surface water were taken at each station using a YSI Incorporated (YSI) meter. Turbidity was also measured in the surface waters using a LaMotte portable turbidity meter.

2.2.4 Toxicity Evaluation

Toxicity samples were collected during each cleaning event and analyzed via 48-hour chronic bioassay tests using larvae of the mussel *Mytilus galloprovincialis*. For each cleaning event, water was collected from each station before the start of the business day (i.e., at baseline conditions) and at the end of the business day (i.e., post-release of the last cleaned vessel from the Boatwash). Toxicity samples were collected and composited for surface and bottom water at each station using a precleaned Niskin bottle. Composite samples were transferred into labeled containers and kept on ice until delivery to the toxicity laboratory.

Toxicity samples were also collected from each station on the last follow-up sampling day for each event (i.e., Day 30 for Event 1 and Day 14 for Events 2 and 3) using the same procedures.

2.2.5 Boatwash Particulate Debris Monitoring

At the end of each cleaning event, particulate debris was collected from the bottom of the Boatwash basin to quantify the volume of the debris resulting from the cleaning activity and to analyze the debris for copper content. Following collection of the last water quality samples for each event, particulate debris from the basin bottom was collected into fine-mesh filter bag using a vacuum system. Samples were collected along three equidistant transects on the bottom of the basin. Excess water was siphoned off, and debris was homogenized and distributed into sample jars for particulate copper analysis.

2.3 Equipment Decontamination and Cleaning

Prior to each water quality sampling event, the Niskin bottle was cleaned using Alconox and water, followed by a thorough rinse with deionized water. Upon deployment, the Niskin bottle was also rinsed thoroughly with site water and soaked at the sampling depth (1 meter below the water surface) for at least for one minute prior to sample collection. After collection, water samples were transferred from the Niskin bottle to laboratory-certified, contaminant-free bottles appropriate for the required analyses. In between sample collections, the Niskin bottle was stored in a plastic-lined 5-gallon bucket.

2.4 Sample Processing, Handling, and Custody

Water samples were uniquely identified by labeling laboratory-provided containers with sample labels in indelible ink. All labels included the project title, appropriate identification number, date and time of sample collection, and preservation method. The field crew inspected the sample collection bottles before and after they were filled to ensure that each sample bottle was correctly labeled with station location and analysis type. After each sample collection, the field crew completed a quality assurance (QA) form to verify bottle information and ensure labeling accuracy.

Water chemistry samples, particulate debris samples, and toxicity samples were logged on chain-of-custody (COC) forms and the forms were placed in the cooler for transport to the analytical and toxicity laboratories. Samples were kept on ice from the time of sample collection until delivery at the analytical laboratory. All samples were transferred to the appropriate laboratory, and analyses were initiated within the method specified holding time (Table 2-4). Additionally, appropriate volumes of each sample were archived at the analytical laboratory Weck Laboratories, Inc. (Weck) and toxicity laboratory (Wood) in case confirmation analyses were needed. All chemical analyses were conducted by Weck and toxicity analyses were completed by Wood; both laboratories are certified through the California Environmental Laboratory Accreditation Program (ELAP) for all the tests required.

Table 2-4. Sample Holding Times

Analyte	Holding Time
Field Measurements	
Turbidity	Field-measured
pH	Field-measured
Salinity	Field-measured
Temperature	Field-measured
Water	
Dissolved Copper	180 days*
Total Copper	180 days**
TSS	7 days
Toxicity	36 hours
Particulate Debris	
Total Copper	1 year

Notes:
pH = hydrogen ion concentration; TSS = total suspended solids
*following filtration and preservation
**following preservation

2.5 Analytical Methods

Surface and bottom water samples were analyzed for total copper, dissolved copper, and TSS. Total and dissolved copper analyses followed certified United States Environmental Protection Agency (USEPA) test methods. The analytical test methods and reporting limits are provided in Table 2-5. Surface water field measurements were taken in situ following collection of each sample for pH, salinity, and temperature using a YSI data sonde and turbidity using a LaMotte turbidity meter. Measurement accuracy for in situ water quality measurements is provided in Table 2-5.

Table 2-5.
Analytical Methods and Measurement Accuracy

Sample Type	Measurement	Method	Method Detection Limit	Reporting Limit	Meter Sensitivity
Water Quality	Total Copper	USEPA 1640	0.0038 µg/L	0.010 µg/L	NA
	Dissolved Copper	USEPA 1640	0.0038 µg/L	0.010 µg/L	NA
	TSS	SM 2540D	NA	5.0 mg/L	NA
	Salinity	YSI Pro Plus	NA	NA	± 0.1 ppt
	Temperature	YSI Pro Plus	NA	NA	± 0.1 °C
	pH	YSI Pro Plus	NA	NA	± 0.1 pH unit
	Turbidity	LaMotte Meter	NA	NA	± 0.1 NTU
Particulate Analysis	Total Copper	USEPA 6020B Cu	0.29 mg/kg	0.50 mg/kg	NA
	Total Solids	USEPA 160.3M	NA	0.1%	NA

Notes:
°C = degrees Celsius; ± = plus or minus; % = percent; µg/L = microgram(s) per liter; Cu = copper; mg/kg = milligram(s) per kilogram; mg/L = milligram(s) per liter; NA = not applicable; NTU = nephelometric turbidity unit(s); pH = hydrogen ion concentration; ppt = part(s) per thousand; SM = Standard Method; TSS= total suspended solids; USEPA = United States Environmental Protection Agency; YSI = YSI Incorporated.

2.6 Quality Assurance and Quality Control

Sampling quality assurance and quality control (QC) included preparation prior to, during, and after collection of the samples to minimize the possibility of compromising sample integrity. The sample collection team was trained in and followed field sampling operating procedures in accordance with the Boatwash Pilot Study SAP/QAPP (Amec Foster Wheeler, 2018; Appendix A). COC procedures were used for all samples throughout the collection, transport, and analytical process. Completed COC forms are provided in Appendix C. The project-specific SAP/QAPP (Amec Foster Wheeler, 2018; Appendix A) provides more information regarding COC procedures.

2.7 Data Review

Following each field event, field data sheets and checklists were checked for completeness and accuracy by the field crew and the field project manager (PM). In addition, all sample COC forms were checked against sample labels prior to samples being transported to the laboratories. In the laboratory, technicians documented sample receipt and sample preparation activities in laboratory logbooks or on bench sheets.

In the laboratory, data validation included use of dated and signed entries by technicians on the data sheets and logbooks used for samples, sample tracking and numbering systems to track the progress of samples through the laboratory, and QC criteria to reject or accept specific data. Data for laboratory analyses were entered directly onto data sheets. Data sheets were filled out in ink and signed by the technician who was responsible for checking the sheet to ensure completeness and accuracy. The technician who generated the data had the primary responsibility for the accuracy and completeness of the data.

Each technician reviewed the data to ensure the following:

- Sample description information is correct and complete;

- Analysis information is correct and complete;
- Results are correct and complete; and
- Documentation is complete.

All data were reviewed and verified by the analytical laboratory to determine whether data quality objectives had been met and whether appropriate corrective actions had been taken, when necessary, as detailed in the project-specific SAP.

2.8 Data Management

All laboratory-supplied analytical results were provided as Adobe Portable Data Format (PDF) files. Analytical laboratory results were reviewed by the laboratory QA/QC Officer, and then forwarded to Wood for review and reporting. All laboratory records are provided in Appendix D.

2.9 Data Analysis

Summary data tables and figures were created after raw data passed the QA/QC criteria.

3.0 RESULTS

This section discusses and summarizes the results of Phase 1a of the Boatwash Pilot Study, including the analytical chemistry and toxicity results and in situ measurements of Boatwash Cleaning Events 1, 2, and 3, and summarizes the results of the Dome Study (Phase 1b).

3.1 Boatwash Cleaning Event Results

Results from each of the three Boatwash cleaning events and follow-up events are summarized in Sections 3.1.1 and 3.1.2. The chemistry and toxicity results reports submitted by the analytical and toxicity laboratories are provided in Appendix D. Detailed tabulated results and field data sheets are provided in Appendix E.

3.1.1 Water Quality Sampling

Water quality samples were collected to address the first study question: *What are the concentrations of dissolved and total copper within and directly outside the Boatwash after a typical business day (i.e., after multiple cleaning events)?* Three cleaning events were completed, as described below.

3.1.1.1 Event 1 (Boatwash Cleaning)

Event 1 was conducted on July 17, 2018. For this event, eight vessels were cleaned using the Boatwash brushes. Dissolved copper concentrations ranged from 4.8 micrograms per liter (µg/L) to 880 µg/L during the sampling event, with the lowest concentrations observed during the baseline (i.e., T0) collections, and the highest concentrations observed at the end of the business day (i.e., after the last boat was cleaned, or T4). In-basin TSS concentrations increased compared with baseline concentrations, while TSS concentrations in the gate samples remained relatively consistent throughout the day. Gate station and basin station toxicity mussel development tests (presented as the combined proportion of normally developed embryos) showed no effect in any of the baseline (i.e., T0) samples, and a significant effect in all samples following the last boat cleaning (i.e., T4). Average concentrations of dissolved copper, total copper, TSS, and toxicity are presented in Table 3-1 and Figure 3-1.

Table 3-1. Chemistry and Toxicity Results for Event 1 (Boatwash Cleaning) (Average ± SD)

Location	Analyte	Baseline	First Boat Cleaning of Day		Last Boat Cleaning of Day	
		T0	T1 (Pre-Release)	T2 (Post-Release)	T3 (Pre-Release)	T4 (Post-Release)
Basin Stations	Dissolved Copper (μg/L)	5.48 ± 0.22	315 ± 87.0	350 ± 8.16	340 ± 347	828 ± 47.9
	Total Copper (μg/L)	5.53 ± 0.15	2,000 ± 744	1,500 ± 115	2,700 ± 365	2,100 ± 216
	TSS (mg/L)	3.00 ± 1.41	9.25 ± 3.40	7.75 ± 2.06	7.75 ± 0.96	11.8 ± 8.18
	Combined Proportion Normal (%)	90.6 ± 0.80	--	--	--	0.0* ± 0.0
Gate Stations	Dissolved Copper (μg/L)	6.98 ± 0.93	9.20 ± 4.42	24.8 ± 10.2	60.5 ± 58.6	62.8 ± 73.5
	Total Copper (μg/L)	7.48 ± 0.93	23.3 ± 19.1	77.8 ± 40.3	156 ± 179	128 ± 182
	TSS (mg/L)	8.25 ± 1.26	7.25 ± 0.50	6.50 ± 1.00	6.50 ± 0.58	9.50 ± 4.04
	Combined Proportion Normal (%)	78.7 ± 4.87	--	--	--	1.75* ± 2.47

Notes:
Concentrations for dissolved copper, total copper, and TSS are presented as the average of both stations and station depths (i.e., average of Gate-1-Top, Gate-1-Bottom, Gate-2-Top, and Gate-2-Bottom) for data summarization purposes.
Bivalve larvae development is presented as the average of both stations (i.e., Gate-1 and Gate-2).
% = percent; -- = not tested; ± = plus or minus; μg/L = microgram(s) per liter; mg/L = milligram(s) per liter; SD = standard deviation; TSS = total suspended solids
* = indicates a statistically significant toxic effect.

Follow-up samples were collected 30 days following Event 1 cleaning (i.e., P30). A paired-samples t-test was conducted to compare concentrations observed during the P30 sampling event and baseline conditions. Results showed that dissolved and total copper concentrations had reached baseline (i.e., T0) concentrations in the gate stations, but remained elevated in the basin stations compared with baseline levels. However, no toxic effects were observed in any of the mussel development tests collected during P30. These results are depicted in Table 3-2 and Figure 3-1.

Table 3-2. Averaged Chemistry and Toxicity Results for Post-Event 1 Monitoring (Average ± SD)

Location	Analyte	30-Days Post Cleaning (P30)
Basin Stations	Dissolved Copper (µg/L)	10.2 ± 0.58
	Total Copper (µg/L)	10.3 ± 0.50
	TSS (mg/L)	8.00 ± 1.83
	Combined Proportion Normal (%)	88.2 ± 2.90
Gate Stations	Dissolved Copper (µg/L)	4.83 ± 0.63
	Total Copper (µg/L)	5.68 ± 0.92
	TSS (mg/L)	16.5 ± 6.95
	Combined Proportion Normal (%)	91.2 ± 0.57

Notes:
Concentrations for dissolved copper, total copper, and TSS are presented as the average of both stations and station depths (i.e., average of Gate-1-Top, Gate-1-Bottom, Gate-2-Top, and Gate-2-Bottom)
Bivalve larvae development is presented as the average of both stations (i.e., Gate-1 and Gate-2).
% = percent; ± = plus or minus; µg/L = microgram(s) per liter; mg/L = milligram(s) per liter; SD = standard deviation; TSS = total suspended solids

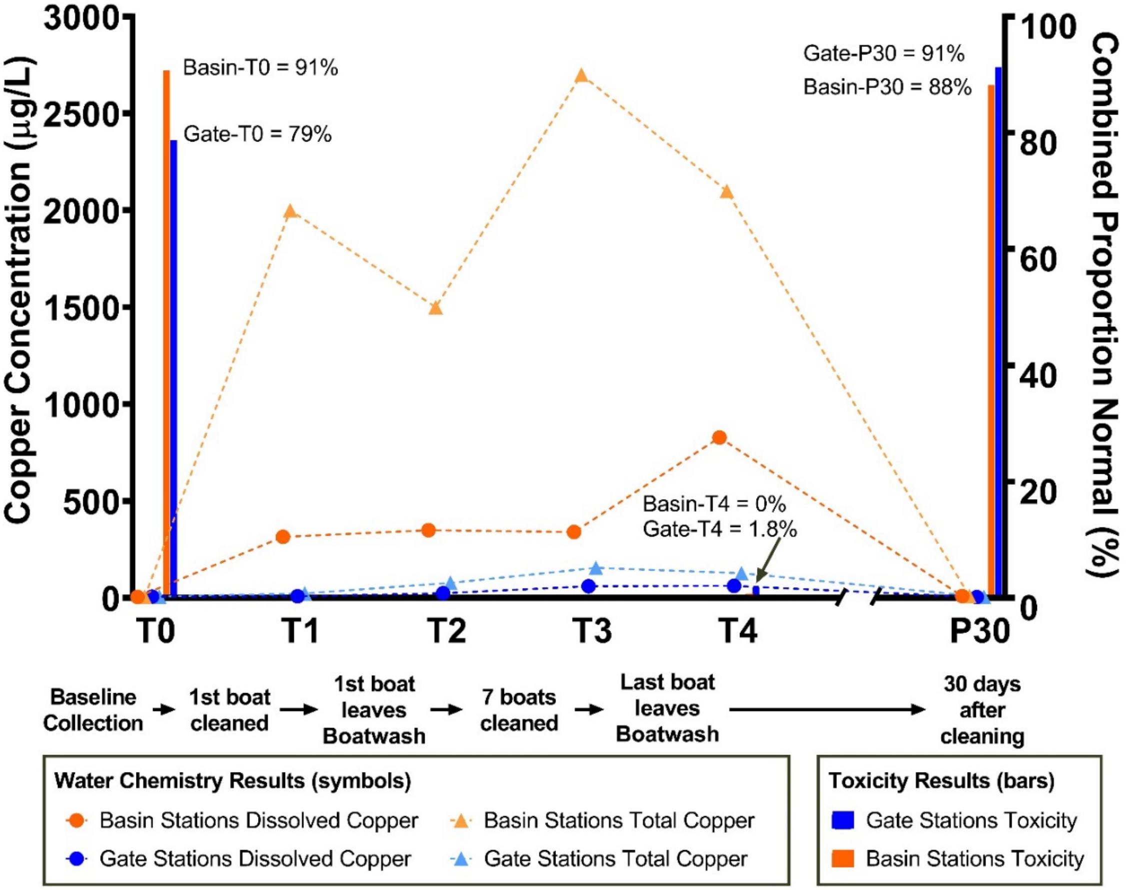

Figure 3-1. Dissolved Copper, Total Copper, and Toxicity Results Over the Series of Sample Collections During Event 1

3.1.1.2 Physical Water Quality Measurements

Surface water temperatures gradually increased throughout the duration of Event 1. Surface water salinity and pH measurements were generally consistent throughout the day. Turbidity measurements were relatively low in all gate samples and the basin baseline samples, but were comparatively elevated in the basin after boats had been washed (i.e., T1 through T4). Table 3-3 presents a summary of all surface water physical parameters measured during Event 1. Water quality measurements for all stations are provided in Appendix E.

Table 3-3. Physical Water Quality Measurements (Average ± SD) for Event 1

Location	Parameter	Baseline	First Boat Cleaning of Day		Last Boat Cleaning of Day	
		T0	T1 (Pre-Release)	T2 (Post-Release)	T3 (Pre-Release)	T4 (Post-Release)
Basin Stations	pH	8.52 ± 0.04	8.44 ± 0.01	8.49 ± 0.01	8.45 ± 0.01	8.49 ± 0.03
	Salinity (ppt)	33.4 ± 0.01	33.3 ± 0.09	33.3 ± 0.00	33.2 ± 0.01	33.3 ± 0.08
	Temperature (°C)	22.9 ± 0.01	22.8 ± 0.04	22.8 ± 0.01	23.1 ± 0.02	23.2 ± 0.02
	Turbidity (NTU)	1.27 ± 0.55	2.14 ± 1.22	1.86 ± 0.03	2.20 ± 0.25	2.04 ± 0.24
Gate Stations	pH	8.32 ± 0.04	8.38 ± 0.04	8.33 ± 0.04	8.42 ± 0.17	8.32 ± 0.02
	Salinity (ppt)	33.5 ± 0.14	33.6 ± 0.14	33.7 ± 0.07	33.6 ± 0.00	33.6 ± 0.00
	Temperature (°C)	22.9 ± 0.07	22.9 ± 0.07	22.9 ± 0.07	23.7 ± 0.07	23.6 ± 0.07
	Turbidity (NTU)	1.51 ± 0.14	1.46 ± 0.04	1.38 ± 0.28	1.32 ± 0.40	1.28 ± 0.10

Notes:
°C = degrees Celsius; ± = plus or minus; NTU = nephelometric turbidity unit(s); pH = hydrogen ion concentration; ppt = parts per thousand; SD = standard deviation

3.1.1.3 Event 2 (Diver Cleaning)

Event 2 was conducted on October 23, 2018. For this event, seven vessels were cleaned by a diver following the BMP procedures outlined in their business' BMP Plan (see Appendix F). During Event 2, dissolved copper concentrations ranged from 4.1 µg/L to 52 µg/L during the sampling event, with the lowest concentrations observed during the baseline (i.e., T0) collections, and the highest concentrations observed at the end of the business day (i.e., after the last boat was cleaned, or T4). An additional collection occurred approximately two hours following the last boat cleaning (i.e., T5), which showed similar dissolved and total copper concentrations in all samples compared with T3 and T4. Basin and gate TSS concentrations remained relatively consistent throughout the day. Mussel development tests showed no effect in any of the baseline (i.e., T0) samples, and a significant effect in basin samples following the last boat cleaning (i.e., T4). However, both samples collected from the gate stations during T4 were considered nontoxic[6].

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[6] Samples collected at Gate-1 and Gate-2 during T4 were not considered toxic per the Test of Significant Toxicity (TST). However, Gate-2 results showed a statistically significant difference compared with the control test results using standard analysis.

Average concentrations of dissolved copper, total copper, TSS, and toxicity are presented in Table 3-4 and Figure 3-2.

Table 3-4. Chemistry and Toxicity Results for Event 2 (Diver Cleaning) (Average ± SD)

Location	Analyte	Baseline	First Boat Cleaning of Day		Last Boat Cleaning of Day		Two hours Post-Last Boat of Day
		T0	T1 (Pre-Release)	T2 (Post-Release)	T3 (Pre-Release)	T4 (Post-Release)	T5
Basin Stations	Dissolved Copper (µg/L)	6.98 ± 0.10	17.3 ± 0.96	15.8 ± 0.50	46.0 ± 3.56	47.8 ± 3.30	44.8 ± 1.89
	Total Copper (µg/L)	7.40 ± 0.20	31.3 ± 3.30	26.0 ± 1.83	99.5 ± 14.7	91.0 ± 6.58	84.0 ± 7.26
	TSS (mg/L)	4.25 ± 0.96	4.00 ± 0.00	5.50 ± 0.58	4.75 ± 1.50	6.75 ± 3.10	6.75 ± 1.71
	Combined Proportion Normal (%)	80.8 ± 2.40	--	--	--	0.0* ± 0.0	--
Gate Stations	Dissolved Copper (µg/L)	5.60 ± 1.09	6.58 ± 0.62	6.08 ± 1.08	7.65 ± 0.26	7.65 ± 0.54	9.08 ± 0.63
	Total Copper (µg/L)	7.05 ± 1.25	8.23 ± 1.90	7.30 ± 1.12	8.75 ± 0.26	10.0 ± 1.41	11.3 ± 1.26
	TSS (mg/L)	5.75 ± 2.22	4.75 ± 1.26	6.25 ± 1.26	6.00 ± 4.08	4.50 ± 0.58	5.50 ± 0.58
	Combined Proportion Normal (%)	77.8 ± 1.06	--	--	--	82.7 ± 0.42	--

Notes:
Concentrations for dissolved copper, total copper, and TSS are presented as the average of both stations and station depths (i.e., average of Gate-1-Top, Gate-1-Bottom, Gate-2-Top, and Gate-2-Bottom) for data summarization purposes.
Bivalve larvae development is presented as the average of both stations (i.e., Gate-1 and Gate-2).
% = percent; ± = plus or minus; µg/L = microgram(s) per liter; mg/L = milligram(s) per liter; SD = standard deviation; TSS = total suspended solids
* = indicates a statistically significant toxic effect.

Follow-up samples were collected 1, 2, 3, 7, and 14 days following the Event 2 cleaning. Dissolved and total copper concentrations had reached baseline concentrations (i.e., T0) by Post-Event Day 7 (P7), as depicted in Table 3-5 and Figure 3-2.

Table 3-5. Chemistry and Toxicity Results for Post-Event 2 Monitoring (Average ± SD)

Location	Analyte	Day 1 Post-Event (P1)	Day 2 Post-Event (P2)	Day 3 Post-Event (P3)	Day 7 Post-Event (P7)	Day 14 Post-Event (P14)
Basin Stations	Dissolved Copper (µg/L)	22.3 ± 2.50	9.33 ± 0.35	8.23 ± 0.24	5.40 ± 0.14	5.25 ± 0.25
	Total Copper (µg/L)	24.3 ± 2.75	9.45 ± 0.37	8.50 ± 0.00	5.95 ± 0.10	5.80 ± 0.37
	TSS (mg/L)	3.00 ± 1.15	3.75 ± 0.50	2.50 ± 0.58	3.75 ± 0.96	3.25 ± 0.96
	Combined Proportion Normal (%)	--	--	--	--	92.2 ± 1.06
Gate Stations	Dissolved Copper (µg/L)	6.45 ± 0.58	6.05 ± 0.34	6.90 ± 0.65	4.90 ± 0.45	7.40 ± 0.08
	Total Copper (µg/L)	7.38 ± 0.97	6.63 ± 0.28	7.90 ± 1.25	6.68 ± 1.23	8.35 ± 0.34
	TSS (mg/L)	3.50 ± 1.29	5.25 ± 0.96	4.75 ± 1.50	8.75 ± 5.68	7.75 ± 2.06
	Combined Proportion Normal (%)	--	--	--	--	87.7 ± 2.26

Notes:
Concentrations for dissolved copper, total copper, and TSS are presented as the average of both stations and station depths (i.e., average of Gate-1-Top, Gate-1-Bottom, Gate-2-Top, and Gate-2-Bottom) for data summarization purposes.
Bivalve larvae development is presented as the average of both stations (i.e., Gate-1 and Gate-2).
% = percent; ± = plus or minus; µg/L = microgram(s) per liter; -- = not tested; mg/L = milligram(s) per liter; SD = standard deviation; TSS = total suspended solids

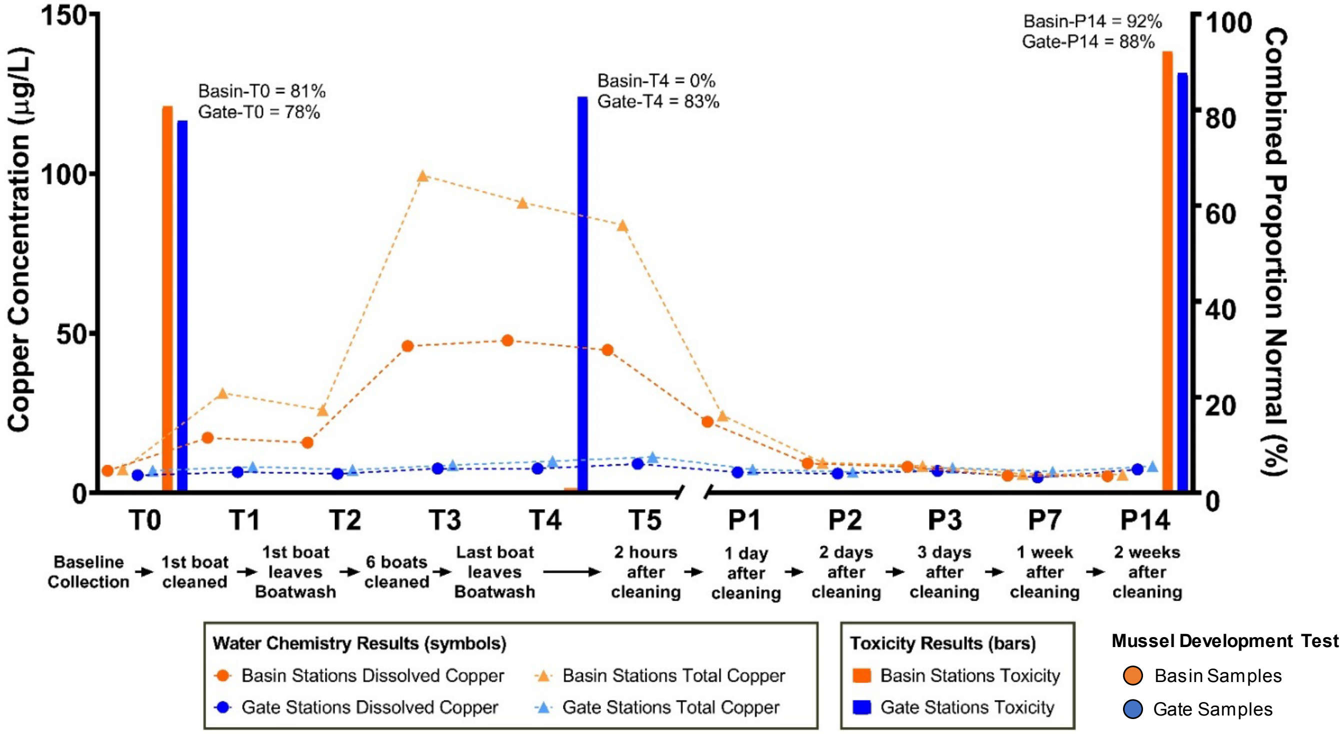


Figure 3-2. Dissolved Copper, Total Copper, and Toxicity Results Over the Series of Sample Collections During Event 2

Physical Water Quality Measurements

Surface water temperatures gradually increased throughout the duration of Event 2, while surface water salinity, pH, and turbidity measurements were generally consistent throughout the day. Table 3-6 presents a summary of all surface water physical parameters measured for Event 2.

Table 3-6. Physical Water Quality Measurements (Average ± SD) for Event 2.

Location	Parameter	Baseline	First Boat Cleaning of Day		Last Boat Cleaning of Day		Two hours Post-Last Boat of Day
		T0	T1 (Pre-Release)	T2 (Post-Release)	T3 (Pre-Release)	T4 (Post-Release)	T5
Basin Stations	pH	7.96 ± 0.02	7.97 ± 0.01	7.99 ± 0.01	8.02 ± 0.02	8.15 ± 0.16	8.04 ± 0.00
	Salinity (ppt)	33.0 ± 0.62	33.5 ± 0.04	33.5 ± 0.02	33.5 ± 0.01	33.6 ± 0.03	33.5 ± 0.01
	Temperature (°C)	19.5 ± 0.00	19.5 ± 0.00	19.5 ± 0.00	19.9 ± 0.07	19.8 ± 0.00	19.8 ± 0.00
	Turbidity (NTU)	0.94 ± 0.13	1.03 ± 0.17	1.07 ± 0.20	0.90 ± 0.21	1.09 ± NA	NR
Gate Stations	pH	7.96 ± 0.03	8.00 ± 0.01	8.01 ± 0.01	8.11 ± 0.00	8.12 ± 0.01	8.04 ± 0.05
	Salinity (ppt)	33.5 ± 0.38	33.8 ± 0.03	33.9 ± 0.01	33.9 ± 0.01	33.9 ± 0.06	33.9 ± 0.00
	Temperature (°C)	19.4 ± 0.14	19.6 ± 0.07	19.6 ± 0.07	20.1 ± 0.00	20.0 ± 0.07	19.8 ± 0.00
	Turbidity (NTU)	1.20 ± 0.10	1.32 ± 0.32	1.03 ± 0.02	NR	NR	NR

Notes:
°C = degrees Celsius; ± = plus or minus; NTU = nephelometric turbidity unit(s); NA = not applicable; NR = not recorded; pH = hydrogen ion concentration; ppt = parts per thousand; SD = standard deviation

3.1.1.4 Event 3 (Boatwash Cleaning)

Event 3 was conducted on March 27, 2019, and included the cleaning of five boats using the Boatwash brushes. Dissolved copper concentrations ranged from 5.9 µg/L to 370 µg/L during the sampling event, with the lowest concentrations observed during the baseline (i.e., T0) collections, and the highest concentrations observed at the end of the business day prior to vessel release (i.e., T3). As with Event 2, an additional collection occurred approximately two hours following the last boat cleaning (i.e., T5), which showed slightly lower dissolved and total copper concentrations in the basin compared with T3 and T4, and more elevated concentrations in the gate samples. Basin TSS concentrations increased compared with baseline concentrations, while gate sample concentrations remained relatively consistent throughout the day. Mussel development tests showed no effect in any of the baseline (i.e., T0) samples, and a 100 percent (%) toxic effect in all samples collected following the last boat cleaning (i.e., T4). Average concentrations of dissolved copper, total copper, TSS, and toxicity are presented in Table 3-7 and Figure 3-3.

Table 3-7. Chemistry and Toxicity Results for Event 3 (Boatwash Cleaning) (Average ± SD)

Location	Analyte	Baseline	First Boat Cleaning of Day		Last Boat Cleaning of Day		Two hours Post-Last Boat of Day
		T0	T1 (Pre-Release)	T2 (Post-Release)	T3 (Pre-Release)	T4 (Post-Release)	T5
Basin Stations	Dissolved Copper (µg/L)	6.23 ± 0.13	195 ± 33.2	208 ± 9.57	335 ± 45.1	315 ± 44.3	275 ± 31.1
	Total Copper (µg/L)	7.15 ± 0.17	940 ± 49.7	720 ± 38.3	883 ± 357	642.5 ± 84.2	510 ± 126
	TSS (mg/L)	3.50 ± 0.58	3.75 ± 0.50	6.75 ± 1.71	7.00 ± 4.08	6.25 ± 1.50	10.5 ± 6.03
	Combined Proportion Normal (%)	93.8 ± 4.10	--	--	--	0.0* ± 0.0	--
Gate Stations	Dissolved Copper (µg/L)	6.83 ± 0.46	8.60 ± 2.77	11.7 ± 6.95	25.3 ± 24.6	29.4 ± 16.5	35.6 ± 40.1
	Total Copper (µg/L)	8.08 ± 0.38	17.6 ± 12.1	28.7 ± 29.9	52.6 ± 50.5	44.8 ± 28.7	60.4 ± 69.1
	TSS (mg/L)	9.75 ± 7.09	5.25 ± 2.50	8.50 ± 7.00	5.00 ± 1.41	7.75 ± 3.20	6.50 ± 1.29
	Combined Proportion Normal (%)	96.3 ± 0.14	--	--	--	0.0* ± 0.0	--

Notes:
Concentrations for dissolved copper, total copper, and TSS are presented as the average of both stations and station depths (i.e., average of Gate-1-Top, Gate-1-Bottom, Gate-2-Top, and Gate-2-Bottom) for data summarization purposes.
Bivalve larvae development is presented as the average of both stations (i.e., Gate-1 and Gate-2).
% = percent; ± = plus or minus; -- = not tested; µg/L = microgram(s) per liter; mg/L = milligram(s) per liter; SD = standard deviation; TSS = total suspended solids
* = indicates a statistically significant toxic effect.

As with Event 2, a series of five follow-up samples were collected following the Event 3 cleaning. By Post-Event Day 14, (i.e., P14) dissolved and total copper concentrations in the basin stations were slightly elevated compared with baseline concentrations (i.e., T0). Dissolved and total copper and TSS concentrations in the gate stations had returned to baseline conditions by Post-Event Day 14 (P14). Summarized results from the Event 3 follow-up monitoring are depicted in Table 3-8 and Figure 3-3.

Table 3-8. Chemistry and Toxicity Results for Post-Event 3 Monitoring (Average ± SD)

Location	Analyte	Day 1 Post-Event (P1)	Day 2 Post-Event (P2)	Day 3 Post-Event (P3)	Day 7 Post-Event (P7)	Day 14 Post-Event (P14)
Basin Stations	Dissolved Copper (µg/L)	168 ± 9.57	69.5 ± 6.56	45.5 ± 3.87	12.0 ± 0.00	7.85 ± 0.13
	Total Copper (µg/L)	175 ± 10.0	81.5 ± 9.57	50.5 ± 5.00	13.0 ± 0.82	7.90 ± 0.22
	TSS (mg/L)	6.75 ± 2.87	3.75 ± 0.50	4.75 ± 0.96	4.25 ± 2.63	7.00 ± 4.00
	Combined Proportion Normal (%)	--	--	--	--	92.3 ± 1.63
Gate Stations	Dissolved Copper (µg/L)	14.4 ± 3.68	12.4 ± 5.12	12.3 ± 3.30	9.53 ± 1.10	7.18 ± 0.83
	Total Copper (µg/L)	14.8 ± 3.59	14.3 ± 6.55	14.5 ± 3.70	10.7 ± 1.01	7.45 ± 0.62
	TSS (mg/L)	6.25 ± 3.30	5.25 ± 1.71	5.00 ± 2.45	6.25 ± 1.71	6.50 ± 5.69
	Combined Proportion Normal (%)	--	--	--	--	93.0 ± 2.05

Notes:

Concentrations for dissolved copper, total copper, and TSS are presented as the average of both stations and station depths (i.e., average of Gate-1-Top, Gate-1-Bottom, Gate-2-Top, and Gate-2-Bottom) for data summarization purposes.

Bivalve larvae development is presented as the average of both stations (i.e., Gate-1 and Gate-2).

% = percent; ± = plus or minus; -- = not tested; µg/L = microgram(s) per liter; mg/L = milligram(s) per liter; SD = standard deviation; TSS = total suspended solids

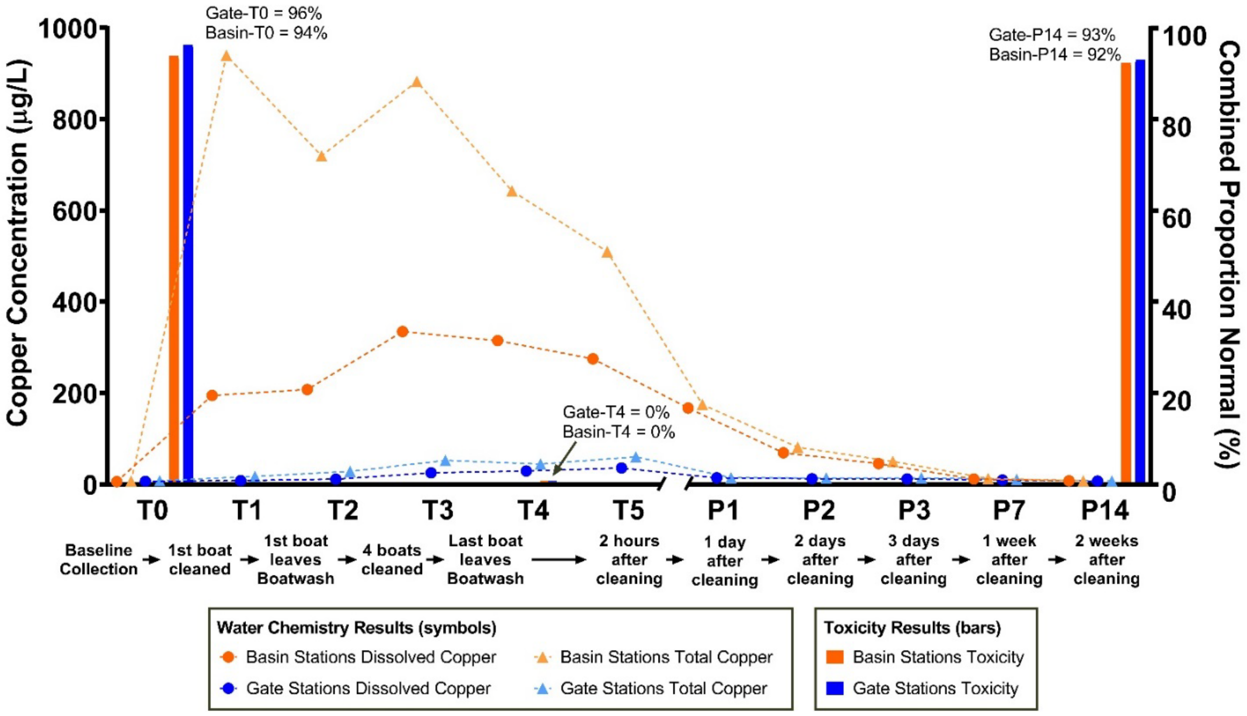


Figure 3-3. Dissolved Copper, Total Copper, and Toxicity Results Over the Series of Sample Collections During Event 3

3.1.1.5 Physical Water Quality Measurements

Surface water temperatures gradually increased throughout the duration of Event 3. Surface water salinity and pH measurements were generally consistent throughout the day. As with Event 1, turbidity measurements were relatively low in all gate samples and the basin baseline samples but were elevated in the basin after boats had been washed (i.e., T1 through T5). Table 3-9 presents a summary of all surface water physical parameters measured for Event 3.

Table 3-9. Physical Water Quality Measurements (Average ± SD) for Event 3

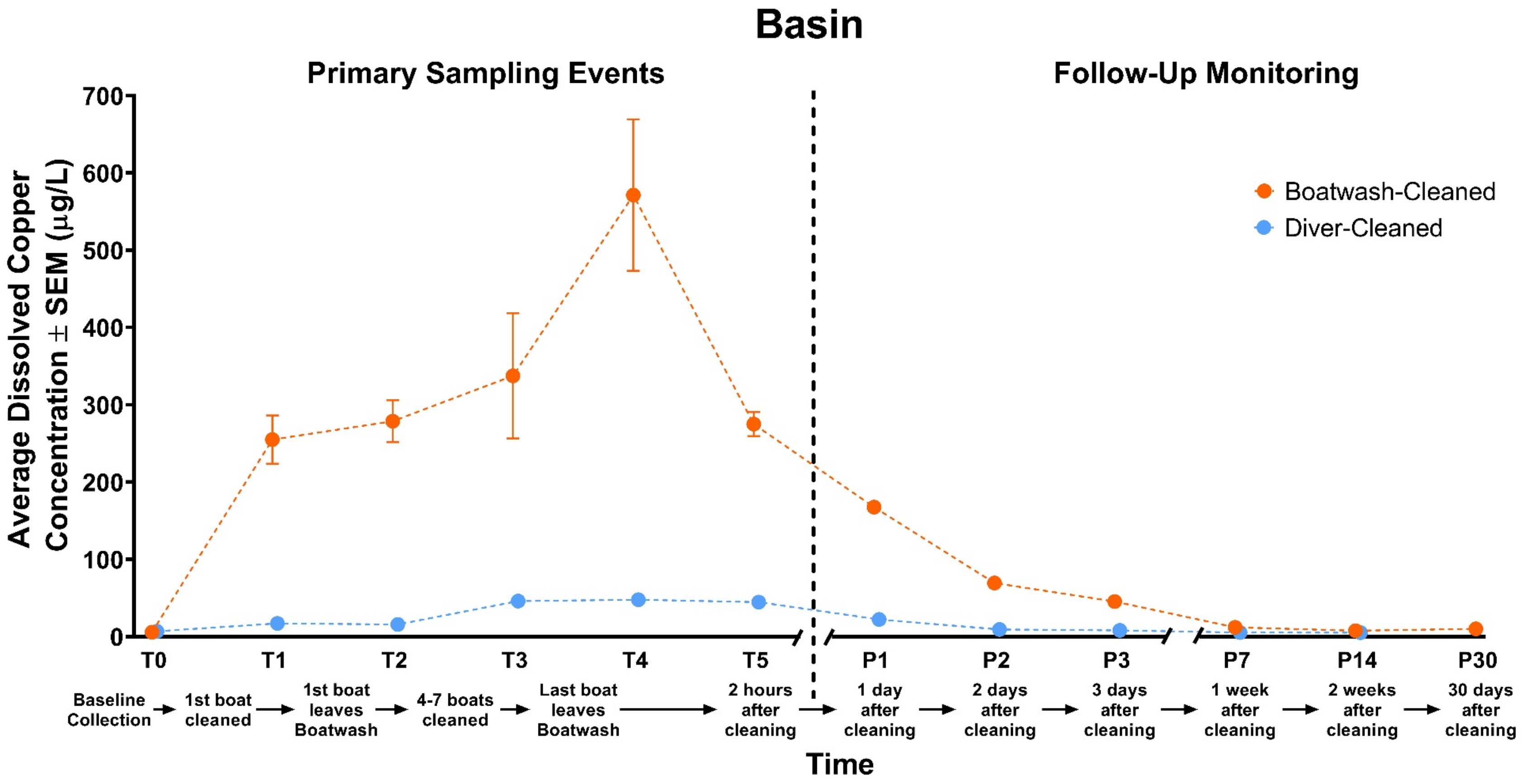
Location	Parameter	Baseline	First Boat Cleaning of Day		Last Boat Cleaning of Day		Two hours Post-Last Boat of Day
		T0	T1 (Pre-Release)	T2 (Post-Release)	T3 (Pre-Release)	T4 (Post-Release)	T5
Basin Stations	pH	7.92 ± 0.03	7.96 ± 0.01	7.96 ± 0.01	8.00 ± 0.00	8.00 ± 0.00	8.00 ± 0.00
	Salinity (ppt)	33.4 ± 0.25	33.7 ± 0.04	33.8 ± 0.01	33.7 ± 0.04	33.8 ± 0.01	33.8 ± 0.06
	Temperature (°C)	17.0 ± 0.00	17.2 ± 0.07	17.2 ± 0.07	17.5 ± 0.07	17.5 ± 0.00	17.6 ± 0.07
	Turbidity (NTU)	2.25 ± 1.44	1.77 ± 0.06	2.05 ± 0.62	2.92 ± 0.09	2.59 ± 0.11	3.05 ± 0.16
Gate Stations	pH	7.90 ± 0.06	8.05 ± 0.00	8.03 ± 0.01	8.09 ± 0.01	8.08 ± 0.01	8.10 ± 0.01
	Salinity (ppt)	33.2 ± 0.08	33.3 ± 0.07	33.3 ± 0.00	33.2 ± 0.14	33.3 ± 0.00	33.3 ± 0.00
	Temperature (°C)	17.0 ± 0.07	17.4 ± 0.07	17.4 ± 0.07	17.4 ± 0.14	17.5 ± 0.00	17.5 ± 0.14
	Turbidity (NTU)	1.42 ± 0.01	1.90 ± 0.07	1.49 ± 0.11	1.61 ± 0.12	1.47 ± 0.01	1.65 ± 0.42

Notes:
°C = degrees Celsius; ± = plus or minus; NTU = nephelometric turbidity unit(s); pH = hydrogen ion concentration; ppt = parts per thousand; SD = standard deviation

3.1.1.6 Dissolved Copper Concentrations Comparison of Events 1, 2, and 3

Average dissolved copper concentrations were calculated for each sampling time (i.e., T0, T1, etc.) for the basin (Figure 3-4) and gate (Figure 3-5) stations to compare results from the Boatwash and diver cleaning events. Each data point represents an average dissolved copper concentration for the top and bottom samples for both basin stations or both gate stations. In addition, the dissolved copper concentrations for both Boatwash cleaning events (Events 1 and 3) were averaged.

Overall, Figures 3-4 and 3-5 show that dissolved copper concentrations were significantly elevated compared with baseline conditions as a result of both cleaning methods (Boatwash system and diver). Dissolved copper concentrations in the basin returned to baseline conditions seven days post-cleaning for Event 2 (diver cleaning); however, for Events 1 and 3 (Boatwash cleaning), elevated dissolved copper concentrations persisted in all follow-up monitoring samples. Significantly higher dissolved copper concentrations were also observed in both basin and gate samples during Events 1 and 3 (Boatwash cleaning) compared with concentrations observed during Event 2 (diver cleaning). This observation is depicted in Figures 3-4 and 3-5.



NOTE: Dissolved copper concentrations are averages of top and bottom samples from Basin-1 and Basin-2. Boatwash-cleaning Events 1 and 3 were averaged for T0-T4. Follow-up sample P30 was only collected for Event 1 and follow-up samples T5, P1-P3, P7, and P14 were only collected for Event 3.

Figure 3-4. Average Dissolved Copper Concentrations for Basin Stations

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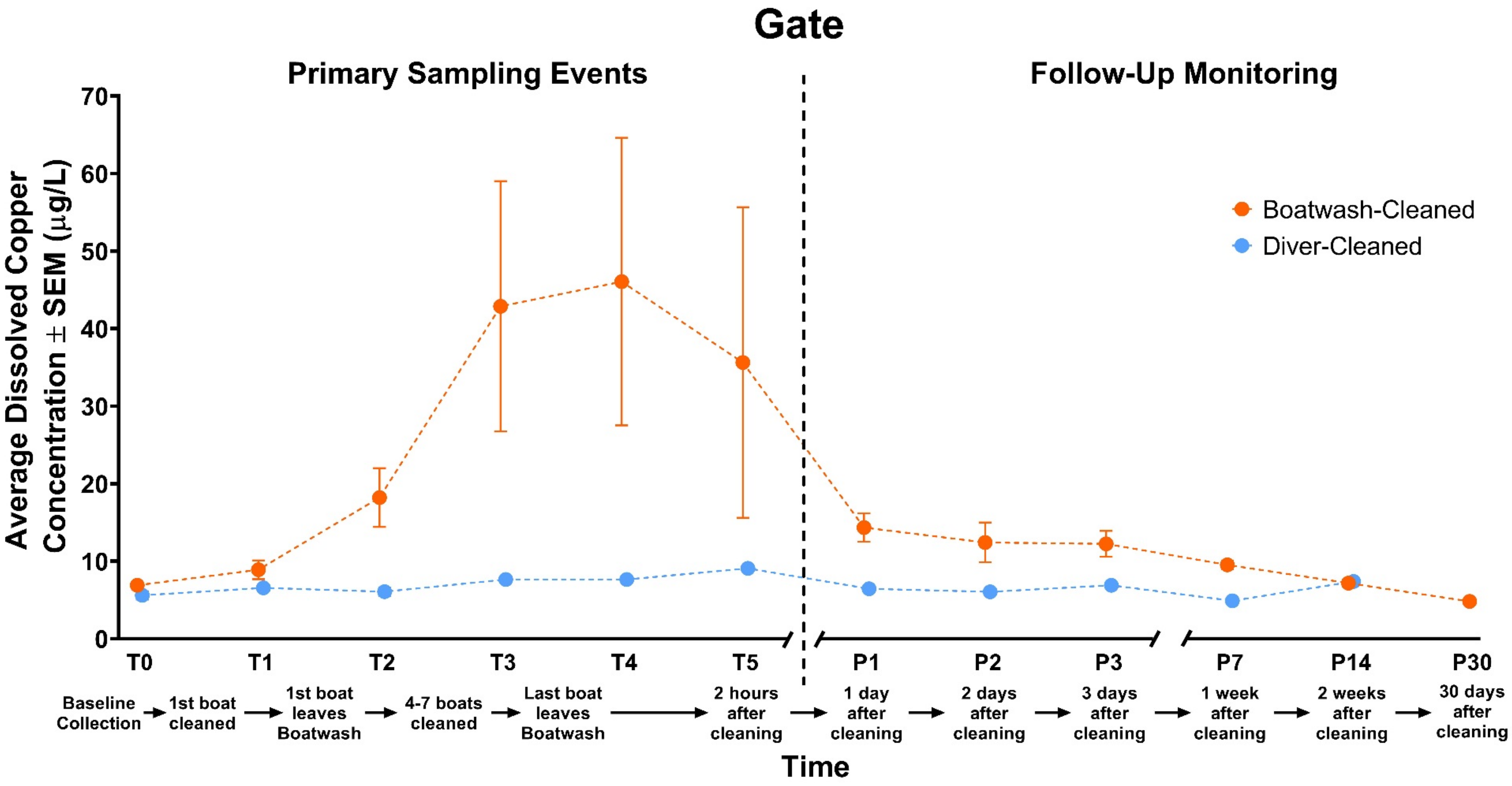

NOTE: Dissolved copper concentrations are averages of top and bottom samples from Gate-1 and Gate-2. Boatwash-cleaning Events 1 and 3 were averaged for T0-T4. Follow-up sample P30 was only collected for Event 1 and follow-up samples T5, P1-P3, P7, and P14 were only collected for Event 3.

Figure 3-5. Average Dissolved Copper Concentrations for Gate Stations

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3.1.2 Basin Particulate Copper Concentrations for Events 1, 2, and 3

To address the second study question, "*What is the quantity of particulate debris that the Boatwash captures, and what is the copper concentration of this debris?"*, basin particulate debris was collected following the release of the last cleaned boat for each event and was analyzed for copper. For Events 1 and 2, particulate debris was collected from the bottom of the Boatwash into a fine-mesh filter bag using a vacuum system (Figure 3-6). For Event 3, Rentunder installed a filtration unit with a vacuum hose, depicted in Figure 3-7. For all events, the vacuum was guided across the Boatwash on three equidistant transects throughout the basin.

Vacuum unit. *Filtered material.*

Figure 3-6. Photos of Vacuum Filtration System Used During Events 1 and 2

Filtration unit and vacuum hose. *Filtration device collection.*

Figure 3-7. Photos of Vacuum Filtration System Used During Event 3

Copper concentrations, total solids, total volume collected, and approximate basin bottom coverage for each cleaning event are presented in Table 3-10. Basin bottom coverage was calculated by using the total filtered area divided by the total basin bottom area.

Table 3-10. Basin Particulate Results

Event	Copper (mg/kg dry weight)	Total Solids (%)	Total Volume (liters)	Approximate Basin Bottom Coverage (%)
1	1,700	6.95	2.5	6.5
2	410	7.41	2.0	6.5
3	180	19.8	1.0	4.8

Notes:
% = percent; mg/kg = milligram(s) per kilogram

3.2 Dome Study Results

The third study question, “*What impact do the cleaning methods of the Boatwash have on the leach rates of commonly-used Category I AFPs?”*, was addressed by the Dome Study conducted from December 2018 through January 2019. The complete Dome Study report, including methods, results, and discussion, is provided in Appendix G.

The purpose of the Dome Study was to compare in situ leach rates of dissolved copper from two vessels, both of which were painted at the same time with the same paint. Both vessels were cleaned on the same day; one was cleaned using standard diver cleaning methods, and the other was cleaned using the Boatwash system. In situ leach rates were measured prior to vessel cleaning (baseline), as well as 1, 3, 14, and 32 days following cleaning.

The Dome Study indicated that the two cleaning methods were both effective in removing hull fouling. The Boatwash system cleaning showed an increase in the dissolved copper leach rate that persisted through the Day 3 post-cleaning sample event. The diver cleaning showed no significant change in the leach rates. Overall, statistical comparisons of the two methods indicated that the differences in leach rates were limited to the Day 1 and Day 3 sampling events, and that dissolved copper leach rates from the two vessels essentially equalized by the Day 14 sampling event.

4.0 RECOMMENDATIONS

Recommendations for the Phase 2 water quality monitoring approach are based on the results of Phase 1. An addendum SAP reflecting these recommendations will be provided prior to field efforts. The Phase 2 water quality monitoring will last for the remainder of the Boatwash Pilot Study (approximately 18 months following the submission of this report). When the Boatwash opens for Phase 2, Wood recommends continuing particulate debris collection and water quality and toxicity monitoring within and directly outside the Boatwash following the close of the business week (i.e., at the end of five consecutive business days) on a quarterly basis. Wood's recommended sampling schedule is presented in Table 4-1.

Water Quality Sampling Scheme

The results from Phase 1 indicated little overall difference in the toxicity levels between the two basin stations (Basin-1 and Basin-2) and the two gate stations (Gate-1 and Gate-2). Concentrations of dissolved copper, total copper, and TSS were typically more elevated in Gate-1 and Basin-1 compared to Gate-2 and Basin-2 following a vessel cleaning (i.e., T1-T4), likely due to sequence of sample collections[7]. Additionally, dissolved copper, total copper, and TSS results from the baseline collection (T0) and post-event monitoring collections showed little difference between the two basin stations and the two gate stations. Based on these results, Wood recommends reducing the sampling scheme to include one station within the Boatwash basin (Basin-1) and one station directly outside the Boatwash (Gate-1). Water quality samples should continue to be collected from surface water (i.e., 1 meter below the surface) and bottom water (i.e., 2.2-meter depth).

Table 4-1. Schedule of Phase 2 Monitoring Events

Event	Timing	Collection Sequence	Analyses
Baseline	Conducted prior to public Boatwash opening	Samples collected in sequence at Gate-1 and Basin-1.	*Water chemistry:* Dissolved Copper Total Copper TSS *Toxicity:* Mussel embryo development *Physical water quality:* Temperature Salinity pH Turbidity *Particulate Debris Collection:* Total Copper Percent Solids
Quarterly Monitoring (every 3 months for 18 months)	Following the close of a typical business week (i.e., 5-day week)	Gate-1 and Basin-1 samples collected simultaneously (i.e., two teams), immediately following the release of the last vessel of the business day (i.e., similar timing to T4 in Phase 1). Following water quality sample collections, particulate debris sample collection.	

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[7] Samples from Gate-1 and Basin-1 were simultaneously collected immediately following vessel cleaning (T1 and T3) and vessel release (T2 and T4). Sample collections at Gate-2 and Basin-2 collections followed Gate-1 and Basin-1.

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5.0 QA/QC SUMMARY

All samples were submitted to the analytical laboratories within 48 hours after collection. All samples were received on ice and in good condition at Weck. The samples for dissolved metals analyses were preserved by the laboratory immediately upon receipt. All samples met holding time requirements for analysis.

Analytical chemistry results underwent a thorough QA/QC evaluation. Results were determined to meet the data quality objectives in the QAPP and were deemed acceptable for reporting purposes, with qualifications as noted in the QA section of the individual laboratory reports (summarized below). The analytical laboratory reports in Appendix D have specific QA/QC sections that highlight any qualified data.

- **Issue** – Higher-than-expected levels of dissolved and total copper were observed in the equipment rinsate blank, specifically for Event 2 (Niskin 1). Ideally, the level of metals in this QA sample should be very low or non-detect. The field blank contained concentrations less than those of the equipment blank, which is indicative of potential trace contamination of equipment. The concentrations of the metals in the equipment rinsate are less than the concentrations measured during the baseline samples at either the gate or basin stations for Events 1, 2, or 3. As a result, following Event 2 and subsequent follow-up monitoring, Niskin 1 was replaced.

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6.0 REFERENCES

Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler). 2018. Rentunder Boatwash Pilot Study in Shelter Island Yacht Basin Sampling and Analysis Plan and Quality Assurance Project Plan. May 2018.

Coastal Monitoring Associates. 2019. Comparison of In-Situ Copper Release Rates from Two Hull Cleaning Methods. April 2019.

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APPENDIX A
RENTUNDER BOATWASH PILOT STUDY IN SHELTER ISLAND YACHT BASIN SAMPLING AND ANALYSIS PLAN AND QUALITY ASSURANCE PROJECT PLAN

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FINAL

RENTUNDER™ BOATWASH PILOT PROJECT IN SHELTER ISLAND YACHT BASIN

SAMPLING AND ANALYSIS PLAN & QUALITY ASSURANCE PROJECT PLAN

Prepared for:
San Diego Unified Port District

Prepared by:

Amec Foster Wheeler Environment & Infrastructure, Inc.
9210 Sky Park Court, Suite 200
San Diego, California 92123

May 2018

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ACRONYMS AND ABBREVIATIONS

Amec Foster Wheeler	Amec Foster Wheeler Environment & Infrastructure, Inc.
AFP	Antifoulant paint
BEI	Blue Economy Incubator
Boatwash	Rentunder™ Drive-In Boatwash
Boatwash Pilot Study	Two-Year Rentunder™ Drive-In Boatwash Pilot Project Study
COC	chain-of-custody
CRM	Certified Reference Material
Cu	Copper
DI	de-ionized
DQO	data quality objective
ELAP	California Environmental Laboratory Accreditation Program
FD	field duplicate
ID	identification
ITRC	The Interstate Technology & Regulatory Council
LCS	laboratory control standard
LD	laboratory duplicate
MS	matrix spike
MSD	matrix spike duplicate
NA	not applicable
NIST	National Institute of Standards and Technology
NWP	Nationwide Permit
pH	hydrogen ion concentration
PM	Project Manager
Port	Port of San Diego
ppt	parts per thousand
QA	quality assurance
QA/QC	quality assurance and quality control
QAM	Quality Assurance Manual
QAPP	Quality Assurance Project Plan
QC	quality control
RFP	request for proposals
RPD	relative percent difference
SAP	Sampling and Analysis Plan
SIYB	Shelter Island Yacht Basin
SM	Standard Methods
SOP	Standard Operating Procedure
SRM	Standard Reference Material
SWAMP	Surface Water Ambient Monitoring Program
State Board	State Water Resources Control Board
TMDL	Total Maximum Daily Load
TSS	total suspended solids
USCG	United States Coast Guard
USEPA	United States Environmental Protection Agency
Weck	Weck Laboratories, Inc.
WQO	water quality objective
YSI	YSI Incorporated

UNITS OF MEASURE

<	less than
±	plus or minus
%	percent
°C	degrees Celsius
µg	microgram(s)
µg/L	micrograms per liter
µm	micrometer(s)
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
mL	milliliter(s)
ppt	parts per thousand

1.0 INTRODUCTION

Since the adoption of the Shelter Island Yacht Basin (SIYB) Total Maximum Daily Load (TMDL) for dissolved copper in 2005, the Port of San Diego (Port) and tenants of SIYB have evaluated several methods of reducing dissolved copper contributions to the water column in SIYB and San Diego Bay. The TMDL attributes the majority of the dissolved copper load to leaching from copper based antifoulant paints (AFP), and secondarily from the in-water cleaning of hulls coated with AFPs. In 2015, Port staff began exploring alternative technologies and project concepts to assist in the removal of copper in the water, exploring alternatives to traditional in-slip hull cleaning, and the use of natural ecosystem enhancements (i.e. bioremediation) to reduce copper. In April 2016, a request for proposals (RFP) for innovative hull-cleaning and copper remediation technology was received. Upon proposal review, the Rentunder™ Drive-In Boatwash (Boatwash) was selected, and it was recognized that the proposal could be directly applicable to the Port's newly established Blue Economy incubator (BEI). On June 2017, the Port Board authorized, through the BEI, a two-year pilot project to demonstrate the Boatwash technology. This Sampling and Analysis Plan (SAP) will guide the implementation of the Boatwash Water Quality Monitoring Study (Boatwash Pilot Study) and establish the environmental testing associated with this technology, ultimately determining the efficacy of the project in reducing copper from hull cleaning.

The Boatwash can accommodate recreational vessels up to 53 feet in length to drive into its enclosed basin, and subsequently be cleaned by mechanical scrubbers for a period of approximately 30 minutes. The entire cleaning process is conducted within the enclosed basin of the Boatwash, which is designed to retain residual debris and particulate matter within the basin. When the cleaning process for each vessel is complete, the vessel is manually guided out of the Boatwash where the gate is only lowered enough to clear the hull or keel of the vessel. Residual cleaning debris sinks to the bottom of the Boatwash basin, which is cleaned out by a suction pump and/or a diver on a regular basis.

In addition to Port approval via the BEI, Rentunder has obtained permission under the U.S. Army Corps of Engineer's Nationwide Permit (NWP) 5, which allows the construction of Scientific Measurement Devices pursuant to Section 10 of the Rivers and Harbors Act. Additionally, the NWP 5 is pre-certified for the 401 Water Quality Certification. As part of the 401 Certification, a water quality monitoring plan must be submitted to the San Diego Regional Water Quality Control Board to evaluate any potential discharge. The Port of San Diego approved a two-year pilot project to evaluate whether the Boatwash will provide a feasible alternative to standard in-water hull cleaning practices, and whether the Boatwash will improve the overall water quality in SIYB. The Boatwash Pilot Study will evaluate the Boatwash in three ways:

- By quantifying the amount of particulate copper collected within the Boatwash basin. It is assumed that this particulate copper would otherwise be released into the water column and/or settle in the sediments as a result of the current practice of conducting in-water hull cleaning in boat slips;
- By measuring the effects of the Boatwash on surrounding water quality (specifically dissolved and total copper concentrations); and
- By evaluating the differences in changes in the copper paint leach rates as a result of Boatwash cleaning methods compared to current in-slip cleaning practices.

This combined Sampling and Analysis Plan (SAP) and Quality Assurance Project Plan (QAPP) has been prepared for the Boatwash Pilot Study. This plan was prepared by Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler)[1] for the Port of San Diego (Port).

The objective of the Boatwash Pilot Study is to answer the following questions:

1. *What is the concentration of dissolved and total copper within and directly outside the Boatwash after a typical business day (i.e., multiple cleaning events)?*
2. *What is the quantity of particulate debris that the boatwash captures, and what is the copper concentration of this debris?*
3. *What impact do the cleaning methods of the Boatwash have on the leach rates of commonly-used Category I AFPs?*

The scope of work for the Boatwash Pilot Study is outlined in this SAP. The study will include:

- Collection and analysis of water for total and dissolved copper, and *in situ* measurement of physical parameters
- Toxicity testing
- Particulate debris monitoring
- A dome study quantifying the copper leach rate from Boatwash cleaning methods

This SAP/QAPP provides detailed information on the design and implementation of the Boatwash Pilot Study. It is organized as follows:

- Section 1, **Introduction** to Boatwash Pilot Study including purpose and objectives.
- Section 2, **Project Management** overview of the project personnel, roles and responsibilities of the key team members, and lines of communication.
- Section 3, **Monitoring Plan** with detailed information on the design of each of the components of the Boatwash Pilot Study, proposed collection locations, schedule of sampling events, sample collection techniques, sample handling and chain of custody (COC), field measurements and analytical tests to be conducted, data analysis techniques, and project schedules.
- Section 4, **Quality Assurance Project Plan** outlining the procedures to ensure that collection and handling of water samples, collection of field data, and analysis of water samples are conducted with a high degree of quality assurance and quality control (QA/QC).
- Section 5, **Report Preparation** to list information that will be compiled and submitted to the Port at the conclusion of the Boatwash Pilot Study.
- Section 6, References for literature sources and reports cited in this document.

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[1] Amec Foster Wheeler's parent company is now owned by Wood plc.

2.0 PROJECT MANAGEMENT

This section presents project personnel, team organization, roles and responsibilities of key team members, and lines of communication for field and laboratory activities.

2.1 SAP/QAPP Distribution

Table 2-1 identifies those individuals who will receive one copy of the approved SAP/QAPP.

Table 2-1.
SAP/QAPP Distribution List

Title	Name (Affiliation)	Signature/Date
Project Manager	Phillip LeBlanc (Port of San Diego)	
Copper Reduction Program Manager	Kelly Tait (Port of San Diego)	
Project Manager and Field Quality Assurance (QA) Officer	Barry Snyder (Amec Foster Wheeler)	
Field Project Manager	Corey Sheredy (Amec Foster Wheeler)	
Analytical QA Officer	Rolf Schottle (Amec Foster Wheeler)	
Toxicity QA Officer	Chris Stransky (Amec Foster Wheeler)	
Analytical Laboratory Project Manager	Chris Samatmanakit (Weck Laboratory)	
Toxicity Laboratory Project Manager	Steve Carlson (Amec Foster Wheeler)	
Dome Study Project Manager	Bart Chadwick, Ph.D. (Coastal Monitoring Associates)	

2.2 Project Organization

Project Personnel and Roles

Amec Foster Wheeler will organize field sampling logistics and equipment, provide sample collection and oversight for laboratory analysis of samples, perform data analysis, and prepare reports for the Boatwash Study. Individual roles for project personnel are outlined in Table 2-2.

Phillip LeBlanc is the Project Manager (PM) for the Port. Mr. LeBlanc will be responsible for project administration and will serve as the lead contact at the Port.

Kelly Tait is the PM for the Copper Reduction Program. Ms. Tait will be responsible for project administration of the Water Quality Monitoring portion of the Boatwash Pilot Project.

Barry Snyder is the PM and Field Quality Assurance (QA) Officer for Amec Foster Wheeler. Mr. Snyder will be responsible for overall project management, organization, contracts, and oversight. In addition, he will serve as the Field QA Officer and will oversee field-related QA/QC procedures.

Corey Sheredy is the Field PM for Amec Foster Wheeler. Ms. Sheredy will oversee coordination and execution of the field effort, including organization of field staff and scheduling of sampling days, and will be responsible for overseeing data analysis and finalizing the project reports.

Rolf Schottle is the Analytical QA Officer for analytical chemistry for Amec Foster Wheeler. Mr. Schottle will be responsible for guaranteeing the validity of all QA/QC procedures and will ensure that analytical chemistry data reported by the laboratory and Amec Foster Wheeler has been generated in compliance with the appropriate protocols. Mr. Schottle will also be responsible for coordination with the analytical laboratory and will work with the Analytical Laboratory PM to ensure that proper QC procedures are followed.

Chris Stransky is the Toxicity QA Officer for Amec Foster Wheeler. Mr. Stransky will be responsible for guaranteeing the validity of all QA/QC procedures and will ensure that toxicity reported by the laboratory has been generated in compliance with the appropriate protocols. Mr. Stransky will also be responsible for coordination with the analytical laboratory and will work with the Analytical Laboratory PM to ensure that proper QC procedures are followed.

Chris Samatmanakit is the Analytical Laboratory PM for Weck Laboratories, Inc. (Weck). Mr. Samatmanakit will be responsible for providing analytical chemistry data in an approved and quality-controlled (QC) format.

Steve Carlson is the Toxicity Laboratory PM for Amec Foster Wheeler. Mr. Carlson will be responsible for providing the toxicity data in an approved and quality-controlled (QC) format.

Bart Chadwick, Ph.D. is Dome Study PM for Coastal Monitoring Associates. Dr. Chadwick will oversee coordination and execution of the Dome Study component.

Table 2-2.
Project Personnel Roles and Contact Information

Name (Affiliation)	Project Role(s)	Contact Information
Phillip LeBlanc (Port of San Diego)	Port Project Manager	(619) 686-6516 (office) (619) 686-6467 (fax) pleblanc@portofsandiego.org
Kelly Tait (Port of San Diego)	Copper Reduction Program Manager	(619) 686-6372 (office) (619) 348-1690 (mobile) (619) 686-6467 (fax) ktait@portofsandiego.org
Barry Snyder (Amec Foster Wheeler)	Project Manager and Field QA Officer	(858) 300-4320 (office) (858) 354-8340 (mobile) (858) 300-4301 (fax) barry.snyder@amecfw.com
Corey Sheredy (Amec Foster Wheeler)	Field Project Manager	(858) 300-4316 (office) (831) 359-7761 (mobile) (858) 300-4301 (fax) corey.sheredy@amecfw.com
Rolf Schottle (Amec Foster Wheeler)	Analytical QA Officer	(858) 300-4323 (office) (619) 985-2405 (mobile) (858) 300-431 (fax) rolf.schottle@amecfw.com
Chris Stransky (Amec Foster Wheeler)	Toxicity QA Officer	(858) 300-4350 (office) (858) 775-5547 (mobile) (858) 300-4301 (fax) chris.stransky@amecfw.com
Chris Samatmanakit (Weck Laboratories)	Analytical Laboratory Project Manager	(626) 336-2139 ext. 141 (office) (626) 336-2634 (fax) chris.samatmanakit@wecklabs.com
Steve Carlson (Amec Foster Wheeler)	Toxicity Laboratory Project Manager	(858) 300-4300 (office) (858) 300-4301 (fax) steve.carlson@amecfw.com
Bart Chadwick, Ph.D. (Coastal Monitroing Associates)	Dome Study Project Manager	(619) 218-5882 bart.chadwick@coastalmonitoring.net

2.3 Quality Assurance Officers' Roles

The QA Officers are responsible for guaranteeing the overall quality of the data produced and reported throughout the project. Specific duties of the QA Officers include:

- Conducting audits of ongoing tests, data packages, and completed reports;
- Conducting audits of the routine QC documentation of field and laboratory procedures;
- Communicating potential QC problems to the staff; and
- Ensuring that all problems are resolved.

The QA Officers are also responsible for issuing QA reports to management, maintaining a current Quality Assurance Manual (QAM), and issuing QAPPs as required. The QA Officers also ensure that data reported have been generated in compliance with the QAM and the appropriate protocols. The QA Officers are knowledgeable in the quality system standard defined under the California Department of Health Services Environmental Laboratory Accreditation Program (ELAP).

Barry Snyder, Rolf Schottle, and Chris Stransky are the project QA Officers. Mr. Snyder, in the role of Field QA Officer, will oversee sample collection activities to ensure that proper sampling procedures are employed. Mr. Snyder will provide QA checklists to each sampling team member that will be completed after each sample is collected. As Analytical QA Officer, Mr. Schottle will work directly with the Analytical Laboratory PM, Mr. Samatmanakit, to ensure that proper QC procedures are followed. As Toxicity QA Officer, Mr. Stransky will work directly with the Toxicity Laboratory PM, Mr. Carlson, to ensure that proper QC procedures are followed.

The QA Officers will also review and assess procedures against plan requirements during the life of the project and will evaluate the need for any corrective actions. The QA Officers may stop actions conducted by the team if there are significant deviations from required practices or if there is evidence of a systematic failure. Mr. Samatmanakit and Mr. Carlson will also have the same authority for laboratory-related operations.

3.0 MONITORING PLAN

Sampling methodology, sample collection and handling, analytical and toxicity test methods to be employed by the field and laboratory teams are discussed in this section.

3.1 Phasing and Sample Collection Schedule

The Boatwash Pilot Study will be separated into two separate phases:

- Phase 1 will consist of two components:
    - Phase 1a: Water Quality Monitoring;
    - Phase 1b: A study measuring the AFP leach rates following a Boatwash cleaning event (Dome Study); and
- Phase 2: Long-Term Monitoring for the duration of the Pilot Study.

An adaptive management approach will be used where results from Phase 1 will be analyzed to determine the Phase 2 approach, which may include adjustments to sampling and/or technology. An addendum to the SAP will be developed and provided to the Distribution List prior to the start of any Phase 2 sampling.

The two phases are described below and in Table 3-1:

1. **Phase 1**
    a. **Phase 1a (Water Quality Monitoring)** will include controlled cleaning events and concurrent water quality and particulate sampling during a limited operational phase extending for 3 months. Water quality and particulate debris sample collection and analyses will occur during the 3 days in which the Boatwash will be in operation (3 events total during this Phase). Water quality and particulate samples collected during Phase 1a will both be analyzed for chemistry, and the water samples will also be tested for toxicity.
    b. **Phase 1b (Dome Study)** will measure the AFP leach rates from a vessel as a result of a Boatwash cleaning event. The Dome Study will last for approximately 30 days.
2. **Phase 2 (Long-Term)** will last for the remainder of the Boatwash Pilot Project (approximately 18 months following the conclusion of Phase 1). The tentative sample design for Phase 2 includes quarterly collection and analyses of water quality samples and particulate debris samples, in addition to the evaluation of water quality and toxicity at the end of Phase 2; however, the sample design will be reassessed after analyzing the results from Phase 1, and an addendum SAP with a more detailed monitoring strategy will be developed and provided to the Distribution List.

It is important to note that Phase 1 operations will be conducted on a selected set of boats under controlled conditions. The paint on these boats is intended to represent paints that are currently used on vessels throughout Shelter Island Yacht Basin, and vessel use will be tracked.

Table 3-1. Boatwash Pilot Study Phasing and Sampling Schedule.

Event	Phase 1a. Water Quality and Particulate Monitoring and 1b. Dome Study (controlled Boatwash operation)			Evaluation of Phase 1 Results and Development of Phase 2 Monitoring Strategy		Phase 2: Long-Term Monitoring (Boatwash open to public)[b]
	Month			Month		Months 6-24
	1	2	3	4	5	
Water Quality Sampling	X	X	X	--	--	Quarterly sampling
Toxicity Sampling	X	X	X	--	--	Toxicity sampling will be conducted at the beginning and conclusion of Phase 2.
Particulate Debris Sampling	X	X	X	--	--	Quarterly sampling
Dome Study[a] Monitoring	The Dome Study will last for approximately 30 days during the Phase 1 period.			--		--

Notes:
[a]The Dome Study includes sample collection events on the day prior to cleaning events, the day of (or within 24 hours) the cleaning event Day 0), and Days 3, 15, and 30 following the cleaning event. All sample collection will utilize the U.S. Navy's dome method and methods described in Earley et al. 2013.
[b]Methods and timing of Phase 2 are tentative pending the results from Phase 1.
-- No sampling during this period.

3.2 Sampling Design

Sampling methodology, sample collection and handling, analytical and toxicity test methods to be employed by the field and laboratory teams are discussed in this section. The Boatwash Pilot Study consists of two Phases with interrelated components, as described below.

3.2.1 Phase 1a – Water Quality, Toxicity, and Particulate Monitoring

Phase 1a of the Boatwash Pilot Study will include controlled cleaning events and concurrent water quality and particulate sampling during a limited operational phase. Monitoring for Phase 1a will occur on the designated 3 operational days that will simulate a 'typical Boatwash business day', defined as the cleaning of 7-10 vessels in the Boatwash. The Boatwash will not be in operation during non-sampling days[2]. Prior to any sampling event, the boats for Phase 1a will be will be coordinated and assigned a cleaning date and time. Factors such as the hull paint age, extent of hull fouling, and hull condition will also be noted.

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[2] The Boatwash may operate for an additional day as part of Phase 1b (Dome Study), which may not coincide with Phase 1a sampling events.

Timing and tides

The water quality monitoring events during Phase 1a will note the tidal phase during each sample collection event.

3.2.1.1 Water Quality Monitoring

The purpose of the water quality monitoring component is to evaluate the concentrations of total and dissolved copper within and directly outside the Boatwash throughout a 'typical Boatwash business day', defined as the cleaning of 7-10 vessels in the Boatwash. The study will evaluate the concentrations of total and dissolved copper both within and directly outside the Boatwash and evaluate any cumulative effects resulting from Boatwash operations. Water quality monitoring will occur during each of the 3 operational days during Phase 1a. A water quality sampling event will be comprised of a series of water quality samples to be collected five times throughout a sampling day, as described in Table 3-2.

Table 3-2.
Collection Day Scheme

Series	Sequence Code (for sample ID labeling purposes)	Timing Description
Background	A (i.e., BWG-1-A)	Prior to start of Boatwash business day
Start of Business Day – Post Cleaning	B1	Water quality samples to be collected following the cleaning of the first vessel of the day. Samples will be collected prior to gate opening (for vessel release).
Start of Business Day – Post Boatwash Release	B2	Water quality samples to be collected following the exit of the first cleaned vessel. Samples will be collected within 5 minutes of the vessel exit, or as soon as the area is considered safe for sample collection.
End of Business Day – Post Cleaning	C1	Water quality samples to be collected following the cleaning of the last vessel of the day. Samples will be collected prior to gate opening (for vessel release).
End of Business Day – Post Release	C2	Water quality samples to be collected following the exit of the last cleaned vessel. Samples will be collected within 5 minutes of the vessel exit, or as soon as the area is considered safe for sample collection.

During each of the three sampling events, water quality samples will be collected from surface water (i.e., 1 meter below the surface) and bottom water (i.e., 2.2 meter depth[3]) at four locations within and directly outside the Boatwash. Sampling locations are provided in Table 3-3 and Figure 3-1. All water quality samples will be analyzed for total and dissolved copper and total suspended solids (TSS). Turbidity, pH, temperature, and salinity will also be measured *in situ* at each collection location.

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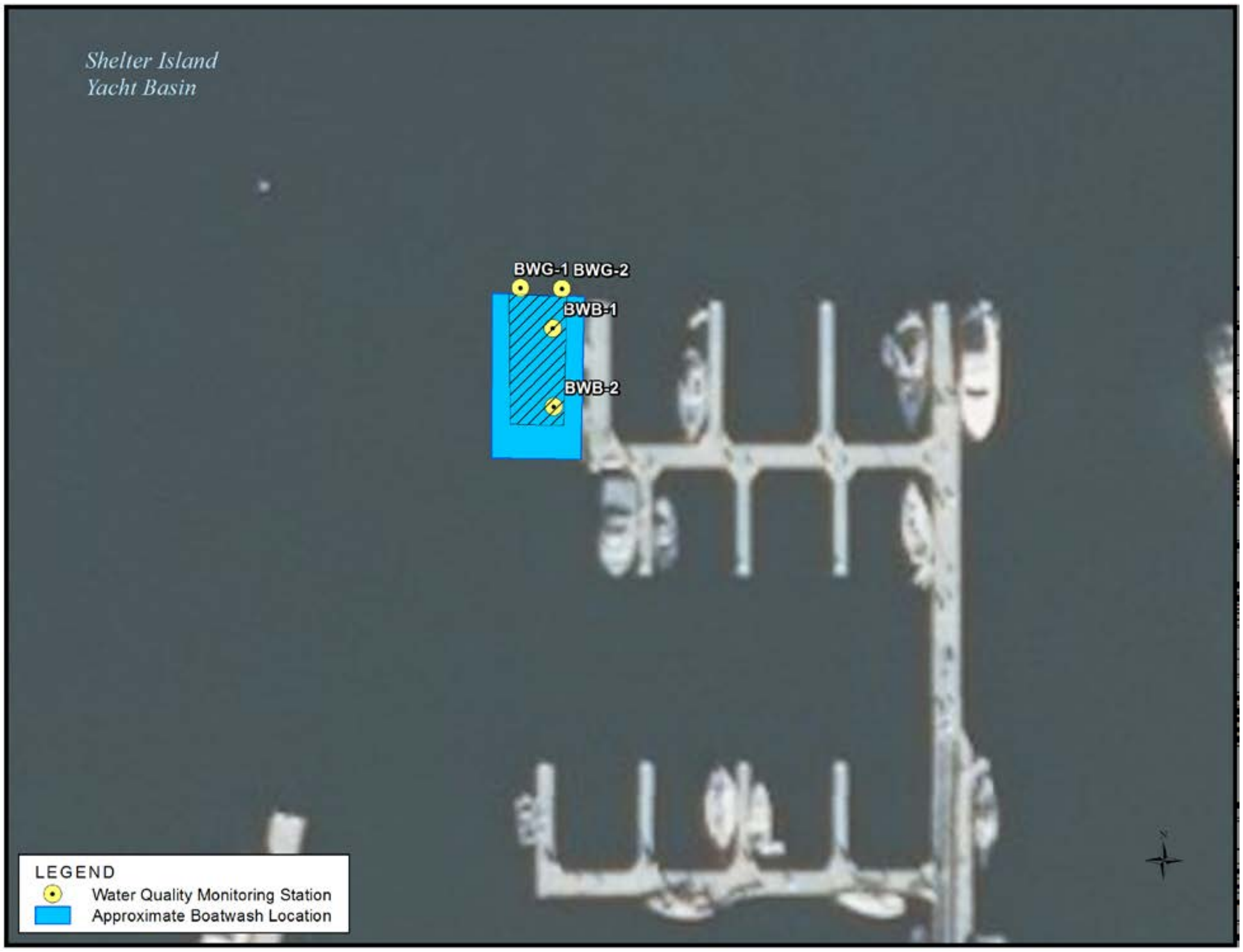
[3] Bottom sampling depth was determined based on the depth of the Boatwash. Samples are to be collected 1 m above the bottom surface of the Boatwash basin floor, which measures 3.2 m in depth.

Table 3-3.
Sample Collection Locations

Collection Order	Station ID	Depth	Location	Target Coordinate	
				Latitude (dd.ddddd°)	Longitude (ddd·ddddd°)
1	BWG-1	Surface (top 1 m)	Immediately outside and adjacent to Boatwash gate (east)	32.710142	-117.234596
		Bottom (1 meter from bottom)			
2	BWG-2	Surface (top 1 m)	Immediately outside and adjacent to Boatwash gate (west)	32.710141	-117.234543
		Bottom (1 meter from bottom)			
3	BWB-1	Surface (top 1 m)	Boatwash basin (forward)	32.710098	-117.234554
		Bottom (1 meter from bottom)			
4	BWB-2	Surface (top 1 m)	Boatwash basin (aft)	32.710015	-117.234552
		Bottom (1 meter from bottom)			

Notes: ddd/dd.ddddd° = decimal degrees

Figure 3-1.
Sample Collection Locations



The water quality samples will be collected at each station using the “clean hands” techniques with a Niskin bottle deployed directly off the Boatwash platform for all stations. Upon collection, water samples will be transferred to labeled containers for analysis of total and dissolved copper and TSS. Water samples collected for dissolved copper analysis will be filtered in the field and preserved immediately upon arrival to the analytical laboratory. Field measurements of the hydrogen ion concentration (pH), temperature, and salinity of the surface water at each station (i.e., within 1 meter (m) of the surface), will be made using a YSI meter according to manufacturer’s specifications. Turbidity will be measured in surface waters *in situ* using a LaMotte portable turbidity meter according to manufacturer’s specifications. Due to time constraints, field measurements of water quality parameters will only be made at the surface.

3.2.1.2 Toxicity Evaluation

As part of water quality monitoring, toxicity samples will also be collected during each of the three water quality collection events of Phase 1a. Toxicity testing will consist of a 48-hour chronic bioassay test using a mussel (*Mytilus galloprovincialis*) because previous studies have used the 48-hour mussel chronic test as the primary indicator of toxicity. This test will be used to assess toxicity, as this species of mussel has ecological relevance to the marina environment and has previously been found to be sensitive to dissolved copper.

Water will be collected from each of the four locations for the toxicity evaluation component. Two sets of water samples for toxicity analyses will be collected during each sampling event at each of the four sampling locations: 1) before the start of the business day (i.e., Baseline conditions), and 2) at the end of the business day (i.e., post-release of the last cleaned vessel from the Boatwash). Collection for toxicity samples will immediately follow the collection of water quality samples. Similar to the water quality sample collection, the toxicity sample will be collected at the appropriate station using the “clean hands” techniques with a Niskin bottle deployed directly off the Boatwash platform. At each location, one sample will be collected from 1 meter below the surface, and one sample will be collected from 1 meter above the bottom. The two samples from each location will be combined to into a composite sample for toxicity analysis. Composite water samples will then be transferred to labeled containers, and kept on ice until delivery to the toxicity laboratory.

3.2.1.3 Boatwash Particulate Debris Monitoring

Particulate debris removed from boat hulls as a result of cleaning activity will accumulate at the bottom of the Boatwash. The purpose of the particulate debris monitoring component of the Boatwash Study will be to collect and quantify the volume of debris, and analyze the collected debris for copper content.

Following the last collection of water quality samples of the day (i.e., End of Business Day – Post-Release), particulate debris will be collected from the bottom of the Boatwash basin into a fine-mesh filter bag, using a vacuum system (Figure 3-2). For sampling, particulate debris will be collected following each water quality monitoring event during Phase 1a, for a total of three sampling events. Particulate debris will be sampled using the Interstate Technology & Regulatory Council (ITRC) Incremental Sampling Methodology for guidance (ITRC, 2012). Contaminant concentrations in particulate matter measured using traditional, discrete sampling methods are often highly variable due to the heterogeneity of samples. By collecting and combining numerous increments of particulate debris to process and subsample, incremental sampling provides a more representative sample of larger volumes of debris than discrete sampling methods.

During Phase 1a, each sample of particulate debris from the Boatwash will be spread out into a thin layer. A small stainless-steel spatula will be used to collect twenty ~2-gram increments from systematic random locations. Random locations will be predetermined using the systematic random incremental sampling pattern for square areas found in the ITRC Incremental Sampling Methodology (ITRC, 2012) for guidance. All 20 increments will be combined to form an "increment sample," which will be sent to the lab to be analyzed for copper content. The increment samples will be subsampled in triplicate during laboratory processing to evaluate the precision of processing and subsampling. Upon receiving results for the Phase 1a, sampling protocol may be adjusted to reflect Phase 1a findings as necessary for monitoring during Phase 2.

Figure 3-2. Boatwash Vacuum System for the Collection of Particulate Debris and Collected Debris.

3.2.2 Phase 1b - Dome Study

The Dome Study (Phase 1b) will be conducted concurrently with Phase 1a. Currently, the Boatwash is equipped with a motorized plastic bristle brush on a mechanical arm (Figure 3-3). The main brushes rotate at a set rotational speed of 18 rotations per minute[4] while the mechanical arm moves horizontally along the vessel hull, removing growth and/or debris.

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[4] Per correspondence with Rentunder.

Figure 3-3. Boatwash Cleaning Brush and Arm Configuration.

The purpose of Phase 1b is to identify and measure any potential differences in the copper leach rates after a Boatwash cleaning compared to the leach rates after a cleaning using current in-water hull cleaning practices. As such, a side-by-side leach rate study between the Boatwash and in-water hull cleaning methods will be conducted (Dome Study). Two vessels will be selected for the Dome Study; one vessel will be designated for Boatwash cleaning, the second for standard BMP in-water hull cleaning methods. The two vessels chosen for Phase 1b of the Boatwash Pilot Study should both be newly coated with a selected Category I paint[5]. Additionally, the vessels selected should have similar properties (i.e., hull shape, size, and use over the duration of the study). Hull cleaning and subsequent measurement of the paint leach rate of the two selected vessels will follow the schedule described in Table 3-4.

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[5] The Category I paint selected for the dome study will (1) be an epoxy paint commonly-utilized in SIYB, and (2) have a higher leach rate (i.e., closer to 9.5 ug/cm^2/day). The vessel, per paint manufacturer's specifications, will not be cleaned for at least 60 days after the application of paint.

Table 3-4.
Dome Study Sampling Schedule.

Day	Comments	Boatwash Vessel Sampled	Control (In-water hull cleaned vessel) Sampled	Replicates per Sample
Pre-Cleaning Event	Baseline leach rate; should be conducted 24-48 hours prior to cleaning event	X	X	3
Day 0 (day of cleaning events)	Leach rate should be measured within 24 hours of a cleaning event.	X	X	3
Day 3	Expected peak of post-refreshment leach rate increase (Earley et al. 2013)	X	X	3
Day 15	--	X	X	3
Day 30	Expected return to baseline leach rate (Earley et al. 2013)	X	X	3

Sampling methods to determine the biocide release rates from paint will follow the U.S. Navy's dome method, also used during the Earley et al. 2013 study. Sampling days were selected based on the profile of post-cleaning leach rates analyzed by Earley et al., 2013. Each sample will be taken in triplicate. The Dome Study component will be completed by Coastal Monitoring Associates following methods described in Earley et al. 2013; Coastal Monitoring Associates will work with Amec Foster Wheeler to coordinate vessel cleaning events and subsequent dome method sampling. It is anticipated that the cleaning event for the Dome Study component will be one of the 3 operational days for the Boatwash, with the subject test boat included in the number boats cleaned within that Boatwash Business Day.

3.2.3 Phase 2 (Long-Term)

The Phase 2 water quality monitoring will last for the remainder of the Boatwash Pilot Project (approximately 18 months following the conclusion of Phase 1). Tentatively, the sampling design for Phase 2 includes the quarterly collection and analysis of water quality samples and particulate debris samples. In addition, toxicity will be re-evaluated at the beginning and conclusion of Phase 2 and compared to the baseline measurements obtained during the first water quality monitoring event of Phase 1. However, it is important to reiterate that this Pilot Project is a 2-year scientific experiment intended to evaluate whether the Boatwash will provide a feasible alternative to standard in-water hull cleaning practices and whether the Boatwash will improve overall water quality. As such, the sampling design for Phase 2 may be modified following the evaluation of Phase 1 results during months 4 and 5, if the need for further scientific data/analysis outside the original sampling design is warranted. An addendum SAP including a more detailed monitoring strategy will be developed and distributed to the appropriate parties after evaluating the results of Phase 1 and prior to conducting any Phase 2 operations.

3.3 Collection Station Positioning

Water sampling stations will be accessed using the platform of the Boatwash and will be documented using a Global Positioning System (GPS) device. Particulate debris will be collected using a vacuum (similar to a pool vacuum) into a fine-mesh filter bag from the bottom of the Boatwash basin.

3.4 Equipment Decontamination and Cleaning

Prior to each water quality sampling event, the Niskin bottle will be cleaned using soapy water followed by a thorough rinse with deionized water. Upon deployment, the Niskin bottle will also be rinsed thoroughly with site water and soaked at the sampling depth (1 meter below the water surface) for at least for one minute prior to sample collection. After collection, water samples will be transferred from the Niskin bottle to laboratory-certified, contaminant-free bottles that are the appropriate type for the required analyses. In between sample collections, the Niskin bottle will be stored in a plastic-lined, 5-gallon bucket.

3.5 Sample Processing, Handling, and Custody

Water samples will be uniquely identified by labeling laboratory-provided containers with sample labels in indelible ink. All labels will include the project title, appropriate identification number, date and time of sample collection, and preservation method. The field crew will inspect the sample collection bottles before and after they are filled to ensure that each sample bottle is correctly labeled with station location and analysis type. After each sample collection, the field crew will complete a QA form to verify bottle information and ensure labeling accuracy.

Water samples and particulate debris samples will be logged on a COC form (Attachment B), and the form will be placed in the cooler for transport to the analytical and toxicity laboratories. Samples will be kept on ice from the time of sample collection until delivery to the analytical laboratory. All samples will be transferred to the appropriate laboratory and analyses initiated within the method specified holding time (Table 3-5). Additionally, appropriate volumes of each sample will be archived at Weck in case any analyses need to be repeated for confirmation. All analyses will be conducted by Weck, a California ELAP accredited laboratory for all the specific tests required for this program.

Table 3-5. Sample Holding Times

Analyte	Holding Time
Field Measurements	
Turbidity	Field Collected
pH	Field Collected
Salinity	Field Collected
Temperature	Field Collected
Water	
Dissolved Copper	180 days
Total Copper	180 days
TSS	7 days
Debris	
Particulate Copper	1 year

3.6 Field Sampling Preservation, Packaging, and Shipment

During each sampling event, samples will be preserved by placing the sample bottles in wet-iced coolers immediately after collection. Field samples will be shipped via courier with appropriate COC forms within 24 hours of completion of the sampling event.

3.7 Chain-of-Custody Records

Proper COC procedures will be used throughout the sample collection, transport, and analytical process. The principal documents used to identify samples and to document possession are COC records, field logbooks, checklists, and field tracking forms. The COC process is initiated during sample collection. A COC record will be provided with each sample or group of samples. Each employee who has custody of the samples will sign the form and will ensure that the samples are not left unattended and are properly secured.

Documentation of sample handling and COC includes the following:

- Client and project name,
- Sample identifier,
- Sample collection date and time,
- Any special notations on sample characteristics or analysis,
- Initials of the person collecting the sample,
- Date the sample was sent to the analytical laboratory, and
- Shipping company and waybill information or courier.

Completed COC forms will be placed into a plastic envelope and kept inside the cooler containing the samples. A courier will deliver the water samples from the Amec Foster Wheeler Office to the analytical laboratory following the day of collection. Upon delivery of the samples to the analytical laboratory, the COC form will be signed by the person receiving the samples.

Copies of the COC records will be included in the final reports prepared by the analytical laboratory.

3.8 Analytical Methods

Water samples will be analyzed for total copper, dissolved copper TSS; water will be measured in the field for turbidity, salinity, temperature, and pH (Table 3-6). Total and dissolved copper analyses will follow USEPA methods. Water samples will also be tested for toxicity. Analytical methods, detection, and reporting limits are presented in Table 3-6.

Table 3-6.
Laboratory Analytical Methods and Detection Limits

Sample Type	Measurement	Method	Method Detection Limit	Reporting Limit
Water Quality	Total Copper	USEPA 1640	0.0038 µg/L	0.010 µg/L
	Dissolved Copper	USEPA 1640	0.0038 µg/L	0.010 µg/L
	TSS	SM 2540D	NA	5.0 mg/L
	Salinity	YSI Pro Plus	NA	± 0.1 ppt
	Temperature	YSI Pro Plus	NA	± 0.1 °C
	pH	YSI Pro Plus	NA	± 0.1 pH unit
	Turbidity	LaMotte Meter	NA	± 0.1 NTU
Particulate Analysis	Solids	USEPA 6020 Cu	0.29 mg/kg	0.50 mg/kg
Dome Study[a]	Dissolved Copper	USEPA 1640	0.0038 µg/L	0.010 µg/L

Notes:
[a] The Dome Study water collection will be subcontracted. °C = degrees Celsius; ± = plus or minus; µg/L = microgram(s) per liter; mg/L = milligram(s) per liter; mg/kg = milligram(s) per kilogram; NA = not applicable; NTU = Nephelometric Turbidity Unit; TSS= total suspended solids; pH = hydrogen ion concentration; ppt = part(s) per thousand; SM = Standard Method; USEPA = United States Environmental Protection Agency; YSI = YSI Incorporated.

3.9 Data Analysis

Summary data tables and figures will be created only after the raw data have passed through the QA/QC criteria.

3.10 Data Review

Following each field event, field data sheets and checklists will be checked for completeness and accuracy by the field crew and the Field PM (Ms. Sheredy). In addition, all sample COCs will be checked against sample labels prior to samples being transported to the laboratories. In the laboratory, technicians will document sample receipt and sample preparation activities in laboratory logbooks or on bench sheets.

In the laboratory, data validation will include use of dated and signed entries by technicians on the data sheets and logbooks used for samples, sample tracking and numbering systems to track the progress of samples through the laboratory, and QC criteria to reject or accept specific data. Data for laboratory analyses will be entered directly onto data sheets. Data sheets will be filled out in ink and signed by the technician, who is responsible for checking the sheet to ensure completeness and accuracy. The technician who generated the data will have the prime responsibility for the accuracy and completeness of the data.

Each technician will review the data to ensure the following:

- Sample description information is correct and complete,
- Analysis information is correct and complete,
- Results are correct and complete, and
- Documentation is complete.

All data will be reviewed and verified by the analytical laboratory to determine whether data quality objectives have been met and whether appropriate corrective actions have been taken, when necessary, as detailed in this SAP/QAPP.

3.11 Data Management

The analytical laboratory will supply analytical results in both hard copy and electronic formats and will be responsible for ensuring that both forms are accurate. After completion of the data review by the laboratory, hard copy results will be placed in the project files; results in electronic format will be imported into a database system. The database is discussed in further detail in Section 5.4.1.

3.12 Laboratory Quality Assurance and Quality Control

Analytical laboratories will provide a QA/QC narrative that describes the results of the standard QA/QC protocols that accompany analysis of field samples. All hard copies of results will be maintained in the project files. In addition, backup copies of results generated by the laboratory will be maintained at its facility. At a minimum, the laboratory reports will contain results of the laboratory analysis, QA/QC results, all protocols and any deviations from the project SAP/QAPP, and a case narrative of COC details. Laboratory QA/QC requirements are discussed in detail in Section 5.0.

4.0 QUALITY ASSURANCE

4.1 Field and Analytical QA/QC Procedures

Strict QA/QC procedures will be employed throughout the entire study, from mobilization through delivery of samples to the laboratories. Extra care will be taken to minimize the possibility of compromising sample integrity. The sample collection team will be trained in and follow field sampling standard operating procedures (SOPs), as described in this document. A QA/QC log will be completed following each sample collection event to review each step of the sample and data collection process. These checks will ensure that collection procedures are consistent between sampling events and among all three stations, and that all required field data are recorded correctly and completely. The QA/QC log is provided in Attachment C.

Field team members will take care to avoid contamination of samples at all times by employing the SWAMP clean-hands technique and will wear powder-free nitrile gloves during sample collection. In addition, the Field Manager will ensure that the sample collection boat is either un-painted or painted with a non-biocide hull paint containing no copper. All samples will be collected in laboratory-supplied, laboratory-certified, contaminant-free sample bottles containing the correct preservative (if applicable).

The sampling team will be familiar with this SAP/QAPP and field sampling SOPs to ensure that all sampling personnel are trained accordingly. Additionally, the field team members will be made aware of the significance of the project’s method detection limits and the requirement to avoid contamination of samples at all times.

Field equipment will be checked and calibrated for operation in accordance with the manufacturer’s specifications (calibration records will be recorded and maintained), and will be inspected for damage prior to and when returned from use. Observations of activities surrounding the sampling area will be recorded on field data sheets at each station and during movement between stations (i.e., boat hull cleaning, boat washing, etc.). Photographs will also be taken if necessary.

As required by SWAMP protocols, the Boatwash Study will include field replicates. The purpose of a field replicate is to assess variability in sampling procedures as well as ambient conditions. The field replicate sample will consist of a second complete set of samples collected during one sampling interval at each of the stations. The field replicate samples will be analyzed for the same suite of chemicals as the test samples. In addition to the field replicate samples, the study will also include one equipment rinse blank and one field blank, as specified by SWAMP protocols.

The Boatwash Study will include the following QA/QC elements:

- ✓ Verification of laboratory certifications
- ✓ Field mobilization and equipment checklists
- ✓ Field sampling QA/QC checklists at each station
- ✓ Field equipment calibrations records at each station
- ✓ Observations for hull cleaning or other water-quality-impacting activities near sample collection stations
- ✓ Staff training on QAPP-required field procedures
- ✓ Field conditions and water quality data sheets

For this study, the analytical laboratory chosen to conduct the analyses is required to (1) be certified to conduct the analyses for the constituents of concern, (2) be certified for the specific analysis methods required for this program, and (3) hold a valid ELAP certificate at the time the Boatwash Study is initiated and the samples are analyzed. The QA objectives for chemical analysis to be followed by the analytical laboratory are detailed in its laboratory QA manual and this QAPP. The objectives for accuracy and precision involve all aspects of the testing process, including the following:

- Methods and SOPs
- Calibration methods and frequency
- Data analysis, validation, and reporting
- Internal QC
- Preventive maintenance
- Procedures to ensure data accuracy and completeness

Results of all laboratory QC analyses will be reported with the final data. Any QC samples that fail to meet the specified QC criteria in the methodology or QAPP will be identified and the corresponding data will be appropriately qualified in the final report. The final report will include a separate section that discusses any QA/QC issues encountered during the sampling activities, as well as the corrective actions taken to address any issues satisfactorily.

4.2 Assessments and Response Actions

The Analytical Laboratory PM at Weck, Chris Samatmanakit, will receive a copy of this SAP/QAPP prior to submission of samples and will be required to sign off that he has read and understands all of the expectations for Weck outlined in this SAP/QAPP. The Amec Foster Wheeler Analytical QA Officer, Rolf Schottle, will be immediately notified by phone, with a follow-up in writing, of any incident that results in the need for corrective action as described in the following sections. The Toxicity Laboratory Manager at Amec Foster Wheeler, Steve Carlson, will receive a copy of this SAP/QAPP prior to submission of samples and will be required to sign off that he has read and understands all of the expectations for Amec Foster Wheeler outlined in this SAP/QAPP. The Amec Foster Toxicity QA Officer, Chris Stransky, will be immediately notified by phone, with a follow-up in writing, of any incident that results in the need for corrective action as described in the following sections

4.2.1 Corrective Action Plans

An out-of-control event is defined as any occurrence failing to meet pre-established criteria. A nonconformance is a deficiency in characteristic, documentation, or procedure sufficient to make the quality indeterminate or unacceptable. An out-of-control event is a subcategory of nonconformance. Any out-of-control events observed, whether in the field or in the laboratory, will be immediately communicated to the Amec Foster Wheeler PM and Analytical QA Officer to determine the appropriate course of action.

When either situation (out-of-control event or nonconformance) is identified, it will be categorized as follows:

- **Deficiency** – Recognition that a specific requirement (e.g., program, process, or procedure) has been violated.
- **Observation** – Recognition of an activity or action that might be improved, but is not in violation of a specific requirement. Left unaddressed, the activity or action might develop into a deficiency.

4.2.2 Criteria Used for Determination of an Out-of-Control Event

Factors that affect data quality (e.g., failure to meet calibration criteria, inadequate recordkeeping, improper storage, or preservation of samples) require investigation and corrective action.

When a nonconformance is recognized, each individual involved with the analysis in question has an interactive role and responsibility. This process is described in the following two paragraphs.

- **Analytical Laboratory PM and Toxicity Laboratory PM** – The Analytical Laboratory PM, Chris Samatmanakit, must review all analytical and QC data for reasonableness, accuracy, and clerical errors. In an out-of-control event, Mr. Samatmanakit will notify the Analytical QA Officer, Rolf Schottle, immediately (within 24-48 hours) by telephone and email. Mr. Samatmanakit and Mr. Schottle will work together to solve the problem. The Toxicity Laboratory PM, Steve Carlson, must review all toxicity and QC data for reasonableness, accuracy, and clerical errors. In an out-of-control event, Mr. Carlson will notify the Toxicology QA Officer, Chris Stransky, immediately (within 24-48 hours) by telephone and email. Mr. Carlson and Mr. Stransky will work together to solve the problem. In both cases, Mr. Stransky and Mr. Schottle will notify Amec Foster Wheeler PM, Barry Snyder of the issue and their proposed remedy. This process will prevent the reporting of suspect data by stopping work on the analysis in question and ensuring that all results that are suspect are repeated, if possible, after the source of the error is determined and remedied.

- **Analytical QA Officer and Toxicology QA Officer** – The Analytical QA Officer, Mr. Schottle, and the Toxicology QA Officer, Mr. Stransky, will report to Amec Foster Wheeler PM, Barry Snyder, on the status of the problem. Mr. Snyder will then notify the Port PM, Phillip LeBlanc, immediately (24-48 hours) by phone with a follow-up in writing if the work is affected by an out-of-control event or results of an internal audit. In the event that a QC measure is out-of-control and the data are to be reported, qualifiers will be reported together with sample results. Mr. Schottle and Mr. Stransky are responsible for reviewing nonconformance report forms, recommending or approving proposed corrective actions, and verifying that corrective actions have been completed.

4.2.3 Procedures for Stopping Analyses

Whenever the analytical system is out of control, investigation and correction efforts are initiated by all concerned personnel. Best professional judgment will be used by the person(s) notified to rectify the problem in accordance with the QAPP.

If the problem is instrumental or specific only to preparation of a sample batch, samples will be reprocessed after the instrument is repaired and recalibrated.

4.2.4 Corrective Action

The need for corrective action may arise from various possible sources: equipment malfunction, failure of internal QA/QC checks, failure of follow up on performance or system audit findings, or noncompliance with QA requirements.

When measurement equipment or analytical methods fail QA/QC requirements, the problem(s) will immediately be brought to the attention of the appropriate Analytical Laboratory PM, who will notify the appropriate QA Officer immediately. Corrective measures will depend entirely on the type of analysis, the extent of the error, and whether the error is determinant or not. The corrective action is determined by the Laboratory PM and the QA Officer. However, final approval is the responsibility of the Amec Foster Wheeler PM, Mr. Snyder.

The Amec Foster Wheeler PM, Mr. Snyder, is responsible for preparing and submitting all project reports. Draft and final reports will summarize the data collected for this project.

4.3 Data Validation and Usability

Data validation is the process whereby data are filtered and accepted or rejected on the basis of a set of criteria. It is a systematic procedure of reviewing a body of data against a set of criteria to provide assurance of its validity prior to its intended use. Data are checked for accuracy and completeness. The data validation process consists of data generation, reduction, and review. Requirements of the ELAP Standard and Good Automated Laboratory Practices (Document 2185) (USEPA, 1995) are followed for computer processing, manipulation, reporting, storage, and retrieval of data.

Data reduction, validation, and reporting are ongoing processes that involve the Analytical Laboratory PM, QA Officers, and Amec Foster Wheeler PM.

4.4 Verification and Validation Methods

4.4.1 Database Generation

Upon completion of the survey, the field data sheets will be removed from the field logbooks, and the sheets will be checked for completeness and accuracy by the applicable QA Officer or Amec Foster Wheeler PM, Mr. Snyder. Appropriate field sheets must be present and filled out completely. If there are any questions, clarification from field personnel will be obtained as soon as possible. Field data sheets and the field logbooks will be placed into folders by data type, labeled with the data type and survey name, and filed in the appropriate filing cabinet. Field sheets will also be scanned, and electronic copies stored in the project folder on Amec Foster Wheeler's San Diego server.

In the laboratory, technicians will document sample preparation activities in bound laboratory notebooks or on bench sheets. Data validation includes use of dated and signed entries by technicians on the data sheets and logbooks used for samples, sample tracking and numbering systems to track the progress of samples through the laboratory, and QC criteria to reject or accept specific data.

The data for laboratory analyses will be entered directly onto data sheets. Data sheets must be filled out in ink and signed by the technician, who is responsible for checking the sheet to ensure completeness and accuracy.

The technician who generates the data has the prime responsibility for the accuracy and completeness of the data. Each technician reviews the data to ensure the following:

- Sample description information is correct and complete.
- Analysis information is correct and complete.
- Results are correct and complete.
- Documentation is complete.

Data sheets are submitted to the Analytical Laboratory PM and Analytical QA Officer. A tracking sheet is initialed when the data are ready for transmittal to a data entry operator. Original data sheets are not allowed to leave laboratory facilities. If for any reason data entry is performed by an employee, but not at Amec Foster Wheeler's facilities, data sheets are copied, and the originals are kept with the Analytical Laboratory PM and Analytical QA Officer.

Data files are assigned a job number and are given a file name, which will be used when the file is put on compact disk.

4.4.2 Error Checking and Verification

The raw data file is printed and 100 percent of the raw data is checked against the original data by the applicable QA Officer or designee. Any errors found are corrected on the raw data printout and on the data entry sheets. If no errors are found, the station checked is marked "OK." The process is continued until no errors are found in the check. After the raw data are checked, each sheet is marked with the date the check was completed and the initials of the applicable QA Officer or designee. The raw data printout used for error checking is saved and filed with the data entry sheets. Any errors in the raw data file are corrected, and the establishment program is rerun.

After the database has been established, the data entry copies may be discarded, and the original data entry sheets and raw data printouts are filed.

Further data validation is performed by the Analytical Laboratory and/or Toxicity Laboratory PM. Validation is accomplished by performing routine audits of the data collection and flow procedures and by monitoring QC sampling results.

Data validation includes use of dated and signed entries by the technicians and Analytical Laboratory PM and Toxicity Laboratory PM on the bench sheets and notebooks used for samples, sample tracking and numbering systems to track the progress of samples through the laboratory, and QC criteria to reject or accept specific data.

In the data review process, the data are compared with information (e.g., sample history, sample preparation, and QC sample data) to evaluate the validity of the results. Corrective action is minimized by developing and implementing routine internal system controls. Analysts are provided specific criteria that must be met for each procedure, operation, or measurement system.

4.5 Reconciliation with User Requirements

The Amec Foster Wheeler QA Officers (Barry Snyder and Rolf Schottle) will review data after each survey to determine whether data quality objectives (DQOs) have been met. If data do not meet the project's specifications, the applicable QA Officer will review the errors, communicate verbally and in writing with laboratory QA Officers as appropriate, and determine whether the problem is a result of calibration/maintenance, sampling techniques, or other factors. They will suggest corrective action. It is expected that the problem would be corrected by retraining, revision of techniques, or replacement of supplies/equipment. If the problem is not corrected by these methods, then the DQOs will be reviewed for feasibility. If specific DQOs are not achievable, the applicable QA Officer will recommend appropriate modifications. Any revisions need approval by the Amec Foster Wheeler PM, Barry Snyder, and the Port PM, Phillip LeBlanc.

4.6 Quality Objectives for Criteria for Measurement of Data

The laboratory will follow in-house QA/QC plans, and any deviations will be documented in the analytical reports. DQOs applicable to water samples collected for this project consist of accuracy, precision, recovery, and completeness for the following field testing and chemistry analyses types (Table 4-1):

Table 4-1.
Summary of Data Quality Objectives

Measurement or Analysis Type	Applicable Data Quality Objective
Field Testing Turbidity Temperature Salinity pH	Accuracy, Precision, Completeness
Analytical Chemistry Laboratory Analyses Dissolved Copper Total Copper Particulate Copper TSS	Accuracy, Precision, Recovery, Completeness
Chemical Reporting Limits	Accuracy, Precision

Specific DQOs are presented in Table 4-2, along with acceptability criteria for each measurement.

Table 4-2. Data Quality Objectives for Laboratory and Field Measurements

Group	Parameter	Calibration	Accuracy[1]	Precision		Percent Complete
Field Testing	Turbidity Temperature pH Salinity	NIST (temp) three-point calibration (pH) Salinity standard	± 0.1 NTU ± 0.1 °C ± 0.1 pH ± 0.1 ppt	FD		100
Laboratory Analyses	Aqueous Metals	SRM/CRM or MS/MSD, LCS[2]	83–109% (Cu)	LD, FD, and MS/MSD	<25%	100
Laboratory Analyses	Solid Metals	SRM/CRM or MS/MSD, LCS	80–120%	LD, FD, and MS/MSD	<25%	100

Notes:
1 The objectives are applicable unless the method or manufacturer specifies more stringent requirements.
2 Reported LCS limits for copper were statistically derived by Weck Laboratories, Sept. 2012.
°C = degrees Celsius; < = less than; µg/L = micrograms per liter; % = percent; ± = plus or minus; CRM = Certified Reference Material; Cu = copper; FD = field duplicate; LCS = laboratory control sample; MS = matrix spike; MSD = matrix spike duplicate; NA = not applicable; NTU = Nephelometric turbidity unit; ppt = part(s) per thousand; NIST = National Institute of Standards and Technology; SRM = Standard Reference Material

Acceptance criteria will be based on the implementation of acceptable and recognized QA/QC procedures. Acceptable data require proper sample collection and handling methods, sample preparation and analytical procedures, holding times, and QA protocols.

Accuracy is defined as the difference between the measured value of an indicator and its true or expected value, which is an estimate of systematic error or net bias. Accuracy will be ensured for trace metals.

Recovery of laboratory control standard (LCS) and matrix spike (MS) recoveries using method specific performance-based control limits. Based upon previous results, the spike levels chosen for this project is10 micrograms per liter (µg/L) for copper.

Precision is defined as the measure of agreement among repeated measurements of the same property under identical or substantially similar conditions, calculated either as a range or as a standard deviation. The precision of instrument-related field measurements will be assessed for field instruments by measuring three replicate readings for all three parameters at each station. At one selected location, the replicated field measurements will be reported as the mean, and the precision will be calculated as the standard deviation of the measurements. The precision of chemistry laboratory measurements will be assessed by comparison of the sample result to that for a duplicate sample in addition to comparisons between the laboratory MS and matrix spike duplicate (MSD). Precision will be measured by the degree of agreement between the sample and the laboratory duplicate (LD) or the MS and MSD results. Samples within a ±25% relative percent difference (RPD) between the sample result and duplicate result will be accepted as unqualified results.

Completeness is a measure of the proportion of the expected, valid data (i.e., data not associated with some criterion of potential unacceptability) that is actually collected during a measurement process. The objective for completeness is 100 percent for each measurement process.

The analytical reporting limits for copper are below the relevant regulatory criteria for assessment of aquatic health, meeting this DQO, as presented in Table 5-2. The method detection limits are below the SWAMP reporting limits and preliminary benchmarks in accordance with the DQOs.

4.7 Special Training Needs/Certifications

All field personnel will be trained and will have experience in proper field sampling and sample handling techniques, including COC procedures, prior to sampling. These techniques will be reviewed prior to each sampling event and all field personnel will provide a signature to document the training.

Weck is accredited by the California Department of Public Health ELAP (National ELAP Certificate #04229CA) for the analysis of metals using USEPA Method 1640.

4.7.1 Training and Certification Documentation

All personnel are responsible for complying with the QA/QC requirements that pertain to their organizational/technical function. Technical staff member musts have a combination of experience and education to adequately demonstrate a specific knowledge of their particular functions and a general knowledge of laboratory operations, test methods, QA/QC procedures, and records management. A training sign-in sheet will document that field personnel are trained and experienced in all handling techniques and procedures.

4.7.2 Field Sampling

Field personnel will be trained in proper sampling techniques, sample handling, sample preservation and storage, sample transport, COC, and standard operating procedures.

4.7.3 Analytical Laboratory

The training program for the analytical chemistry laboratory begins with reviewing the SOP for a new task. The Analytical Laboratory PM, Chris Samatmanakit, demonstrates the procedure to the trainee, shows the appropriate steps in the SOP, and explains the significance of each step. The trainee later performs the procedure under the supervision of Mr. Samatmanakit. At this time, questions are answered and parts of the procedure may be demonstrated again to the trainee. The trainee continues to work under the direct supervision until he/she can demonstrate the procedure with competence and full understanding. This process may be short or long, depending on the procedure. Once the trainee has demonstrated competence, Mr. Samatmanakit completes a training form. At this time, the employee can work without supervision. This documentation is kept in files organized by individual with a separate form for each task. On an annual basis, the analyst is requalified, and this requalification is documented on the training form as well.

4.7.4 Training Personnel

Amec Foster Wheeler’s Field PM, Corey Sheredy, and/or Field QA Officer, Barry Snyder, will verify that training is provided for field personnel in proper field sampling techniques prior to work initiation to ensure that consistent and appropriate sampling, sample handling/storage, and COC procedures are followed.

4.8 Documents and Records

Amec Foster Wheeler will document and track aspects of the sample collection process, including generating field logs at each site and COC forms for all samples collected. COC forms will accompany water samples to the analytical laboratory. The analytical laboratory will document and track all aspects of sample receipt and storage, analyses, and reporting.

Amec Foster Wheeler will maintain a database of information collected throughout this project. After verification and final database establishment, the raw data files and databases will be copied onto CD for storage onsite. All original data sheets, statistical worksheets, and reports produced will be accumulated into project-specific files maintained in file cabinets at the Amec Foster Wheeler office after the report has been submitted. Final report text and tables are also stored on disk and provided to the Port. After data submissions, directories are archived for storage offsite. All records will be maintained for at least five years or transferred according to agreement between the company and the client, should the laboratory transfer ownership. All records and analyses pertaining to accreditation are kept for a minimum of five years. If there is a change in company ownership, accreditation records for at least the previous five years must be transferred to the new owner.

Analytical results gathered at Weck will be stored in a database system at their main office and will be provided to Amec Foster Wheeler’s PM, Barry Snyder, and Analytical QA Officer, Rolf Schottle, electronically. Data received from outside contractors will be kept exactly as received (electronically); data are error checked and processed into Amec Foster Wheeler’s database system.

Persons responsible for maintaining records for this project are as follows: Mr. Snyder, Amec Foster Wheeler's PM, will oversee the operations of the project, including field QA, and will arbitrate any issues relative to records retention and any decisions to discard records. The Analytical Laboratory PM, Mr. Samatmanakit, will maintain all chemistry records; and the Field PM, Ms. Sheredy, will maintain the data at Amec Foster Wheeler and will maintain all sample collection, sample transport, COC, and field analyses forms.

Copies of this QAPP will be distributed to the Port's PM, Phillip LeBlanc. Updates to this QAPP will be distributed in like manner, and all previous versions will be discarded from the project file.

Copies of the final report, including laboratory results and field records, will be maintained for a minimum of five years after project completion.

5.0 REPORT PREPARATION

Amec Foster Wheeler will provide an assessment based on the parameters outlined in Section 1.0 within 60 days of the conclusion of both Phase 1 (progress report) and Phase 2 (final report) of this pilot study. The following presents an outline of the information to be included in these reports:

1. *Introduction*. A presentation of the study objectives.
2. *Sampling collection methods*. This section will provide detailed information on collection locations, number of samples, and collection methods for Phase 1a and 1b.
3. *Sample analyses*. Laboratory analytical methods, sample handling and transport, lab QA/QC results, and other pertinent information will be described.
4. *Results*. An evaluation, interpretation, tabulation, and summary of the water quality (toxicity, turbidity, pH, salinity, temperature, dissolved and total copper, and TSS), particulate debris data, and the Dome Study data will be provided.
5. *Recommendations.* Recommendations for the sampling approach to be implemented in Phase 2 of the Boatwash Pilot Study.
6. *QA/QC Summary.* This section will discuss adherence to project-specific QAPP requirements, QA/QC issues to be addressed, and any necessary corrective actions.

Additionally, the evaluation of the results from Phase 1 should be used to determine the sampling approach for Phase 2 of the pilot study (i.e., Long-Term Monitoring). An addendum SAP will be developed and provided to relevant parties for comments prior to the start of Phase 2 sampling. For the reports, the tables, figures, and write-up will be reviewed by at least two Amec Foster Wheeler staff, including, at a minimum, the PM and a QA Officer. The document will also be reviewed by a technical editor. The reports will be returned to the office staff for any corrections, and the final draft will then be reviewed again by the Amec Foster Wheeler PM. The Amec Foster Wheeler PM will sign the letter of transmittal for delivery of the reports to the Port PM.

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6.0 REFERENCES

Amec Foster Wheeler. 2017. *Shelter Island Yacht Basin Dissolved Copper TMDL. Monitoring Plan (Revision 3)*. August.

California State Water Resources Control Board (State Board) (2014). *Collections of Water and Bed Sediment Samples with Associated Field Measurements and Physical Habitat in California*. Version 1.1. Updated March 2014. http://www.waterboards.ca.gov/water_issues/programs/swamp/docs/collect_bed_sediment_update.pdf

Early, Patrick J., Brandon L. Swope, Katherine Barbeau, Randelle Bundy, Janessa A. McDonald, and Ignacio Rivera-Duarte. 2013. Life cycle contributions of copper from vessel painting and maintenance activities. Biofouling: The Journal of Bioadhesion and Biofilm Research, DOI: 10.1080/08927014.2013.841891.

ITRC (Interstate Technology & Regulatory Council). 2012. Incremental Sampling Methodology. ISM-1. Washington, D.C.: Interstate Technology & Regulatory Council, Incremental Sampling Methodology Team. www.itrcweb.org. United States Environmental Protection Agency (USEPA). 1995. *Good Automated Laboratory Practices*. EPA/200/B-95/006. USEPA Resources Management. Triangle Park, NC.

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ATTACHMENT A

FIELD LOG FORMS

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PORT OF SAN DIEGO
RENTUNDER BOATWASH PILOT STUDY
2018

FIELD WATER QUALITY DATA SHEET

Collection Sequence: ____________________

Date: (mm/dd/yyyy) __________

GPS: (WGS84) Lat. __________ Long. __________

Tide (ft): ____________________

Weather conditions: ____________________

Wind (none, light, moderate, heavy): __________

Station: BWG-1-T-A (Surface Sample) Time of Collection: __________

Physical Water Quality Measurements

Parameter	pH	Salinity (ppt)	Temperature (°C)	Turbidity (NTU)
Measurement:				

*Water quality measured at the same depth as sample collection (i.e. within 1 meter from the surface).

Notes: ____________________

Station: BWG-1-B-A (Bottom Sample) Time of Collection: __________

Physical Water Quality Measurements

Parameter	pH	Salinity (ppt)	Temperature (°C)	Turbidity (NTU)
Measurement:				

*Water quality measured at the same depth as sample collection (i.e. within 1 meter from the surface).

Notes: ____________________

ATTACHMENT B

CHAIN-OF-CUSTODY FORMS

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CHAIN OF CUSTODY RECORD

STANDARD

Page 1 Of 2

CLIENT NAME: Wood Environmental & Infrastructure

PROJECT: Boatwash Pilot Study

ADDRESS:
9210 Sky Park Ct., Suite 200
San Diego, CA 92123

PHONE: 858-300-4316
FAX: 858-300-4301
EMAIL: rolf.schottle@woodplc.com
corey.sheredy@woodplc.com

PROJECT MANAGER: Barry Snyder

SAMPLER: Corey Sheredy (CCS)

SPECIAL HANDLING

☐ Same Day Rush 150%
☐ 24 Hour Rush 100%
☐ 48-72 Hour Rush 75%
☐ 4 - 5 Day Rush 30%
☐ Rush Extractions 50%
☑ 10 Business Days
☐ QA/QC Data Package

Charges will apply for weekends/holidays

Method of Shipment:

ANALYSES REQUESTED

ID# (For lab Use Only)	DATE SAMPLED	TIME SAMPLED	SMPL TYPE	SAMPLE IDENTIFICATION/SITE LOCATION	# OF CONT.	**Total Copper**[1] Method EPA 1640 MDL 0.0038 µg/L, RL= 0.01 µg/L	**Dissolved Copper**[1,2] Method EPA 1640 MDL 0.0038 µg/L, RL= 0.01 µg/L	**Total Suspended Solids** Method USEPA 2540 D, MDL = 1 mg/L, RL = 5 mg/L								COMMENTS

RELINQUISHED BY	DATE / TIME	RECEIVED BY
RELINQUISHED BY	DATE / TIME	RECEIVED BY
RELINQUISHED BY	DATE / TIME	RECEIVED BY

SAMPLE CONDITION:

Actual Temperature:

Received On Ice	Y / N
Preserved	Y / N
Evidence Seals Present	Y / N
Container Intact	Y / N
Preserved at Lab	Y / N

SAMPLE TYPE CODE:
AQ=Aqueous
NA= Non Aqueous
SL = Sludge
DW = Drinking Water
WW = Waste Water
RW = Rain Water
GW = Ground Water
SO = Soil
SW = Solid Waste
OL = Oil
OT = Other Matrix

SPECIAL REQUIREMENTS / BILLING INFORMATION

1) LAB ACTION: PRESERVE Cu/Zn IMMEDIATELY. HDPE Metals bottles have NO acid (HNO3) in bottle; 2) Diss. metals were field filtered using 0.45 um bottletop filt. system;

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CHAIN OF CUSTODY RECORD

STANDARD

Page 2 Of 2

CLIENT NAME: Wood Environmental & Infrastructure

PROJECT: Boatwash Pilot Study

ADDRESS:
9210 Sky Park Ct., Suite 200
San Diego, CA 92123

PHONE: 858-300-4316
FAX: 858-300-4301
EMAIL: rolf.schottle@woodplc.com
corey.sheredy@woodplc.com

PROJECT MANAGER: Barry Snyder

SAMPLER: Corey Sheredy (CCS)

SPECIAL HANDLING

☐ Same Day Rush 150%
☐ 24 Hour Rush 100%
☐ 48-72 Hour Rush 75%
☐ 4 - 5 Day Rush 30%
☐ Rush Extractions 50%
☑ 10 Business Days
☐ QA/QC Data Package

Charges will apply for weekends/holidays

Method of Shipment:

ANALYSES REQUESTED

ID# (For lab Use Only)	DATE SAMPLED	TIME SAMPLED	SMPL TYPE	SAMPLE IDENTIFICATION/SITE LOCATION	# OF CONT.	**Solids (Copper)** Method USEPA 6020 Cu D, MDL = 0.29 mg/kg, RL = 0.50 mg/kg										COMMENTS

RELINQUISHED BY	DATE / TIME	RECEIVED BY
RELINQUISHED BY	DATE / TIME	RECEIVED BY
RELINQUISHED BY	DATE / TIME	RECEIVED BY

SAMPLE CONDITION:

Actual Temperature:

Received On Ice	Y / N
Preserved	Y / N
Evidence Seals Present	Y / N
Container Intact	Y / N
Preserved at Lab	Y / N

SAMPLE TYPE CODE:
AQ=Aqueous
NA= Non Aqueous
SL = Sludge
DW = Drinking Water
WW = Waste Water
RW = Rain Water
GW = Ground Water
SO = Soil
SW = Solid Waste
OL = Oil
OT = Other Matrix

SPECIAL REQUIREMENTS / BILLING INFORMATION

ATTACHMENT C

QA CHECKLIST

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FIELD SAMPLING QA CHECKLIST

Collection Sequnce: **Date/Time:**

Mark each box with Y, N, or NA

Field Procedures

1. Upon arriving at the sampling location, the following site observations are being recorded:

Station GPS coordinates (approx. ± 3 m) and station identification verified and recorded	
Tide recorded	
Weather conditions recorded	
Time of sampling recorded	
Water depth at sample site recorded	
General site observations recorded	

2. Sampling procedures:

Field staff wearing fresh, powder free nitrile gloves	
Sampling depth delineated on sampling instrument with a clear marking (sampling must occur within 1 m of surface)	
Sampling instrument given site water rinse prior to deployment	
SWAMP protocols utilized to avoid sample contamination (i.e., clean hands/dirty hands technique)	
Samples bottles and containers are the correct type in accordance with the QAPP	
Sample bottles correctly labeled and match the station identification	
Sample bottles correctly labeled with date and time in accordance with Table 10 in the QAPP	
Bottles filled in the following order: metals, TSS, toxicity	
Staff avoided contaminating samples at all times	
pH, salinity, temperature, and turbidity readings taken	
Equipment rinsate blank and field blank have been collected (if applicable)	
Site replicate (i.e., duplicate) collected (if applicable)	

3. PPE properly removed and disposed of upon station completion ________

4. Data Recording:

Field notes have been recorded for this site before moving to the next	
Water samples properly logged on COC form	
Proper persons have signed the COC	

FIELD SAMPLING QA CHECKLIST

5. Sample Storage:

Water samples properly stored on ice in a cooler	
Cooler and samples hand delivered to labs	
Completed COC included with courier to hand deliver to labs	

Additional Notes:

Signature of QA/QC Personnel:__________________________ **Date/Time**__________________

Print Name/Company:__________________________________

APPENDIX B
ADDENDUM TO SAMPLING AND ANALYSIS PLAN

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Addendum to the
Rentunder™ Boatwash Pilot Project in Shelter Island Yacht Basin
Sampling and Analysis Plan & Quality Assurance Project Plan

The scope of the Boatwash Pilot Project is described in the Sampling and Analysis Plan & Quality Assurance Project Plan (SAP/QAPP) dated May 2018. As described in Section 3.2.1 of the SAP/QAPP, three controlled Boatwash cleaning events and subsequent water quality and particulate sampling events are included in Phase 1a of the Boatwash Pilot Project. This addendum to the SAP/QAPP describes the modified scope for the remainder of Phase 1a of the project. There are two modifications described in this addendum:

1. *Modifications to the second Boatwash cleaning and subsequent sampling event (henceforth referred to as Event 2):* This component of the modified scope will only apply to Event 2 of Phase 1a. Event 2 will follow the exact procedures as described in Section 3.2.1 of the SAP/QAPP with one exception: rather than using the mechanical brushes, vessels will be cleaned inside the Boatwash basin by a diver[1] using standard hull cleaning best management practices (BMPs). The third and final sampling event of Phase 1a (i.e., Event 3) will be in accordance with the methods originally described in the SAP/QAPP (i.e., vessels will be cleaned by the mechanical brushes of the Boatwash).

2. *Addition of follow-up sampling events after Event 2 and Event 3:* Following both Event 2 (diver-based cleaning) and Event 3 (cleaning by mechanical brushes), a series of water quality sample collections will occur to quantify the dissolved and total copper concentrations and total suspended solids (TSS) following the controlled cleaning events. Sampling design and sampling locations will be the same as presented in the SAP/QAPP for Events 1, 2 and 3. Samples for the follow-up will be collected and analyzed based on the following schedule:

    i. One set of follow-up samples for total copper, dissolved copper, and TSS will be collected two hours after the last regularly scheduled sample is collected for Event 2 and 3 (Day 0).

    ii. One set of follow-up samples for total copper, dissolved copper, and TSS per day for three days following the initial collection (Days 1, 2 and 3).

    iii. One set of follow-up samples for total copper, dissolved copper, and TSS one and two weeks following Event 2 and Event 3 (Days 7 and 14).

---

[1] Diver must be in possession of a valid in-water hull cleaning permit from the Port of San Diego.

Collection Sequence of Follow-up Samples

Timeline	**Day 0**	**Day 1**	**Day 2**	**Day 3**	**Day 7**	**Day 14**
Event	Event 2 or 3 Controlled Cleaning & Sample Event occurs - First follow-up sample collected two hours after the final sampling for the cleaning event	One set of follow-up samples collected				

APPENDIX C
CHAIN-OF-CUSTODY FORMS

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EVENT 1 (BOATWASH CLEANING)
CHEMISTRY CHAIN-OF-CUSTODY FORMS

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CHAIN OF CUSTODY RECORD

STANDARD 8G19067

Page 1 Of 5

CLIENT NAME: Wood E&I Solutions, Inc.

ADDRESS:
9210 Sky Park Ct., Suite 200
San Diego, CA 92123

PROJECT MANAGER: Barry Snyder

PROJECT: SHELTER ISLAND BOATWASH PILOT STUDY ~~Annual Shelter Island Yacht Basin TMDL Monitoring (Port of San Diego)~~

PHONE: ~~619-985-2405~~ ~~[illegible]~~ 858-300-4316

FAX: 858-300-4301

EMAIL: corey.sheredy@woodplc.com
barry.snyder@woodplc.com

SAMPLER: Corey Sheredy (CCS) / Barry Snyder (BJS)

ID# (For lab Use Only)	DATE SAMPLED	TIME SAMPLED	SMPL TYPE	SAMPLE IDENTIFICATION/SITE LOCATION	# OF CONT.	Total Copper Method EPA 1640 MDL 0.0038 µg/L, RL= 0.01 µg/L	Dissolved Copper[1] Method EPA 1640 MDL 0.0038 µg/L, RL= 0.01 µg/L	Total Suspended Solids Method USEPA 2540 D, MDL = 1 mg/L, RL = 5 mg/L	Solids (Copper) USEPA 6020 Cu MDL = 0.29 mg/kg, RL = 0.50 mg/kg	TOTAL SOLIDS	COMMENTS
	7/16/18	1945	DI	NISKIN-1	3	X	X	X			EQUIP. RINSE 1
	7/16/18	2000	DI	NISKIN-2	3	X	X	X			EQUIP RINSE 2
	7/17/18	1500	DI	BW-FB	3	X	X	X			FIELD BLANK
	7/17/18	1752	SED	BWB-PARTICULATE	3				X	X	DEBRIS COLLECTED AT BOATWASH BOTTOM

SPECIAL HANDLING
☐ Same Day Rush 150%
☐ 24 Hour Rush 100%
☐ 48-72 Hour Rush 75%
☐ 4 - 5 Day Rush 30%
☐ Rush Extractions 50%
☑ 10 Business Days
☐ QA/QC Data Package

Charges will apply for weekends/holidays

Method of Shipment:

RELINQUISHED BY	DATE / TIME	RECEIVED BY
	7-18-18 13:00	Hector Sanchez
Hector Sanchez	7-18-18 15:30	Jamahma 7/18/18 15:30 ~~1730~~ 56

SAMPLE CONDITION:
Actual Temperature: 5.2°C
Received On Ice [✓ Y] / N
Preserved Y [✓ N]
Evidence Seals Present Y [✓ N]
Container Intact Y [✓ N]
Preserved at Lab [✓ Y] N

SAMPLE TYPE CODE:
AQ=Aqueous
NA= Non Aqueous
SL = Sludge
DW = Drinking Water
WW = Waste Water
RW = Rain Water
GW = Ground Water
SO = Soil
SW = Solid Waste
OL = Oil
OT = Other Matrix

DI = dI water
sed = sediment

SPECIAL REQUIREMENTS / BILLING INFORMATION

1) **Dissolved Copper samples have been field filtered.**

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CHAIN OF CUSTODY RECORD

STANDARD 8G19067

Page 2 Of 5

CLIENT NAME: Wood E&I Solutions, Inc.
ADDRESS:
9210 Sky Park Ct., Suite 200
San Diego, CA 92123
PROJECT MANAGER: Barry Snyder

PROJECT: SI BOATWASH PILOT STUDY ~~Annual Shelter Island Yacht Basin TMDL Monitoring (Port of San Diego)~~
PHONE: ~~619-985-2405~~ 858-300-4316
FAX: 858-300-4301
EMAIL: corey.sheredy@woodplc.com
barry.snyder@woodplc.com
SAMPLER: Corey Sheredy (CCS) / Barry Snyder (BJS)

SPECIAL HANDLING
☐ Same Day Rush 150%
☐ 24 Hour Rush 100%
☐ 48-72 Hour Rush 75%
☐ 4 - 5 Day Rush 30%
☐ Rush Extractions 50%
☑ 10 Business Days
☐ QA/QC Data Package
Charges will apply for weekends/holidays
Method of Shipment:

ID# (For lab Use Only)	DATE SAMPLED	TIME SAMPLED	SMPL TYPE	SAMPLE IDENTIFICATION/SITE LOCATION	# OF CONT.	Total Copper Method EPA 1640 MDL 0.0038 µg/L, RL= 0.01 µg/L	Dissolved Copper[1] Method EPA 1640 MDL 0.0038 µg/L, RL= 0.01 µg/L	Total Suspended Solids Method USEPA 2540 D, MDL = 1 mg/L, RL = 5 mg/L	Solids (Copper) USEPA 6020 Cu MDL = 0.29 mg/kg, RL = 0.50 mg/kg						COMMENTS
	7/17/18	0905	SW	BWB1-E1-T	3										
		0910		BWB1-E1-B											
		0935		BWB2-E1-T											
		0945		BWB2-E1-B											
		1100		BWB1-E2-T											
		1105		BWB1-E2-B											
		1112		BWB2-E2-T											
		1118		BWB2-E2-B											
		1130		BWB1-E3-T											please run MS/MSD analysis
		1138		BWB1-E3-B											
	↓	1152	↓	BWB2-E3-T	↓	↓	↓	↓							please run MS/MSD analysis

RELINQUISHED BY	DATE / TIME	RECEIVED BY
	13:00 7-18-18	Hector Sanchez
Hector Sanchez	15:30 7-18-18	7/18/18 1530

SAMPLE CONDITION:
Actual Temperature: 5.2°C
Received On Ice [✓ Y] N
Preserved Y [✓ N]
Evidence Seals Present Y [✓ N]
Container Intact Y [✓ N]
Preserved at Lab [✓ Y] N

SAMPLE TYPE CODE:
AQ=Aqueous
NA= Non Aqueous
SL = Sludge
DW = Drinking Water
WW = Waste Water
RW = Rain Water
GW = Ground Water
SO = Soil
SW = Solid Waste
OL = Oil
OT = Other Matrix
SW = seawater

SPECIAL REQUIREMENTS / BILLING INFORMATION
1) Dissolved Copper samples have been field filtered.

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Tel 626-336-2139 ♦ Fax 626-336-2634 ♦ www.wecklabs.com

CHAIN OF CUSTODY RECORD

STANDARD 8G19067

Page 3 Of 5

CLIENT NAME: Wood E&I Solutions, Inc.
ADDRESS: 9210 Sky Park Ct., Suite 200
San Diego, CA 92123
PROJECT MANAGER: Barry Snyder

PROJECT: S.I. BOATWASH PILOT STUDY ~~Annual Shelter Island Yacht Basin TMDL Monitoring (Port of San Diego)~~
PHONE: 619-985-2405
FAX: 858-300-4301
EMAIL: corey.sheredy@woodplc.com
barry.snyder@woodplc.com
SAMPLER: Corey Sheredy (CCS) / Barry Snyder (BJS)

SPECIAL HANDLING
☐ Same Day Rush 150%
☐ 24 Hour Rush 100%
☐ 48-72 Hour Rush 75%
☐ 4 - 5 Day Rush 30%
☐ Rush Extractions 50%
☑ 10 Business Days
☐ QA/QC Data Package

Charges will apply for weekends/holidays

Method of Shipment:

ID# (For lab Use Only)	DATE SAMPLED	TIME SAMPLED	SMPL TYPE	SAMPLE IDENTIFICATION/SITE LOCATION	# OF CONT.	Total Copper Method EPA 1640 MDL 0.0038 µg/L, RL= 0.01 µg/L	Dissolved Copper[1] Method EPA 1640 MDL 0.0038 µg/L, RL= 0.01 µg/L	Total Suspended Solids Method USEPA 2540 D, MDL = 1 mg/L, RL = 5 mg/L	Solids (Copper) USEPA 6020 Cu MDL = 0.29 mg/kg, RL = 0.50 mg/kg.						COMMENTS
	7/17/18	1159	SW	BWB2-E3-B	3	X	X	X							
		1145		BWB1-E3-T-REP	3										station replicate
		1210		BWB2-E3-T-REP	3										station replicate
		1632		BWB1-E4-T											
		1638		BWB1-E4-B											
		1646		BWB2-E4-T											
		1652		BWB2-E4-B											
		1704		BWB1-E5-T											
		1712		BWB1-E5-B											
		1723		BWB2-E5-T											
	↓	1730	↓	BWB2-E5-B	↓	↓	↓	↓							

RELINQUISHED BY	DATE / TIME	RECEIVED BY
CSheredy	7-18-18 13:00	Hector Sanchez
Hector Sanch	7-18-18 15:30	Jamahmn 7/18/18 1530

SAMPLE CONDITION:
Actual Temperature: 5.2°C
Received On Ice [✓ Y] N
Preserved [✓ Y] N
Evidence Seals Present Y [✓ N]
Container Intact Y [✓ N]
Preserved at Lab Y [✓ N]

SAMPLE TYPE CODE:
AQ=Aqueous
NA= Non Aqueous
SL = Sludge
DW = Drinking Water
WW = Waste Water
RW = Rain Water
GW = Ground Water
SO = Soil
SW = Solid Waste
OL = Oil
OT = Other Matrix
SW = Seawater

SPECIAL REQUIREMENTS / BILLING INFORMATION
1) Dissolved Copper samples have been field filtered.

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CHAIN OF CUSTODY RECORD

STANDARD 8G19067

Page 4 Of 5

CLIENT NAME: Wood E&I Solutions, Inc.

ADDRESS:
9210 Sky Park Ct., Suite 200
San Diego, CA 92123

PROJECT MANAGER: Barry Snyder

PROJECT: SH. ISLAND BOATWASH PILOT STY ~~Annual Shelter Island Yacht Basin TMDL Monitoring (Port of San Diego)~~

PHONE: ~~619-985-2405~~ 858-300-4316

FAX: 858-300-4301

EMAIL: corey.sheredy@woodplc.com
barry.snyder@woodplc.com

SAMPLER: Corey Sheredy (CCS) / Barry Snyder (BJS)

SPECIAL HANDLING

☐ Same Day Rush 150%
☐ 24 Hour Rush 100%
☐ 48-72 Hour Rush 75%
☐ 4 - 5 Day Rush 30%
☐ Rush Extractions 50%
☑ 10 Business Days
☐ QA/QC Data Package

Charges will apply for weekends/holidays

Method of Shipment:

ANALYSES REQUESTED

ID# (For lab Use Only)	DATE SAMPLED	TIME SAMPLED	SMPL TYPE	SAMPLE IDENTIFICATION/SITE LOCATION	# OF CONT.	Total Copper Method EPA 1640 MDL 0.0038 µg/L, RL= 0.01 µg/L	Dissolved Copper[1] Method EPA 1640 MDL 0.0038 µg/L, RL= 0.01 µg/L	Total Suspended Solids Method USEPA 2540 D, MDL = 1 mg/L, RL = 5 mg/L	Solids (Copper) USEPA 6020 Cu MDL = 0.29 mg/kg, RL = 0.50 mg/kg						COMMENTS
	7/17/18	0910	SW	BW61-E1-T	3	X	X	X							
		0920		BW61-E1-B											
		0935		BW62-E1-T											
		0945		BW62-E1-B											
		1100		BW61-E2-T											
		1105		BW61-E2-B											
		1115		BW62-E2-T											
		1120		BW62-E2-B											
		1130		BW6[illegible]-E3-T											please run MS/MSD analysis
		1140		BW61-E3-B											
	↓	1200	↓	BW62-E3-T	↓	↓	↓	↓							please run MS/MSD analysis

RELINQUISHED BY	DATE / TIME	RECEIVED BY
CSheredy	7-18-18 13:00	Hector Sancha
Hector Sanch	7-18-18 15:30	Tamahma 7/18/18 1530

SAMPLE CONDITION:
Actual Temperature: 5.2°C
Received On Ice [✓ Y] / N
Preserved Y / [✓ N]
Evidence Seals Present Y / [✓ N]
Container Intact X / N
Preserved at Lab [✓ Y] / N

SAMPLE TYPE CODE:
AQ=Aqueous
NA= Non Aqueous
SL = Sludge
DW = Drinking Water
WW = Waste Water
RW = Rain Water
GW = Ground Water
SO = Soil
SW = Solid Waste
OL = Oil
OT = Other Matrix

SW= seawater

SPECIAL REQUIREMENTS / BILLING INFORMATION

1) Dissolved Copper samples have been field filtered.

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CHAIN OF CUSTODY RECORD

STANDARD 8G19067

SHELTER IS.

Page 5 Of 5

CLIENT NAME:
Wood E&I Solutions, Inc.

ADDRESS:
9210 Sky Park Ct., Suite 200
San Diego, CA 92123

PROJECT: BOATWASH PILOT STUDY
~~Annual Shelter Island Yacht Basin TMDL Monitoring (Port of San Diego)~~

PHONE: ~~619-985-2405~~ 858-300-4316
FAX: 858-300-4301
EMAIL: corey.sheredy@woodplc.com
barry.snyder@woodplc.com

PROJECT MANAGER
Barry Snyder

SAMPLER
Corey Sheredy (CCS) / Barry Snyder (BJS)

SPECIAL HANDLING
☐ Same Day Rush 150%
☐ 24 Hour Rush 100%
☐ 48-72 Hour Rush 75%
☐ 4 - 5 Day Rush 30%
☐ Rush Extractions 50%
☑ 10 Business Days
☐ QA/QC Data Package

Charges will apply for weekends/holidays

Method of Shipment:

						ANALYSES REQUESTED										
ID# (For lab Use Only)	DATE SAMPLED	TIME SAMPLED	SMPL TYPE	SAMPLE IDENTIFICATION/SITE LOCATION	# OF CONT.	Total Copper Method EPA 1640 MDL 0.0038 µg/L, RL= 0.01 µg/L	Dissolved Copper[1] Method EPA 1640 MDL 0.0038 µg/L, RL= 0.01 µg/L	Total Suspended Solids Method USEPA 2540 D, MDL = 1 mg/L, RL = 5 mg/L	Solids (Copper) USEPA 6020 Cu MDL = 0.29 mg/kg, RL = 0.50 mg/kg							COMMENTS
	7/17/18	1205	SW	BW62-E3-B	3	X	X	X								
		1150		BW61-E3-T-REP												STN. REPLICATE
		1210		BW62-E3-T-REP												STN. REPLICATE
		1630		BW61-E4-T												
		1635		BW61-E4-B												
		1645		BW62-E4-T												
		1650		BW62-E4-B												
		1710		BW61-E5-T												
		1715		BW61-E5-B												
		1725		BW62-E5-T												
	↓	1735	↓	BW62-E5-B	↓	↓	↓	↓								

RELINQUISHED BY CSheredy	DATE / TIME 7-18-18 13:00	RECEIVED BY Hector Sanchez
RELINQUISHED BY Hector Sanch	DATE / TIME 7-18-18 1530	RECEIVED BY Samalmer 7/18/18 1530
RELINQUISHED BY	DATE / TIME	RECEIVED BY

SAMPLE CONDITION:
Actual Temperature: 5.2°C
Received On Ice [✓ Y] N
Preserved Y [✓ N]
Evidence Seals Present Y [✓ N]
Container Intact [✓ Y] N
Preserved at Lab [✓ Y] N

SAMPLE TYPE CODE:
AQ=Aqueous
NA= Non Aqueous
SL = Sludge
DW = Drinking Water
WW = Waste Water
RW = Rain Water
GW = Ground Water
SO = Soil
SW = Solid Waste
OL = Oil
OT = Other Matrix

SW = seawater ✓

SPECIAL REQUIREMENTS / BILLING INFORMATION

1) Dissolved Copper samples have been field filtered.

WL

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CHAIN OF CUSTODY RECORD

STANDARD 8H17049

Page 1 Of 1

CLIENT NAME: Wood E&I Solutions, Inc.	PROJECT: Annual Shelter Island Yacht Basin TMDL Monitoring (Port of San Diego)
ADDRESS: 9210 Sky Park Ct., Suite 200 San Diego, CA 92123	PHONE: 619-985-2405 FAX: 858-300-4301 EMAIL: corey.sheredy@woodplc.com barry.snyder@woodplc.com
PROJECT MANAGER: Barry Snyder	SAMPLER: Corey Sheredy (CCS) / Barry Snyder (BJS)

SPECIAL HANDLING

- ☐ Same Day Rush 150%
- ☐ 24 Hour Rush 100%
- ☒ CCS 48-72 Hour Rush 75%
- ☑ 4 - 5 Day Rush 30%
- ☐ Rush Extractions 50%
- ☐ 10 Business Days
- ☐ QA/QC Data Package

Charges will apply for weekends/holidays

Method of Shipment:

ANALYSES REQUESTED

ID# (For lab Use Only)	DATE SAMPLED	TIME SAMPLED	SMPL TYPE	SAMPLE IDENTIFICATION/SITE LOCATION	# OF CONT.	Total Copper Method EPA 1640 MDL 0.0038 µg/L, RL= 0.01 µg/L	Dissolved Copper¹ Method EPA 1640 MDL 0.0038 µg/L, RL= 0.01 µg/L	Total Suspended Solids Method USEPA 2540 D, MDL = 1 mg/L, RL = 5 mg/L							COMMENTS
	08/16/18	0945	seawater	E1-Gate-1-Top	3	X	X	X							
	08/16/18	0950	seawater	E1-Gate-1-Bottom	3	X	X	X							
	08/16/18	0955	seawater	E1-Gate-2-Top	3	X	X	X							
	08/16/18	1000	seawater	E1-Gate-2-Bottom	3	X	X	X							
	08/16/18	1050	seawater	E1-Basin-1-Top	3	X	X	X							analyze MS/MSD
	08/16/18	1055	seawater	E1-Basin-1-Top-REP	3	X	X	X							
	08/16/18	1100	seawater	E1-Basin-1-Bottom	3	X	X	X							
	08/16/18	1110	seawater	E1-Basin-2-Top	3	X	X	X							
	08/16/18	1115	seawater	E1-Basin-2-Bottom	3	X	X	X							
	08/16/18	0920	DI	Niskin-1-ER	3	X	X	X							
	08/16/18	1150	DI	BW-FB	3	X	X	X							

RELINQUISHED BY	DATE / TIME	RECEIVED BY
Kate Buckley	8/17/18 09:15	Hector Sanch 8-17-18 0915
Hector Sanch	8-17-18 11:23	Jamchun 8/17/18 11:23

SAMPLE CONDITION:

Actual Temperature: 5.1°C

Received On Ice [✓ Y] N
Preserved Y [✓ N]
Evidence Seals Present Y [✓ N]
Container Intact Y [✓ N]
Preserved at Lab [✓ Y] N

SAMPLE TYPE CODE:
AQ=Aqueous
NA= Non Aqueous
SL = Sludge
DW = Drinking Water
WW = Waste Water
RW = Rain Water
GW = Ground Water
SO = Soil
SW = Solid Waste
OL = Oil
OT = Other Matrix

SPECIAL REQUIREMENTS / BILLING INFORMATION

1) Dissolved Copper samples have been field filtered.

4 COOLERS → 3 LARGE BLUE
+ 1 SMALL RED

EVENT 1 (BOATWASH CLEANING)
TOXICITY CHAIN-OF-CUSTODY FORMS

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CHAIN OF CUSTODY RECORD

STANDARD

Page_____Of_______

CLIENT NAME: Wood E&I Solutions, Inc.	PROJECT: Annual Shelter Island Yacht Basin TMDL Monitoring (Port of San Diego)
ADDRESS: 9210 Sky Park Ct., Suite 200 San Diego, CA 92123	PHONE: 619-985-2405 FAX: 858-300-4301 EMAIL: corey.sheredy@woodplc.com barry.snyder@woodplc.com
PROJECT MANAGER Barry Snyder	SAMPLER Corey Sheredy (CCS) / Barry Snyder (BJS)

SPECIAL HANDLING

- ☐ Same Day Rush 150%
- ☐ 24 Hour Rush 100%
- ☐ 48-72 Hour Rush 75%
- ☐ 4 - 5 Day Rush 30%
- ☐ Rush Extractions 50%
- ☑ 10 Business Days
- ☐ QA/QC Data Package

Charges will apply for weekends/holidays

Method of Shipment:

COMMENTS

CCS 7/17/18

ID# (For lab Use Only)	DATE SAMPLED	TIME SAMPLED	SMPL TYPE	SAMPLE IDENTIFICATION/SITE LOCATION	# OF CONT.	ANALYSES REQUESTED: Mussel 48-hr Survival and Development									
	07/17/18	0910	seawater	BWG1-E1	1	X									
	07/17/18	0135	seawater	BWG2-E1	1	X									
	~~07/18/18~~	0905	seawater	BWB1-E1	1	X									
	~~07/19/18~~	0935	seawater	BWB2-E1	1	X									
	~~07/20/18~~	1710	seawater	BWG1-E5	1	X									
	~~07/21/18~~	1725	seawater	BWG2-E5	1	X									
	~~07/22/18~~	1704	seawater	BWB1-E5	1	X									
	~~07/23/18~~	1723	seawater	BWB2-E5	1	X									

RELINQUISHED BY	DATE / TIME	RECEIVED BY
	7/18/18 0912	Steve Corbun

SAMPLE CONDITION:

Actual Temperature:

Received On Ice Y / N
Preserved Y / N
Evidence Seals Present Y / N
Container Intact Y / N
Preserved at Lab Y / N

SAMPLE TYPE CODE:
AQ=Aqueous
NA= Non Aqueous
SL = Sludge
DW = Drinking Water
WW = Waste Water
RW = Rain Water
GW = Ground Water
SO = Soil
SW = Solid Waste
OL = Oil
OT = Other Matrix

SPECIAL REQUIREMENTS / BILLING INFORMATION

~~1) Dissolved Copper samples have been field filtered.~~ Samples were delivered to the lab at 20:00 on 7/17/18. They were immediately put in 4°c cold storage and checked in on 7/18/18.

wood.

Wood Environmental Toxicology Lab
4905 Morena Blvd, Ste. 1304
San Diego, CA 92117
Phone: (858) 299-5368

Chain of Custody Form

Page 1 of 1

Client/Send Report To:

Company Wood E+I
Address 9210 Sky Park Ct
Contact/PM Corey Sneredy
Phone Number 858-300-4316
Email Address Corey.Sneredy@~~[illegible]~~woodplc.com

Project Information (if needed):

Project Name S14B Boatwash
Project No. Will email
PO Number

Personal Cooler Shipped:
Return Requested: YES____ NO____.

Analysis Requested (write out or use codes below)

Sample ID	Collection Date	Collection Time	Sample Volume	Sample Type: Grab/Comp.	Sample Number (for lab use)	Ms-dv							Receipt Temp (°C)
Basin-1	8/16/18	1050	4L	Comp		✓							4.0
Basin-2		1110											
Gate-1		0945											
Gate-2	↓	0955	↓	↓		↓							↓

Samples Collected By: Corey Sneredy / Kate Buckly

Additional Comments:

Samples Shipped via: Hand-delivered
Condition Upon Receipt:

Relinquished/Shipped By:	Received By:	Relinquished By:	Received By:
Signature:	Signature:	Signature:	Signature:
Print Name: Corey Sneredy	Print Name: Ashley Donohue	Print Name:	Print Name:
Date/Time: 8/16/18 1300	Date/Time: 8/16/18 1300	Date/Time:	Date/Time:

Test Codes (marine):

Mp-c: Chronic Kelp
Hr-dv: Chronic Abalone
Aa-a: Acute Topsmelt
Aa-c: Chronic Topsmelt
Mb-a: Acute Menidia/Silverside
Mb-c: Chronic Menidia/Silverside
Ab-a: Acute Mysid Shrimp
Ab-c: Chronic Mysid Shrimp
Sp-c: Chronic Urchin Fertilization
Sp-dv: Chronic Urchin Development
Ms-dv: Chronic Mussel Development
Other: Write out the test organism

Test Codes (freshwater):

Cd-a: Acute Ceriodaphnia
Cd-c: Chronic Ceriodaphnia
Pp-a: Acute Fathead Minnow
Pp-c: Chronic Fathead Minno
Sc-c: Chronic Green Algae
Ha-a: Acute Hyalella amphipod
Ha-c: Chronic Hyalella amphipod
T-22: CA Title 22 Hazardous Waste

EVENT 2 (DIVER CLEANING)
CHEMISTRY CHAIN-OF-CUSTODY FORMS

WL

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CHAIN OF CUSTODY RECORD

STANDARD

8J25060

Page 1 Of 5

CLIENT NAME: Wood E&I Solutions, Inc.
ADDRESS: 9210 Sky Park Ct., Suite 200
San Diego, CA 92123
PROJECT MANAGER: Barry Snyder

PROJECT: Boatwash Pilot Study
PHONE: 619-985-2405
FAX: 858-300-4301
EMAIL: corey.sheredy@woodplc.com
barry.snyder@woodplc.com
SAMPLER: Corey Sheredy (CCS) / Marisa Swiderski (MS)

SPECIAL HANDLING
- ☐ Same Day Rush 150%
- ☐ 24 Hour Rush 100%
- ☐ 48-72 Hour Rush 75%
- ☐ 4 - 5 Day Rush 30%
- ☐ Rush Extractions 50%
- ☑ 10 Business Days
- ☐ QA/QC Data Package

Charges will apply for weekends/holidays
Method of Shipment:
COMMENTS

ID# (For lab Use Only)	DATE SAMPLED	TIME SAMPLED	SMPL TYPE	SAMPLE IDENTIFICATION/SITE LOCATION	# OF CONT.	Total Copper Method EPA 1640 MDL 0.0038 µg/L, RL= 0.01 µg/L	Dissolved Copper[1] Method EPA 1640 MDL 0.0038 µg/L, RL= 0.01 µg/L	Total Suspended Solids Method USEPA 2540 D, MDL = 1 mg/L, RL = 5 mg/L							
	10/23/18	0700	seawater	GATE1-Top-T0	3	X	X	X							
	10/23/18	0705	seawater	GATE1-Bottom-T0	3	X	X	X							
	10/23/18	0725	seawater	GATE2-Top-T0	3	X	X	X							
	10/23/18	0730	seawater	GATE2-Bottom-T0	3	X	X	X							
	10/23/18	0700	seawater	BASIN1-Top-T0	3	X	X	X							
	10/23/18	0705	seawater	BASIN1-Bottom-T0	3	X	X	X							
	10/23/18	0710	seawater	BASIN2-Top-T0	3	X	X	X							
	10/23/18	0715	seawater	BASIN2-Bottom-T0	3	X	X	X							
	10/23/18	0935	seawater	GATE1-Top-T1	3	X	X	X							
	10/23/18	0940	seawater	GATE1-Bottom-T1	3	X	X	X							
	10/23/18	0945	seawater	GATE2-Top-T1	3	X	X	X							

RELINQUISHED BY	DATE / TIME	RECEIVED BY
Kate Buckley	10/24/2018 12:00	
	10/25/18 1328	10/25/18 1354

SAMPLE CONDITION:
Actual Temperature: 1.4C
Received On Ice [✓ Y] / N
Preserved Y / [✓ N]
Evidence Seals Present Y / [✓ N]
Container Intact [✓ Y] / N
Preserved at Lab Y / [✓ N]

SAMPLE TYPE CODE:
AQ=Aqueous
NA= Non Aqueous
SL = Sludge
DW = Drinking Water
WW = Waste Water
RW = Rain Water
GW = Ground Water
SO = Soil
SW = Solid Waste
OL = Oil
OT = Other Matrix

SPECIAL REQUIREMENTS / BILLING INFORMATION

1) Dissolved Copper samples have been field-filtered.

12 COOLERS TOTAL

WL

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CHAIN OF CUSTODY RECORD

STANDARD

8J25060

Page 2 Of 5

CLIENT NAME: Wood E&I Solutions, Inc.
ADDRESS: 9210 Sky Park Ct., Suite 200
San Diego, CA 92123
PROJECT MANAGER: Barry Snyder

PROJECT: Boatwash Pilot Study
PHONE: 619-985-2405
FAX: 858-300-4301
EMAIL: corey.sheredy@woodplc.com
barry.snyder@woodplc.com
SAMPLER: Corey Sheredy (CCS) / Marisa Swiderski (MS)

SPECIAL HANDLING

☐ Same Day Rush 150%
☐ 24 Hour Rush 100%
☐ 48-72 Hour Rush 75%
☐ 4 - 5 Day Rush 30%
☐ Rush Extractions 50%
☑ 10 Business Days
☐ QA/QC Data Package

Charges will apply for weekends/holidays

Method of Shipment:

ID# (For lab Use Only)	DATE SAMPLED	TIME SAMPLED	SMPL TYPE	SAMPLE IDENTIFICATION/SITE LOCATION	# OF CONT.	Total Copper Method EPA 1640 MDL 0.0038 µg/L, RL= 0.01 µg/L	Dissolved Copper[1] Method EPA 1640 MDL 0.0038 µg/L, RL= 0.01 µg/L	Total Suspended Solids Method USEPA 2540 D, MDL = 1 mg/L, RL = 5 mg/L								COMMENTS
	10/23/18	0950	seawater	GATE2-Bottom-T1	3	X	X	X								
	10/23/18	0930	seawater	BASIN1-Top-T1	3	X	X	X								
	10/23/18	0935	seawater	BASIN1-Bottom-T1	3	X	X	X								
	10/23/18	0945	seawater	BASIN2-Top-T1	3	X	X	X								
	10/23/18	0950	seawater	BASIN2-Bottom-T1	3	X	X	X								
	10/23/18	1010	seawater	GATE1-Top-T2	3	X	X	X								
	10/23/18	1015	seawater	GATE1-Bottom-T2	3	X	X	X								Please run MS/MSD
	10/23/18	1030	seawater	GATE2-Top-T2	3	X	X	X								
	10/23/18	1035	seawater	GATE2-Bottom-T2	3	X	X	X								
	10/23/18	1010	seawater	BASIN1-Top-T2	3	X	X	X								
	10/23/18	1015	seawater	BASIN1-Bottom-T2	3	X	X	X								Please run MS/MSD

RELINQUISHED BY	DATE / TIME	RECEIVED BY
Kate Barkley	10/24/2018 12:00	
	10/25/18 13:54	10/25/18 13:54

SAMPLE CONDITION:

Actual Temperature: 1.4C

Received On Ice [✓ Y] / N
Preserved Y / N
Evidence Seals Present Y / [✓ N]
Container Intact Y / [✓ N]
Preserved at Lab Y / N

SAMPLE TYPE CODE:
AQ=Aqueous
NA= Non Aqueous
SL = Sludge
DW = Drinking Water
WW = Waste Water
RW = Rain Water
GW = Ground Water
SO = Soil
SW = Solid Waste
OL = Oil
OT = Other Matrix

SPECIAL REQUIREMENTS / BILLING INFORMATION

1) Dissolved Copper samples have been field-filtered.

W L

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CHAIN OF CUSTODY RECORD

STANDARD

8J25060

Page 3 Of 5

CLIENT NAME: Wood E&I Solutions, Inc.	PROJECT: Boatwash Pilot Study
ADDRESS: 9210 Sky Park Ct., Suite 200 San Diego, CA 92123	PHONE: 619-985-2405 FAX: 858-300-4301 EMAIL: corey.sheredy@woodplc.com barry.snyder@woodplc.com
PROJECT MANAGER Barry Snyder	SAMPLER Corey Sheredy (CCS) / Marisa Swiderski (MS)

ANALYSES REQUESTED

ID# (For lab Use Only)	DATE SAMPLED	TIME SAMPLED	SMPL TYPE	SAMPLE IDENTIFICATION/SITE LOCATION	# OF CONT.	Total Copper Method EPA 1640 MDL 0.0038 µg/L, RL= 0.01 µg/L	Dissolved Copper[1] Method EPA 1640 MDL 0.0038 µg/L, RL= 0.01 µg/L	Total Suspended Solids Method USEPA 2540 D, MDL = 1 mg/L, RL = 5 mg/L							COMMENTS
	10/23/18	1025	seawater	BASIN2-Top-T2	3	X	X	X							
	10/23/18	1030	seawater	BASIN2-Bottom-T2	3	X	X	X							
	10/23/18	1020	seawater	GATE1-Top-T2-REP	3	X	X	X							Station replicate
	10/23/18	1020	seawater	BASIN1-Top-T2-REP	3	X	X	X							Station replicate
	10/23/18	1515	seawater	GATE1-Top-T3	3	X	X	X							
	10/23/18	1520	seawater	GATE1-Bottom-T3	3	X	X	X							
	10/23/18	1530	seawater	GATE2-Top-T3	3	X	X	X							
	10/23/18	1535	seawater	GATE2-Bottom-T3	3	X	X	X							
	10/23/18	1515	seawater	BASIN1-Top-T3	3	X	X	X							
	10/23/18	1520	seawater	BASIN1-Bottom-T3	3	X	X	X							
	10/23/18	1525	seawater	BASIN2-Top-T3	3	X	X	X							

SPECIAL HANDLING

☐ Same Day Rush 150%
☐ 24 Hour Rush 100%
☐ 48-72 Hour Rush 75%
☐ 4 - 5 Day Rush 30%
☐ Rush Extractions 50%
☑ 10 Business Days
☐ QA/QC Data Package

Charges will apply for weekends/holidays

Method of Shipment:

RELINQUISHED BY	DATE / TIME	RECEIVED BY
Kate Buckley	10/24/2018 12:00	
RELINQUISHED BY	DATE / TIME	RECEIVED BY
	10-25-18 13:54	10/25/18 13:54
RELINQUISHED BY	DATE / TIME	RECEIVED BY

SAMPLE CONDITION:

Actual Temperature: 1.6

Received On Ice [✓ Y] / N
Preserved [✓ Y] / N
Evidence Seals Present Y / [✓ N]
Container Intact [✓ Y] / N
Preserved at Lab Y / [✓ N]

SAMPLE TYPE CODE:
AQ=Aqueous
NA= Non Aqueous
SL = Sludge
DW = Drinking Water
WW = Waste Water
RW = Rain Water
GW = Ground Water
SO = Soil
SW = Solid Waste
OL = Oil
OT = Other Matrix

SPECIAL REQUIREMENTS / BILLING INFORMATION

1) Dissolved Copper samples have been field-filtered.

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CHAIN OF CUSTODY RECORD

STANDARD

8J25060

Page 4 Of 5

CLIENT NAME: Wood E&I Solutions, Inc.

ADDRESS:
9210 Sky Park Ct., Suite 200
San Diego, CA 92123

PROJECT: Boatwash Pilot Study
PHONE: 619-985-2405
FAX: 858-300-4301
EMAIL: corey.sheredy@woodplc.com
barry.snyder@woodplc.com

PROJECT MANAGER: Barry Snyder

SAMPLER: Corey Sheredy (CCS) / Marisa Swiderski (MS)

ANALYSES REQUESTED

ID# (For lab Use Only)	DATE SAMPLED	TIME SAMPLED	SMPL TYPE	SAMPLE IDENTIFICATION/SITE LOCATION	# OF CONT.	Total Copper Method EPA 1640 MDL 0.0038 µg/L, RL= 0.01 µg/L	Dissolved Copper[1] Method EPA 1640 MDL 0.0038 µg/L, RL= 0.01 µg/L	Total Suspended Solids Method USEPA 2540 D, MDL = 1 mg/L, RL = 5 mg/L	COMMENTS
	10/23/18	1530	seawater	BASIN2-Bottom-T3	3	X	X	X	
	10/23/18	1540	seawater	GATE1-Top-T4	3	X	X	X	
	10/23/18	1545	seawater	GATE1-Bottom-T4	3	X	X	X	
	10/23/18	1550	seawater	GATE2-Top-T4	3	X	X	X	
	10/23/18	1555	seawater	GATE2-Bottom-T4	3	X	X	X	
	10/23/18	1540	seawater	BASIN1-Top-T4	3	X	X	X	
	10/23/18	1545	seawater	BASIN1-Bottom-T4	3	X	X	X	
	10/23/18	1550	seawater	BASIN2-Top-T4	3	X	X	X	
	10/23/18	1555	seawater	BASIN2-Bottom-T4	3	X	X	X	
	10/22/18	1900	DI	Niskin-1-ER	3	X	X	X	Equipment Rinse 1
	10/22/18	1920	DI	Niskin-2-ER	3	X	X	X	Equipment Rinse 2

SPECIAL HANDLING
- ☐ Same Day Rush 150%
- ☐ 24 Hour Rush 100%
- ☐ 48-72 Hour Rush 75%
- ☐ 4 - 5 Day Rush 30%
- ☐ Rush Extractions 50%
- ☑ 10 Business Days
- ☐ QA/QC Data Package

Charges will apply for weekends/holidays

Method of Shipment:

RELINQUISHED BY: Kate Buckley
DATE / TIME: 10/24/2018 12:00
RECEIVED BY:

RELINQUISHED BY:
DATE / TIME: 10-25-18 13:54
RECEIVED BY: 10/25/18 13:54

RELINQUISHED BY:
DATE / TIME:
RECEIVED BY:

SAMPLE CONDITION:
Actual Temperature: 1.4C
Received On Ice [✓ Y] / N
Preserved [✓ Y] / N
Evidence Seals Present Y / [✓ N]
Container Intact [✓ Y] / N
Preserved at Lab Y [✓ N]

SAMPLE TYPE CODE:
AQ=Aqueous
NA= Non Aqueous
SL = Sludge
DW = Drinking Water
WW = Waste Water
RW = Rain Water
GW = Ground Water
SO = Soil
SW = Solid Waste
OL = Oil
OT = Other Matrix

SPECIAL REQUIREMENTS / BILLING INFORMATION

1) Dissolved Copper samples have been field-filtered.

W L

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CHAIN OF CUSTODY RECORD

STANDARD

8J25060

Page 5 Of 5

CLIENT NAME: Wood E&I Solutions, Inc.
ADDRESS: 9210 Sky Park Ct., Suite 200
San Diego, CA 92123
PROJECT MANAGER: Barry Snyder

PROJECT: Boatwash Pilot Study
PHONE: 619-985-2405
FAX: 858-300-4301
EMAIL: corey.sheredy@woodplc.com
barry.snyder@woodplc.com
SAMPLER: Corey Sheredy (CCS) / Marisa Swiderski (MS)

SPECIAL HANDLING

- ☐ Same Day Rush 150%
- ☐ 24 Hour Rush 100%
- ☐ 48-72 Hour Rush 75%
- ☐ 4 - 5 Day Rush 30%
- ☐ Rush Extractions 50%
- ☑ 10 Business Days
- ☐ QA/QC Data Package

Charges will apply for weekends/holidays
Method of Shipment:

						ANALYSES REQUESTED										
ID# (For lab Use Only)	DATE SAMPLED	TIME SAMPLED	SMPL TYPE	SAMPLE IDENTIFICATION/SITE LOCATION	# OF CONT.	Total Copper Method EPA 1640 MDL 0.0038 µg/L, RL= 0.01 µg/L	Dissolved Copper¹ Method EPA 1640 MDL 0.0038 µg/L, RL= 0.01 µg/L	Total Suspended Solids Method USEPA 2540 D, MDL = 1 mg/L, RL = 5 mg/L	Solids (Copper) USEPA 6020 Cu MDL = 0.29 mg/kg, RL = 0.50 mg/kg	Total % SOLIDS						COMMENTS
	10/23/18	1330	DI	BW-FB	3	X	X	X								Field Blank
	10/23/18	1640	sediment	BASIN-PARTICULATE	2				X	X						Debris collected at Boatwash bottom
	10/23/18	1740	seawater	GATE1-Top-T5	3	X	X	X								
	10/23/18	1745	seawater	GATE1-Bottom-T5	3	X	X	X								
	10/23/18	1755	seawater	GATE2-Top-T5	3	X	X	X								
	10/23/18	1800	seawater	GATE2-Bottom-T5	3	X	X	X								
	10/23/18	1740	seawater	BASIN1-Top-T5	3	X	X	X								
	10/23/18	1745	seawater	BASIN1-Bottom-T5	3	X	X	X								
	10/23/18	1750	seawater	BASIN2-Top-T5	3	X	X	X								
	10/23/18	1755	seawater	BASIN2-Bottom-T5	3	X	X	X								

RELINQUISHED BY	DATE / TIME	RECEIVED BY
Kat Buckley	10/24/2018 12:00	
	10-25-18 1354	10/25/18 1354

SAMPLE CONDITION:
Actual Temperature: 1.4°C
Received On Ice [✓ Y] / N
Preserved [✓ Y] / N
Evidence Seals Present Y / [✓ N]
Container Intact [✓ Y] / N
Preserved at Lab Y / [✓ N]

SAMPLE TYPE CODE:
AQ=Aqueous
NA= Non Aqueous
SL = Sludge
DW = Drinking Water
WW = Waste Water
RW = Rain Water
GW = Ground Water
SO = Soil
SW = Solid Waste
OL = Oil
OT = Other Matrix

SPECIAL REQUIREMENTS / BILLING INFORMATION
1) Dissolved Copper samples have been field-filtered.

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CHAIN OF CUSTODY RECORD

STANDARD

Page 1 Of 1

CLIENT NAME:
Wood E&I Solutions, Inc.

PROJECT:
Boatwash Pilot Study

ADDRESS:
9210 Sky Park Ct., Suite 200
San Diego, CA 92123

PHONE: 619-985-2405
FAX: 858-300-4301
EMAIL: corey.sheredy@woodplc.com
barry.snyder@woodplc.com

PROJECT MANAGER
Barry Snyder

SAMPLER
Corey Sheredy (CCS) / Marisa Swiderski (MS)

SPECIAL HANDLING

☐ Same Day Rush 150%
☐ 24 Hour Rush 100%
☐ 48-72 Hour Rush 75%
☐ 4 - 5 Day Rush 30%
☐ Rush Extractions 50%
☑ 10 Business Days
☐ QA/QC Data Package

Charges will apply for weekends/holidays

Method of Shipment:

ANALYSES REQUESTED

ID# (For lab Use Only)	DATE SAMPLED	TIME SAMPLED	SMPL TYPE	SAMPLE IDENTIFICATION/SITE LOCATION	# OF CONT.	**Total Copper** Method EPA 1640 MDL 0.0038 µg/L, RL= 0.01 µg/L	**Dissolved Copper**[1] Method EPA 1640 MDL 0.0038 µg/L, RL= 0.01 µg/L	**Total Suspended Solids** Method USEPA 2540 D, MDL = 1 mg/L, RL = 5 mg/L								COMMENTS
	10/24/18	1025	seawater	GATE1-Top-P1	3	X	X	X								
	10/24/18	1030	seawater	GATE1-Bottom-P1	3	X	X	X								
	10/24/18	1035	seawater	GATE2-Top-P1	3	X	X	X								
	10/24/18	1040	seawater	GATE2-Bottom-P1	3	X	X	X								
	10/24/18	1050	seawater	BASIN1-Top-P1	3	X	X	X								
	10/24/18	1055	seawater	BASIN1-Bottom-P1	3	X	X	X								
	10/24/18	1100	seawater	BASIN2-Top-P1	3	X	X	X								
	10/24/18	1105	seawater	BASIN2-Bottom-P1	3	X	X	X								

RELINQUISHED BY	DATE / TIME	RECEIVED BY
Kate Buckley	10/24/2018 12:00	

SAMPLE CONDITION:

Actual Temperature:

Received On Ice Y / N
Preserved Y / N
Evidence Seals Present Y / N
Container Intact Y / N
Preserved at Lab Y / N

SAMPLE TYPE CODE:
AQ=Aqueous
NA= Non Aqueous
SL = Sludge
DW = Drinking Water
WW = Waste Water
RW = Rain Water
GW = Ground Water
SO = Soil
SW = Solid Waste
OL = Oil
OT = Other Matrix

SPECIAL REQUIREMENTS / BILLING INFORMATION

1) Dissolved Copper samples have been field-filtered.

2 COOLERS TOTAL

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CHAIN OF CUSTODY RECORD

STANDARD

8J26088

Page 1 Of 1

CLIENT NAME: Wood E&I Solutions, Inc.
ADDRESS:
9210 Sky Park Ct., Suite 200
San Diego, CA 92123

PROJECT: Boatwash Pilot Study
PHONE: 619-985-2405
FAX: 858-300-4301
EMAIL: corey.sheredy@woodplc.com
barry.snyder@woodplc.com

PROJECT MANAGER: Barry Snyder

SAMPLER: Corey Sheredy (CCS) / Marisa Swiderski (MS)

SPECIAL HANDLING

☐ Same Day Rush 150%
☐ 24 Hour Rush 100%
☐ 48-72 Hour Rush 75%
☐ 4 - 5 Day Rush 30%
☐ Rush Extractions 50%
☑ 10 Business Days
☐ QA/QC Data Package

Charges will apply for weekends/holidays

Method of Shipment:

COMMENTS

ANALYSES REQUESTED

ID# (For lab Use Only)	DATE SAMPLED	TIME SAMPLED	SMPL TYPE	SAMPLE IDENTIFICATION/SITE LOCATION	# OF CONT.	Total Copper Method EPA 1640 MDL 0.0038 µg/L, RL= 0.01 µg/L	Dissolved Copper[1] Method EPA 1640 MDL 0.0038 µg/L, RL= 0.01 µg/L	Total Suspended Solids Method USEPA 2540 D, MDL = 1 mg/L, RL = 5 mg/L
	10/25/18	1045	seawater	GATE1-Top-P2	3	X	X	X
	10/25/18	1050	seawater	GATE1-Bottom-P2	3	X	X	X
	10/25/18	1055	seawater	GATE2-Top-P2	3	X	X	X
	10/25/18	1100	seawater	GATE2-Bottom-P2	3	X	X	X
	10/25/18	1110	seawater	BASIN1-Top-P2	3	X	X	X
	10/25/18	1115	seawater	BASIN1-Bottom-P2	3	X	X	X
	10/25/18	1120	seawater	BASIN2-Top-P2	3	X	X	X
	10/25/18	1125	seawater	BASIN2-Bottom-P2	3	X	X	X
	10/26/18	1100	seawater	GATE1-Top-P3	3	X	X	X
	10/26/18	1105	seawater	GATE1-Bottom-P3	3	X	X	X
	10/26/18	1110	seawater	GATE2-Top-P3	3	X	X	X

RELINQUISHED BY	DATE / TIME	RECEIVED BY
	10/26/18 1300	10/26/18
	10/26/18 10:20	

SAMPLE CONDITION:
Actual Temperature: 4.8
Received On Ice [✓ Y] / N
Preserved [✓ Y] / N
Evidence Seals Present Y / [✓ N]
Container Intact Y / [✓ N]
Preserved at Lab Y / [✓ N]

SAMPLE TYPE CODE:
AQ=Aqueous
NA= Non Aqueous
SL = Sludge
DW = Drinking Water
WW = Waste Water
RW = Rain Water
GW = Ground Water
SO = Soil
SW = Solid Waste
OL = Oil
OT = Other Matrix

SPECIAL REQUIREMENTS / BILLING INFORMATION

1) Dissolved Copper samples have been field-filtered.

8J26088

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CHAIN OF CUSTODY RECORD

STANDARD

Page 2 Of 2

CLIENT NAME: Wood E&I Solutions, Inc.
ADDRESS:
9210 Sky Park Ct., Suite 200
San Diego, CA 92123
PROJECT MANAGER: Barry Snyder

PROJECT: Boatwash Pilot Study
PHONE: 619-985-2405
FAX: 858-300-4301
EMAIL: corey.sheredy@woodplc.com
barry.snyder@woodplc.com
SAMPLER: Corey Sheredy (CCS) / Marisa Swiderski (MS)

SPECIAL HANDLING
- ☐ Same Day Rush 150%
- ☐ 24 Hour Rush 100%
- ☐ 48-72 Hour Rush 75%
- ☐ 4 - 5 Day Rush 30%
- ☐ Rush Extractions 50%
- ☑ 10 Business Days
- ☐ QA/QC Data Package

Charges will apply for weekends/holidays
Method of Shipment:
COMMENTS

ID# (For lab Use Only)	DATE SAMPLED	TIME SAMPLED	SMPL TYPE	SAMPLE IDENTIFICATION/SITE LOCATION	# OF CONT.	ANALYSES REQUESTED: **Total Copper** Method EPA 1640 MDL 0.0038 µg/L, RL= 0.01 µg/L	**Dissolved Copper**[1] Method EPA 1640 MDL 0.0038 µg/L, RL= 0.01 µg/L	**Total Suspended Solids** Method USEPA 2540 D, MDL = 1 mg/L, RL = 5 mg/L							COMMENTS
	10/26/18	1115	seawater	GATE2-Bottom-P3	3	X	X	X							
	10/26/18	1125	seawater	BASIN1-Top-P3	3	X	X	X							
	10/26/18	1130	seawater	BASIN1-Bottom-P3	3	X	X	X							
	10/26/18	1135	seawater	BASIN2-Top-P3	3	X	X	X							
	10/26/18	1140	seawater	BASIN2-Bottom-P3	3	X	X	X							

RELINQUISHED BY	DATE / TIME	RECEIVED BY
	10/26/18 1300	
	10/26/18 16:20	

SAMPLE CONDITION:
Actual Temperature: 4.8
Received On Ice [✓ Y] / N
Preserved [✓ Y] / N
Evidence Seals Present Y / [✓ N]
Container Intact Y / [✓ N]
Preserved at Lab Y / [✓ N]

SAMPLE TYPE CODE:
AQ=Aqueous
NA= Non Aqueous
SL = Sludge
DW = Drinking Water
WW = Waste Water
RW = Rain Water
GW = Ground Water
SO = Soil
SW = Solid Waste
OL = Oil
OT = Other Matrix

SPECIAL REQUIREMENTS / BILLING INFORMATION
1) Dissolved Copper samples have been field-filtered.

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CHAIN OF CUSTODY RECORD

STANDARD

Page 1 Of 1

CLIENT NAME: Wood E&I Solutions, Inc.
PROJECT: Boatwash Pilot Study
ADDRESS:
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PHONE: 619-985-2405
FAX: 858-300-4301
EMAIL: corey.sheredy@woodplc.com
barry.snyder@woodplc.com
PROJECT MANAGER: Barry Snyder
SAMPLER: Corey Sheredy (CCS) / Marisa Swiderski (MS)

SPECIAL HANDLING

- ☐ Same Day Rush 150%
- ☐ 24 Hour Rush 100%
- ☐ 48-72 Hour Rush 75%
- ☐ 4 - 5 Day Rush 30%
- ☐ Rush Extractions 50%
- ☑ 10 Business Days
- ☐ QA/QC Data Package

Charges will apply for weekends/holidays

Method of Shipment:

ID# (For lab Use Only)	DATE SAMPLED	TIME SAMPLED	SMPL TYPE	SAMPLE IDENTIFICATION/SITE LOCATION	# OF CONT.	Total Copper Method EPA 1640 MDL 0.0038 µg/L, RL= 0.01 µg/L	Dissolved Copper[1] Method EPA 1640 MDL 0.0038 µg/L, RL= 0.01 µg/L	Total Suspended Solids Method USEPA 2540 D, MDL = 1 mg/L, RL = 5 mg/L								COMMENTS
	10/30/18	10:55	seawater	GATE1-Top-P7	3	X	X	X								
	10/30/18	11:00	seawater	GATE1-Bottom-P7	3	X	X	X								
	10/30/18	11:05	seawater	GATE2-Top-P7	3	X	X	X								
	10/30/18	11:10	seawater	GATE2-Bottom-P7	3	X	X	X								
	10/30/18	11:20	seawater	BASIN1-Top-P7	3	X	X	X								
	10/30/18	11:25	seawater	BASIN1-Bottom-P7	3	X	X	X								
	10/30/18	11:30	seawater	BASIN2-Top-P7	3	X	X	X								
	10/30/18	11:35	seawater	BASIN2-Bottom-P7	3	X	X	X								

RELINQUISHED BY	DATE / TIME	RECEIVED BY
Marisa Swiderski	10/31/18 10:10	Hector Sanchez

SAMPLE CONDITION:

Actual Temperature:
Received On Ice Y / N
Preserved Y / N
Evidence Seals Present Y / N
Container Intact Y / N
Preserved at Lab Y / N

SAMPLE TYPE CODE:
AQ=Aqueous
NA= Non Aqueous
SL = Sludge
DW = Drinking Water
WW = Waste Water
RW = Rain Water
GW = Ground Water
SO = Soil
SW = Solid Waste
OL = Oil
OT = Other Matrix

SPECIAL REQUIREMENTS / BILLING INFORMATION

1) Dissolved Copper samples have been field-filtered.

2 coolers

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CHAIN OF CUSTODY RECORD

STANDARD

Page 1 Of 1

CLIENT NAME: Wood E&I Solutions, Inc.
ADDRESS:
9210 Sky Park Ct., Suite 200
San Diego, CA 92123

PROJECT: Boatwash Pilot Study
PHONE: 619-985-2405
FAX: 858-300-4301
EMAIL: corey.sheredy@woodplc.com
barry.snyder@woodplc.com

PROJECT MANAGER: Barry Snyder
SAMPLER: Corey Sheredy (CCS) / Marisa Swiderski (MS)

SPECIAL HANDLING
☐ Same Day Rush 150%
☐ 24 Hour Rush 100%
☐ 48-72 Hour Rush 75%
☐ 4 - 5 Day Rush 30%
☐ Rush Extractions 50%
☑ 10 Business Days
☐ QA/QC Data Package

Charges will apply for weekends/holidays
Method of Shipment:

ANALYSES REQUESTED

ID# (For lab Use Only)	DATE SAMPLED	TIME SAMPLED	SMPL TYPE	SAMPLE IDENTIFICATION/SITE LOCATION	# OF CONT.	Total Copper Method EPA 1640 MDL 0.0038 µg/L, RL= 0.01 µg/L	Dissolved Copper[1] Method EPA 1640 MDL 0.0038 µg/L, RL= 0.01 µg/L	Total Suspended Solids Method USEPA 2540 D, MDL = 1 mg/L, RL = 5 mg/L	COMMENTS
	11/06/18	12:30	seawater	GATE1-Top-P14	3	X	X	X	
	11/06/18	12:35	seawater	GATE1-Bottom-P14	3	X	X	X	
	11/06/18	12:40	seawater	GATE2-Top-P14	3	X	X	X	
	11/06/18	12:45	seawater	GATE2-Bottom-P14	3	X	X	X	
	11/06/18	12:55	seawater	BASIN1-Top-P14	3	X	X	X	
	11/06/18	13:00	seawater	BASIN1-Bottom-P14	3	X	X	X	
	11/06/18	13:05	seawater	BASIN2-Top-P14	3	X	X	X	
	11/06/18	13:10	seawater	BASIN2-Bottom-P14	3	X	X	X	

RELINQUISHED BY	DATE / TIME	RECEIVED BY
Marisa Swiderski	11/07/18 08:35	

SAMPLE CONDITION:
Actual Temperature:
Received On Ice Y / N
Preserved Y / N
Evidence Seals Present Y / N
Container Intact Y / N
Preserved at Lab Y / N

SAMPLE TYPE CODE:
AQ=Aqueous
NA= Non Aqueous
SL = Sludge
DW = Drinking Water
WW = Waste Water
RW = Rain Water
GW = Ground Water
SO = Soil
SW = Solid Waste
OL = Oil
OT = Other Matrix

SPECIAL REQUIREMENTS / BILLING INFORMATION

1) Dissolved Copper samples have been field-filtered.

2 coolers

EVENT 2 (DIVER CLEANING)
TOXICITY CHAIN-OF-CUSTODY FORMS

wood.

Wood Environmental Toxicology Lab
4905 Morena Blvd, Ste. 1304
San Diego, CA 92117
Phone: (858) 299-5368

Chain of Custody Form

Page 1 of ~~3~~ 2

Client/Send Report To:
Company: WOOD
Address:
Contact/PM: COREY SHEREDY
Phone Number: 858-300-4316
Email Address:

Project Information (if needed):
Project Name: BOATWASH PILOT STDY
Project No.:
PO Number:

Personal Cooler Shipped:
Return Requested: YES____ NO____.

						Analysis Requested (Write out or use codes below)							
Sample ID	Collection Date	Collection Time	Sample Volume	Sample Type: Grab/Comp.	Sample Number (for lab use)	Ms-dv							Receipt Temp (°C)
BASIN 1-T0	10/23/18	0700	4L	COMP		X							8.9 AD
BASIN 2-T0	↓	0710	↓	↓		↓							8.~~8~~6 AD
GATE 1-T0	↓	0700	↓	↓		↓							8.~~9~~4
GATE 2-T0	↓	0725	↓	↓		↓							8.8
BASIN 1-T4	↓		↓	↓		↓							
BASIN 2-T4	↓		↓	↓		↓							
~~BASIN~~ GATE 1-T4	↓		↓	↓		↓							
GATE 2-T4	↓		↓	↓		↓							

Samples Collected By: CCS/MS/RS/KB

Additional Comments:

Samples Shipped via:
Condition Upon Receipt:

Relinquished/Shipped By:	Received By:	Relinquished By:	Received By:
Signature:	Signature:	Signature:	Signature:
Print Name: COREY SHEREDY	Print Name: Chris Stransky	Print Name: Chris Stransky	Print Name: Ashley Donohue
Date/Time: 10/23/2018 1115	Date/Time: 10/23/18 1115	Date/Time: 10/23/18 1625	Date/Time: 10/23/18 1625

Test Codes (marine):
Mp-c: Chronic Kelp
Hr-dv: Chronic Abalone
Aa-a: Acute Topsmelt
Aa-c: Chronic Topsmelt
Mb-a: Acute Menidia/Silverside
Mb-c: Chronic Menidia/Silverside
Ab-a: Acute Mysid Shrimp
Ab-c: Chronic Mysid Shrimp
Sp-c: Chronic Urchin Fertilization
Sp-dv: Chronic Urchin Development
Ms-dv: Chronic Mussel Development
Other: Write out the test organism

Test Codes (freshwater):
Cd-a: Acute Ceriodaphnia
Cd-c: Chronic Ceriodaphnia
Pp-a: Acute Fathead Minnow
Pp-c: Chronic Fathead Minnow
Sc-c: Chronic Green Algae
Ha-a: Acute Hyalella amphipod
Ha-c: Chronic Hyalella amphipod
T-22: CA Title 22 Hazardous Waste

wood.

Wood Environmental Toxicology Lab
4905 Morena Blvd, Ste. 1304
San Diego, CA 92117
Phone: (858) 299-5368

Chain of Custody Form

Page 1 **of** 1

Client/Send Report To:
Company: Wood
Address:
Contact/PM: Corey Sheredy
Phone Number: 858) 300-4316
Email Address:

Project Information (if needed):
Project Name: Boatwash Pilot Study
Project No.:
PO Number:

Personal Cooler Shipped:
Return Requested: YES____ NO____.

Sample ID	Collection Date	Collection Time	Sample Volume	Sample Type: Grab/Comp.	Sample Number (for lab use)	Analysis Requested (write out or use codes below): Ms-dv							Receipt Temp (°C)
BASIN1-T4	10/23/18	1540	4L	Comp		X							12.5
BASIN2-T4	10/23/18	1550	4L	Comp		↓							↓
GATE1-T4	10/23/18	1540	4L	Comp									
GATE2-T4	10/23/18	1550	4L	Comp		↓							↓

Samples Collected By: CCS/MS/RS/KB

Additional Comments:

Samples Shipped via:
Condition Upon Receipt:

Relinquished/Shipped By:
Signature: Marisa Swiderski
Print Name: Marisa Swiderski
Date/Time: 10/23/18 ~~0647pm~~ 1847

Received By:
Signature: Chris Stany
Print Name: Chris Stany
Date/Time: 10/23/18 1847

Relinquished By:
Signature:
Print Name:
Date/Time:

Received By:
Signature:
Print Name:
Date/Time:

Test Codes (marine):

- Mp-c: Chronic Kelp
- Hr-dv: Chronic Abalone
- Aa-a: Acute Topsmelt
- Aa-c: Chronic Topsmelt
- Mb-a: Acute Menidia/Silverside
- Mb-c: Chronic Menidia/Silverside
- Ab-a: Acute Mysid Shrimp
- Ab-c: Chronic Mysid Shrimp
- Sp-c: Chronic Urchin Fertilization
- Sp-dv: Chronic Urchin Development
- Ms-dv: Chronic Mussel Development
- Other: Write out the test organism

Test Codes (freshwater):

- Cd-a: Acute Ceriodaphnia
- Cd-c: Chronic Ceriodaphnia
- Pp-a: Acute Fathead Minnow
- Pp-c: Chronic Fathead Minno
- Sc-c: Chronic Green Algae
- Ha-a: Acute Hyalella amphipod
- Ha-c: Chronic Hyalella amphipod
- T-22: CA Title 22 Hazardous Waste

wood.

Wood Environmental Toxicology Lab
4905 Morena Blvd, Ste. 1304
San Diego, CA 92117
Phone: (858) 299-5368

Chain of Custody Form

Page 1 **of** 1

Client/Send Report To:
Company wood
Address
Contact/PM Corey Sheredy
Phone Number
Email Address

Project Information (if needed):
Project Name Boatwash Monitoring
Project No. 1715100615
PO Number

Personal Cooler Shipped:
Return Requested: YES____ NO____.

Analysis Requested (write out or use codes below)

Sample ID	Collection Date	Collection Time	Sample Volume	Sample Type: Grab/Comp.	Sample Number (for lab use)	Mg -dv							Receipt Temp (°C)
BASIN 1	11/06/18	1255	4L	Comp	2018-W0067	X							14.0
BASIN 2	11/06/18	1305	4L	Comp	-W0068	X							9.0
GATE 1	11/06/18	1230	4L	Comp	-W0069	X							9.0
GATE 2	11/06/18	1240	4L	Comp	-W0070	X							7.0

Samples Collected By: Corey Sheredy / Marisa Swiderski

Additional Comments:

Samples Shipped via:
Condition Upon Receipt:

Relinquished/Shipped By:
Signature:
Print Name: Marisa Swiderski
Date/Time: 11/06/18 1434

Received By:
Signature:
Print Name: Steve Carlson
Date/Time: 11/6/18 1434

Relinquished By:
Signature:
Print Name:
Date/Time:

Received By:
Signature:
Print Name:
Date/Time:

Test Codes (marine):

Mp-c: Chronic Kelp
Hr-dv: Chronic Abalone
Aa-a: Acute Topsmelt
Aa-c: Chronic Topsmelt

Mb-a: Acute Menidia/Silverside
Mb-c: Chronic Menidia/Silverside
Ab-a: Acute Mysid Shrimp
Ab-c: Chronic Mysid Shrimp

Sp-c: Chronic Urchin Fertilization
Sp-dv: Chronic Urchin Development
Mg-dv: Chronic Mussel Development
Other: Write out the test organism

Test Codes (freshwater):

Cd-a: Acute Ceriodaphnia
Cd-c: Chronic Ceriodaphnia
Pp-a: Acute Fathead Minnow
Pp-c: Chronic Fathead Minno

Sc-c: Chronic Green Algae
Ha-a: Acute Hyalella amphipod
Ha-c: Chronic Hyalella amphipod
T-22: CA Title 22 Hazardous Waste

EVENT 3 (BOATWASH CLEANING)
CHEMISTRY CHAIN-OF-CUSTODY FORMS

Weck Laboratories, Inc.
Analytical Laboratory Services - Since 1964

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Tel 626-336-2139 ♦ Fax 626-336-2634 ♦ www.wecklabs.com

CHAIN OF CUSTODY RECORD

STANDARD

Page 1 Of 5

CLIENT NAME: Wood E&I Solutions, Inc.
ADDRESS: 9210 Sky Park Ct., Suite 200
San Diego, CA 92123
PROJECT MANAGER: Barry Snyder

PROJECT: Boatwash Pilot Study
PHONE: 619-985-2405
FAX: 858-300-4301
EMAIL: corey.sheredy@woodplc.com
barry.snyder@woodplc.com
SAMPLER: Corey Sheredy (CCS) / Marisa Swiderski (MS)

SPECIAL HANDLING

☐ Same Day Rush 150%
☐ 24 Hour Rush 100%
☐ 48-72 Hour Rush 75%
☐ 4 - 5 Day Rush 30%
☐ Rush Extractions 50%
☑ 10 Business Days
☐ QA/QC Data Package

Charges will apply for weekends/holidays

Method of Shipment:

COMMENTS

ANALYSES REQUESTED

ID# (For lab Use Only)	DATE SAMPLED	TIME SAMPLED	SMPL TYPE	SAMPLE IDENTIFICATION/SITE LOCATION	# OF CONT.	**Total Copper** Method EPA 1640 MDL 0.0038 µg/L, RL= 0.01 µg/L	**Dissolved Copper**[1] Method EPA 1640 MDL 0.0038 µg/L, RL= 0.01 µg/L	**Total Suspended Solids** Method USEPA 2540 D, MDL = 1 mg/L, RL = 5 mg/L
	03/27/19	0815	seawater	GATE1-Top-T0	3	X	X	X
	03/27/19	0820	seawater	GATE1-Bottom-T0	3	X	X	X
	03/27/19	0825	seawater	GATE2-Top-T0	3	X	X	X
	03/27/19	0830	seawater	GATE2-Bottom-T0	3	X	X	X
	03/27/19	0815	seawater	BASIN1-Top-T0	3	X	X	X
	03/27/19	0820	seawater	BASIN1-Bottom-T0	3	X	X	X
	03/27/19	0825	seawater	BASIN2-Top-T0	3	X	X	X
	03/27/19	0830	seawater	BASIN2-Bottom-T0	3	X	X	X
	03/27/19	1020	seawater	GATE1-Top-T1	3	X	X	X
	03/27/19	1025	seawater	GATE1-Bottom-T1	3	X	X	X
	03/27/19	1030	seawater	GATE2-Top-T1	3	X	X	X

RELINQUISHED BY	DATE / TIME	RECEIVED BY
	3/28/19 0920	3-28-19 0920

SAMPLE CONDITION:

Actual Temperature:

Received On Ice Y / N
Preserved Y / N
Evidence Seals Present Y / N
Container Intact Y / N
Preserved at Lab Y / N

SAMPLE TYPE CODE:

AQ=Aqueous
NA= Non Aqueous
SL = Sludge
DW = Drinking Water
WW = Waste Water
RW = Rain Water
GW = Ground Water
SO = Soil
SW = Solid Waste
OL = Oil
OT = Other Matrix

SPECIAL REQUIREMENTS / BILLING INFORMATION

1) Dissolved Copper samples have been field-filtered.

WL

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CHAIN OF CUSTODY RECORD

STANDARD

Page 2 Of 5

CLIENT NAME: Wood E&I Solutions, Inc.

ADDRESS:
9210 Sky Park Ct., Suite 200
San Diego, CA 92123

PROJECT MANAGER: Barry Snyder

PROJECT: Boatwash Pilot Study

PHONE: 619-985-2405

FAX: 858-300-4301

EMAIL: corey.sheredy@woodplc.com
barry.snyder@woodplc.com

SAMPLER: Corey Sheredy (CCS) / Marisa Swiderski (MS)

SPECIAL HANDLING

☐ Same Day Rush 150%
☐ 24 Hour Rush 100%
☐ 48-72 Hour Rush 75%
☐ 4 - 5 Day Rush 30%
☐ Rush Extractions 50%
☑ 10 Business Days
☐ QA/QC Data Package

Charges will apply for weekends/holidays

Method of Shipment:

COMMENTS

ID# (For lab Use Only)	DATE SAMPLED	TIME SAMPLED	SMPL TYPE	SAMPLE IDENTIFICATION/SITE LOCATION	# OF CONT.	Total Copper Method EPA 1640 MDL 0.0038 µg/L, RL= 0.01 µg/L	Dissolved Copper[1] Method EPA 1640 MDL 0.0038 µg/L, RL= 0.01 µg/L	Total Suspended Solids Method USEPA 2540 D, MDL = 1 mg/L, RL = 5 mg/L							
	03/27/19	1035	seawater	GATE2-Bottom-T1	3	X	X	X							
	03/27/19	1020	seawater	BASIN1-Top-T1	3	X	X	X							
	03/27/19	1025	seawater	BASIN1-Bottom-T1	3	X	X	X							
	03/27/19	1030	seawater	BASIN2-Top-T1	3	X	X	X							
	03/27/19	1035	seawater	BASIN2-Bottom-T1	3	X	X	X							
	03/27/19	1045	seawater	GATE1-Top-T2	3	X	X	X							
	03/27/19	1050	seawater	GATE1-Bottom-T2	3	X	X	X							
	03/27/19	1100	seawater	GATE2-Top-T2	3	X	X	X							
	03/27/19	1105	seawater	GATE2-Bottom-T2	3	X	X	X							
	03/27/19	1045	seawater	BASIN1-Top-T2	3	X	X	X							
	03/27/19	1050	seawater	BASIN1-Bottom-T2	3	X	X	X							

RELINQUISHED BY	DATE / TIME	RECEIVED BY
	0420 3-28-19	Hector Sanch

SAMPLE CONDITION:

Actual Temperature:

Received On Ice Y / N
Preserved Y / N
Evidence Seals Present Y / N
Container Intact Y / N
Preserved at Lab Y / N

SAMPLE TYPE CODE:
AQ=Aqueous
NA= Non Aqueous
SL = Sludge
DW = Drinking Water
WW = Waste Water
RW = Rain Water
GW = Ground Water
SO = Soil
SW = Solid Waste
OL = Oil
OT = Other Matrix

SPECIAL REQUIREMENTS / BILLING INFORMATION

1) Dissolved Copper samples have been field-filtered.

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CHAIN OF CUSTODY RECORD

STANDARD

Page 3 Of 5

CLIENT NAME: Wood E&I Solutions, Inc.

PROJECT: Boatwash Pilot Study

ADDRESS:
9210 Sky Park Ct., Suite 200
San Diego, CA 92123

PHONE: 619-985-2405
FAX: 858-300-4301
EMAIL: corey.sheredy@woodplc.com
barry.snyder@woodplc.com

PROJECT MANAGER: Barry Snyder

SAMPLER: Corey Sheredy (CCS) / Marisa Swiderski (MS)

ANALYSES REQUESTED

ID# (For lab Use Only)	DATE SAMPLED	TIME SAMPLED	SMPL TYPE	SAMPLE IDENTIFICATION/SITE LOCATION	# OF CONT.	**Total Copper** Method EPA 1640 MDL 0.0038 µg/L, RL= 0.01 µg/L	**Dissolved Copper**[1] Method EPA 1640 MDL 0.0038 µg/L, RL= 0.01 µg/L	**Total Suspended Solids** Method USEPA 2540 D, MDL = 1 mg/L, RL = 5 mg/L	COMMENTS
	03/27/19	1100	seawater	BASIN2-Top-T2	3	X	X	X	
	03/27/19	1105	seawater	BASIN2-Bottom-T2	3	X	X	X	
	03/27/19	1055	seawater	GATE1-Top-T2-REP	3	X	X	X	Station replicate
	03/27/19	1055	seawater	BASIN1-Top-T2-REP	3	X	X	X	Station replicate
	03/27/19	1500	seawater	GATE1-Top-T3	3	X	X	X	
	03/27/19	1505	seawater	GATE1-Bottom-T3	3	X	X	X	
	03/27/19	1510	seawater	GATE2-Top-T3	3	X	X	X	
	03/27/19	15[illegible] 15	seawater	GATE2-Bottom-T3	3	X	X	X	
	03/27/19	1500	seawater	BASIN1-Top-T3	3	X	X	X	
	03/27/19	1505	seawater	BASIN1-Bottom-T3	3	X	X	X	
	03/27/19	1510	seawater	BASIN2-Top-T3	3	X	X	X	

SPECIAL HANDLING

☐ Same Day Rush 150%
☐ 24 Hour Rush 100%
☐ 48-72 Hour Rush 75%
☐ 4 - 5 Day Rush 30%
☐ Rush Extractions 50%
☑ 10 Business Days
☐ QA/QC Data Package

Charges will apply for weekends/holidays

Method of Shipment:

RELINQUISHED BY	DATE / TIME	RECEIVED BY
	0920 3-28-19	

SAMPLE CONDITION:

Actual Temperature:

Received On Ice Y / N
Preserved Y / N
Evidence Seals Present Y / N
Container Intact Y / N
Preserved at Lab Y / N

SAMPLE TYPE CODE:
AQ=Aqueous
NA= Non Aqueous
SL = Sludge
DW = Drinking Water
WW = Waste Water
RW = Rain Water
GW = Ground Water
SO = Soil
SW = Solid Waste
OL = Oil
OT = Other Matrix

SPECIAL REQUIREMENTS / BILLING INFORMATION

1) Dissolved Copper samples have been field-filtered.

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CHAIN OF CUSTODY RECORD

STANDARD

Page 4 Of 5

CLIENT NAME: Wood E&I Solutions, Inc.
ADDRESS:
9210 Sky Park Ct., Suite 200
San Diego, CA 92123
PROJECT MANAGER: Barry Snyder

PROJECT: Boatwash Pilot Study
PHONE: 619-985-2405
FAX: 858-300-4301
EMAIL: corey.sheredy@woodplc.com
barry.snyder@woodplc.com
SAMPLER: Corey Sheredy (CCS) / Marisa Swiderski (MS)

SPECIAL HANDLING
☐ Same Day Rush 150%
☐ 24 Hour Rush 100%
☐ 48-72 Hour Rush 75%
☐ 4 - 5 Day Rush 30%
☐ Rush Extractions 50%
☑ 10 Business Days
☐ QA/QC Data Package

Charges will apply for weekends/holidays
Method of Shipment:
COMMENTS

ANALYSES REQUESTED

ID# (For lab Use Only)	DATE SAMPLED	TIME SAMPLED	SMPL TYPE	SAMPLE IDENTIFICATION/SITE LOCATION	# OF CONT.	Total Copper Method EPA 1640 MDL 0.0038 µg/L, RL= 0.01 µg/L	Dissolved Copper[1] Method EPA 1640 MDL 0.0038 µg/L, RL= 0.01 µg/L	Total Suspended Solids Method USEPA 2540 D, MDL = 1 mg/L, RL = 5 mg/L
	03/27/19	1515	seawater	BASIN2-Bottom-T3	3	X	X	X
	03/27/19	1520	seawater	GATE1-Top-T4	3	X	X	X
	03/27/19	1525	seawater	GATE1-Bottom-T4	3	X	X	X
	03/27/19	1530	seawater	GATE2-Top-T4	3	X	X	X
	03/27/19	1535	seawater	GATE2-Bottom-T4	3	X	X	X
	03/27/19	1520	seawater	BASIN1-Top-T4	3	X	X	X
	03/27/19	1525	seawater	BASIN1-Bottom-T4	3	X	X	X
	03/27/19	1530	seawater	BASIN2-Top-T4	3	X	X	X
	03/27/19	1535	seawater	BASIN2-Bottom-T4	3	X	X	X
	03/27/19	1710	seawater	GATE1-Top-T5	3	X	X	X
	03/27/19	17~~20~~15	seawater	GATE1-Bottom-T5	3	X	X	X

RELINQUISHED BY	DATE / TIME	RECEIVED BY
	3-28-19 0920	Hect Saraha

SAMPLE CONDITION:
Actual Temperature:
Received On Ice Y / N
Preserved Y / N
Evidence Seals Present Y / N
Container Intact Y / N
Preserved at Lab Y / N

SAMPLE TYPE CODE:
AQ=Aqueous
NA= Non Aqueous
SL = Sludge
DW = Drinking Water
WW = Waste Water
RW = Rain Water
GW = Ground Water
SO = Soil
SW = Solid Waste
OL = Oil
OT = Other Matrix

SPECIAL REQUIREMENTS / BILLING INFORMATION
1) Dissolved Copper samples have been field-filtered.

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CHAIN OF CUSTODY RECORD

STANDARD

Page 5 Of 5

CLIENT NAME: Wood E&I Solutions, Inc.
ADDRESS: 9210 Sky Park Ct., Suite 200
San Diego, CA 92123
PROJECT MANAGER: Barry Snyder

PROJECT: Boatwash Pilot Study
PHONE: 619-985-2405
FAX: 858-300-4301
EMAIL: corey.sheredy@woodplc.com
barry.snyder@woodplc.com
SAMPLER: Corey Sheredy (CCS) / Marisa Swiderski (MS)

SPECIAL HANDLING

- ☐ Same Day Rush 150%
- ☐ 24 Hour Rush 100%
- ☐ 48-72 Hour Rush 75%
- ☐ 4 - 5 Day Rush 30%
- ☐ Rush Extractions 50%
- ☑ 10 Business Days
- ☐ QA/QC Data Package

Charges will apply for weekends/holidays

Method of Shipment:

ID# (For lab Use Only)	DATE SAMPLED	TIME SAMPLED	SMPL TYPE	SAMPLE IDENTIFICATION/SITE LOCATION	# OF CONT.	**Total Copper** Method EPA 1640 MDL 0.0038 µg/L, RL= 0.01 µg/L	**Dissolved Copper**[1] Method EPA 1640 MDL 0.0038 µg/L, RL= 0.01 µg/L	**Total Suspended Solids** Method USEPA 2540 D, MDL = 1 mg/L, RL = 5 mg/L	**Solids (Copper)** USEPA 6020 Cu MDL = 0.29 mg/kg, RL = 0.50 mg/kg	**Total Solids**						COMMENTS
	03/27/19	1720	seawater	GATE2-Top-T5	3	X	X	X								
	03/27/19	1725	seawater	GATE2-Bottom-T5	3	X	X	X								
	03/27/19	1710	seawater	BASIN1-Top-T5	3	X	X	X								
	03/27/19	1715	seawater	BASIN1-Bottom-T5	3	X	X	X								
	03/27/19	1720	seawater	BASIN2-Top-T5	3	X	X	X								
	03/27/19	1725	seawater	BASIN2-Bottom-T5	3	X	X	X								
	03/27/19	1230	DI	BW-FB	3	X	X	X								Field Blank
	03/27/19	1600	sediment	BASIN-PARTICULATE	3				X	X						Debris collected at Boatwash bottom
	03/26/19	1700	DI	Niskin3-ER	3	X	X	X								Equipment Rinse 1
	03/26/19	1710	DI	Niskin-2-ER	3	X	X	X								Equipment Rinse 2

RELINQUISHED BY	DATE / TIME	RECEIVED BY
	0920 3-28-19	

SAMPLE CONDITION:

Actual Temperature:

Received On Ice Y / N
Preserved Y / N
Evidence Seals Present Y / N
Container Intact Y / N
Preserved at Lab Y / N

SAMPLE TYPE CODE:
AQ=Aqueous
NA= Non Aqueous
SL = Sludge
DW = Drinking Water
WW = Waste Water
RW = Rain Water
GW = Ground Water
SO = Soil
SW = Solid Waste
OL = Oil
OT = Other Matrix

SPECIAL REQUIREMENTS / BILLING INFORMATION

1) Dissolved Copper samples have been field-filtered.

Weck Laboratories, Inc.
[illegible]

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CHAIN OF CUSTODY RECORD

STANDARD

Page 1 Of 1

CLIENT NAME: Wood E&I Solutions, Inc.

ADDRESS:
9210 Sky Park Ct., Suite 200
San Diego, CA 92123

PROJECT MANAGER: Barry Snyder

PROJECT: Boatwash Pilot Study

PHONE: 619-985-2405
FAX: 858-300-4301
EMAIL: corey.sheredy@woodplc.com
barry.snyder@woodplc.com

SAMPLER: Corey Sheredy (CCS) / Marisa Swiderski (MS)

SPECIAL HANDLING
- ☐ Same Day Rush 150%
- ☐ 24 Hour Rush 100%
- ☐ 48-72 Hour Rush 75%
- ☐ 4 - 5 Day Rush 30%
- ☐ Rush Extractions 50%
- ☑ 10 Business Days
- ☐ QA/QC Data Package

Charges will apply for weekends/holidays

Method of Shipment:

ID# (For lab Use Only)	DATE SAMPLED	TIME SAMPLED	SMPL TYPE	SAMPLE IDENTIFICATION/SITE LOCATION	# OF CONT.	ANALYSES REQUESTED Total Copper Method EPA 1640 MDL 0.0038 µg/L, RL= 0.01 µg/L	Dissolved Copper¹ Method EPA 1640 MDL 0.0038 µg/L, RL= 0.01 µg/L	Total Suspended Solids Method USEPA 2540 D, MDL = 1 mg/L, RL = 5 mg/L								COMMENTS
	03/28/19	1240	seawater	GATE1-Top-P1	3	X	X	X								
	03/28/19	1245	seawater	GATE1-Bottom-P1	3	X	X	X								
	03/28/19	1250	seawater	GATE2-Top-P1	3	X	X	X								
	03/28/19	1255	seawater	GATE2-Bottom-P1	3	X	X	X								
	03/28/19	1300	seawater	BASIN1-Top-P1	3	X	X	X								
	03/28/19	1305	seawater	BASIN1-Bottom-P1	3	X	X	X								
	03/28/19	1310	seawater	BASIN2-Top-P1	3	X	X	X								
	03/28/19	1315	seawater	BASIN2-Bottom-P1	3	X	X	X								

RELINQUISHED BY	DATE / TIME	RECEIVED BY
	3/29/19 1325	Hector Sanchez
RELINQUISHED BY	DATE / TIME	RECEIVED BY
RELINQUISHED BY	DATE / TIME	RECEIVED BY

SAMPLE CONDITION:

Actual Temperature:

Received On Ice	Y / N
Preserved	Y / N
Evidence Seals Present	Y / N
Container Intact	Y / N
Preserved at Lab	Y / N

SAMPLE TYPE CODE:
AQ=Aqueous
NA= Non Aqueous
SL = Sludge
DW = Drinking Water
WW = Waste Water
RW = Rain Water
GW = Ground Water
SO = Soil
SW = Solid Waste
OL = Oil
OT = Other Matrix

SPECIAL REQUIREMENTS / BILLING INFORMATION

1) Dissolved Copper samples have been field-filtered. Please preserve upon receipt.

Weck Laboratories, Inc.
[illegible]

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CHAIN OF CUSTODY RECORD

STANDARD

Page 1 Of 1

CLIENT NAME: Wood E&I Solutions, Inc.
ADDRESS:
9210 Sky Park Ct., Suite 200
San Diego, CA 92123
PROJECT MANAGER: Barry Snyder

PROJECT: Boatwash Pilot Study
PHONE: 619-985-2405
FAX: 858-300-4301
EMAIL: corey.sheredy@woodplc.com
barry.snyder@woodplc.com
SAMPLER: Corey Sheredy (CCS) / Marisa Swiderski (MS)

SPECIAL HANDLING
☐ Same Day Rush 150%
☐ 24 Hour Rush 100%
☐ 48-72 Hour Rush 75%
☐ 4 - 5 Day Rush 30%
☐ Rush Extractions 50%
☑ 10 Business Days
☐ QA/QC Data Package

Charges will apply for weekends/holidays
Method of Shipment:
COMMENTS

ID# (For lab Use Only)	DATE SAMPLED	TIME SAMPLED	SMPL TYPE	SAMPLE IDENTIFICATION/SITE LOCATION	# OF CONT.	**Total Copper** Method EPA 1640 MDL 0.0038 µg/L, RL= 0.01 µg/L	**Dissolved Copper**[1] Method EPA 1640 MDL 0.0038 µg/L, RL= 0.01 µg/L	**Total Suspended Solids** Method USEPA 2540 D, MDL = 1 mg/L, RL = 5 mg/L							
	03/29/19	1045	seawater	GATE1-Top-P2	3	X	X	X							
	03/29/19	1050	seawater	GATE1-Bottom-P2	3	X	X	X							
	03/29/19	1055	seawater	GATE2-Top-P2	3	X	X	X							
	03/29/19	1100	seawater	GATE2-Bottom-P2	3	X	X	X							
	03/29/19	1105	seawater	BASIN1-Top-P2	3	X	X	X							
	03/29/19	1110	seawater	BASIN1-Bottom-P2	3	X	X	X							
	03/29/19	1115	seawater	BASIN2-Top-P2	3	X	X	X							
	03/29/19	1120	seawater	BASIN2-Bottom-P2	3	X	X	X							

RELINQUISHED BY	DATE / TIME	RECEIVED BY
	3/29/19 1325	Heather Sanch
RELINQUISHED BY	DATE / TIME	RECEIVED BY
RELINQUISHED BY	DATE / TIME	RECEIVED BY

SAMPLE CONDITION:
Actual Temperature:
Received On Ice Y / N
Preserved Y / N
Evidence Seals Present Y / N
Container Intact Y / N
Preserved at Lab Y / N

SAMPLE TYPE CODE:
AQ=Aqueous
NA= Non Aqueous
SL = Sludge
DW = Drinking Water
WW = Waste Water
RW = Rain Water
GW = Ground Water
SO = Soil
SW = Solid Waste
OL = Oil
OT = Other Matrix

SPECIAL REQUIREMENTS / BILLING INFORMATION

1) Dissolved Copper samples have been field-filtered. Please preserve immediately upon receipt.

W.L

Weck Laboratories, Inc.

Analytical Laboratory Services - Since 1964

14859 East Clark Avenue : Industry : CA 91745
Tel 626-336-2139 ♦ Fax 626-336-2634 ♦ www.wecklabs.com

CHAIN OF CUSTODY RECORD

STANDARD

Page 1 Of 1

CLIENT NAME: Wood E&I Solutions, Inc.

PROJECT: Boatwash Pilot Study

ADDRESS:
9210 Sky Park Ct., Suite 200
San Diego, CA 92123

PHONE: 619-985-2405
FAX: 858-300-4301
EMAIL: corey.sheredy@woodplc.com
barry.snyder@woodplc.com

PROJECT MANAGER: Barry Snyder

SAMPLER: Corey Sheredy (CCS) / Marisa Swiderski (MS)

ID# (For lab Use Only)	DATE SAMPLED	TIME SAMPLED	SMPL TYPE	SAMPLE IDENTIFICATION/SITE LOCATION	# OF CONT.	**Total Copper** Method EPA 1640 MDL 0.0038 µg/L, RL= 0.01 µg/L	**Dissolved Copper**[1] Method EPA 1640 MDL 0.0038 µg/L, RL= 0.01 µg/L	**Total Suspended Solids** Method USEPA 2540 D, MDL = 1 mg/L, RL = 5 mg/L								COMMENTS
	03/30/19	850	seawater	GATE1-Top-P3	3	X	X	X								
	03/30/19	855	seawater	GATE1-Bottom-P3	3	X	X	X								
	03/30/19	900	seawater	GATE2-Top-P3	3	X	X	X								
	03/30/19	905	seawater	GATE2-Bottom-P3	3	X	X	X								
	03/30/19	910	seawater	BASIN1-Top-P3	3	X	X	X								
	03/30/19	915	seawater	BASIN1-Bottom-P3	3	X	X	X								
	03/30/19	920	seawater	BASIN2-Top-P3	3	X	X	X								
	03/30/19	925	seawater	BASIN2-Bottom-P3	3	X	X	X								

SPECIAL HANDLING

- ☐ Same Day Rush 150%
- ☐ 24 Hour Rush 100%
- ☐ 48-72 Hour Rush 75%
- ☐ 4 - 5 Day Rush 30%
- ☐ Rush Extractions 50%
- ☑ 10 Business Days
- ☐ QA/QC Data Package

Charges will apply for weekends/holidays

Method of Shipment:

RELINQUISHED BY	DATE / TIME	RECEIVED BY
	4/1/2019 1230	Timothy Maestas

SAMPLE CONDITION:

Actual Temperature:

Received On Ice Y / N
Preserved Y / N
Evidence Seals Present Y / N
Container Intact Y / N
Preserved at Lab Y / N

SAMPLE TYPE CODE:
AQ=Aqueous
NA= Non Aqueous
SL = Sludge
DW = Drinking Water
WW = Waste Water
RW = Rain Water
GW = Ground Water
SO = Soil
SW = Solid Waste
OL = Oil
OT = Other Matrix

SPECIAL REQUIREMENTS / BILLING INFORMATION

1) Dissolved Copper samples have been field-filtered. Please preserve immediately upon receipt.

W L

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CHAIN OF CUSTODY RECORD

STANDARD

Page 1 Of 1

CLIENT NAME: Wood E&I Solutions, Inc.
ADDRESS:
9210 Sky Park Ct., Suite 200
San Diego, CA 92123
PROJECT MANAGER: Barry Snyder

PROJECT: Boatwash Pilot Study
PHONE: 619-985-2405
FAX: 858-300-4301
EMAIL: corey.sheredy@woodplc.com
barry.snyder@woodplc.com
SAMPLER: Corey Sheredy (CCS) / Marisa Swiderski (MS)

SPECIAL HANDLING
- ☐ Same Day Rush 150%
- ☐ 24 Hour Rush 100%
- ☐ 48-72 Hour Rush 75%
- ☐ 4 - 5 Day Rush 30%
- ☐ Rush Extractions 50%
- ☑ 10 Business Days
- ☐ QA/QC Data Package

Charges will apply for weekends/holidays
Method of Shipment:
COMMENTS

						ANALYSES REQUESTED									
ID# (For lab Use Only)	DATE SAMPLED	TIME SAMPLED	SMPL TYPE	SAMPLE IDENTIFICATION/SITE LOCATION	# OF CONT.	**Total Copper** Method EPA 1640 MDL 0.0038 µg/L, RL= 0.01 µg/L	**Dissolved Copper**[1] Method EPA 1640 MDL 0.0038 µg/L, RL= 0.01 µg/L	**Total Suspended Solids** Method USEPA 2540 D, MDL = 1 mg/L, RL = 5 mg/L							
	04/03/19	1015	seawater	GATE1-Top-P7	3	X	X	X							
	04/03/19	1020	seawater	GATE1-Bottom-P7	3	X	X	X							
	04/03/19	1025	seawater	GATE2-Top-P7	3	X	X	X							
	04/03/19	1030	seawater	GATE2-Bottom-P7	3	X	X	X							
	04/03/19	1035	seawater	BASIN1-Top-P7	3	X	X	X							
	04/03/19	1040	seawater	BASIN1-Bottom-P7	3	X	X	X							
	04/03/19	1045	seawater	BASIN2-Top-P7	3	X	X	X							
	04/03/19	1050	seawater	BASIN2-Bottom-P7	3	X	X	X							

RELINQUISHED BY	DATE / TIME	RECEIVED BY
	04/04/2019 0845	Hector Sanchez

SAMPLE CONDITION:
Actual Temperature:
Received On Ice Y / N
Preserved Y / N
Evidence Seals Present Y / N
Container Intact Y / N
Preserved at Lab Y / N

SAMPLE TYPE CODE:
AQ=Aqueous
NA= Non Aqueous
SL = Sludge
DW = Drinking Water
WW = Waste Water
RW = Rain Water
GW = Ground Water
SO = Soil
SW = Solid Waste
OL = Oil
OT = Other Matrix

SPECIAL REQUIREMENTS / BILLING INFORMATION

1) Dissolved Copper samples have been field-filtered. Please preserve immediately upon receipt.

W L

Weck Laboratories, Inc.

Analytical Laboratory Services - Since 1964

14859 East Clark Avenue : Industry : CA 91745
Tel 626-336-2139 ♦ Fax 626-336-2634 ♦ www.wecklabs.com

CHAIN OF CUSTODY RECORD

STANDARD

Page 1 Of 1

CLIENT NAME: Wood E&I Solutions, Inc.

PROJECT: Boatwash Pilot Study

ADDRESS:
9210 Sky Park Ct., Suite 200
San Diego, CA 92123

PHONE: 619-985-2405

FAX: 858-300-4301

EMAIL: corey.sheredy@woodplc.com
barry.snyder@woodplc.com

PROJECT MANAGER: Barry Snyder

SAMPLER: Corey Sheredy (CCS) / Marisa Swiderski (MS)

SPECIAL HANDLING

☐ Same Day Rush 150%
☐ 24 Hour Rush 100%
☐ 48-72 Hour Rush 75%
☐ 4 - 5 Day Rush 30%
☐ Rush Extractions 50%
☑ 10 Business Days
☐ QA/QC Data Package

Charges will apply for weekends/holidays

Method of Shipment:

COMMENTS

ID# (For lab Use Only)	DATE SAMPLED	TIME SAMPLED	SMPL TYPE	SAMPLE IDENTIFICATION/SITE LOCATION	# OF CONT.	**Total Copper** Method EPA 1640 MDL 0.0038 µg/L, RL= 0.01 µg/L	**Dissolved Copper**[1] Method EPA 1640 MDL 0.0038 µg/L, RL= 0.01 µg/L	**Total Suspended Solids** Method USEPA 2540 D, MDL = 1 mg/L, RL = 5 mg/L							
	04/10/19	1550	seawater	GATE1-Top-P14	3	X	X	X							
	04/10/19	1555	seawater	GATE1-Bottom-P14	3	X	X	X							
	04/10/19	1600	seawater	GATE2-Top-P14	3	X	X	X							
	04/10/19	1605	seawater	GATE2-Bottom-P14	3	X	X	X							
	04/10/19	1610	seawater	BASIN1-Top-P14	3	X	X	X							
	04/10/19	1615	seawater	BASIN1-Bottom-P14	3	X	X	X							
	04/10/19	1620	seawater	BASIN2-Top-P14	3	X	X	X							
	04/10/19	1625	seawater	BASIN2-Bottom-P14	3	X	X	X							

ANALYSES REQUESTED

RELINQUISHED BY	DATE / TIME	RECEIVED BY
	850 4-11-19	Hector Sanchez
RELINQUISHED BY	DATE / TIME	RECEIVED BY
RELINQUISHED BY	DATE / TIME	RECEIVED BY

SAMPLE CONDITION:

Actual Temperature:

Received On Ice Y / N
Preserved Y / N
Evidence Seals Present Y / N
Container Intact Y / N
Preserved at Lab Y / N

SAMPLE TYPE CODE:
AQ=Aqueous
NA= Non Aqueous
SL = Sludge
DW = Drinking Water
WW = Waste Water
RW = Rain Water
GW = Ground Water
SO = Soil
SW = Solid Waste
OL = Oil
OT = Other Matrix

SPECIAL REQUIREMENTS / BILLING INFORMATION

1) Dissolved Copper samples have been field-filtered. Please preserve immediately upon receipt.

EVENT 3 (BOATWASH CLEANING)
TOXICITY CHAIN-OF-CUSTODY FORMS

wood.

Wood Aquatic Toxicology Lab
4905 Morena Blvd, Ste. 1304
San Diego, CA 92117
Phone: (858) 299-5368

Chain of Custody Form

Page 1 of 1

Client/Send Report To:

Company Wood E & I Solutions, Inc.
Address 9210 Sky Park Court, Suite 200
San Diego, CA 92123
Contact/PM Corey Sheredy
Phone Number 858-300-4316
Email Address corey.sheredy@woodplc.com

Project Information (if needed):

Project Name Boatwash Pilot Study
Project No. 1715100615
PO Number

Personal Cooler Shipped:
Return Requested: YES____ NO____.

Analysis Requested (write out or use codes below)

Sample ID	Collection Date	Collection Time	Sample Volume	Sample Type: Grab/Comp.	Sample Number (for lab use)	ms-dv							Receipt Temp (°C)
GATE1-T0	3/27/2019	0815	4L	Comp		X							7.0
GATE2-T0	3/27/2019	0825	4L	Comp		X							↓
BASIN1-T0	3/27/2019	0815	4L	Comp		X							↓
BASIN2-T0	3/27/2019	0825	4L	Comp		X							↓
GATE1-T4	3/27/2019	~~[illegible]~~ 1520	4L	Comp		X							6.2
GATE2-T4	3/27/2019	~~1720~~ 1530	4L	Comp		X							↓
BASIN1-T4	3/27/2019	~~[illegible]~~ 1520	4L	Comp		X							↓
BASIN2-T4	3/27/2019	1530	4L	Comp		X							↓

Samples Collected By:
CCS/MS/BS/CG

Additional Comments:

Samples Shipped via:
Condition Upon Receipt:

Relinquished/Shipped By:
Signature: CSheredy
Print Name: Corey Sheredy
Date/Time: 3/27/19 1900

Received By:
Signature:
Print Name: Chris Stransky
Date/Time: 3/27/19 1900

Relinquished By:
Signature:
Print Name:
Date/Time:

Received By:
Signature:
Print Name:
Date/Time:

Test Codes (marine):

Mp-c: Chronic Kelp
Hr-dv: Chronic Abalone
Aa-a: Acute Topsmelt
Aa-c: Chronic Topsmelt
Mb-a: Acute Menidia/Silverside
Mb-c: Chronic Menidia/Silverside
Ab-a: Acute Mysid Shrimp
Ab-c: Chronic Mysid Shrimp
Sp-c: Chronic Urchin Fertilization
Sp-dv: Chronic Urchin Development
Mg-dv: Chronic Mussel Development
Other: Write out the test organism

Test Codes (freshwater):

Cd-a: Acute Ceriodaphnia
Cd-c: Chronic Ceriodaphnia
Pp-a: Acute Fathead Minnow
Pp-c: Chronic Fathead Minno
Sc-c: Chronic Green Algae
Ha-a: Acute Hyalella amphipod
Ha-c: Chronic Hyalella amphipod
T-22: CA Title 22 Hazardous Waste

wood.

Wood Aquatic Toxicology Lab
4905 Morena Blvd, Ste. 1304
San Diego, CA 92117
Phone: (858) 299-5368

Chain of Custody Form

Page 1 of 1

Client/Send Report To:

Company Wood E & I Solutions, Inc.
Address 9210 Sky Park Court, Suite 200
San Diego, CA 92123
Contact/PM Corey Sheredy
Phone Number 858-300-4316
Email Address corey.sheredy@woodplc.com

Project Information (if needed):

Project Name Boatwash Pilot Study
Project No. 1715100615
PO Number

Personal Cooler Shipped:
Return Requested: YES_____ NO_____.

Analysis Requested (write out or use codes below)

Sample ID	Collection Date	Collection Time	Sample Volume	Sample Type: Grab/Comp.	Sample Number (for lab use)	ms-dv							Receipt Temp (°C)
GATE1-~~T0~~ P14	4/10/2019	1550	4L	Comp		X							
GATE2-~~T0~~ P14	4/10/2019	1600	4L	Comp		X							
BASIN1-~~T0~~ P14	4/10/2019	1610	4L	Comp		X							
BASIN2-~~T0~~ P14	4/10/2019	1620	4L	Comp		X							

Samples Collected By:
CCS/MS

Additional Comments:

Samples Shipped via:
Condition Upon Receipt:

Relinquished/Shipped By:
Signature:
Print Name: Marisa Swiderski
Date/Time: 04/11/2019 0915

Received By:
Signature:
Print Name: Jeff Van Voorhis
Date/Time: 4/11/19 0915

Relinquished By:
Signature:
Print Name:
Date/Time:

Received By:
Signature:
Print Name:
Date/Time:

Test Codes (marine):

Mp-c: Chronic Kelp
Hr-dv: Chronic Abalone
Aa-a: Acute Topsmelt
Aa-c: Chronic Topsmelt
Mb-a: Acute Menidia/Silverside
Mb-c: Chronic Menidia/Silverside
Ab-a: Acute Mysid Shrimp
Ab-c: Chronic Mysid Shrimp
Sp-c: Chronic Urchin Fertilization
Sp-dv: Chronic Urchin Development
Mg-dv: Chronic Mussel Development
Other: Write out the test organism

Test Codes (freshwater):

Cd-a: Acute Ceriodaphnia
Cd-c: Chronic Ceriodaphnia
Pp-a: Acute Fathead Minnow
Pp-c: Chronic Fathead Minno
Sc-c: Chronic Green Algae
Ha-a: Acute Hyalella amphipod
Ha-c: Chronic Hyalella amphipod
T-22: CA Title 22 Hazardous Waste

APPENDIX D
ANALYTICAL REPORTS

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EVENT 1 (BOATWASH CLEANING) CHEMISTRY LAB REPORTS

WECK LABORATORIES, INC.

Certificate of Analysis

FINAL REPORT

Work Orders: 8G19067

Project: Shelter Island Boatwash Pilot Study

Attn: Barry Snyder

Client: Wood - San Diego 2
9210 Sky Park Court, Suite 200
San Diego, CA 92123

Report Date: 8/07/2018

Received Date: 7/18/2018

Turnaround Time: Normal

Phones: (858) 300-4320

Fax: (858) 300-4301

P.O. #:

Billing Code:

DoD-ELAP #L2457 • ELAP-CA #1132 • EPA-UCMR #CA00211 • Guam-EPA #17-008R • HW-DOH # • ISO 17025 #L2457.01 • LACSD #10143 • NELAP-CA #04229CA • NELAP-OR #4047 • NJ-DEP #CA015

Dear Barry Snyder,

Enclosed are the results of analyses for samples received 7/18/18 with the Chain-of-Custody document. The samples were received in good condition, at 5.2 °C and on ice. All analyses met the method criteria except as noted in the case narrative or in the report with data qualifiers.

Reviewed by:

Chris Samatmanakit
Project Manager

Wood - San Diego 2
9210 Sky Park Court, Suite 200
San Diego, CA 92123

Project Number: Shelter Island Boatwash Pilot Study

Project Manager: Barry Snyder

Reported:
08/07/2018 10:38

Sample Summary

Sample Name	Sampled By	Lab ID	Matrix	Sampled	Qualifiers
NISKIN-1	Corey Sheredy/Barry Snyder	8G19067-01	Water	07/16/18 19:45	
NISKIN-2	Corey Sheredy/Barry Snyder	8G19067-02	Water	07/16/18 20:00	
BW-FB	Corey Sheredy/Barry Snyder	8G19067-03	Water	07/17/18 15:00	
BWB-Particulate	Corey Sheredy/Barry Snyder	8G19067-04	Solid	07/17/18 17:52	
BWB1-E1-T	Corey Sheredy/Barry Snyder	8G19067-05	Water	07/17/18 09:05	
BWB1-E1-B	Corey Sheredy/Barry Snyder	8G19067-06	Water	07/17/18 09:10	
BWB2-E1-T	Corey Sheredy/Barry Snyder	8G19067-07	Water	07/17/18 09:35	
BWB2-E1-B	Corey Sheredy/Barry Snyder	8G19067-08	Water	07/17/18 09:35	
BWB1-E2-T	Corey Sheredy/Barry Snyder	8G19067-09	Water	07/17/18 11:00	
BWB1-E2-B	Corey Sheredy/Barry Snyder	8G19067-10	Water	07/17/18 11:05	
BWB2-E2-T	Corey Sheredy/Barry Snyder	8G19067-11	Water	07/17/18 11:12	
BWB2-E2-B	Corey Sheredy/Barry Snyder	8G19067-12	Water	07/17/18 11:18	
BWB1-E3-T	Corey Sheredy/Barry Snyder	8G19067-13	Water	07/17/18 11:30	
BWB1-E3-B	Corey Sheredy/Barry Snyder	8G19067-14	Water	07/17/18 11:38	
BWB2-E3-T	Corey Sheredy/Barry Snyder	8G19067-15	Water	07/17/18 11:52	
BWB2-E3-B	Corey Sheredy/Barry Snyder	8G19067-16	Water	07/17/18 11:59	
BWB1-E3-T-REP	Corey Sheredy/Barry Snyder	8G19067-17	Water	07/17/18 11:45	
BWB2-E3-T-REP	Corey Sheredy/Barry Snyder	8G19067-18	Water	07/17/18 12:10	
BWB1-E4-T	Corey Sheredy/Barry Snyder	8G19067-19	Water	07/17/18 16:32	
BWB1-E4-B	Corey Sheredy/Barry Snyder	8G19067-20	Water	07/17/18 16:38	
BWB2-E4-T	Corey Sheredy/Barry Snyder	8G19067-21	Water	07/17/18 16:46	
BWB2-E4-B	Corey Sheredy/Barry Snyder	8G19067-22	Water	07/17/18 16:52	
BWB1-E5-T	Corey Sheredy/Barry Snyder	8G19067-23	Water	07/17/18 17:04	
BWB1-E5-B	Corey Sheredy/Barry Snyder	8G19067-24	Water	07/17/18 17:12	
BWB2-E5-T	Corey Sheredy/Barry Snyder	8G19067-25	Water	07/17/18 17:23	
BWB2-E5-B	Corey Sheredy/Barry Snyder	8G19067-26	Water	07/17/18 17:30	
BWG1-E1-T	Corey Sheredy/Barry Snyder	8G19067-27	Water	07/17/18 09:10	
BWG1-E1-B	Corey Sheredy/Barry Snyder	8G19067-28	Water	07/17/18 09:20	
BWG2-E1-T	Corey Sheredy/Barry Snyder	8G19067-29	Water	07/17/18 09:35	

Certificate of Analysis

FINAL REPORT

Wood - San Diego 2
9210 Sky Park Court, Suite 200
San Diego, CA 92123

Project Number: Shelter Island Boatwash Pilot Study

Project Manager: Barry Snyder

Reported:
08/07/2018 10:38

Sample Name	Sampled By	Lab ID	Matrix	Sampled	Qualifiers
BWG2-E1-B	Corey Sheredy/Barry Snyder	8G19067-30	Water	07/17/18 09:45	
BWG1-E2-T	Corey Sheredy/Barry Snyder	8G19067-31	Water	07/17/18 11:00	
BWG1-E2-B	Corey Sheredy/Barry Snyder	8G19067-32	Water	07/17/18 11:05	
BWG2-E2-T	Corey Sheredy/Barry Snyder	8G19067-33	Water	07/17/18 11:15	
BWG2-E2-B	Corey Sheredy/Barry Snyder	8G19067-34	Water	07/17/18 11:20	
BWG1-E3-T	Corey Sheredy/Barry Snyder	8G19067-35	Water	07/17/18 11:30	
BWG1-E3-B	Corey Sheredy/Barry Snyder	8G19067-36	Water	07/17/18 11:40	
BWG2-E3-T	Corey Sheredy/Barry Snyder	8G19067-37	Water	07/17/18 12:00	
BWG2-E3-B	Corey Sheredy/Barry Snyder	8G19067-38	Water	07/17/18 12:05	
BWG1-E3-T-REP	Corey Sheredy/Barry Snyder	8G19067-39	Water	07/17/18 11:50	
BWG2-E3-T-REP	Corey Sheredy/Barry Snyder	8G19067-40	Water	07/17/18 12:10	
BWG1-E4-T	Corey Sheredy/Barry Snyder	8G19067-41	Water	07/17/18 16:30	
BWG1-E4-B	Corey Sheredy/Barry Snyder	8G19067-42	Water	07/17/18 16:35	
BWG2-E4-T	Corey Sheredy/Barry Snyder	8G19067-43	Water	07/17/18 16:45	
BWG2-E4-B	Corey Sheredy/Barry Snyder	8G19067-44	Water	07/17/18 16:50	
BWG1-E5-T	Corey Sheredy/Barry Snyder	8G19067-45	Water	07/17/18 17:10	
BWG1-E5-B	Corey Sheredy/Barry Snyder	8G19067-46	Water	07/17/18 17:15	
BWG2-E5-T	Corey Sheredy/Barry Snyder	8G19067-47	Water	07/17/18 17:25	
BWG2-E5-B	Corey Sheredy/Barry Snyder	8G19067-48	Water	07/17/18 17:35	

Not Certified Analyses Summary

Analyte	CAS #	Not Accredited By
EPA 160.3M in Solid		
% Solids		NELAP

Sample Results

Sample: NISKIN-1
8G19067-01 (Water)
Sampled: 07/16/18 19:45 by Corey Sheredy/Barry Snyder

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8G1233 **Instr:** OVEN11 **Prepared:** 07/23/18 10:36 **Analyst:** vll							
Total Suspended Solids	ND		5	mg/l	1	07/23/18 18:08	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8G1376 **Instr:** ICPMS03 **Prepared:** 07/18/18 19:00 **Analyst:** aln							
Copper, Dissolved	**0.12**	0.0038	0.010	ug/l	1	07/28/18 17:19	
Method: EPA 1640 **Batch ID:** W8G1431 **Instr:** ICPMS03 **Prepared:** 07/18/18 19:00 **Analyst:** aln							
Copper, Total	**0.15**	0.0038	0.010	ug/l	1	07/27/18 23:00	

Sample: NISKIN-2
8G19067-02 (Water)
Sampled: 07/16/18 20:00 by Corey Sheredy/Barry Snyder

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8G1233 **Instr:** OVEN11 **Prepared:** 07/23/18 10:36 **Analyst:** vll							
Total Suspended Solids	ND		5	mg/l	1	07/23/18 18:08	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8G1376 **Instr:** ICPMS03 **Prepared:** 07/18/18 19:00 **Analyst:** aln							
Copper, Dissolved	**0.085**	0.0038	0.010	ug/l	1	07/28/18 17:33	
Method: EPA 1640 **Batch ID:** W8G1431 **Instr:** ICPMS03 **Prepared:** 07/18/18 19:00 **Analyst:** aln							
Copper, Total	**0.11**	0.0038	0.010	ug/l	1	07/27/18 23:14	

Sample: BW-FB
8G19067-03 (Water)
Sampled: 07/17/18 15:00 by Corey Sheredy/Barry Snyder

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8G1233 **Instr:** OVEN11 **Prepared:** 07/23/18 10:36 **Analyst:** vll							
Total Suspended Solids	ND		5	mg/l	1	07/23/18 18:08	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8H0055 **Instr:** ICPMS03 **Prepared:** 07/18/18 19:00 **Analyst:** aln							
Copper, Dissolved	**0.077**	0.0038	0.010	ug/l	1	07/31/18 22:57	
Copper, Total	**0.058**	0.0038	0.010	ug/l	1	07/31/18 23:52	

Sample: BWB-Particulate
8G19067-04 (Solid)
Sampled: 07/17/18 17:52 by Corey Sheredy/Barry Snyder

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: EPA 160.3M **Batch ID:** W8G1765 **Instr:** Inst **Prepared:** 07/31/18 13:40 **Analyst:** dec							
% Solids	**6.95**		0.100	% by Weight	1	08/01/18 11:31	
Metals (Non-Aqueous) by EPA 6000/7000 Series Methods							
Method: EPA 6020B **Batch ID:** W8G1538 **Instr:** ICPMS02 **Prepared:** 07/26/18 15:44 **Analyst:** MTT							
Copper, Total	**1700**	5.8	10	mg/kg	20	08/01/18 11:31	

Sample Results

(Continued)

Sample: BWB1-E1-T Sampled: 07/17/18 9:05 by Corey Sheredy/Barry Snyder
8G19067-05 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8G1160 **Instr:** OVEN11 **Prepared:** 07/20/18 11:11 **Analyst:** vll							
Total Suspended Solids	**4**		5	mg/l	1	07/23/18 14:49	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8G1376 **Instr:** ICPMS03 **Prepared:** 07/18/18 19:00 **Analyst:** aln							
Copper, Dissolved	**5.4**	0.0076	0.020	ug/l	2	07/28/18 18:00	
Method: EPA 1640 **Batch ID:** W8G1431 **Instr:** ICPMS03 **Prepared:** 07/18/18 19:00 **Analyst:** aln							
Copper, Total	**5.4**	0.0076	0.020	ug/l	2	07/29/18 02:00	

Sample: BWB1-E1-B Sampled: 07/17/18 9:10 by Corey Sheredy/Barry Snyder
8G19067-06 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8G1160 **Instr:** OVEN11 **Prepared:** 07/20/18 11:11 **Analyst:** vll							
Total Suspended Solids	**1**		5	mg/l	1	07/23/18 14:49	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8G1376 **Instr:** ICPMS03 **Prepared:** 07/18/18 19:00 **Analyst:** aln							
Copper, Dissolved	**5.3**	0.0076	0.020	ug/l	2	07/28/18 18:14	
Method: EPA 1640 **Batch ID:** W8G1431 **Instr:** ICPMS03 **Prepared:** 07/18/18 19:00 **Analyst:** aln							
Copper, Total	**5.4**	0.0076	0.020	ug/l	2	07/29/18 02:13	

Sample: BWB2-E1-T Sampled: 07/17/18 9:35 by Corey Sheredy/Barry Snyder
8G19067-07 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8G1160 **Instr:** OVEN11 **Prepared:** 07/20/18 11:11 **Analyst:** vll							
Total Suspended Solids	**4**		5	mg/l	1	07/23/18 14:49	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8G1376 **Instr:** ICPMS03 **Prepared:** 07/18/18 19:00 **Analyst:** aln							
Copper, Dissolved	**5.4**	0.0076	0.020	ug/l	2	07/28/18 18:27	
Method: EPA 1640 **Batch ID:** W8G1431 **Instr:** ICPMS03 **Prepared:** 07/18/18 19:00 **Analyst:** aln							
Copper, Total	**5.6**	0.0076	0.020	ug/l	2	07/29/18 02:27	

Sample Results

(Continued)

Sample: BWB2-E1-B
8G19067-08 (Water)

Sampled: 07/17/18 9:35 by Corey Sheredy/Barry Snyder

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8G1160 **Instr:** OVEN11 **Prepared:** 07/20/18 11:11 **Analyst:** vll							
Total Suspended Solids	**3**		5	mg/l	1	07/23/18 14:49	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8G1376 **Instr:** ICPMS03 **Prepared:** 07/18/18 19:00 **Analyst:** aln							
Copper, Dissolved	**5.8**	0.0076	0.020	ug/l	2	07/28/18 18:41	
Method: EPA 1640 **Batch ID:** W8G1431 **Instr:** ICPMS03 **Prepared:** 07/18/18 19:00 **Analyst:** aln							
Copper, Total	**5.7**	0.0076	0.020	ug/l	2	07/29/18 02:41	

Sample: BWB1-E2-T
8G19067-09 (Water)

Sampled: 07/17/18 11:00 by Corey Sheredy/Barry Snyder

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8G1160 **Instr:** OVEN11 **Prepared:** 07/20/18 11:11 **Analyst:** vll							
Total Suspended Solids	**8**		5	mg/l	1	07/23/18 14:49	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8G1376 **Instr:** ICPMS03 **Prepared:** 07/18/18 19:00 **Analyst:** aln							
Copper, Dissolved	**430**	0.38	1.0	ug/l	100	07/28/18 18:55	
Method: EPA 1640 **Batch ID:** W8G1431 **Instr:** ICPMS03 **Prepared:** 07/18/18 19:00 **Analyst:** aln							
Copper, Total	**3000**	3.8	10	ug/l	1000	07/28/18 00:36	

Sample: BWB1-E2-B
8G19067-10 (Water)

Sampled: 07/17/18 11:05 by Corey Sheredy/Barry Snyder

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8G1160 **Instr:** OVEN11 **Prepared:** 07/20/18 11:11 **Analyst:** vll							
Total Suspended Solids	**6**		5	mg/l	1	07/23/18 14:49	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8G1376 **Instr:** ICPMS03 **Prepared:** 07/18/18 19:00 **Analyst:** aln							
Copper, Dissolved	**330**	0.38	1.0	ug/l	100	07/28/18 19:08	
Method: EPA 1640 **Batch ID:** W8G1431 **Instr:** ICPMS03 **Prepared:** 07/18/18 19:00 **Analyst:** aln							
Copper, Total	**2100**	3.8	10	ug/l	1000	07/28/18 00:50	

Sample Results

(Continued)

Sample: BWB2-E2-T
8G19067-11 (Water)
Sampled: 07/17/18 11:12 by Corey Sheredy/Barry Snyder

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8G1160 **Instr:** OVEN11 **Prepared:** 07/20/18 11:11 **Analyst:** vll							
Total Suspended Solids	**14**		5	mg/l	1	07/23/18 14:49	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8G1376 **Instr:** ICPMS03 **Prepared:** 07/18/18 19:00 **Analyst:** aln							
Copper, Dissolved	**230**	0.38	1.0	ug/l	100	07/28/18 19:22	
Method: EPA 1640 **Batch ID:** W8G1431 **Instr:** ICPMS03 **Prepared:** 07/18/18 19:00 **Analyst:** aln							
Copper, Total	**1300**	1.9	5.0	ug/l	500	07/28/18 01:03	

Sample: BWB2-E2-B
8G19067-12 (Water)
Sampled: 07/17/18 11:18 by Corey Sheredy/Barry Snyder

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8G1160 **Instr:** OVEN11 **Prepared:** 07/20/18 11:11 **Analyst:** vll							
Total Suspended Solids	**9**		5	mg/l	1	07/23/18 14:49	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8G1376 **Instr:** ICPMS03 **Prepared:** 07/18/18 19:00 **Analyst:** aln							
Copper, Dissolved	**270**	0.38	1.0	ug/l	100	07/28/18 20:44	
Method: EPA 1640 **Batch ID:** W8G1431 **Instr:** ICPMS03 **Prepared:** 07/18/18 19:00 **Analyst:** aln							
Copper, Total	**1600**	1.9	5.0	ug/l	500	07/28/18 02:26	

Sample: BWB1-E3-T
8G19067-13 (Water)
Sampled: 07/17/18 11:30 by Corey Sheredy/Barry Snyder

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8G1160 **Instr:** OVEN11 **Prepared:** 07/20/18 11:11 **Analyst:** vll							
Total Suspended Solids	**10**		5	mg/l	1	07/23/18 14:49	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8G1376 **Instr:** ICPMS03 **Prepared:** 07/18/18 19:00 **Analyst:** aln							
Copper, Dissolved	**340**	0.38	1.0	ug/l	100	07/28/18 20:58	
Method: EPA 1640 **Batch ID:** W8G1431 **Instr:** ICPMS03 **Prepared:** 07/18/18 19:00 **Analyst:** aln							
Copper, Total	**1600**	3.8	10	ug/l	1000	07/28/18 02:39	

Sample Results

(Continued)

Sample: BWB1-E3-B
8G19067-14 (Water)

Sampled: 07/17/18 11:38 by Corey Sheredy/Barry Snyder

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8G1160 **Instr:** OVEN11 **Prepared:** 07/20/18 11:11 **Analyst:** vll							
Total Suspended Solids	**9**		5	mg/l	1	07/23/18 14:49	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8G1376 **Instr:** ICPMS03 **Prepared:** 07/18/18 19:00 **Analyst:** aln							
Copper, Dissolved	**360**	0.38	1.0	ug/l	100	07/28/18 21:12	
Method: EPA 1640 **Batch ID:** W8G1431 **Instr:** ICPMS03 **Prepared:** 07/18/18 19:00 **Analyst:** aln							
Copper, Total	**1600**	3.8	10	ug/l	1000	07/28/18 02:53	

Sample: BWB2-E3-T
8G19067-15 (Water)

Sampled: 07/17/18 11:52 by Corey Sheredy/Barry Snyder

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8G1233 **Instr:** OVEN11 **Prepared:** 07/23/18 10:36 **Analyst:** vll							
Total Suspended Solids	**6**		5	mg/l	1	07/23/18 18:08	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8G1376 **Instr:** ICPMS03 **Prepared:** 07/18/18 19:00 **Analyst:** aln							
Copper, Dissolved	**350**	0.38	1.0	ug/l	100	07/28/18 21:26	
Method: EPA 1640 **Batch ID:** W8G1431 **Instr:** ICPMS03 **Prepared:** 07/18/18 19:00 **Analyst:** aln							
Copper, Total	**1400**	1.9	5.0	ug/l	500	07/28/18 03:07	

Sample: BWB2-E3-B
8G19067-16 (Water)

Sampled: 07/17/18 11:59 by Corey Sheredy/Barry Snyder

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8G1233 **Instr:** OVEN11 **Prepared:** 07/23/18 10:36 **Analyst:** vll							
Total Suspended Solids	**6**		5	mg/l	1	07/23/18 18:08	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8G1376 **Instr:** ICPMS03 **Prepared:** 07/18/18 19:00 **Analyst:** aln							
Copper, Dissolved	**350**	0.38	1.0	ug/l	100	07/28/18 21:39	
Method: EPA 1640 **Batch ID:** W8G1431 **Instr:** ICPMS03 **Prepared:** 07/18/18 19:00 **Analyst:** aln							
Copper, Total	**1400**	1.9	5.0	ug/l	500	07/28/18 03:20	

Sample Results

(Continued)

Sample: BWB1-E3-T-REP
8G19067-17 (Water)

Sampled: 07/17/18 11:45 by Corey Seredy/Barry Snyder

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8G1233 **Instr:** OVEN11 **Prepared:** 07/23/18 10:36 **Analyst:** vll							
Total Suspended Solids	**5**		5	mg/l	1	07/23/18 18:08	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8G1376 **Instr:** ICPMS03 **Prepared:** 07/18/18 19:00 **Analyst:** aln							
Copper, Dissolved	**370**	0.38	1.0	ug/l	100	07/28/18 21:53	
Method: EPA 1640 **Batch ID:** W8G1431 **Instr:** ICPMS03 **Prepared:** 07/18/18 19:00 **Analyst:** aln							
Copper, Total	**1600**	1.9	5.0	ug/l	500	07/28/18 03:34	

Sample: BWB2-E3-T-REP
8G19067-18 (Water)

Sampled: 07/17/18 12:10 by Corey Sheredy/Barry Snyder

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8G1233 **Instr:** OVEN11 **Prepared:** 07/23/18 10:36 **Analyst:** vll							
Total Suspended Solids	**3**		5	mg/l	1	07/23/18 18:08	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8G1376 **Instr:** ICPMS03 **Prepared:** 07/18/18 19:00 **Analyst:** aln							
Copper, Dissolved	**340**	0.38	1.0	ug/l	100	07/28/18 22:07	
Method: EPA 1640 **Batch ID:** W8G1431 **Instr:** ICPMS03 **Prepared:** 07/18/18 19:00 **Analyst:** aln							
Copper, Total	**1200**	1.9	5.0	ug/l	500	07/28/18 03:48	

Sample: BWB1-E4-T
8G19067-19 (Water)

Sampled: 07/17/18 16:32 by Corey Sheredy/Barry Snyder

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8G1233 **Instr:** OVEN11 **Prepared:** 07/23/18 10:36 **Analyst:** vll							
Total Suspended Solids	**7**		5	mg/l	1	07/23/18 18:08	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8G1376 **Instr:** ICPMS03 **Prepared:** 07/18/18 19:00 **Analyst:** aln							
Copper, Dissolved	**170**	0.38	1.0	ug/l	100	07/28/18 22:20	
Method: EPA 1640 **Batch ID:** W8G1431 **Instr:** ICPMS03 **Prepared:** 07/18/18 19:00 **Analyst:** aln							
Copper, Total	**3100**	3.8	10	ug/l	1000	07/28/18 04:01	

Sample Results

(Continued)

Sample: BWB1-E4-B
8G19067-20 (Water)

Sampled: 07/17/18 16:38 by Corey Sheredy/Barry Snyder

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8G1233 **Instr:** OVEN11 **Prepared:** 07/23/18 10:36 **Analyst:** vll							
Total Suspended Solids	**7**		5	mg/l	1	07/23/18 18:08	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8G1376 **Instr:** ICPMS03 **Prepared:** 07/18/18 19:00 **Analyst:** aln							
Copper, Dissolved	**170**	0.38	1.0	ug/l	100	07/28/18 22:34	
Method: EPA 1640 **Batch ID:** W8G1431 **Instr:** ICPMS03 **Prepared:** 07/18/18 19:00 **Analyst:** aln							
Copper, Total	**2900**	3.8	10	ug/l	1000	07/28/18 04:15	

Sample: BWB2-E4-T
8G19067-21 (Water)

Sampled: 07/17/18 16:46 by Corey Sheredy/Barry Snyder

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8G1233 **Instr:** OVEN11 **Prepared:** 07/23/18 10:36 **Analyst:** vll							
Total Suspended Solids	**9**		5	mg/l	1	07/23/18 18:08	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8G1376 **Instr:** ICPMS03 **Prepared:** 07/18/18 19:00 **Analyst:** aln							
Copper, Dissolved	**160**	0.38	1.0	ug/l	100	07/28/18 22:48	
Method: EPA 1640 **Batch ID:** W8G1431 **Instr:** ICPMS03 **Prepared:** 07/18/18 19:00 **Analyst:** aln							
Copper, Total	**2500**	3.8	10	ug/l	1000	07/28/18 04:29	

Sample: BWB2-E4-B
8G19067-22 (Water)

Sampled: 07/17/18 16:52 by Corey Sheredy/Barry Snyder

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8G1233 **Instr:** OVEN11 **Prepared:** 07/23/18 10:36 **Analyst:** vll							
Total Suspended Solids	**8**		5	mg/l	1	07/23/18 18:08	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8G1432 **Instr:** ICPMS03 **Prepared:** 07/18/18 19:00 **Analyst:** aln							
Copper, Total	**2300**	0.38	1.0	ug/l	100	07/30/18 01:29	
Method: EPA 1640 **Batch ID:** W8G1436 **Instr:** ICPMS03 **Prepared:** 07/19/18 19:00 **Analyst:** aln							
Copper, Dissolved	**860**	0.38	1.0	ug/l	100	07/29/18 17:16	

Sample Results

(Continued)

Sample: BWB1-E5-T
8G19067-23 (Water)
Sampled: 07/17/18 17:04 by Corey Sheredy/Barry Snyder

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D	**Batch ID:** W8G1233	**Instr:** OVEN11		**Prepared:** 07/23/18 10:36		**Analyst:** vll	
Total Suspended Solids	**8**		5	mg/l	1	07/23/18 18:08	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640	**Batch ID:** W8G1432	**Instr:** ICPMS03		**Prepared:** 07/18/18 19:00		**Analyst:** aln	
Copper, Total	**2200**	0.38	1.0	ug/l	100	07/30/18 01:43	
Method: EPA 1640	**Batch ID:** W8G1436	**Instr:** ICPMS03		**Prepared:** 07/19/18 19:00		**Analyst:** aln	
Copper, Dissolved	**810**	0.38	1.0	ug/l	100	07/29/18 17:30	

Sample: BWB1-E5-B
8G19067-24 (Water)
Sampled: 07/17/18 17:12 by Corey Sheredy/Barry Snyder

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D	**Batch ID:** W8G1250	**Instr:** OVEN11		**Prepared:** 07/23/18 11:33		**Analyst:** vll	
Total Suspended Solids	**24**		5	mg/l	1	07/24/18 12:34	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640	**Batch ID:** W8G1432	**Instr:** ICPMS03		**Prepared:** 07/18/18 19:00		**Analyst:** aln	
Copper, Total	**2300**	0.38	1.0	ug/l	100	07/30/18 01:57	
Method: EPA 1640	**Batch ID:** W8G1436	**Instr:** ICPMS03		**Prepared:** 07/19/18 19:00		**Analyst:** aln	
Copper, Dissolved	**850**	0.38	1.0	ug/l	100	07/29/18 17:43	

Sample: BWB2-E5-T
8G19067-25 (Water)
Sampled: 07/17/18 17:23 by Corey Sheredy/Barry Snyder

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D	**Batch ID:** W8G1250	**Instr:** OVEN11		**Prepared:** 07/23/18 11:33		**Analyst:** vll	
Total Suspended Solids	**7**		5	mg/l	1	07/24/18 12:34	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640	**Batch ID:** W8G1432	**Instr:** ICPMS03		**Prepared:** 07/18/18 19:00		**Analyst:** aln	
Copper, Total	**1800**	0.38	1.0	ug/l	100	07/30/18 02:10	
Method: EPA 1640	**Batch ID:** W8G1436	**Instr:** ICPMS03		**Prepared:** 07/19/18 19:00		**Analyst:** aln	
Copper, Dissolved	**770**	0.38	1.0	ug/l	100	07/29/18 17:57	

Sample Results

(Continued)

Sample: BWB2-E5-B
8G19067-26 (Water)
Sampled: 07/17/18 17:30 by Corey Sheredy/Barry Snyder

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8G1250 **Instr:** OVEN11 **Prepared:** 07/23/18 11:33 **Analyst:** vll							
Total Suspended Solids	**8**		5	mg/l	1	07/24/18 12:34	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8G1432 **Instr:** ICPMS03 **Prepared:** 07/18/18 19:00 **Analyst:** aln							
Copper, Total	**2100**	0.38	1.0	ug/l	100	07/30/18 02:24	
Method: EPA 1640 **Batch ID:** W8G1436 **Instr:** ICPMS03 **Prepared:** 07/19/18 19:00 **Analyst:** aln							
Copper, Dissolved	**880**	0.38	1.0	ug/l	100	07/29/18 18:11	

Sample: BWG1-E1-T
8G19067-27 (Water)
Sampled: 07/17/18 9:10 by Corey Sheredy/Barry Snyder

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8G1160 **Instr:** OVEN11 **Prepared:** 07/20/18 11:11 **Analyst:** vll							
Total Suspended Solids	**8**		5	mg/l	1	07/23/18 14:49	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8H0055 **Instr:** ICPMS03 **Prepared:** 07/18/18 19:00 **Analyst:** aln							
Copper, Dissolved	**6.2**	0.0038	0.010	ug/l	1	08/01/18 00:05	
Copper, Total	**7.0**	0.0038	0.010	ug/l	1	08/01/18 00:19	

Sample: BWG1-E1-B
8G19067-28 (Water)
Sampled: 07/17/18 9:20 by Corey Sheredy/Barry Snyder

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8G1160 **Instr:** OVEN11 **Prepared:** 07/20/18 11:11 **Analyst:** vll							
Total Suspended Solids	**10**		5	mg/l	1	07/23/18 14:49	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8G1432 **Instr:** ICPMS03 **Prepared:** 07/18/18 19:00 **Analyst:** aln							
Copper, Total	**8.2**	0.38	1.0	ug/l	100	07/30/18 02:51	
Method: EPA 1640 **Batch ID:** W8G1436 **Instr:** ICPMS03 **Prepared:** 07/19/18 19:00 **Analyst:** aln							
Copper, Dissolved	**6.9**	0.38	1.0	ug/l	100	07/29/18 18:38	

Sample Results

(Continued)

Sample: BWG2-E1-T
8G19067-29 (Water)
Sampled: 07/17/18 9:35 by Corey Sheredy/Barry Snyder

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

Method: SM 2540D **Batch ID:** W8G1160 **Instr:** OVEN11 **Prepared:** 07/20/18 11:11 **Analyst:** vll

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Total Suspended Solids	**7**		5	mg/l	1	07/23/18 14:49	

Metals - Low Level by 1600 Series Methods

Method: EPA 1640 **Batch ID:** W8G1432 **Instr:** ICPMS03 **Prepared:** 07/18/18 19:00 **Analyst:** aln

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Copper, Total	**8.3**	0.38	1.0	ug/l	100	07/30/18 03:05	

Method: EPA 1640 **Batch ID:** W8G1436 **Instr:** ICPMS03 **Prepared:** 07/19/18 19:00 **Analyst:** aln

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Copper, Dissolved	**8.3**	0.38	1.0	ug/l	100	07/29/18 18:52	

Sample: BWG2-E1-B
8G19067-30 (Water)
Sampled: 07/17/18 9:45 by Corey Sheredy/Barry Snyder

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

Method: SM 2540D **Batch ID:** W8G1160 **Instr:** OVEN11 **Prepared:** 07/20/18 11:11 **Analyst:** vll

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Total Suspended Solids	**8**		5	mg/l	1	07/23/18 14:49	

Metals - Low Level by 1600 Series Methods

Method: EPA 1640 **Batch ID:** W8G1432 **Instr:** ICPMS03 **Prepared:** 07/18/18 19:00 **Analyst:** aln

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Copper, Total	**6.4**	0.38	1.0	ug/l	100	07/30/18 03:19	

Method: EPA 1640 **Batch ID:** W8G1436 **Instr:** ICPMS03 **Prepared:** 07/19/18 19:00 **Analyst:** aln

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Copper, Dissolved	**6.5**	0.38	1.0	ug/l	100	07/29/18 19:06	

Sample: BWG1-E2-T
8G19067-31 (Water)
Sampled: 07/17/18 11:00 by Corey Sheredy/Barry Snyder

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

Method: SM 2540D **Batch ID:** W8G1160 **Instr:** OVEN11 **Prepared:** 07/20/18 11:11 **Analyst:** vll

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Total Suspended Solids	**7**		5	mg/l	1	07/23/18 14:49	

Metals - Low Level by 1600 Series Methods

Method: EPA 1640 **Batch ID:** W8H0055 **Instr:** ICPMS03 **Prepared:** 07/18/18 19:00 **Analyst:** aln

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Copper, Dissolved	**4.8**	0.0038	0.010	ug/l	1	08/01/18 00:46	
Copper, Total	**5.8**	0.0038	0.010	ug/l	1	08/01/18 01:00	

Sample Results

(Continued)

Sample: BWG1-E2-B
8G19067-32 (Water)

Sampled: 07/17/18 11:05 by Corey Sheredy/Barry Snyder

Analyte		Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods								
Method: SM 2540D	**Batch ID:** W8G1160	**Instr:** OVEN11		**Prepared:** 07/20/18 11:11			**Analyst:** vll	
Total Suspended Solids		**7**		5	mg/l	1	07/23/18 14:49	
Metals - Low Level by 1600 Series Methods								
Method: EPA 1640	**Batch ID:** W8G1432	**Instr:** ICPMS03		**Prepared:** 07/18/18 19:00			**Analyst:** aln	
Copper, Total		**46**	0.38	1.0	ug/l	100	07/30/18 04:55	
Method: EPA 1640	**Batch ID:** W8G1436	**Instr:** ICPMS03		**Prepared:** 07/19/18 19:00			**Analyst:** aln	
Copper, Dissolved		**15**	0.38	1.0	ug/l	100	07/29/18 20:41	

Sample: BWG2-E2-T
8G19067-33 (Water)

Sampled: 07/17/18 11:15 by Corey Sheredy/Barry Snyder

Analyte		Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods								
Method: SM 2540D	**Batch ID:** W8G1160	**Instr:** OVEN11		**Prepared:** 07/20/18 11:11			**Analyst:** vll	
Total Suspended Solids		**8**		5	mg/l	1	07/23/18 14:49	
Metals - Low Level by 1600 Series Methods								
Method: EPA 1640	**Batch ID:** W8G1432	**Instr:** ICPMS03		**Prepared:** 07/18/18 19:00			**Analyst:** aln	
Copper, Total		**32**	0.38	1.0	ug/l	100	07/30/18 05:08	
Method: EPA 1640	**Batch ID:** W8G1436	**Instr:** ICPMS03		**Prepared:** 07/19/18 19:00			**Analyst:** aln	
Copper, Dissolved		**10**	0.38	1.0	ug/l	100	07/29/18 20:55	

Sample: BWG2-E2-B
8G19067-34 (Water)

Sampled: 07/17/18 11:20 by Corey Sheredy/Barry Snyder

Analyte		Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods								
Method: SM 2540D	**Batch ID:** W8G1160	**Instr:** OVEN11		**Prepared:** 07/20/18 11:11			**Analyst:** vll	
Total Suspended Solids		**7**		5	mg/l	1	07/23/18 14:49	
Metals - Low Level by 1600 Series Methods								
Method: EPA 1640	**Batch ID:** W8G1432	**Instr:** ICPMS03		**Prepared:** 07/18/18 19:00			**Analyst:** aln	
Copper, Total		**9.3**	0.38	1.0	ug/l	100	07/30/18 05:22	
Method: EPA 1640	**Batch ID:** W8G1436	**Instr:** ICPMS03		**Prepared:** 07/19/18 19:00			**Analyst:** aln	
Copper, Dissolved		**7.0**	0.38	1.0	ug/l	100	07/29/18 21:09	

Sample Results

(Continued)

Sample: BWG1-E3-T
8G19067-35 (Water)
Sampled: 07/17/18 11:30 by Corey Sheredy/Barry Snyder

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

Method: SM 2540D **Batch ID:** W8G1160 **Instr:** OVEN11 **Prepared:** 07/20/18 11:11 **Analyst:** vll

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Total Suspended Solids	**7**		5	mg/l	1	07/23/18 14:49	

Metals - Low Level by 1600 Series Methods

Method: EPA 1640 **Batch ID:** W8G1432 **Instr:** ICPMS03 **Prepared:** 07/18/18 19:00 **Analyst:** aln

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Copper, Total	**78**	0.38	1.0	ug/l	100	07/30/18 05:36	

Method: EPA 1640 **Batch ID:** W8G1436 **Instr:** ICPMS03 **Prepared:** 07/19/18 19:00 **Analyst:** aln

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Copper, Dissolved	**21**	0.38	1.0	ug/l	100	07/29/18 21:23	

Sample: BWG1-E3-B
8G19067-36 (Water)
Sampled: 07/17/18 11:40 by Corey Sheredy/Barry Snyder

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

Method: SM 2540D **Batch ID:** W8G1160 **Instr:** OVEN11 **Prepared:** 07/20/18 11:11 **Analyst:** vll

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Total Suspended Solids	**7**		5	mg/l	1	07/23/18 14:49	

Metals - Low Level by 1600 Series Methods

Method: EPA 1640 **Batch ID:** W8G1432 **Instr:** ICPMS03 **Prepared:** 07/18/18 19:00 **Analyst:** aln

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Copper, Total	**71**	0.38	1.0	ug/l	100	07/30/18 05:49	

Method: EPA 1640 **Batch ID:** W8G1436 **Instr:** ICPMS03 **Prepared:** 07/19/18 19:00 **Analyst:** aln

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Copper, Dissolved	**20**	0.38	1.0	ug/l	100	07/29/18 21:36	

Sample: BWG2-E3-T
8G19067-37 (Water)
Sampled: 07/17/18 12:00 by Corey Sheredy/Barry Snyder

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

Method: SM 2540D **Batch ID:** W8G1233 **Instr:** OVEN11 **Prepared:** 07/23/18 10:36 **Analyst:** vll

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Total Suspended Solids	**7**		5	mg/l	1	07/23/18 18:08	

Metals - Low Level by 1600 Series Methods

Method: EPA 1640 **Batch ID:** W8G1432 **Instr:** ICPMS03 **Prepared:** 07/18/18 19:00 **Analyst:** aln

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Copper, Total	**130**	0.38	1.0	ug/l	100	07/30/18 06:03	

Method: EPA 1640 **Batch ID:** W8G1436 **Instr:** ICPMS03 **Prepared:** 07/19/18 19:00 **Analyst:** aln

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Copper, Dissolved	**40**	0.38	1.0	ug/l	100	07/29/18 21:50	

Sample Results

(Continued)

Sample: BWG2-E3-B
8G19067-38 (Water)
Sampled: 07/17/18 12:05 by Corey Sheredy/Barry Snyder

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8G1233 **Instr:** OVEN11 **Prepared:** 07/23/18 10:36 **Analyst:** vll							
Total Suspended Solids	**5**		5	mg/l	1	07/23/18 18:08	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8G1432 **Instr:** ICPMS03 **Prepared:** 07/18/18 19:00 **Analyst:** aln							
Copper, Total	**32**	0.38	1.0	ug/l	100	07/30/18 06:17	
Method: EPA 1640 **Batch ID:** W8G1436 **Instr:** ICPMS03 **Prepared:** 07/19/18 19:00 **Analyst:** aln							
Copper, Dissolved	**18**	0.38	1.0	ug/l	100	07/29/18 22:04	

Sample: BWG1-E3-T-REP
8G19067-39 (Water)
Sampled: 07/17/18 11:50 by Corey Sheredy/Barry Snyder

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8G1233 **Instr:** OVEN11 **Prepared:** 07/23/18 10:36 **Analyst:** vll							
Total Suspended Solids	**6**		5	mg/l	1	07/23/18 18:08	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8G1432 **Instr:** ICPMS03 **Prepared:** 07/18/18 19:00 **Analyst:** aln							
Copper, Total	**27**	0.38	1.0	ug/l	100	07/30/18 06:31	
Method: EPA 1640 **Batch ID:** W8G1436 **Instr:** ICPMS03 **Prepared:** 07/19/18 19:00 **Analyst:** aln							
Copper, Dissolved	**9.9**	0.38	1.0	ug/l	100	07/29/18 22:17	

Sample: BWG2-E3-T-REP
8G19067-40 (Water)
Sampled: 07/17/18 12:10 by Corey Sheredy/Barry Snyder

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8G1233 **Instr:** OVEN11 **Prepared:** 07/23/18 10:36 **Analyst:** vll							
Total Suspended Solids	**7**		5	mg/l	1	07/23/18 18:08	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8G1432 **Instr:** ICPMS03 **Prepared:** 07/18/18 19:00 **Analyst:** aln							
Copper, Total	**25**	0.38	1.0	ug/l	100	07/30/18 06:44	
Method: EPA 1640 **Batch ID:** W8G1436 **Instr:** ICPMS03 **Prepared:** 07/19/18 19:00 **Analyst:** aln							
Copper, Dissolved	**8.6**	0.38	1.0	ug/l	100	07/29/18 22:31	

Sample Results

(Continued)

Sample: BWG1-E4-T Sampled: 07/17/18 16:30 by Corey Seredy/Barry Snyder
8G19067-41 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8G1233 **Instr:** OVEN11 **Prepared:** 07/23/18 10:36 **Analyst:** vll							
Total Suspended Solids	**6**		5	mg/l	1	07/23/18 18:08	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8G1432 **Instr:** ICPMS03 **Prepared:** 07/18/18 19:00 **Analyst:** aln							
Copper, Total	**390**	0.38	1.0	ug/l	100	07/30/18 06:58	
Method: EPA 1640 **Batch ID:** W8G1436 **Instr:** ICPMS03 **Prepared:** 07/19/18 19:00 **Analyst:** aln							
Copper, Dissolved	**130**	0.38	1.0	ug/l	100	07/29/18 22:45	

Sample: BWG1-E4-B Sampled: 07/17/18 16:35 by Corey Sheredy/Barry Snyder
8G19067-42 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8G1233 **Instr:** OVEN11 **Prepared:** 07/23/18 10:36 **Analyst:** vll							
Total Suspended Solids	**6**		5	mg/l	1	07/23/18 18:08	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8G1433 **Instr:** ICPMS03 **Prepared:** 07/25/18 13:34 **Analyst:** aln							
Copper, Total	**200**	0.38	1.0	ug/l	100	08/02/18 23:13	
Method: EPA 1640 **Batch ID:** W8G1438 **Instr:** ICPMS03 **Prepared:** 07/25/18 13:43 **Analyst:** aln							
Copper, Dissolved	**88**	0.38	1.0	ug/l	100	08/01/18 22:35	

Sample: BWG2-E4-T Sampled: 07/17/18 16:45 by Corey Sheredy/Barry Snyder
8G19067-43 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8G1233 **Instr:** OVEN11 **Prepared:** 07/23/18 10:36 **Analyst:** vll							
Total Suspended Solids	**7**		5	mg/l	1	07/23/18 18:08	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8G1433 **Instr:** ICPMS03 **Prepared:** 07/25/18 13:34 **Analyst:** aln							
Copper, Total	**19**	0.38	1.0	ug/l	100	08/02/18 23:27	
Method: EPA 1640 **Batch ID:** W8G1438 **Instr:** ICPMS03 **Prepared:** 07/25/18 13:43 **Analyst:** aln							
Copper, Dissolved	**12**	0.38	1.0	ug/l	100	08/01/18 23:30	

Sample Results

(Continued)

Sample: BWG2-E4-B
8G19067-44 (Water)

Sampled: 07/17/18 16:50 by Corey Sheredy/Barry Snyder

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8G1233 **Instr:** OVEN11 **Prepared:** 07/23/18 10:36 **Analyst:** vll							
Total Suspended Solids	**7**		5	mg/l	1	07/23/18 18:08	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8G1433 **Instr:** ICPMS03 **Prepared:** 07/25/18 13:34 **Analyst:** aln							
Copper, Total	**13**	0.38	1.0	ug/l	100	08/02/18 23:40	
Method: EPA 1640 **Batch ID:** W8G1438 **Instr:** ICPMS03 **Prepared:** 07/25/18 13:43 **Analyst:** aln							
Copper, Dissolved	**12**	0.38	1.0	ug/l	100	08/01/18 23:43	

Sample: BWG1-E5-T
8G19067-45 (Water)

Sampled: 07/17/18 17:10 by Corey Sheredy/Barry Snyder

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8G1250 **Instr:** OVEN11 **Prepared:** 07/23/18 11:33 **Analyst:** vll							
Total Suspended Solids	**13**		5	mg/l	1	07/24/18 12:34	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8G1433 **Instr:** ICPMS03 **Prepared:** 07/25/18 13:34 **Analyst:** aln							
Copper, Total	**400**	0.38	1.0	ug/l	100	08/02/18 23:54	
Method: EPA 1640 **Batch ID:** W8G1438 **Instr:** ICPMS03 **Prepared:** 07/25/18 13:43 **Analyst:** aln							
Copper, Dissolved	**170**	0.38	1.0	ug/l	100	08/01/18 23:57	

Sample: BWG1-E5-B
8G19067-46 (Water)

Sampled: 07/17/18 17:15 by Corey Sheredy/Barry Snyder

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8G1250 **Instr:** OVEN11 **Prepared:** 07/23/18 11:33 **Analyst:** vll							
Total Suspended Solids	**13**		5	mg/l	1	07/24/18 12:34	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8G1433 **Instr:** ICPMS03 **Prepared:** 07/25/18 13:34 **Analyst:** aln							
Copper, Total	**61**	0.38	1.0	ug/l	100	08/03/18 00:08	
Method: EPA 1640 **Batch ID:** W8G1438 **Instr:** ICPMS03 **Prepared:** 07/25/18 13:43 **Analyst:** aln							
Copper, Dissolved	**51**	0.38	1.0	ug/l	100	08/02/18 00:11	

Sample Results

(Continued)

Sample: BWG2-E5-T
8G19067-47 (Water)
Sampled: 07/17/18 17:25 by Corey Sheredy/Barry Snyder

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8G1250 **Instr:** OVEN11 **Prepared:** 07/23/18 11:33 **Analyst:** vll							
Total Suspended Solids	**6**		5	mg/l	1	07/24/18 12:34	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8G1433 **Instr:** ICPMS03 **Prepared:** 07/25/18 13:34 **Analyst:** aln							
Copper, Total	**19**	0.38	1.0	ug/l	100	08/03/18 00:21	
Method: EPA 1640 **Batch ID:** W8G1438 **Instr:** ICPMS03 **Prepared:** 07/25/18 13:43 **Analyst:** aln							
Copper, Dissolved	**12**	0.38	1.0	ug/l	100	08/02/18 00:25	

Sample: BWG2-E5-B
8G19067-48 (Water)
Sampled: 07/17/18 17:35 by Corey Sheredy/Barry Snyder

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8G1250 **Instr:** OVEN11 **Prepared:** 07/23/18 11:33 **Analyst:** vll							
Total Suspended Solids	**6**		5	mg/l	1	07/24/18 12:34	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8G1433 **Instr:** ICPMS03 **Prepared:** 07/25/18 13:34 **Analyst:** aln							
Copper, Total	**33**	0.38	1.0	ug/l	100	08/03/18 00:35	
Method: EPA 1640 **Batch ID:** W8G1438 **Instr:** ICPMS03 **Prepared:** 07/25/18 13:43 **Analyst:** aln							
Copper, Dissolved	**18**	0.38	1.0	ug/l	100	08/02/18 00:38	

Quality Control Results

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W8G1160 - SM 2540D											
Blank (W8G1160-BLK1)					**Prepared: 07/20/18 Analyzed: 07/23/18**						
Total Suspended Solids	ND		5	mg/l							
LCS (W8G1160-BS1)					**Prepared: 07/20/18 Analyzed: 07/23/18**						
Total Suspended Solids	57.0		5	mg/l	53.1		107	90-110			
Duplicate (W8G1160-DUP1)	**Source: 8G19067-35**				**Prepared: 07/20/18 Analyzed: 07/23/18**						
Total Suspended Solids	7.00		5	mg/l		7.00			0	20	
Duplicate (W8G1160-DUP2)	**Source: 8G19067-13**				**Prepared: 07/20/18 Analyzed: 07/23/18**						
Total Suspended Solids	11.0		5	mg/l		10.0			10	20	
Batch: W8G1233 - SM 2540D											
Blank (W8G1233-BLK1)					**Prepared & Analyzed: 07/23/18**						
Total Suspended Solids	ND		5	mg/l							
LCS (W8G1233-BS1)					**Prepared & Analyzed: 07/23/18**						
Total Suspended Solids	55.0		5	mg/l	59.9		92	90-110			
Duplicate (W8G1233-DUP1)	**Source: 8G19067-15**				**Prepared & Analyzed: 07/23/18**						
Total Suspended Solids	7.00		5	mg/l		6.00			15	20	
Duplicate (W8G1233-DUP2)	**Source: 8G19067-16**				**Prepared & Analyzed: 07/23/18**						
Total Suspended Solids	6.00		5	mg/l		6.00			0	20	
Batch: W8G1250 - SM 2540D											
Blank (W8G1250-BLK1)					**Prepared: 07/23/18 Analyzed: 07/24/18**						
Total Suspended Solids	ND		5	mg/l							
LCS (W8G1250-BS1)					**Prepared: 07/23/18 Analyzed: 07/24/18**						
Total Suspended Solids	52.0		5	mg/l	55.4		94	90-110			
Duplicate (W8G1250-DUP1)	**Source: 8G19011-01**				**Prepared: 07/23/18 Analyzed: 07/24/18**						
Total Suspended Solids	2.00		5	mg/l		2.00			0	20	J
Duplicate (W8G1250-DUP2)	**Source: 8G19067-24**				**Prepared: 07/23/18 Analyzed: 07/24/18**						
Total Suspended Solids	21.0		5	mg/l		24.0			13	20	
Batch: W8G1765 - EPA 160.3M											
Duplicate (W8G1765-DUP1)	**Source: 8G19067-04**				**Prepared: 07/31/18 Analyzed: 08/01/18**						
% Solids	6.82		0.100	% by Weight		6.95			2	20	
Duplicate (W8G1765-DUP2)	**Source: 8G25110-01**				**Prepared: 07/31/18 Analyzed: 08/01/18**						
% Solids	16.7		0.100	% by Weight		16.7			0.4	20	

Quality Control Results

(Continued)

Metals - Low Level by 1600 Series Methods

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W8G1376 - EPA 1640											
Blank (W8G1376-BLK1)					**Prepared: 07/24/18**	**Analyzed: 07/28/18**					
Copper, Dissolved	ND	0.0038	0.010	ug/l							
LCS (W8G1376-BS1)					**Prepared: 07/24/18**	**Analyzed: 07/28/18**					
Copper, Dissolved	2.07	0.0038	0.010	ug/l	2.00		103	70-130			
Matrix Spike (W8G1376-MS1)	**Source: 8G19067-13**				**Prepared: 07/24/18**	**Analyzed: 07/28/18**					
Copper, Dissolved	349	0.38	1.0	ug/l	2.00	341	365	70-130			MS-02
Matrix Spike (W8G1376-MS2)	**Source: 8G19067-15**				**Prepared: 07/24/18**	**Analyzed: 07/28/18**					
Copper, Dissolved	353	0.38	1.0	ug/l	2.00	351	87	70-130			
Matrix Spike Dup (W8G1376-MSD1)	**Source: 8G19067-13**				**Prepared: 07/24/18**	**Analyzed: 07/28/18**					
Copper, Dissolved	353	0.38	1.0	ug/l	2.00	341	564	70-130	1	30	MS-02
Matrix Spike Dup (W8G1376-MSD2)	**Source: 8G19067-15**				**Prepared: 07/24/18**	**Analyzed: 07/28/18**					
Copper, Dissolved	362	0.38	1.0	ug/l	2.00	351	539	70-130	3	30	MS-02
Batch: W8G1431 - EPA 1640											
Blank (W8G1431-BLK1)					**Prepared: 07/25/18**	**Analyzed: 07/27/18**					
Copper, Total	ND	0.0038	0.010	ug/l							
Blank (W8G1431-BLK2)					**Prepared: 07/25/18**	**Analyzed: 07/29/18**					
Copper, Total	ND	0.0038	0.010	ug/l							
LCS (W8G1431-BS1)					**Prepared: 07/25/18**	**Analyzed: 07/27/18**					
Copper, Total	2.08	0.0038	0.010	ug/l	2.00		104	73-122			
LCS (W8G1431-BS2)					**Prepared: 07/25/18**	**Analyzed: 07/29/18**					
Copper, Total	1.94	0.0038	0.010	ug/l	2.00		97	73-122			
Matrix Spike (W8G1431-MS1)	**Source: 8G19067-13**				**Prepared: 07/25/18**	**Analyzed: 07/27/18**					
Copper, Total	1540	1.9	5.0	ug/l	2.00	1610	NR	60-138			MS-02
Matrix Spike (W8G1431-MS2)	**Source: 8G19067-15**				**Prepared: 07/25/18**	**Analyzed: 07/27/18**					
Copper, Total	1360	1.9	5.0	ug/l	2.00	1380	NR	60-138			MS-02
Matrix Spike (W8G1431-MS3)	**Source: 8G19067-13**				**Prepared: 07/25/18**	**Analyzed: 07/29/18**					
Copper, Total	1460	1.9	5.0	ug/l	2.00	1610	NR	60-138			MS-02
Matrix Spike (W8G1431-MS4)	**Source: 8G19067-15**				**Prepared: 07/25/18**	**Analyzed: 07/29/18**					
Copper, Total	1240	1.9	5.0	ug/l	2.00	1380	NR	60-138			MS-02
Matrix Spike Dup (W8G1431-MSD1)	**Source: 8G19067-13**				**Prepared: 07/25/18**	**Analyzed: 07/27/18**					
Copper, Total	1510	1.9	5.0	ug/l	2.00	1610	NR	60-138	2	30	MS-02
Matrix Spike Dup (W8G1431-MSD2)	**Source: 8G19067-15**				**Prepared: 07/25/18**	**Analyzed: 07/27/18**					
Copper, Total	1390	1.9	5.0	ug/l	2.00	1380	557	60-138	2	30	MS-02
Matrix Spike Dup (W8G1431-MSD3)	**Source: 8G19067-13**				**Prepared: 07/25/18**	**Analyzed: 07/29/18**					
Copper, Total	1430	1.9	5.0	ug/l	2.00	1610	NR	60-138	2	30	MS-02
Matrix Spike Dup (W8G1431-MSD4)	**Source: 8G19067-15**				**Prepared: 07/25/18**	**Analyzed: 07/29/18**					
Copper, Total	1310	1.9	5.0	ug/l	2.00	1380	NR	60-138	5	30	MS-02

Quality Control Results

(Continued)

Metals - Low Level by 1600 Series Methods (Continued)

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W8G1432 - EPA 1640											
Blank (W8G1432-BLK1)					**Prepared: 07/25/18 Analyzed: 07/30/18**						
Copper, Total	ND	0.0038	0.010	ug/l							
LCS (W8G1432-BS1)					**Prepared: 07/25/18 Analyzed: 07/30/18**						
Copper, Total	1.93	0.0038	0.010	ug/l	2.00		97	73-122			
Matrix Spike (W8G1432-MS1)	**Source: 8G19067-35**				**Prepared: 07/25/18 Analyzed: 07/30/18**						
Copper, Total	85.5	0.38	1.0	ug/l	2.00	78.1	371	60-138			MS-02
Matrix Spike (W8G1432-MS2)	**Source: 8G19067-37**				**Prepared: 07/25/18 Analyzed: 07/30/18**						
Copper, Total	130	0.38	1.0	ug/l	2.00	128	89	60-138			
Matrix Spike Dup (W8G1432-MSD1)	**Source: 8G19067-35**				**Prepared: 07/25/18 Analyzed: 07/30/18**						
Copper, Total	122	0.38	1.0	ug/l	2.00	78.1	NR	60-138	35	30	MS-02
Matrix Spike Dup (W8G1432-MSD2)	**Source: 8G19067-37**				**Prepared: 07/25/18 Analyzed: 07/30/18**						
Copper, Total	133	0.38	1.0	ug/l	2.00	128	224	60-138	2	30	MS-02
Batch: W8G1433 - EPA 1640											
Blank (W8G1433-BLK1)					**Prepared: 07/25/18 Analyzed: 08/02/18**						
Copper, Total	ND	0.0038	0.010	ug/l							
LCS (W8G1433-BS1)					**Prepared: 07/25/18 Analyzed: 08/02/18**						
Copper, Total	1.94	0.0038	0.010	ug/l	2.00		97	73-122			
Matrix Spike (W8G1433-MS1)	**Source: 8G19067-42**				**Prepared: 07/25/18 Analyzed: 08/02/18**						
Copper, Total	209	0.38	1.0	ug/l	2.00	199	466	60-138			MS-02
Matrix Spike Dup (W8G1433-MSD1)	**Source: 8G19067-42**				**Prepared: 07/25/18 Analyzed: 08/02/18**						
Copper, Total	207	0.38	1.0	ug/l	2.00	199	393	60-138	0.7	30	MS-02
Batch: W8G1436 - EPA 1640											
Blank (W8G1436-BLK1)					**Prepared: 07/25/18 Analyzed: 07/29/18**						
Copper, Dissolved	ND	0.0038	0.010	ug/l							
LCS (W8G1436-BS1)					**Prepared: 07/25/18 Analyzed: 07/29/18**						
Copper, Dissolved	1.97	0.0038	0.010	ug/l	2.00		98	70-130			
Matrix Spike (W8G1436-MS1)	**Source: 8G19067-35**				**Prepared: 07/25/18 Analyzed: 07/29/18**						
Copper, Dissolved	24.1	0.38	1.0	ug/l	2.00	21.1	150	70-130			MS-02
Matrix Spike (W8G1436-MS2)	**Source: 8G19067-37**				**Prepared: 07/25/18 Analyzed: 07/29/18**						
Copper, Dissolved	41.5	0.38	1.0	ug/l	2.00	40.3	60	70-130			MS-02
Matrix Spike Dup (W8G1436-MSD1)	**Source: 8G19067-35**				**Prepared: 07/25/18 Analyzed: 07/29/18**						
Copper, Dissolved	22.6	0.38	1.0	ug/l	2.00	21.1	74	70-130	6	30	MS-02
Matrix Spike Dup (W8G1436-MSD2)	**Source: 8G19067-37**				**Prepared: 07/25/18 Analyzed: 07/29/18**						
Copper, Dissolved	41.4	0.38	1.0	ug/l	2.00	40.3	56	70-130	0.2	30	MS-02
Batch: W8G1438 - EPA 1640											
Blank (W8G1438-BLK1)					**Prepared: 07/25/18 Analyzed: 08/01/18**						
Copper, Dissolved	ND	0.0038	0.010	ug/l							

Quality Control Results

(Continued)

Metals - Low Level by 1600 Series Methods (Continued)

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W8G1438 - EPA 1640 (Continued)											
LCS (W8G1438-BS1)					**Prepared: 07/25/18 Analyzed: 08/01/18**						
Copper, Dissolved	1.97	0.0038	0.010	ug/l	2.00		98	70-130			
Matrix Spike (W8G1438-MS1)	**Source: 8G19067-42**				**Prepared: 07/25/18 Analyzed: 08/01/18**						
Copper, Dissolved	84.7	0.38	1.0	ug/l	2.00	88.2	NR	70-130			MS-02
Matrix Spike Dup (W8G1438-MSD1)	**Source: 8G19067-42**				**Prepared: 07/25/18 Analyzed: 08/01/18**						
Copper, Dissolved	91.8	0.38	1.0	ug/l	2.00	88.2	181	70-130	8	30	MS-02
Batch: W8H0055 - EPA 1640											
Blank (W8H0055-BLK1)					**Prepared & Analyzed: 07/31/18**						
Copper, Dissolved	ND	0.0038	0.010	ug/l							
Copper, Total	ND	0.0038	0.010	ug/l							
LCS (W8H0055-BS1)					**Prepared & Analyzed: 07/31/18**						
Copper, Dissolved	2.00	0.0038	0.010	ug/l	2.00		100	70-130			
Copper, Total	2.00	0.0038	0.010	ug/l	2.00		100	73-122			
Matrix Spike (W8H0055-MS1)	**Source: 8G19067-03**				**Prepared & Analyzed: 07/31/18**						
Copper, Dissolved	2.13	0.0038	0.010	ug/l	2.00	0.0771	103	70-130			
Matrix Spike Dup (W8H0055-MSD1)	**Source: 8G19067-03**				**Prepared & Analyzed: 07/31/18**						
Copper, Dissolved	2.13	0.0038	0.010	ug/l	2.00	0.0771	103	70-130	0.2	30	

Metals (Non-Aqueous) by EPA 6000/7000 Series Methods

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W8G1538 - EPA 6020B											
Blank (W8G1538-BLK1)					**Prepared: 07/26/18 Analyzed: 08/01/18**						
Copper, Total	ND	0.29	0.50	mg/kg							
LCS (W8G1538-BS1)					**Prepared: 07/26/18 Analyzed: 08/01/18**						
Copper, Total	53.1	0.29	0.50	mg/kg	50.0		106	80-120			
Matrix Spike (W8G1538-MS1)	**Source: 8G19067-04**				**Prepared: 07/26/18 Analyzed: 08/01/18**						
Copper, Total	1630	5.8	10	mg/kg	49.2	1670	NR	75-125			MS-02
Matrix Spike Dup (W8G1538-MSD1)	**Source: 8G19067-04**				**Prepared: 07/26/18 Analyzed: 08/01/18**						
Copper, Total	1950	5.8	10	mg/kg	49.1	1670	572	75-125	17	20	MS-02

Notes and Definitions

Item	Definition
J	Estimated conc. detected <MRL and >MDL.
MS-02	The RPD and/or percent recovery for this QC spike sample cannot be accurately calculated due to the high concentration of analyte inherent in the sample.
ND	NOT DETECTED at or above the Method Reporting Limit (MRL). If Method Detection Limit (MDL) is reported, then ND means not detected at or above the MDL.
Dil	Dilution
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
% Rec	Percent Recovery
Source	Sample that was matrix spiked or duplicated.
MDL	Method Detection Limit
MRL	The minimum levels, concentrations, or quantities of a target variable (e.g., target analyte) that can be reported with a specified degree of confidence. The MRL is also known as Limit of Quantitation (LOQ) and Detection Limit for Reporting (DLR)
MDA	Minimum Detectable Activity
NR	Not Reportable
TIC	Tentatively Identified Compound (TIC) using mass spectrometry. The reported concentration is relative concentration based on the nearest internal standard. If the library search produces no matches at, or above 85%, the compound is reported as unknown.

Any remaining sample(s) will be disposed of one month from the final report date unless other arrangements are made in advance.
An Absence of Total Coliform meets the drinking water standards as established by the California State Water Resources Control Board (SWRCB)
All results are expressed on wet weight basis unless otherwise specified.
All samples collected by Weck Laboratories have been sampled in accordance to laboratory SOP Number MIS 002.

WECK LABORATORIES, INC.

Certificate of Analysis

SUPPLEMENTAL REPORT

Work Orders: 8H17049

Project: Boatwash Pilot Study

Attn: Barry Snyder

Client: Wood - San Diego 2
9210 Sky Park Court, Suite 200
San Diego, CA 92123

Report Date: 9/05/2018

Received Date: 8/17/2018

Turnaround Time: 4 workdays

Phones: (858) 300-4320

Fax: (858) 300-4301

P.O. #:

Billing Code:

DoD-ELAP #L2457 • ELAP-CA #1132 • EPA-UCMR #CA00211 • Guam-EPA #17-008R • HW-DOH # • ISO 17025 #L2457.01 • LACSD #10143 • NELAP-CA #04229CA • NELAP-OR #4047 • NJ-DEP #CA015 • NV-DEP #NAC 445A • SCAQMD #93LA1006

This is a complete final report. The information in this report applies to the samples analyzed in accordance with the chain-of-custody document. Weck Laboratories certifies that the test results meet all requirements of TNI unless noted by qualifiers or written in the Case Narrative. This analytical report must be reproduced in its entirety.

Dear Barry Snyder,

Enclosed are the results of analyses for samples received 8/17/18 with the Chain-of-Custody document. The samples were received in good condition, at 5.1 °C and on ice. All analyses met the method criteria except as noted in the case narrative or in the report with data qualifiers.

Reviewed by:

Chris Samatmanakit
Project Manager

Certificate of Analysis

SUPPLEMENTAL REPORT

Wood - San Diego 2
9210 Sky Park Court, Suite 200
San Diego, CA 92123

Project Number: Boatwash Pilot Study

Project Manager: Barry Snyder

Reported:
09/05/2018 16:01

Case Narrative

This is a Supplement to the Certificate of Analysis previously issued 8/27/18 for the above referenced Project to reflect corrected Project Name for associated samples. CSS 9/5/18

Sample Summary

Sample Name	Sampled By	Lab ID	Matrix	Sampled	Qualifiers
E1-Gate-1-Top	Corey Sheredy/Barry Snyder	8H17049-01	Water	08/16/18 09:45	
E1-Gate-1-Bottom	Corey Sheredy/Barry Snyder	8H17049-02	Water	08/16/18 09:50	
E1-Gate-2-Top	Corey Sheredy/Barry Snyder	8H17049-03	Water	08/16/18 09:55	
E1-Gate-2-Bottom	Corey Sheredy/Barry Snyder	8H17049-04	Water	08/16/18 10:00	
E1-Basin-1-Top	Corey Sheredy/Barry Snyder	8H17049-05	Water	08/16/18 10:50	
E1-Basin-1-Top-REP	Corey Sheredy/Barry Snyder	8H17049-06	Water	08/16/18 10:55	
E1-Basin-1-Bottom	Corey Sheredy/Barry Snyder	8H17049-07	Water	08/16/18 11:00	
E1-Basin-2-Top	Corey Sheredy/Barry Snyder	8H17049-08	Water	08/16/18 11:10	
E1-Basin-2-Bottom	Corey Sheredy/Barry Snyder	8H17049-09	Water	08/16/18 11:15	
Niskin-1-ER	Corey Sheredy/Barry Snyder	8H17049-10	Water	08/16/18 09:20	
BW-FB	Corey Sheredy/Barry Snyder	8H17049-11	Water	08/16/18 11:50	

Sample Results

Sample: E1-Gate-1-Top
8H17049-01 (Water)
Sampled: 08/16/18 9:45 by Corey Sheredy/Barry Snyder

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8H1078 **Instr:** OVEN11 **Prepared:** 08/17/18 14:24 **Analyst:** vll							
Total Suspended Solids	**10**		5	mg/l	1	08/17/18 20:05	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8H1185 **Instr:** ICPMS03 **Prepared:** 08/20/18 15:37 **Analyst:** aln							
Copper, Total	**5.1**	0.019	0.050	ug/l	5	08/21/18 21:36	
Method: EPA 1640 **Batch ID:** W8H1192 **Instr:** ICPMS03 **Prepared:** 08/20/18 17:28 **Analyst:** aln							
Copper, Dissolved	**4.7**	0.019	0.050	ug/l	1	08/21/18 07:39	

Sample: E1-Gate-1-Bottom
8H17049-02 (Water)
Sampled: 08/16/18 9:50 by Corey Sheredy/Barry Snyder

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8H1078 **Instr:** OVEN11 **Prepared:** 08/17/18 14:24 **Analyst:** vll							
Total Suspended Solids	**13**		5	mg/l	1	08/17/18 20:05	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8H1185 **Instr:** ICPMS03 **Prepared:** 08/20/18 15:37 **Analyst:** aln							
Copper, Total	**5.6**	0.019	0.050	ug/l	5	08/22/18 01:01	
Method: EPA 1640 **Batch ID:** W8H1192 **Instr:** ICPMS03 **Prepared:** 08/20/18 17:28 **Analyst:** aln							
Copper, Dissolved	**4.7**	0.019	0.050	ug/l	5	08/21/18 11:55	

Sample: E1-Gate-2-Top
8H17049-03 (Water)
Sampled: 08/16/18 9:55 by Corey Sheredy/Barry Snyder

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8H1078 **Instr:** OVEN11 **Prepared:** 08/17/18 14:24 **Analyst:** vll							
Total Suspended Solids	**17**		5	mg/l	1	08/17/18 20:05	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8H1185 **Instr:** ICPMS03 **Prepared:** 08/20/18 15:37 **Analyst:** aln							
Copper, Total	**5.0**	0.019	0.050	ug/l	5	08/22/18 01:14	
Method: EPA 1640 **Batch ID:** W8H1192 **Instr:** ICPMS03 **Prepared:** 08/20/18 17:28 **Analyst:** aln							
Copper, Dissolved	**4.2**	0.019	0.050	ug/l	5	08/21/18 12:09	

Sample Results

(Continued)

Sample: E1-Gate-2-Bottom
8H17049-04 (Water)

Sampled: 08/16/18 10:00 by Corey Seredy/Barry Snyder

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8H1078 **Instr:** OVEN11 **Prepared:** 08/17/18 14:24 **Analyst:** vll							
Total Suspended Solids	**26**		5	mg/l	1	08/17/18 20:05	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8H1185 **Instr:** ICPMS03 **Prepared:** 08/20/18 15:37 **Analyst:** aln							
Copper, Total	**7.0**	0.019	0.050	ug/l	5	08/22/18 01:28	
Method: EPA 1640 **Batch ID:** W8H1192 **Instr:** ICPMS03 **Prepared:** 08/20/18 17:28 **Analyst:** aln							
Copper, Dissolved	**5.7**	0.019	0.050	ug/l	5	08/21/18 12:23	

Sample: E1-Basin-1-Top
8H17049-05 (Water)

Sampled: 08/16/18 10:50 by Corey Sheredy/Barry Snyder

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8H1099 **Instr:** OVEN11 **Prepared:** 08/17/18 17:37 **Analyst:** vll							
Total Suspended Solids	**7**		5	mg/l	1	08/17/18 20:05	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8H1185 **Instr:** ICPMS03 **Prepared:** 08/20/18 15:37 **Analyst:** aln							
Copper, Total	**10**	0.0038	0.010	ug/l	1	08/21/18 22:30	
Method: EPA 1640 **Batch ID:** W8H1192 **Instr:** ICPMS03 **Prepared:** 08/20/18 17:28 **Analyst:** aln							
Copper, Dissolved	**10**	0.0038	0.010	ug/l	1	08/21/18 08:34	

Sample: E1-Basin-1-Top-REP
8H17049-06 (Water)

Sampled: 08/16/18 10:55 by Corey Sheredy/Barry Snyder

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8H1099 **Instr:** OVEN11 **Prepared:** 08/17/18 17:37 **Analyst:** vll							
Total Suspended Solids	**12**		5	mg/l	1	08/17/18 20:05	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8H1185 **Instr:** ICPMS03 **Prepared:** 08/20/18 15:37 **Analyst:** aln							
Copper, Total	**10**	0.0038	0.010	ug/l	1	08/21/18 23:11	
Method: EPA 1640 **Batch ID:** W8H1192 **Instr:** ICPMS03 **Prepared:** 08/20/18 17:28 **Analyst:** aln							
Copper, Dissolved	**10**	0.0038	0.010	ug/l	1	08/21/18 09:15	

Sample Results

(Continued)

Sample: E1-Basin-1-Bottom
8H17049-07 (Water)

Sampled: 08/16/18 11:00 by Corey Sheredy/Barry Snyder

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8H1099 **Instr:** OVEN11 **Prepared:** 08/17/18 17:37 **Analyst:** vll							
Total Suspended Solids	**6**		5	mg/l	1	08/17/18 20:05	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8H1185 **Instr:** ICPMS03 **Prepared:** 08/20/18 15:37 **Analyst:** aln							
Copper, Total	**11**	0.0038	0.010	ug/l	1	08/21/18 23:25	
Method: EPA 1640 **Batch ID:** W8H1192 **Instr:** ICPMS03 **Prepared:** 08/20/18 17:28 **Analyst:** aln							
Copper, Dissolved	**11**	0.0038	0.010	ug/l	1	08/21/18 09:29	

Sample: E1-Basin-2-Top
8H17049-08 (Water)

Sampled: 08/16/18 11:10 by Corey Sheredy/Barry Snyder

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8H1099 **Instr:** OVEN11 **Prepared:** 08/17/18 17:37 **Analyst:** vll							
Total Suspended Solids	**9**		5	mg/l	1	08/17/18 20:05	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8H1185 **Instr:** ICPMS03 **Prepared:** 08/20/18 15:37 **Analyst:** aln							
Copper, Total	**10**	0.0038	0.010	ug/l	1	08/21/18 23:39	
Method: EPA 1640 **Batch ID:** W8H1192 **Instr:** ICPMS03 **Prepared:** 08/20/18 17:28 **Analyst:** aln							
Copper, Dissolved	**9.7**	0.0038	0.010	ug/l	1	08/21/18 09:42	

Sample: E1-Basin-2-Bottom
8H17049-09 (Water)

Sampled: 08/16/18 11:15 by Corey Sheredy/Barry Snyder

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8H1078 **Instr:** OVEN11 **Prepared:** 08/17/18 14:24 **Analyst:** vll							
Total Suspended Solids	**10**		5	mg/l	1	08/17/18 20:05	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8H1185 **Instr:** ICPMS03 **Prepared:** 08/20/18 15:37 **Analyst:** aln							
Copper, Total	**10**	0.0038	0.010	ug/l	1	08/21/18 23:52	
Method: EPA 1640 **Batch ID:** W8H1192 **Instr:** ICPMS03 **Prepared:** 08/20/18 17:28 **Analyst:** aln							
Copper, Dissolved	**9.9**	0.0038	0.010	ug/l	1	08/21/18 09:56	

Sample Results

(Continued)

Sample: Niskin-1-ER
8H17049-10 (Water)
Sampled: 08/16/18 9:20 by Corey Sheredy/Barry Snyder

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8H1078 **Instr:** OVEN11 **Prepared:** 08/17/18 14:24 **Analyst:** vll							
Total Suspended Solids	**1**		5	mg/l	1	08/17/18 20:05	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8H1192 **Instr:** ICPMS03 **Prepared:** 08/20/18 17:28 **Analyst:** aln							
Copper, Dissolved	**0.044**	0.0038	0.010	ug/l	1	08/21/18 06:58	
Method: EPA 1640 **Batch ID:** W8H1414 **Instr:** ICPMS03 **Prepared:** 08/22/18 14:55 **Analyst:** aln							
Copper, Total	**0.037**	0.0038	0.010	ug/l	1	08/22/18 23:22	

Sample: BW-FB
8H17049-11 (Water)
Sampled: 08/16/18 11:50 by Corey Sheredy/Barry Snyder

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8H1099 **Instr:** OVEN11 **Prepared:** 08/17/18 17:37 **Analyst:** vll							
Total Suspended Solids	**1**		5	mg/l	1	08/17/18 20:05	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8H1192 **Instr:** ICPMS03 **Prepared:** 08/20/18 17:28 **Analyst:** aln							
Copper, Dissolved	**0.046**	0.0038	0.010	ug/l	1	08/21/18 07:12	
Method: EPA 1640 **Batch ID:** W8H1414 **Instr:** ICPMS03 **Prepared:** 08/22/18 14:55 **Analyst:** aln							
Copper, Total	**0.024**	0.0038	0.010	ug/l	1	08/22/18 23:35	

Quality Control Results

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W8H1078 - SM 2540D											
Blank (W8H1078-BLK1)					**Prepared & Analyzed: 08/17/18**						
Total Suspended Solids	ND		5	mg/l							
LCS (W8H1078-BS1)					**Prepared & Analyzed: 08/17/18**						
Total Suspended Solids	54.0		5	mg/l	50.2		108	90-110			
Duplicate (W8H1078-DUP1)	**Source: 8H09001-02**				**Prepared & Analyzed: 08/17/18**						
Total Suspended Solids	4.00		5	mg/l		6.00			40	20	R-03, J
Duplicate (W8H1078-DUP2)	**Source: 8H17049-02**				**Prepared & Analyzed: 08/17/18**						
Total Suspended Solids	13.0		5	mg/l		13.0			0	20	
Batch: W8H1099 - SM 2540D											
Blank (W8H1099-BLK1)					**Prepared & Analyzed: 08/17/18**						
Total Suspended Solids	ND		5	mg/l							
LCS (W8H1099-BS1)					**Prepared & Analyzed: 08/17/18**						
Total Suspended Solids	62.0		5	mg/l	66.2		94	90-110			
Duplicate (W8H1099-DUP1)	**Source: 8H17049-05**				**Prepared & Analyzed: 08/17/18**						
Total Suspended Solids	8.00		5	mg/l		7.00			13	20	
Duplicate (W8H1099-DUP2)	**Source: 8H06085-01**				**Prepared & Analyzed: 08/17/18**						
Total Suspended Solids	11.0		5	mg/l		9.00			20	20	

Quality Control Results

(Continued)

Metals - Low Level by 1600 Series Methods

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W8H1185 - EPA 1640											
Blank (W8H1185-BLK1)					**Prepared: 08/20/18**	**Analyzed: 08/21/18**					
Copper, Total	ND	0.0038	0.010	ug/l							
LCS (W8H1185-BS1)					**Prepared: 08/20/18**	**Analyzed: 08/21/18**					
Copper, Total	1.97	0.0038	0.010	ug/l	2.00		98	73-122			
Matrix Spike (W8H1185-MS1)	**Source: 8H17049-01**				**Prepared: 08/20/18**	**Analyzed: 08/21/18**					
Copper, Total	7.26	0.019	0.050	ug/l	2.00	5.10	108	60-138			
Matrix Spike (W8H1185-MS2)	**Source: 8H17049-05**				**Prepared: 08/20/18**	**Analyzed: 08/21/18**					
Copper, Total	12.1	0.0038	0.010	ug/l	2.00	10.3	87	60-138			
Matrix Spike Dup (W8H1185-MSD1)	**Source: 8H17049-01**				**Prepared: 08/20/18**	**Analyzed: 08/21/18**					
Copper, Total	7.39	0.019	0.050	ug/l	2.00	5.10	114	60-138	2	30	
Matrix Spike Dup (W8H1185-MSD2)	**Source: 8H17049-05**				**Prepared: 08/20/18**	**Analyzed: 08/21/18**					
Copper, Total	12.4	0.0038	0.010	ug/l	2.00	10.3	105	60-138	3	30	
Batch: W8H1192 - EPA 1640											
Blank (W8H1192-BLK1)					**Prepared: 08/20/18**	**Analyzed: 08/21/18**					
Copper, Dissolved	ND	0.0038	0.010	ug/l							
LCS (W8H1192-BS1)					**Prepared: 08/20/18**	**Analyzed: 08/21/18**					
Copper, Dissolved	2.11	0.0038	0.010	ug/l	2.00		105	70-130			
Matrix Spike (W8H1192-MS1)	**Source: 8H17049-01**				**Prepared: 08/20/18**	**Analyzed: 08/21/18**					
Copper, Dissolved	14.9	0.019	0.050	ug/l	10.0	4.69	102	70-130			
Matrix Spike (W8H1192-MS2)	**Source: 8H17049-05**				**Prepared: 08/20/18**	**Analyzed: 08/21/18**					
Copper, Dissolved	12.2	0.0038	0.010	ug/l	2.00	10.2	103	70-130			
Matrix Spike Dup (W8H1192-MSD1)	**Source: 8H17049-01**				**Prepared: 08/20/18**	**Analyzed: 08/21/18**					
Copper, Dissolved	15.4	0.019	0.050	ug/l	10.0	4.69	107	70-130	3	30	
Matrix Spike Dup (W8H1192-MSD2)	**Source: 8H17049-05**				**Prepared: 08/20/18**	**Analyzed: 08/21/18**					
Copper, Dissolved	12.0	0.0038	0.010	ug/l	2.00	10.2	93	70-130	2	30	
Batch: W8H1414 - EPA 1640											
Blank (W8H1414-BLK1)					**Prepared & Analyzed: 08/22/18**						
Copper, Total	ND	0.0038	0.010	ug/l							
LCS (W8H1414-BS1)					**Prepared: 08/22/18**	**Analyzed: 08/23/18**					
Copper, Total	2.03	0.0038	0.010	ug/l	2.00		101	73-122			
Matrix Spike (W8H1414-MS1)	**Source: 8H14069-09**				**Prepared: 08/22/18**	**Analyzed: 08/23/18**					
Copper, Total	2.13	0.0038	0.010	ug/l	2.00	0.0524	104	60-138			
Matrix Spike (W8H1414-MS2)	**Source: 8H14069-10**				**Prepared: 08/22/18**	**Analyzed: 08/23/18**					
Copper, Total	1.98	0.0038	0.010	ug/l	2.00	0.0285	98	60-138			
Matrix Spike Dup (W8H1414-MSD1)	**Source: 8H14069-09**				**Prepared: 08/22/18**	**Analyzed: 08/23/18**					
Copper, Total	2.14	0.0038	0.010	ug/l	2.00	0.0524	104	60-138	0.3	30	
Matrix Spike Dup (W8H1414-MSD2)	**Source: 8H14069-10**				**Prepared: 08/22/18**	**Analyzed: 08/23/18**					
Copper, Total	2.09	0.0038	0.010	ug/l	2.00	0.0285	103	60-138	5	30	

Notes and Definitions

Item	Definition
J	Estimated conc. detected <MRL and >MDL.
R-03	The RPD is not applicable for result below the reporting limit (either ND or J value).
ND	NOT DETECTED at or above the Method Reporting Limit (MRL). If Method Detection Limit (MDL) is reported, then ND means not detected at or above the MDL.
Dil	Dilution
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
% Rec	Percent Recovery
Source	Sample that was matrix spiked or duplicated.
MDL	Method Detection Limit
MRL	The minimum levels, concentrations, or quantities of a target variable (e.g., target analyte) that can be reported with a specified degree of confidence. The MRL is also known as Limit of Quantitation (LOQ) and Detection Limit for Reporting (DLR)
MDA	Minimum Detectable Activity
NR	Not Reportable
TIC	Tentatively Identified Compound (TIC) using mass spectrometry. The reported concentration is relative concentration based on the nearest internal standard. If the library search produces no matches at, or above 85%, the compound is reported as unknown.

Any remaining sample(s) will be disposed of one month from the final report date unless other arrangements are made in advance.
An Absence of Total Coliform meets the drinking water standards as established by the California State Water Resources Control Board (SWRCB)
All results are expressed on wet weight basis unless otherwise specified.
All samples collected by Weck Laboratories have been sampled in accordance to laboratory SOP Number MIS 002.

EVENT 1 (BOATWASH CLEANING) TOXICITY LAB REPORTS

Results of Chronic Toxicity Tests for Shelter Island Yacht Basin Boatwash Pilot Project – July Testing

Sample Collections: July 17, 2018
Project Number: 1715100615.0002.

Submitted to:

Wood Environment & Infrastructure Solutions, Inc.
9177 Sky Park Court
San Diego, CA 92123

Testing Performed by:

wood.

Wood Environment & Infrastructure Solutions, Inc.
Aquatic Toxicity Laboratory
4905 Morena Blvd., Suite 1304
San Diego, California 92117

The Wood aquatic toxicity laboratory is certified by the State of California Department of Health Services – Environmental Lab Accreditation Program (ELAP) under Certificate Number 3010. All test results were obtained following EPA Protocol guidelines and internal QA Program requirements. The data and test results have been reviewed and verified by the following laboratory representative:

Verified by: Steve Carlson **Date:** 3/25/19.

MATERIALS & METHODS

Sample Information

Client:	Wood Environment & Infrastructure Solutions
Project:	Shelter Island Yacht Basin – Boatwash Pilot Study
Monitoring Period:	July 2018 (round 1 of 3)
Sample IDs:	BWG1-E1, BWG2-E1, BWB1-E1, BWB2-E1, and BWG1-E5, BWG2-E5, BWB1-E5, BWB2-E5
Sample Collection Date, Time:	7/17/18, 09:05 – 09:35 and 17:04 – 17:25
Sample Receipt Date, Time:	7/17/18, 20:00
Sample Collection Method:	Grab samples

Table 1. Water Quality Measured Upon Sample Receipt

Sample ID	Temp. (°C)	pH (units)	Dissolved Oxygen (mg/L)	Salinity (ppt)	Alkalinity (mg/L)	Total Chlorine (mg/L)
BWG1-E1	N/R [1]	7.75	8.3	33.7	119	0.03
BWG2-E1	N/R [1]	7.78	8.1	33.7	121	<0.02
BWB1-E1	N/R [1]	7.85	8.2	33.9	133	<0.02
BWB2-E1	N/R [1]	7.87	8.4	33.8	129	0.03
BWG1-E5	N/R [1]	7.91	8.2	33.5	109	0.02
BWG2-E5	N/R [1]	7.92	8.1	33.9	118	0.02
BWB1-E5	N/R [1]	7.92	8.3	33.8	112	<0.02
BWB2-E5	N/R [1]	7.93	8.2	34.0	122	<0.02

[1] Not recorded – samples received same day as collected and immediately placed in cold storage. Water quality measurements recorded the following morning (temperature of samples was approximately 4 - 6°C).

Chronic Mussel Development Test Specifications

Test Period:	7/18/18; 12:30 – 7/20/18; 12:30
Test Organism:	*Mytilus galloprovincialis* (bivalve - mussel)
Test Organism Source:	Field-collected – Mission Bay (San Diego, CA)
Test Organism Age at start:	Fertilized embryos (<4 hours old)
Test Procedure:	48-hour embryo-larval development
Test Endpoint (statistical analysis):	48-hour Combined Proportion Normal (ASTM)
Test Concentrations:	25, 50, and 100% sample; plus Lab Control
Control / Dilution Water:	Natural seawater collected from the inlet at Scripps Institution of Oceanography (20-µm filtered)
Test Recordings:	Development in the 100% concentration was first recorded. If an adverse effect was observed, the 25% and 50% concentrations were also recorded.
Protocols Used:	EPA, 1995 West Coast Manual (EPA/600/R-95/136); and ASTM, 1998 (E 724-98).
EPA Test Acceptability Criteria:	Control must have ≥50% survival; ≥90% proportion normal; and the minimum significant difference (MSD) must be <25%.
Statistical Analysis Software:	CETIS™ v.1.9.3.0

RESULTS

After test completion, the results of the 100% concentration were recorded first on a microscope. If a 10% effect or greater was observed, then the 25 and 50% concentrations were also recorded. The BWG1-E1, BWG2-E1, BWB1-E1, and BWB2-E1 samples all resulted in no statistically significant effects in the 100% concentration (although the BWG1-E1 sample resulted in a 10% effect, so the 25 and 50% concentrations were also recorded, with no significant effects). The BWG1-E5, BWG2-E5, BWB1-E5, and BWB2-E5 samples all resulted in close to 100% abnormal development in the 100% concentration. Therefore, the 25 and 50% concentrations were also recorded with these four samples. Three of the samples (BWG1-E5, BWB1-E5, and BWB2-E5), resulted in 100% abnormal development in all test concentrations. The fourth sample (BWG2-E5) resulted in a partial effect and a median effect concentration (EC_{50}) of 64% sample. A summary of the test results for the four samples ending in "E1" is provided in Table 2. A summary of the test results for the four samples ending in "E5" is provided in Table 3. The full statistical analyses and raw bench sheets are provided in Appendix A. Sample receipt information and the chain of custody form are included in Appendix B and C, respectively.

To confirm whether there were biologically significant effects with the samples, test results were also evaluated using the EPA Test of Significant Toxicity (TST) approach. This approach to analysis applies a modified t-Test that accounts for the statistical power of the test and the magnitude of the biological effect in determining the presence of toxicity. The instream waste concentration (IWC) for this analysis is the 100 percent sample. The IWC was compared to the Lab Control for statistical analysis. The four "E1" samples all resulted in a "Pass" for the TST analysis. The four "E5" samples all resulted in a "Fail" with the TST analysis. The TST analysis takes in to account the biological effects of the samples – a "Fail" indicates the sample is toxic, and a "Pass" indicates the sample is non-toxic.

Table 2. Summary of Results for E1 Samples – Combined Proportion Normal (%)

Sample Concentration (%)	BWG1-E1	BWG2-E1	BWB1-E1	BWB2-E1
Lab Control	83.6	83.6	89.1	89.1
25	86.2	NR	NR	NR
50	83.6	NR	NR	NR
100	75.2	82.1	90.0	91.2
NOEC =	100	100	100	100
EC_{50} =	> 100	> 100	> 100	> 100
Percent Effect = (in 100% sample)	10.1	1.9	-1.0	-2.4
TST (Pass/Fail) =	Pass	Pass	Pass	Pass

NR = Not Recorded; these concentrations were not read due to < 10% effect in the 100% concentration.
NOEC = the highest Concentration tested that results in No Observed Effect (using standard analysis).
EC_{50} = the effect concentration expected to cause an adverse effect to 50% of the test organisms.
Percent Effect = the percent difference from the control. A negative value indicates a positive effect.
TST = Test of Significant Toxicity (a new approach to statistical analysis). A "Pass" indicates the percent effect is not biologically significant and the sample results are considered non-toxic.

Table 3. Summary of Results for E5 Samples – Combined Proportion Normal (%)

Sample Concentration (%)	BWG1-E5	BWG2-E5	BWB1-E5	BWB2-E5
Lab Control	86.4	86.4	86.7	86.7
25	0 *	90.1	0 *	0 *
50	0 *	71.4 *	0 *	0 *
100	0 *	3.5 *	0 *	0 *
NOEC =	< 25	25	< 25	< 25
EC_{50} =	< 12.5	63.9	< 12.5	< 12.5
Percent Effect = (in 100% sample)	100	95.9	100	100
TST (Pass/Fail) =	**Fail**	**Fail**	**Fail**	**Fail**

* An asterisk indicates a statistically significant difference compared to the control (using standard analysis).
NOEC = the highest Concentration tested that results in No Observed Effect (using standard analysis).
EC_{50} = the effect concentration expected to cause an adverse effect to 50% of the test organisms.
Percent Effect = the percent difference from the control. A negative value indicates a positive effect.
TST = Test of Significant Toxicity (a new approach to statistical analysis). A "Pass" indicates the percent effect is not biologically significant and the sample results are considered non-toxic. A "Fail" indicates toxicity.

QUALITY ASSURANCE

Samples were collected on 7/17/2018 and delivered to the testing laboratory later the same evening. The samples were immediately placed in cold storage, and water quality measurements were recorded the following morning before test set-up. All tests were initiated within the appropriate 36-hour holding time. There were four sets of lab controls conducted during this round of testing (1 control per 2 samples), and all four controls met the EPA's minimum test acceptability criteria (TAC) for the Percent Survival and the Percent Minimum Significant Difference (PMSD). For the Proportion Normal endpoint, two controls had 89.3% and 89.4% normal development (just under the 90% TAC), and two of the controls had 91.7% and 91.1% normal development (over the 90% TAC). Pooling of all four controls results in 90.4% normal development, exceeding the TAC for his endpoint. Therefore, all test results were deemed valid for reporting. In addition, the samples were analyzed, and the results were reported, using the Combined Proportion Normal endpoint. According to the ASTM guidance document, bivalve tests meet acceptability criteria if the control results in >70% for the Combined Proportion Normal endpoint. All four controls for this round of testing ranged from 83% to 89% for the combined endpoint (exceeding the ASTM acceptability criteria).

The concurrent reference toxicant test met the TAC and was deemed valid. The median effect concentration (EC_{50}) was equivalent to the lower two standard deviation value of the historical control chart mean for the laboratory, indicating this batch of organisms resulted in a typical response and sensitivity to copper. The reference toxicant test results are summarized in Table 4 and presented in full in Appendix D.

Table 4. Summary of Copper Reference Toxicant Test Results

Test Concentration (µg/L copper)	Combined Proportion Normal (%)	Statistical Results (in µg/L copper)
Lab Control	91.0	NOEC = 5.0 EC_{50} = 9.6 Historical EC_{50} ±2SD = 9.6 – 14.9 range
2.5	91.9	
5.0	91.1	
10	40.9 *	
20	0.0 *	
40	0.0 *	

* An asterisk indicates a statistically significant effect compared to the control (using standard analysis).
NOEC = the highest concentration tested that results in No Observed Effect.
EC_{50} = the median effect concentration expected to cause an adverse effect to 50% of the test organisms.
Historical EC_{50} = the mean EC_{50} for previous testing by the lab, plus or minus two standard deviations.

REFERENCES

ASTM. 1998. Standard Guide for Conducting Static Acute Toxicity Tests Starting with Embryos of Four Species of Saltwater Bivalve Molluscs. ASTM E 724-98.

Tidepool Scientific Software, 2001-2015. CETIS: Comprehensive Environmental Toxicity Information System software, version 1.9.3.0.

USEPA (U.S. Environmental Protection Agency). 1995. Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine and Estuarine Organisms (EPA/600/R-95/136). The USEPA, Office of Research and Development, Washington, DC.

USEPA (U.S. Environmental Protection Agency). 2010. Test of Significant Toxicity Implementation Document (EPA/833/R-10/003). The USEPA, Office of Wastewater Management, Washington, DC.

Results of Chronic Toxicity Tests for Shelter Island Yacht Basin Boatwash Pilot Project – August Testing

Sample Collections: August 16, 2018
Project Number: 1715100615.0002.

Submitted to:

Wood Environment & Infrastructure Solutions, Inc.
9177 Sky Park Court
San Diego, CA 92123

Testing Performed by:

wood.

Wood Environment & Infrastructure Solutions, Inc.
Aquatic Toxicity Laboratory
4905 Morena Blvd., Suite 1304
San Diego, California 92117

The Wood aquatic toxicity laboratory is certified by the State of California Department of Health Services – Environmental Lab Accreditation Program (ELAP) under Certificate Number 3010. All test results were obtained following EPA Protocol guidelines and internal QA Program requirements. The data and test results have been reviewed and verified by the following laboratory representative:

Verified by: ______________ **Date:** 3/25/19.

MATERIALS & METHODS

Sample Information

Client:	Wood Environment & Infrastructure Solutions
Project:	Shelter Island Yacht Basin – Boatwash Pilot Study
Monitoring Period:	August 2018 (round 2 of 3)
Sample IDs:	Basin-1, Basin-2, Gate-1, and Gate-2
Sample Collection Date, Time:	8/16/18, 09:45 – 11:10
Sample Receipt Date, Time:	8/16/18, 13:00
Sample Collection Method:	Grab samples
Water Quality Parameters:	See Table 1 (measured upon sample receipt)

Chronic Mussel Development Test Specifications

Test Period:	8/17/18, 17:15 – 8/19/18, 16:00
Test Organism:	*Mytilus galloprovincialis* (bivalve - mussel)
Test Organism Source:	Field-collected – Mission Bay (San Diego, CA)
Test Organism Age at start:	Fertilized embryos (<4 hours old)
Test Procedure:	48-hour embryo-larval development
Test Endpoint (statistical analysis):	48-hour Combined Proportion Normal (ASTM)
Test Concentrations:	25, 50, and 100% sample; plus Lab Control
Control/Dilution Water:	Natural seawater collected from the inlet at Scripps Institution of Oceanography (20-µm filtered)
Test Recordings:	Development in the 100% concentration was first recorded. If an adverse effect was observed, the 25% and 50% concentrations were also recorded.
Protocols Used:	EPA, 1995 West Coast Manual (EPA/600/R-95/136); and ASTM, 1998 (E 724-98).
EPA Test Acceptability Criteria:	Control must have ≥50% survival; ≥90% proportion normal; and the minimum significant difference (MSD) must be <25%.
Statistical Analysis Software:	CETIS™ v.1.9.3.0

Table 1. Water Quality Measured Upon Sample Receipt

Sample ID	Temp. (°C)	pH (units)	Dissolved Oxygen (mg/L)	Salinity (ppt)	Alkalinity (mg/L)	Total Chlorine (mg/L)
Basin-1	4.0	7.76	8.1	33.7	108	<0.02
Basin-2	4.0	7.81	7.8	33.6	112	0.02
Gate-1	4.0	7.85	8.1	33.8	110	0.02
Gate-2	4.0	7.85	8.1	34.0	108	<0.02

RESULTS

After test completion, the results of the 100% concentration were recorded first on a microscope. If there was greater than a 10% effect observed, then the 25% and 50% concentrations were also recorded. This was not necessary, as all four samples resulted in less than a 10% effect. All four of the 100% undiluted samples resulted in no statistically significant effects using the standard statistical analysis method. A summary of the test results is provided in Table 2. The full statistical analyses and raw bench sheets are provided in Appendix A. Sample receipt information and the chain of custody form are included in Appendix B and C, respectively.

To confirm whether there were biologically significant effects with the samples, test results were also evaluated using the EPA Test of Significant Toxicity (TST) approach. This approach to analysis applies a modified t-Test that accounts for the statistical power of the test and the magnitude of the biological effect in determining the presence of toxicity. The instream waste concentration (IWC) for this analysis is the 100 percent sample. The IWC was compared to the Lab Control for statistical analysis. All four samples resulted in a "Pass" for the TST analysis. Therefore, no biologically significant effects were observed, and the samples are considered non-toxic.

Table 2. Summary of Test Results – Combined Proportion Normal (%)

Sample Concentration (%)	Basin-1	Basin-2	Gate-1	Gate-2
Lab Control	91.9	91.9	92.5	92.5
100	86.1	90.2	90.8	91.6
NOEC =	100	100	100	100
EC_{50} =	> 100	> 100	> 100	> 100
Percent Effect = (in 100% sample)	6.3	1.9	1.8	1.0
TST (Pass/Fail) =	Pass	Pass	Pass	Pass

NOEC = the highest Concentration tested that results in No Observed Effect (using standard analysis).
EC_{50} = the effect concentration expected to cause an adverse effect to 50% of the test organisms.
Percent Effect = the percent difference from the control. A negative value indicates a positive effect.
TST = Test of Significant Toxicity (a new approach to statistical analysis). A "Pass" indicates the percent effect is not biologically significant and the sample results are considered non-toxic.

QUALITY ASSURANCE

Samples were collected and delivered to the testing lab the same day. Water quality measurements were recorded, and the samples were placed in cold storage until testing. The testing was initiated within the appropriate 36-hour sample holding time. There were two sets of lab controls conducted during this round of testing (1 control per 2 samples), and both controls met the EPA's minimum test acceptability criteria (TAC) for Percent Survival, Proportion Normal, and the Percent Minimum Significant Difference (PMSD). Therefore, the test results were deemed valid for reporting. In addition, the samples were analyzed for the Combined Proportion Normal endpoint. According to the ASTM guidance document, the bivalve test meets acceptability criteria if the control has > 70% for the Combined Proportion Normal endpoint. Both test controls also exceeded the ASTM acceptability criteria for the combined endpoint.

The concurrent reference toxicant test met TAC for Survival and PMSD. However, the Proportion Normal was 89.4%, which was slightly less than the 90% criteria. The test, though, produced a typical dose-response effect and the calculated EC_{50} value was within two standard deviations of the historical norm (indicating normal sensitivity levels). In addition, the two controls that went with the test samples both resulted in Proportion Normal values that exceeded the 90% criteria. Therefore, the reference toxicant test results were deemed valid for reporting. The reference toxicant test results are summarized in Table 3 and presented in full in Appendix D.

Table 3. Summary of Copper Reference Toxicant Test Results

Test Concentration (µg/L copper)	Combined Proportion Normal (%)	Statistical Results (in µg/L copper)
Lab Control	82.1	NOEC = 10 EC_{50} = 13.1 Historical EC_{50} ±2SD = 8.84 – 15.0 range
2.5	79.2	
5.0	90.1	
10	70.2	
20	4.5 *	
40	0.0 *	

* An asterisk indicates a statistically significant effect compared to the control (using standard analysis).
NOEC = the highest concentration tested that results in No Observed Effect.
EC_{50} = the median effect concentration expected to cause an adverse effect to 50% of the test organisms.
Historical EC_{50} = the mean EC_{50} for previous testing by the lab, plus or minus two standard deviations.

REFERENCES

ASTM. 1998. Standard Guide for Conducting Static Acute Toxicity Tests Starting with Embryos of Four Species of Saltwater Bivalve Molluscs. ASTM E 724-98.

Tidepool Scientific Software, 2001-2015. CETIS: Comprehensive Environmental Toxicity Information System software, version 1.9.3.0.

USEPA (U.S. Environmental Protection Agency). 1995. Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine and Estuarine Organisms (EPA/600/R-95/136). The USEPA, Office of Research and Development, Washington, DC.

USEPA (U.S. Environmental Protection Agency). 2010. Test of Significant Toxicity Implementation Document (EPA/833/R-10/003). The USEPA, Office of Wastewater Management, Washington, DC.

EVENT 2 (DIVER CLEANING)
CHEMISTRY LAB REPORTS

WECK LABORATORIES, INC.

Certificate of Analysis

FINAL REPORT

Work Orders: 8J25060

Project: Boatwash Pilot Study

Attn: Barry Snyder

Client: Wood - San Diego 2
9210 Sky Park Court, Suite 200
San Diego, CA 92123

Report Date: 12/04/2018

Received Date: 10/25/2018

Turnaround Time: Normal

Phones: (858) 300-4320

Fax: (858) 300-4301

P.O. #:

Billing Code:

ELAP-CA #1132 • EPA-UCMR #CA00211 • Guam-EPA #17-008R • HW-DOH # • ISO 17025 #L2457.01 • LACSD #10143 • NELAP-CA #04229CA • NELAP-OR #4047 • NJ-DEP #CA015 • NV-DEP #NAC 445A • SCAQMD #93LA1006

This is a complete final report. The information in this report applies to the samples analyzed in accordance with the chain-of-custody document. Weck Laboratories certifies that the test results meet all requirements of TNI unless noted by qualifiers or written in the Case Narrative. This analytical report must be reproduced in its entirety.

Dear Barry Snyder,

Enclosed are the results of analyses for samples received 10/25/18 with the Chain-of-Custody document. The samples were received in good condition, at 1.4 °C and on ice. All analyses met the method criteria except as noted in the case narrative or in the report with data qualifiers.

Reviewed by:

Chris Samatmanakit
Project Manager

Case Narrative

Report revised to include the appropriate qualifier for Dissolved Copper for sample Niskin-2-ER.

-CSS 12/4/18

Sample Summary

Sample Name	Sampled By	Lab ID	Matrix	Sampled	Qualifiers
Gate1-Top-T0	Corey Sheredy/Marissa Swiderski	8J25060-01	Water	10/23/18 07:00	
Gate1-Bottom-T0	Corey Sheredy/Marissa Swiderski	8J25060-02	Water	10/23/18 07:05	
Gate2-Top-T0	Corey Sheredy/Marissa Swiderski	8J25060-03	Water	10/23/18 07:25	
Gate2-Bottom-T0	Corey Sheredy/Marissa Swiderski	8J25060-04	Water	10/23/18 07:30	
Basin1-Top-T0	Corey Sheredy/Marissa Swiderski	8J25060-05	Water	10/23/18 07:00	
Basin1-Bottom-T0	Corey Sheredy/Marissa Swiderski	8J25060-06	Water	10/23/18 07:05	
Basin2-Top-T0	Corey Sheredy/Marissa Swiderski	8J25060-07	Water	10/23/18 07:10	
Basin2-Bottom-T0	Corey Sheredy/Marissa Swiderski	8J25060-08	Water	10/23/18 07:15	
Gate1-Top-T1	Corey Sheredy/Marissa Swiderski	8J25060-09	Water	10/23/18 09:35	
Gate1-Bottom-T1	Corey Sheredy/Marissa Swiderski	8J25060-10	Water	10/23/18 09:40	
Gate2-Top-T1	Corey Sheredy/Marissa Swiderski	8J25060-11	Water	10/23/18 09:45	
Gate2-Bottom-T1	Corey Sheredy/Marissa Swiderski	8J25060-12	Water	10/23/18 09:50	
Basin1-Top-T1	Corey Sheredy/Marissa Swiderski	8J25060-13	Water	10/23/18 09:30	
Basin2-Bottom-T1	Corey Sheredy/Marissa Swiderski	8J25060-14	Water	10/23/18 09:35	
Basin2-Top-T1	Corey Sheredy/Marissa Swiderski	8J25060-15	Water	10/23/18 09:45	
Basin2-Bottom-T1	Corey Sheredy/Marissa Swiderski	8J25060-16	Water	10/23/18 09:50	
Gate1-Top-T2	Corey Sheredy/Marissa Swiderski	8J25060-17	Water	10/23/18 10:10	
Gate1-Bottom-T2	Corey Sheredy/Marissa Swiderski	8J25060-18	Water	10/23/18 10:15	
Gate2-Top-T2	Corey Sheredy/Marissa Swiderski	8J25060-19	Water	10/23/18 10:30	
Gate2-Bottom-T2	Corey Sheredy/Marissa Swiderski	8J25060-20	Water	10/23/18 10:35	
Basin1-Top-T2	Corey Sheredy/Marissa Swiderski	8J25060-21	Water	10/23/18 10:10	
Basin1-Bottom-T2	Corey Sheredy/Marissa Swiderski	8J25060-22	Water	10/23/18 10:15	
Basin2-Top-T2	Corey Sheredy/Marissa Swiderski	8J25060-23	Water	10/23/18 10:25	
Basin2-Bottom-T2	Corey Sheredy/Marissa Swiderski	8J25060-24	Water	10/23/18 10:30	
Gate1-Top-T2-REP	Corey Sheredy/Marissa Swiderski	8J25060-25	Water	10/23/18 10:20	
Basin1-Top-T2-REP	Corey Sheredy/Marissa Swiderski	8J25060-26	Water	10/23/18 10:20	

Wood - San Diego 2
9210 Sky Park Court, Suite 200
San Diego, CA 92123

Project Number: Boatwash Pilot Study

Project Manager: Barry Snyder

Reported:
12/04/2018 18:02

Sample Name	Sampled By	Lab ID	Matrix	Sampled	Qualifiers
Gate1-Top-T3	Corey Sheredy/Marissa Swiderski	8J25060-27	Water	10/23/18 15:15	
Gate1-Bottom-T3	Corey Sheredy/Marissa Swiderski	8J25060-28	Water	10/23/18 15:20	
Gate2-Top-T3	Corey Sheredy/Marissa Swiderski	8J25060-29	Water	10/23/18 15:30	
Gate2-Bottom-T3	Corey Sheredy/Marissa Swiderski	8J25060-30	Water	10/23/18 15:35	
Basin1-Top-T3	Corey Sheredy/Marissa Swiderski	8J25060-31	Water	10/23/18 15:15	
Basin1-Bottom-T3	Corey Sheredy/Marissa Swiderski	8J25060-32	Water	10/23/18 15:20	
Basin2-Top-T3	Corey Sheredy/Marissa Swiderski	8J25060-33	Water	10/23/18 15:25	
Basin2-Bottom-T3	Corey Sheredy/Marissa Swiderski	8J25060-34	Water	10/23/18 15:30	
Gate1-Top-T4	Corey Sheredy/Marissa Swiderski	8J25060-35	Water	10/23/18 15:40	
Gate1-Bottom-T4	Corey Sheredy/Marissa Swiderski	8J25060-36	Water	10/23/18 15:45	
Gate2-Top-T4	Corey Sheredy/Marissa Swiderski	8J25060-37	Water	10/23/18 15:50	
Gate2-Bottom-T4	Corey Sheredy/Marissa Swiderski	8J25060-38	Water	10/23/18 15:55	
Basin1-Top-T4	Corey Sheredy/Marissa Swiderski	8J25060-39	Water	10/23/18 15:40	
Basin1-Bottom-T4	Corey Sheredy/Marissa Swiderski	8J25060-40	Water	10/23/18 15:45	
Basin2-Top-T4	Corey Sheredy/Marissa Swiderski	8J25060-41	Water	10/23/18 15:50	
Basin2-Bottom-T4	Corey Sheredy/Marissa Swiderski	8J25060-42	Water	10/23/18 15:55	
Niskin-1-ER	Corey Sheredy/Marissa Swiderski	8J25060-43	Water	10/22/18 19:00	
Niskin-2-ER	Corey Sheredy/Marissa Swiderski	8J25060-44	Water	10/22/18 19:20	
BW-FB	Corey Sheredy/Marissa Swiderski	8J25060-45	Water	10/23/18 13:30	
BASIN-PARTICULATE	Corey Sheredy/Marissa Swiderski	8J25060-46	Solid	10/23/18 16:40	
Gate1-Top-T5	Corey Sheredy/Marissa Swiderski	8J25060-47	Water	10/23/18 17:40	
Gate1-Bottom-T5	Corey Sheredy/Marissa Swiderski	8J25060-48	Water	10/23/18 17:45	
Gate2-Top-T5	Corey Sheredy/Marissa Swiderski	8J25060-49	Water	10/23/18 17:55	
Gate2-Bottom-T5	Corey Sheredy/Marissa Swiderski	8J25060-50	Water	10/23/18 18:00	
Basin1-Top-T5	Corey Sheredy/Marissa Swiderski	8J25060-51	Water	10/23/18 17:40	
Basin1-Bottom-T5	Corey Sheredy/Marissa Swiderski	8J25060-52	Water	10/23/18 17:45	
Basin2-Top-T5	Corey Sheredy/Marissa Swiderski	8J25060-53	Water	10/23/18 17:50	
Basin2-Bottom-T5	Corey Sheredy/Marissa Swiderski	8J25060-54	Water	10/23/18 17:55	

Analyses Accreditation Summary

Analyte	CAS #	Not By NELAP	By ANAB

Analyses Accreditation Summary

(Continued)

Analyte	CAS #	Not By NELAP	By ANAB
EPA 160.3M in Solid			
% Solids		✓	
% Solids		✓	

Sample Results

Sample: Gate1-Top-T0 — Sampled: 10/23/18 7:00 by Corey Sheredy/Marissa Swiderski
8J25060-01 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8J1640 **Instr:** OVEN11 **Prepared:** 10/25/18 16:03 **Analyst:** sar							
Total Suspended Solids	**5**		5	mg/l	1	10/26/18 11:39	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8J1723 **Instr:** ICPMS03 **Prepared:** 10/28/18 15:34 **Analyst:** aln							
Copper, Total	**7.7**	0.0038	0.010	ug/l	1	10/30/18 00:13	
Method: EPA 1640 **Batch ID:** W8J1816 **Instr:** ICPMS03 **Prepared:** 10/29/18 18:00 **Analyst:** aln							
Copper, Dissolved	**5.5**	0.0038	0.010	ug/l	1	10/30/18 23:27	

Sample: Gate1-Bottom-T0 — Sampled: 10/23/18 7:05 by Corey Sheredy/Marissa Swiderski
8J25060-02 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8J1640 **Instr:** OVEN11 **Prepared:** 10/25/18 16:03 **Analyst:** sar							
Total Suspended Solids	**4**		5	mg/l	1	10/26/18 11:39	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8J1723 **Instr:** ICPMS03 **Prepared:** 10/28/18 15:34 **Analyst:** aln							
Copper, Total	**7.9**	0.0038	0.010	ug/l	1	10/30/18 00:27	
Method: EPA 1640 **Batch ID:** W8J1816 **Instr:** ICPMS03 **Prepared:** 10/29/18 18:00 **Analyst:** aln							
Copper, Dissolved	**6.5**	0.0038	0.010	ug/l	1	10/30/18 23:40	

Sample: Gate2-Top-T0 — Sampled: 10/23/18 7:25 by Corey Sheredy/Marissa Swiderski
8J25060-03 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8J1640 **Instr:** OVEN11 **Prepared:** 10/25/18 16:03 **Analyst:** sar							
Total Suspended Solids	**5**		5	mg/l	1	10/26/18 11:39	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8J1723 **Instr:** ICPMS03 **Prepared:** 10/28/18 15:34 **Analyst:** aln							
Copper, Total	**5.2**	0.0038	0.010	ug/l	1	10/30/18 00:41	
Method: EPA 1640 **Batch ID:** W8J1816 **Instr:** ICPMS03 **Prepared:** 10/29/18 18:00 **Analyst:** aln							
Copper, Dissolved	**4.1**	0.0038	0.010	ug/l	1	10/30/18 23:54	

Sample Results

(Continued)

Sample: Gate2-Bottom-T0
8J25060-04 (Water)

Sampled: 10/23/18 7:30 by Corey Sheredy/Marissa Swiderski

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

Method: SM 2540D **Batch ID:** W8J1640 **Instr:** OVEN11 **Prepared:** 10/25/18 16:03 **Analyst:** sar

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Total Suspended Solids	**9**		5	mg/l	1	10/26/18 11:39	

Metals - Low Level by 1600 Series Methods

Method: EPA 1640 **Batch ID:** W8J1723 **Instr:** ICPMS03 **Prepared:** 10/28/18 15:34 **Analyst:** aln

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Copper, Total	**7.4**	0.0038	0.010	ug/l	1	10/30/18 00:54	

Method: EPA 1640 **Batch ID:** W8J1816 **Instr:** ICPMS03 **Prepared:** 10/29/18 18:00 **Analyst:** aln

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Copper, Dissolved	**6.3**	0.0038	0.010	ug/l	1	10/31/18 00:08	

Sample: Basin1-Top-T0
8J25060-05 (Water)

Sampled: 10/23/18 7:00 by Corey Sheredy/Marissa Swiderski

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

Method: SM 2540D **Batch ID:** W8J1640 **Instr:** OVEN11 **Prepared:** 10/25/18 16:03 **Analyst:** sar

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Total Suspended Solids	**4**		5	mg/l	1	10/26/18 11:39	J

Metals - Low Level by 1600 Series Methods

Method: EPA 1640 **Batch ID:** W8J1723 **Instr:** ICPMS03 **Prepared:** 10/28/18 15:34 **Analyst:** aln

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Copper, Total	**7.5**	0.0038	0.010	ug/l	1	10/30/18 01:08	

Method: EPA 1640 **Batch ID:** W8J1816 **Instr:** ICPMS03 **Prepared:** 10/29/18 18:00 **Analyst:** aln

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Copper, Dissolved	**7.1**	0.0038	0.010	ug/l	1	10/31/18 00:21	

Sample: Basin1-Bottom-T0
8J25060-06 (Water)

Sampled: 10/23/18 7:05 by Corey Sheredy/Marissa Swiderski

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

Method: SM 2540D **Batch ID:** W8J1640 **Instr:** OVEN11 **Prepared:** 10/25/18 16:03 **Analyst:** sar

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Total Suspended Solids	**4**		5	mg/l	1	10/26/18 11:39	J

Metals - Low Level by 1600 Series Methods

Method: EPA 1640 **Batch ID:** W8J1723 **Instr:** ICPMS03 **Prepared:** 10/28/18 15:34 **Analyst:** aln

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Copper, Total	**7.5**	0.0038	0.010	ug/l	1	10/30/18 01:22	

Method: EPA 1640 **Batch ID:** W8J1816 **Instr:** ICPMS03 **Prepared:** 10/29/18 18:00 **Analyst:** aln

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Copper, Dissolved	**6.9**	0.0038	0.010	ug/l	1	10/31/18 00:35	

Sample Results

(Continued)

Sample: Basin2-Top-T0 Sampled: 10/23/18 7:10 by Corey Sheredy/Marissa Swiderski
8J25060-07 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8J1640 **Instr:** OVEN11 **Prepared:** 10/25/18 16:03 **Analyst:** sar							
Total Suspended Solids	**5**		5	mg/l	1	10/26/18 11:39	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8J1723 **Instr:** ICPMS03 **Prepared:** 10/28/18 15:34 **Analyst:** aln							
Copper, Total	**7.1**	0.0038	0.010	ug/l	1	10/30/18 01:35	
Method: EPA 1640 **Batch ID:** W8J1816 **Instr:** ICPMS03 **Prepared:** 10/29/18 18:00 **Analyst:** aln							
Copper, Dissolved	**7.0**	0.0038	0.010	ug/l	1	10/31/18 00:49	

Sample: Basin2-Bottom-T0 Sampled: 10/23/18 7:15 by Corey Sheredy/Marissa Swiderski
8J25060-08 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8J1640 **Instr:** OVEN11 **Prepared:** 10/25/18 16:03 **Analyst:** sar							
Total Suspended Solids	**3**		5	mg/l	1	10/26/18 11:39	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8J1723 **Instr:** ICPMS03 **Prepared:** 10/28/18 15:34 **Analyst:** aln							
Copper, Total	**7.5**	0.0038	0.010	ug/l	1	10/30/18 01:49	
Method: EPA 1640 **Batch ID:** W8J1816 **Instr:** ICPMS03 **Prepared:** 10/29/18 18:00 **Analyst:** aln							
Copper, Dissolved	**6.9**	0.0038	0.010	ug/l	1	10/31/18 01:02	

Sample: Gate1-Top-T1 Sampled: 10/23/18 9:35 by Corey Sheredy/Marissa Swiderski
8J25060-09 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8J1640 **Instr:** OVEN11 **Prepared:** 10/25/18 16:03 **Analyst:** sar							
Total Suspended Solids	**5**		5	mg/l	1	10/26/18 11:39	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8J1723 **Instr:** ICPMS03 **Prepared:** 10/28/18 15:34 **Analyst:** aln							
Copper, Total	**11**	0.0038	0.010	ug/l	1	10/30/18 03:25	
Method: EPA 1640 **Batch ID:** W8J1816 **Instr:** ICPMS03 **Prepared:** 10/29/18 18:00 **Analyst:** aln							
Copper, Dissolved	**7.4**	0.0038	0.010	ug/l	1	10/31/18 02:38	

Sample Results

(Continued)

Sample: Gate1-Bottom-T1 — Sampled: 10/23/18 9:40 by Corey Sheredy/Marissa Swiderski
8J25060-10 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8J1640 **Instr:** OVEN11 **Prepared:** 10/25/18 16:03 **Analyst:** sar							
Total Suspended Solids	**3**		5	mg/l	1	10/26/18 11:39	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8J1723 **Instr:** ICPMS03 **Prepared:** 10/28/18 15:34 **Analyst:** aln							
Copper, Total	**7.0**	0.0038	0.010	ug/l	1	10/30/18 03:38	
Method: EPA 1640 **Batch ID:** W8J1816 **Instr:** ICPMS03 **Prepared:** 10/29/18 18:00 **Analyst:** aln							
Copper, Dissolved	**6.1**	0.0038	0.010	ug/l	1	10/31/18 02:52	

Sample: Gate2-Top-T1 — Sampled: 10/23/18 9:45 by Corey Sheredy/Marissa Swiderski
8J25060-11 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8J1640 **Instr:** OVEN11 **Prepared:** 10/25/18 16:03 **Analyst:** sar							
Total Suspended Solids	**6**		5	mg/l	1	10/26/18 11:39	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8J1723 **Instr:** ICPMS03 **Prepared:** 10/28/18 15:34 **Analyst:** aln							
Copper, Total	**7.0**	0.0038	0.010	ug/l	1	10/30/18 03:52	
Method: EPA 1640 **Batch ID:** W8J1816 **Instr:** ICPMS03 **Prepared:** 10/29/18 18:00 **Analyst:** aln							
Copper, Dissolved	**6.1**	0.0038	0.010	ug/l	1	10/31/18 03:05	

Sample: Gate2-Bottom-T1 — Sampled: 10/23/18 9:50 by Corey Sheredy/Marissa Swiderski
8J25060-12 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8J1640 **Instr:** OVEN11 **Prepared:** 10/25/18 16:03 **Analyst:** sar							
Total Suspended Solids	**5**		5	mg/l	1	10/26/18 11:39	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8J1723 **Instr:** ICPMS03 **Prepared:** 10/28/18 15:34 **Analyst:** aln							
Copper, Total	**7.9**	0.0038	0.010	ug/l	1	10/30/18 04:06	
Method: EPA 1640 **Batch ID:** W8J1816 **Instr:** ICPMS03 **Prepared:** 10/29/18 18:00 **Analyst:** aln							
Copper, Dissolved	**6.7**	0.0038	0.010	ug/l	1	10/31/18 03:19	

Sample Results

(Continued)

Sample: Basin1-Top-T1 Sampled: 10/23/18 9:30 by Corey Sheredy/Marissa Swiderski
8J25060-13 (Water)

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

Method: SM 2540D **Batch ID:** W8J1640 **Instr:** OVEN11 **Prepared:** 10/25/18 16:03 **Analyst:** sar

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Total Suspended Solids	**4**		5	mg/l	1	10/26/18 11:39	J

Metals - Low Level by 1600 Series Methods

Method: EPA 1640 **Batch ID:** W8J1723 **Instr:** ICPMS03 **Prepared:** 10/28/18 15:34 **Analyst:** aln

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Copper, Total	**35**	0.0038	0.010	ug/l	1	10/30/18 04:19	

Method: EPA 1640 **Batch ID:** W8J1816 **Instr:** ICPMS03 **Prepared:** 10/29/18 18:00 **Analyst:** aln

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Copper, Dissolved	**18**	0.0038	0.010	ug/l	1	10/31/18 03:33	

Sample: Basin2-Bottom-T1 Sampled: 10/23/18 9:35 by Corey Sheredy/Marissa Swiderski
8J25060-14 (Water)

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

Method: SM 2540D **Batch ID:** W8J1640 **Instr:** OVEN11 **Prepared:** 10/25/18 16:03 **Analyst:** sar

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Total Suspended Solids	**4**		5	mg/l	1	10/26/18 11:39	J

Metals - Low Level by 1600 Series Methods

Method: EPA 1640 **Batch ID:** W8J1723 **Instr:** ICPMS03 **Prepared:** 10/28/18 15:34 **Analyst:** aln

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Copper, Total	**28**	0.0038	0.010	ug/l	1	10/30/18 04:33	

Method: EPA 1640 **Batch ID:** W8J1816 **Instr:** ICPMS03 **Prepared:** 10/29/18 18:00 **Analyst:** aln

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Copper, Dissolved	**16**	0.0038	0.010	ug/l	1	10/31/18 03:46	

Sample: Basin2-Top-T1 Sampled: 10/23/18 9:45 by Corey Sheredy/Marissa Swiderski
8J25060-15 (Water)

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

Method: SM 2540D **Batch ID:** W8J1640 **Instr:** OVEN11 **Prepared:** 10/25/18 16:03 **Analyst:** sar

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Total Suspended Solids	**4**		5	mg/l	1	10/26/18 11:39	J

Metals - Low Level by 1600 Series Methods

Method: EPA 1640 **Batch ID:** W8J1723 **Instr:** ICPMS03 **Prepared:** 10/28/18 15:34 **Analyst:** aln

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Copper, Total	**33**	0.0038	0.010	ug/l	1	10/30/18 04:47	

Method: EPA 1640 **Batch ID:** W8J1816 **Instr:** ICPMS03 **Prepared:** 10/29/18 18:00 **Analyst:** aln

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Copper, Dissolved	**18**	0.0038	0.010	ug/l	1	10/31/18 04:00	

Sample Results

(Continued)

Sample: Basin2-Bottom-T1
8J25060-16 (Water)
Sampled: 10/23/18 9:50 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8J1640 **Instr:** OVEN11 **Prepared:** 10/25/18 16:03 **Analyst:** sar							
Total Suspended Solids	**4**		5	mg/l	1	10/26/18 11:39	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8J1723 **Instr:** ICPMS03 **Prepared:** 10/28/18 15:34 **Analyst:** aln							
Copper, Total	**29**	0.0038	0.010	ug/l	1	10/30/18 05:00	
Method: EPA 1640 **Batch ID:** W8J1816 **Instr:** ICPMS03 **Prepared:** 10/29/18 18:00 **Analyst:** aln							
Copper, Dissolved	**17**	0.0038	0.010	ug/l	1	10/31/18 04:14	

Sample: Gate1-Top-T2
8J25060-17 (Water)
Sampled: 10/23/18 10:10 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8J1673 **Instr:** Inst **Prepared:** 10/26/18 10:13 **Analyst:** sar							
Total Suspended Solids	**6**		5	mg/l	1	10/26/18 13:25	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8J1723 **Instr:** ICPMS03 **Prepared:** 10/28/18 15:34 **Analyst:** aln							
Copper, Total	**5.9**	0.0038	0.010	ug/l	1	10/29/18 22:38	
Method: EPA 1640 **Batch ID:** W8J1816 **Instr:** ICPMS03 **Prepared:** 10/29/18 18:00 **Analyst:** aln							
Copper, Dissolved	**4.6**	0.0038	0.010	ug/l	1	10/30/18 21:51	

Sample: Gate1-Bottom-T2
8J25060-18 (Water)
Sampled: 10/23/18 10:15 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8J1673 **Instr:** Inst **Prepared:** 10/26/18 10:13 **Analyst:** sar							
Total Suspended Solids	**5**		5	mg/l	1	10/26/18 13:25	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8J1723 **Instr:** ICPMS03 **Prepared:** 10/28/18 15:34 **Analyst:** aln							
Copper, Total	**8.3**	0.0038	0.010	ug/l	1	10/29/18 23:19	
Method: EPA 1640 **Batch ID:** W8J1816 **Instr:** ICPMS03 **Prepared:** 10/29/18 18:00 **Analyst:** aln							
Copper, Dissolved	**7.1**	0.0038	0.010	ug/l	1	10/30/18 22:32	

Sample Results

(Continued)

Sample: Gate2-Top-T2 — Sampled: 10/23/18 10:30 by Corey Sheredy/Marissa Swiderski

8J25060-19 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8J1673 **Instr:** Inst **Prepared:** 10/26/18 10:13 **Analyst:** sar							
Total Suspended Solids	**8**		5	mg/l	1	10/26/18 13:25	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8J1723 **Instr:** ICPMS03 **Prepared:** 10/28/18 15:34 **Analyst:** aln							
Copper, Total	**6.9**	0.0038	0.010	ug/l	1	10/30/18 05:14	
Method: EPA 1640 **Batch ID:** W8J1816 **Instr:** ICPMS03 **Prepared:** 10/29/18 18:00 **Analyst:** aln							
Copper, Dissolved	**6.0**	0.0038	0.010	ug/l	1	10/31/18 04:27	

Sample: Gate2-Bottom-T2 — Sampled: 10/23/18 10:35 by Corey Sheredy/Marissa Swiderski

8J25060-20 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8J1673 **Instr:** Inst **Prepared:** 10/26/18 10:13 **Analyst:** sar							
Total Suspended Solids	**6**		5	mg/l	1	10/26/18 13:25	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8J1723 **Instr:** ICPMS03 **Prepared:** 10/28/18 15:34 **Analyst:** aln							
Copper, Total	**8.1**	0.0038	0.010	ug/l	1	10/30/18 05:28	
Method: EPA 1640 **Batch ID:** W8J1816 **Instr:** ICPMS03 **Prepared:** 10/29/18 18:00 **Analyst:** aln							
Copper, Dissolved	**6.6**	0.0038	0.010	ug/l	1	10/31/18 04:41	

Sample: Basin1-Top-T2 — Sampled: 10/23/18 10:10 by Corey Sheredy/Marissa Swiderski

8J25060-21 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8J1673 **Instr:** Inst **Prepared:** 10/26/18 10:13 **Analyst:** sar							
Total Suspended Solids	**6**		5	mg/l	1	10/26/18 13:25	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8J1927 **Instr:** ICPMS03 **Prepared:** 10/31/18 11:00 **Analyst:** aln							
Copper, Total	**28**	0.0038	0.010	ug/l	1	10/31/18 22:19	
Method: EPA 1640 **Batch ID:** W8K0046 **Instr:** ICPMS03 **Prepared:** 11/01/18 15:01 **Analyst:** aln							
Copper, Dissolved	**16**	0.0038	0.010	ug/l	1	11/06/18 22:17	

Sample Results

(Continued)

Sample: Basin1-Bottom-T2
8J25060-22 (Water)

Sampled: 10/23/18 10:15 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8J1673 **Instr:** Inst **Prepared:** 10/26/18 10:13 **Analyst:** sar							
Total Suspended Solids	**5**		5	mg/l	1	10/26/18 13:25	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8J1927 **Instr:** ICPMS03 **Prepared:** 10/31/18 11:00 **Analyst:** aln							
Copper, Total	**24**	0.0038	0.010	ug/l	1	10/31/18 23:00	
Method: EPA 1640 **Batch ID:** W8K0046 **Instr:** ICPMS03 **Prepared:** 11/01/18 15:01 **Analyst:** aln							
Copper, Dissolved	**15**	0.0038	0.010	ug/l	1	11/06/18 22:58	

Sample: Basin2-Top-T2
8J25060-23 (Water)

Sampled: 10/23/18 10:25 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8J1673 **Instr:** Inst **Prepared:** 10/26/18 10:13 **Analyst:** sar							
Total Suspended Solids	**6**		5	mg/l	1	10/26/18 13:25	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8J1927 **Instr:** ICPMS03 **Prepared:** 10/31/18 11:00 **Analyst:** aln							
Copper, Total	**27**	0.0038	0.010	ug/l	1	10/31/18 23:55	
Method: EPA 1640 **Batch ID:** W8K0046 **Instr:** ICPMS03 **Prepared:** 11/01/18 15:01 **Analyst:** aln							
Copper, Dissolved	**16**	0.0038	0.010	ug/l	1	11/06/18 23:53	

Sample: Basin2-Bottom-T2
8J25060-24 (Water)

Sampled: 10/23/18 10:30 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8J1673 **Instr:** Inst **Prepared:** 10/26/18 10:13 **Analyst:** sar							
Total Suspended Solids	**5**		5	mg/l	1	10/26/18 13:25	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8J1927 **Instr:** ICPMS03 **Prepared:** 10/31/18 11:00 **Analyst:** aln							
Copper, Total	**25**	0.0038	0.010	ug/l	1	11/01/18 00:09	
Method: EPA 1640 **Batch ID:** W8K0046 **Instr:** ICPMS03 **Prepared:** 11/01/18 15:01 **Analyst:** aln							
Copper, Dissolved	**16**	0.0038	0.010	ug/l	1	11/07/18 00:07	

Sample Results

(Continued)

Sample: Gate1-Top-T2-REP
8J25060-25 (Water)

Sampled: 10/23/18 10:20 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D	**Batch ID:** W8J1673	**Instr:** Inst	**Prepared:** 10/26/18 10:13			**Analyst:** sar	
Total Suspended Solids	**4**		5	mg/l	1	10/26/18 13:25	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640	**Batch ID:** W8J1927	**Instr:** ICPMS03	**Prepared:** 10/31/18 11:00			**Analyst:** aln	
Copper, Total	**10**	0.0038	0.010	ug/l	1	11/01/18 00:22	
Method: EPA 1640	**Batch ID:** W8K0046	**Instr:** ICPMS03	**Prepared:** 11/01/18 15:01			**Analyst:** aln	
Copper, Dissolved	**8.2**	0.0038	0.010	ug/l	1	11/07/18 00:20	

Sample: Basin1-Top-T2-REP
8J25060-26 (Water)

Sampled: 10/23/18 10:20 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D	**Batch ID:** W8J1673	**Instr:** Inst	**Prepared:** 10/26/18 10:13			**Analyst:** sar	
Total Suspended Solids	**4**		5	mg/l	1	10/26/18 13:25	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640	**Batch ID:** W8J1927	**Instr:** ICPMS03	**Prepared:** 10/31/18 11:00			**Analyst:** aln	
Copper, Total	**22**	0.0038	0.010	ug/l	1	11/01/18 00:36	
Method: EPA 1640	**Batch ID:** W8K0046	**Instr:** ICPMS03	**Prepared:** 11/01/18 15:01			**Analyst:** aln	
Copper, Dissolved	**14**	0.0038	0.010	ug/l	1	11/07/18 00:34	

Sample: Gate1-Top-T3
8J25060-27 (Water)

Sampled: 10/23/18 15:15 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D	**Batch ID:** W8J1673	**Instr:** Inst	**Prepared:** 10/26/18 10:13			**Analyst:** sar	
Total Suspended Solids	**12**		5	mg/l	1	10/26/18 13:25	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640	**Batch ID:** W8J1927	**Instr:** ICPMS03	**Prepared:** 10/31/18 11:00			**Analyst:** aln	
Copper, Total	**8.8**	0.0038	0.010	ug/l	1	11/01/18 00:50	
Method: EPA 1640	**Batch ID:** W8K0046	**Instr:** ICPMS03	**Prepared:** 11/01/18 15:01			**Analyst:** aln	
Copper, Dissolved	**7.9**	0.0038	0.010	ug/l	1	11/07/18 00:48	

Sample Results

(Continued)

Sample: Gate1-Bottom-T3
8J25060-28 (Water)
Sampled: 10/23/18 15:20 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8J1673 **Instr:** Inst **Prepared:** 10/26/18 10:13 **Analyst:** sar							
Total Suspended Solids	**4**		5	mg/l	1	10/26/18 13:25	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8J1927 **Instr:** ICPMS03 **Prepared:** 10/31/18 11:00 **Analyst:** aln							
Copper, Total	**8.5**	0.0038	0.010	ug/l	1	11/01/18 01:03	
Method: EPA 1640 **Batch ID:** W8K0046 **Instr:** ICPMS03 **Prepared:** 11/01/18 15:01 **Analyst:** aln							
Copper, Dissolved	**7.3**	0.0038	0.010	ug/l	1	11/07/18 01:01	

Sample: Gate2-Top-T3
8J25060-29 (Water)
Sampled: 10/23/18 15:30 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8J1673 **Instr:** Inst **Prepared:** 10/26/18 10:13 **Analyst:** sar							
Total Suspended Solids	**3**		5	mg/l	1	10/26/18 13:25	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8J1927 **Instr:** ICPMS03 **Prepared:** 10/31/18 11:00 **Analyst:** aln							
Copper, Total	**9.1**	0.0038	0.010	ug/l	1	11/01/18 01:17	
Method: EPA 1640 **Batch ID:** W8K0046 **Instr:** ICPMS03 **Prepared:** 11/01/18 15:01 **Analyst:** aln							
Copper, Dissolved	**7.8**	0.0038	0.010	ug/l	1	11/07/18 01:15	

Sample: Gate2-Bottom-T3
8J25060-30 (Water)
Sampled: 10/23/18 15:35 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8J1688 **Instr:** OVEN11 **Prepared:** 10/26/18 13:15 **Analyst:** sar							
Total Suspended Solids	**5**		5	mg/l	1	10/29/18 11:10	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8J1927 **Instr:** ICPMS03 **Prepared:** 10/31/18 11:00 **Analyst:** aln							
Copper, Total	**8.6**	0.0038	0.010	ug/l	1	11/01/18 01:31	
Method: EPA 1640 **Batch ID:** W8K0046 **Instr:** ICPMS03 **Prepared:** 11/01/18 15:01 **Analyst:** aln							
Copper, Dissolved	**7.6**	0.0038	0.010	ug/l	1	11/07/18 01:29	

Sample Results

(Continued)

Sample: Basin1-Top-T3
8J25060-31 (Water)
Sampled: 10/23/18 15:15 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8J1673	**Instr:** Inst		**Prepared:** 10/26/18 10:13			**Analyst:** sar	
Total Suspended Solids	**4**		5	mg/l	1	10/26/18 13:25	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8J1927	**Instr:** ICPMS03		**Prepared:** 10/31/18 11:00			**Analyst:** aln	
Copper, Total	**120**	0.19	0.50	ug/l	50	11/01/18 22:51	
Method: EPA 1640 **Batch ID:** W8K0046	**Instr:** ICPMS03		**Prepared:** 11/01/18 15:01			**Analyst:** aln	
Copper, Dissolved	**46**	0.19	0.50	ug/l	50	11/07/18 02:51	

Sample: Basin1-Bottom-T3
8J25060-32 (Water)
Sampled: 10/23/18 15:20 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8J1673	**Instr:** Inst		**Prepared:** 10/26/18 10:13			**Analyst:** sar	
Total Suspended Solids	**4**		5	mg/l	1	10/26/18 13:25	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8J1927	**Instr:** ICPMS03		**Prepared:** 10/31/18 11:00			**Analyst:** aln	
Copper, Total	**100**	0.19	0.50	ug/l	50	11/01/18 23:05	
Method: EPA 1640 **Batch ID:** W8K0046	**Instr:** ICPMS03		**Prepared:** 11/01/18 15:01			**Analyst:** aln	
Copper, Dissolved	**51**	0.19	0.50	ug/l	50	11/07/18 03:04	

Sample: Basin2-Top-T3
8J25060-33 (Water)
Sampled: 10/23/18 15:25 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8J1673	**Instr:** Inst		**Prepared:** 10/26/18 10:13			**Analyst:** sar	
Total Suspended Solids	**7**		5	mg/l	1	10/26/18 13:25	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8J1927	**Instr:** ICPMS03		**Prepared:** 10/31/18 11:00			**Analyst:** aln	
Copper, Total	**87**	0.19	0.50	ug/l	50	11/01/18 23:19	
Method: EPA 1640 **Batch ID:** W8K0046	**Instr:** ICPMS03		**Prepared:** 11/01/18 15:01			**Analyst:** aln	
Copper, Dissolved	**43**	0.19	0.50	ug/l	50	11/07/18 03:18	

Sample Results

(Continued)

Sample: Basin2-Bottom-T3 | Sampled: 10/23/18 15:30 by Corey Sheredy/Marissa Swiderski
8J25060-34 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8J1673 **Instr:** Inst **Prepared:** 10/26/18 10:13 **Analyst:** sar							
Total Suspended Solids	**4**		5	mg/l	1	10/26/18 13:25	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8J1927 **Instr:** ICPMS03 **Prepared:** 10/31/18 11:00 **Analyst:** aln							
Copper, Total	**91**	0.19	0.50	ug/l	50	11/01/18 23:32	
Method: EPA 1640 **Batch ID:** W8K0046 **Instr:** ICPMS03 **Prepared:** 11/01/18 15:01 **Analyst:** aln							
Copper, Dissolved	**44**	0.19	0.50	ug/l	50	11/07/18 03:32	

Sample: Gate1-Top-T4 | Sampled: 10/23/18 15:40 by Corey Sheredy/Marissa Swiderski
8J25060-35 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8J1688 **Instr:** OVEN11 **Prepared:** 10/26/18 13:15 **Analyst:** sar							
Total Suspended Solids	**4**		5	mg/l	1	10/29/18 11:10	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8J1927 **Instr:** ICPMS03 **Prepared:** 10/31/18 11:00 **Analyst:** aln							
Copper, Total	**12**	0.0038	0.010	ug/l	1	11/01/18 04:01	
Method: EPA 1640 **Batch ID:** W8K0046 **Instr:** ICPMS03 **Prepared:** 11/01/18 15:01 **Analyst:** aln							
Copper, Dissolved	**8.4**	0.0038	0.010	ug/l	1	11/07/18 03:45	

Sample: Gate1-Bottom-T4 | Sampled: 10/23/18 15:45 by Corey Sheredy/Marissa Swiderski
8J25060-36 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8J1688 **Instr:** OVEN11 **Prepared:** 10/26/18 13:15 **Analyst:** sar							
Total Suspended Solids	**4**		5	mg/l	1	10/29/18 11:10	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8J1927 **Instr:** ICPMS03 **Prepared:** 10/31/18 11:00 **Analyst:** aln							
Copper, Total	**8.7**	0.0038	0.010	ug/l	1	11/01/18 04:15	
Method: EPA 1640 **Batch ID:** W8K0046 **Instr:** ICPMS03 **Prepared:** 11/01/18 15:01 **Analyst:** aln							
Copper, Dissolved	**7.2**	0.0038	0.010	ug/l	1	11/07/18 03:59	

Sample Results

(Continued)

Sample: Gate2-Top-T4 — Sampled: 10/23/18 15:50 by Corey Sheredy/Marissa Swiderski
8J25060-37 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8J1688 **Instr:** OVEN11 **Prepared:** 10/26/18 13:15 **Analyst:** sar							
Total Suspended Solids	**5**		5	mg/l	1	10/29/18 11:10	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8J1927 **Instr:** ICPMS03 **Prepared:** 10/31/18 11:00 **Analyst:** aln							
Copper, Total	**9.8**	0.0038	0.010	ug/l	1	11/01/18 04:28	
Method: EPA 1640 **Batch ID:** W8K0046 **Instr:** ICPMS03 **Prepared:** 11/01/18 15:01 **Analyst:** aln							
Copper, Dissolved	**7.3**	0.0038	0.010	ug/l	1	11/07/18 04:13	

Sample: Gate2-Bottom-T4 — Sampled: 10/23/18 15:55 by Corey Sheredy/Marissa Swiderski
8J25060-38 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8J1688 **Instr:** OVEN11 **Prepared:** 10/26/18 13:15 **Analyst:** sar							
Total Suspended Solids	**5**		5	mg/l	1	10/29/18 11:10	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8J1927 **Instr:** ICPMS03 **Prepared:** 10/31/18 11:00 **Analyst:** aln							
Copper, Total	**9.5**	0.0038	0.010	ug/l	1	11/01/18 04:42	
Method: EPA 1640 **Batch ID:** W8K0046 **Instr:** ICPMS03 **Prepared:** 11/01/18 15:01 **Analyst:** aln							
Copper, Dissolved	**7.7**	0.0038	0.010	ug/l	1	11/07/18 04:26	

Sample: Basin1-Top-T4 — Sampled: 10/23/18 15:40 by Corey Sheredy/Marissa Swiderski
8J25060-39 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8J1688 **Instr:** OVEN11 **Prepared:** 10/26/18 13:15 **Analyst:** sar							
Total Suspended Solids	**4**		5	mg/l	1	10/29/18 11:10	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8J1927 **Instr:** ICPMS03 **Prepared:** 10/31/18 11:00 **Analyst:** aln							
Copper, Total	**95**	0.19	0.50	ug/l	50	11/02/18 00:00	
Method: EPA 1640 **Batch ID:** W8K0046 **Instr:** ICPMS03 **Prepared:** 11/01/18 15:01 **Analyst:** aln							
Copper, Dissolved	**52**	0.19	0.50	ug/l	50	11/07/18 04:40	

Sample Results

(Continued)

Sample: Basin1-Bottom-T4
8J25060-40 (Water)
Sampled: 10/23/18 15:45 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8J1688 **Instr:** OVEN11 **Prepared:** 10/26/18 13:15 **Analyst:** sar							
Total Suspended Solids	**11**		5	mg/l	1	10/29/18 11:10	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8J1927 **Instr:** ICPMS03 **Prepared:** 10/31/18 11:00 **Analyst:** aln							
Copper, Total	**84**	0.19	0.50	ug/l	50	11/02/18 00:13	
Method: EPA 1640 **Batch ID:** W8K0046 **Instr:** ICPMS03 **Prepared:** 11/01/18 15:01 **Analyst:** aln							
Copper, Dissolved	**44**	0.19	0.50	ug/l	50	11/07/18 04:54	

Sample: Basin2-Top-T4
8J25060-41 (Water)
Sampled: 10/23/18 15:50 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8J1688 **Instr:** OVEN11 **Prepared:** 10/26/18 13:15 **Analyst:** sar							
Total Suspended Solids	**5**		5	mg/l	1	10/29/18 11:10	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8K0130 **Instr:** icpms03 **Prepared:** 11/04/18 14:49 **Analyst:** aln							
Copper, Dissolved	**47**	0.19	0.50	ug/l	50	12/04/18 01:15	
Method: EPA 1640 **Batch ID:** W8K0181 **Instr:** ICPMS03 **Prepared:** 11/05/18 12:43 **Analyst:** aln							
Copper, Total	**87**	0.19	0.50	ug/l	50	11/13/18 23:34	

Sample: Basin2-Bottom-T4
8J25060-42 (Water)
Sampled: 10/23/18 15:55 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8J1640 **Instr:** OVEN11 **Prepared:** 10/25/18 16:03 **Analyst:** sar							
Total Suspended Solids	**7**		5	mg/l	1	10/26/18 11:39	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8K0130 **Instr:** icpms03 **Prepared:** 11/04/18 14:49 **Analyst:** aln							
Copper, Dissolved	**48**	0.19	0.50	ug/l	50	12/04/18 01:56	
Method: EPA 1640 **Batch ID:** W8K0181 **Instr:** ICPMS03 **Prepared:** 11/05/18 12:43 **Analyst:** aln							
Copper, Total	**98**	0.19	0.50	ug/l	50	11/14/18 00:15	

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Project Manager: Barry Snyder

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Sample Results

(Continued)

Sample: Niskin-1-ER
8J25060-43 (Water)

Sampled: 10/22/18 19:00 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8J1640 **Instr:** OVEN11 **Prepared:** 10/25/18 16:03 **Analyst:** sar							
Total Suspended Solids	**3**		5	mg/l	1	10/26/18 11:39	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8K0130 **Instr:** icpms03 **Prepared:** 11/04/18 14:49 **Analyst:** aln							
Copper, Dissolved	**3.3**	0.0038	0.010	ug/l	1	12/04/18 00:34	
Method: EPA 1640 **Batch ID:** W8K0181 **Instr:** ICPMS03 **Prepared:** 11/05/18 12:43 **Analyst:** aln							
Copper, Total	**3.6**	0.0038	0.010	ug/l	1	11/13/18 22:39	

Sample: Niskin-2-ER
8J25060-44 (Water)

Sampled: 10/22/18 19:20 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8J1688 **Instr:** OVEN11 **Prepared:** 10/26/18 13:15 **Analyst:** sar							
Total Suspended Solids	**1**		5	mg/l	1	10/29/18 11:10	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8K0130 **Instr:** icpms03 **Prepared:** 11/04/18 14:49 **Analyst:** aln							
Copper, Dissolved	**0.12**	0.0038	0.010	ug/l	1	12/04/18 00:47	B
Method: EPA 1640 **Batch ID:** W8K0181 **Instr:** ICPMS03 **Prepared:** 11/05/18 12:43 **Analyst:** aln							
Copper, Total	**0.16**	0.0038	0.010	ug/l	1	11/13/18 22:53	

Sample: BW-FB
8J25060-45 (Water)

Sampled: 10/23/18 13:30 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8J1673 **Instr:** Inst **Prepared:** 10/26/18 10:13 **Analyst:** sar							
Total Suspended Solids	**2**		5	mg/l	1	10/26/18 13:25	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8K0130 **Instr:** icpms03 **Prepared:** 11/04/18 14:49 **Analyst:** aln							
Copper, Dissolved	**0.031**	0.0038	0.010	ug/l	1	12/04/18 01:01	B
Method: EPA 1640 **Batch ID:** W8K0181 **Instr:** ICPMS03 **Prepared:** 11/05/18 12:43 **Analyst:** aln							
Copper, Total	**0.045**	0.0038	0.010	ug/l	1	11/13/18 23:07	

Sample Results

(Continued)

Sample: BASIN-PARTICULATE
8J25060-46 (Solid)
Sampled: 10/23/18 16:40 by Corey Sheredy/Marissa Swiderski

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

Method: EPA 160.3M **Batch ID:** W8J1768 **Instr:** Inst **Prepared:** 10/29/18 11:21 **Analyst:** map

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
% Solids	**7.41**		0.100	% by Weight	1	10/30/18 10:45	

Metals (Non-Aqueous) by EPA 6000/7000 Series Methods

Method: EPA 6020B **Batch ID:** W8K0078 **Instr:** ICPMS02 **Prepared:** 11/02/18 09:43 **Analyst:** MTT

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Copper, Total	**410**	2.9	5.0	mg/kg	50	11/07/18 12:15	

Sample: Gate1-Top-T5
8J25060-47 (Water)
Sampled: 10/23/18 17:40 by Corey Sheredy/Marissa Swiderski

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

Method: SM 2540D **Batch ID:** W8J1688 **Instr:** OVEN11 **Prepared:** 10/26/18 13:15 **Analyst:** sar

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Total Suspended Solids	**4**		5	mg/l	1	10/29/18 11:10	J

Metals - Low Level by 1600 Series Methods

Method: EPA 1640 **Batch ID:** W8K0130 **Instr:** icpms03 **Prepared:** 11/04/18 14:49 **Analyst:** aln

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Copper, Dissolved	**9.1**	0.019	0.050	ug/l	5	12/04/18 03:32	

Method: EPA 1640 **Batch ID:** W8K0181 **Instr:** ICPMS03 **Prepared:** 11/05/18 12:43 **Analyst:** aln

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Copper, Total	**11**	0.019	0.050	ug/l	5	11/14/18 01:51	

Sample: Gate1-Bottom-T5
8J25060-48 (Water)
Sampled: 10/23/18 17:45 by Corey Sheredy/Marissa Swiderski

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

Method: SM 2540D **Batch ID:** W8J1688 **Instr:** OVEN11 **Prepared:** 10/26/18 13:15 **Analyst:** sar

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Total Suspended Solids	**6**		5	mg/l	1	10/29/18 11:10	

Metals - Low Level by 1600 Series Methods

Method: EPA 1640 **Batch ID:** W8K0130 **Instr:** icpms03 **Prepared:** 11/04/18 14:49 **Analyst:** aln

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Copper, Dissolved	**9.7**	0.019	0.050	ug/l	5	12/04/18 05:21	

Method: EPA 1640 **Batch ID:** W8K0181 **Instr:** ICPMS03 **Prepared:** 11/05/18 12:43 **Analyst:** aln

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Copper, Total	**13**	0.019	0.050	ug/l	5	11/14/18 03:13	

Sample Results

(Continued)

Sample: Gate2-Top-T5
8J25060-49 (Water)
Sampled: 10/23/18 17:55 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8J1688 **Instr:** OVEN11 **Prepared:** 10/26/18 13:15 **Analyst:** sar							
Total Suspended Solids	**5**		5	mg/l	1	10/29/18 11:10	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8K0130 **Instr:** icpms03 **Prepared:** 11/04/18 14:49 **Analyst:** aln							
Copper, Dissolved	**8.2**	0.019	0.050	ug/l	5	12/04/18 05:35	
Method: EPA 1640 **Batch ID:** W8K0181 **Instr:** ICPMS03 **Prepared:** 11/05/18 12:43 **Analyst:** aln							
Copper, Total	**10**	0.019	0.050	ug/l	5	11/14/18 03:26	

Sample: Gate2-Bottom-T5
8J25060-50 (Water)
Sampled: 10/23/18 18:00 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8J1688 **Instr:** OVEN11 **Prepared:** 10/26/18 13:15 **Analyst:** sar							
Total Suspended Solids	**5**		5	mg/l	1	10/29/18 11:10	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8K0130 **Instr:** icpms03 **Prepared:** 11/04/18 14:49 **Analyst:** aln							
Copper, Dissolved	**9.3**	0.019	0.050	ug/l	5	12/04/18 05:49	
Method: EPA 1640 **Batch ID:** W8K0181 **Instr:** ICPMS03 **Prepared:** 11/05/18 12:43 **Analyst:** aln							
Copper, Total	**11**	0.019	0.050	ug/l	5	11/14/18 03:40	

Sample: Basin1-Top-T5
8J25060-51 (Water)
Sampled: 10/23/18 17:40 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8J1688 **Instr:** OVEN11 **Prepared:** 10/26/18 13:15 **Analyst:** sar							
Total Suspended Solids	**6**		5	mg/l	1	10/29/18 11:10	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8K0130 **Instr:** icpms03 **Prepared:** 11/04/18 14:49 **Analyst:** aln							
Copper, Dissolved	**46**	0.19	0.50	ug/l	50	12/04/18 02:37	
Method: EPA 1640 **Batch ID:** W8K0181 **Instr:** ICPMS03 **Prepared:** 11/05/18 12:43 **Analyst:** aln							
Copper, Total	**91**	0.19	0.50	ug/l	50	11/14/18 00:56	

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Project Manager: Barry Snyder

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Sample Results

(Continued)

Sample: Basin1-Bottom-T5
8J25060-52 (Water)
Sampled: 10/23/18 17:45 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8J1688 **Instr:** OVEN11 **Prepared:** 10/26/18 13:15 **Analyst:** sar							
Total Suspended Solids	**5**		5	mg/l	1	10/29/18 11:10	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8K0130 **Instr:** icpms03 **Prepared:** 11/04/18 14:49 **Analyst:** aln							
Copper, Dissolved	**45**	0.19	0.50	ug/l	50	12/04/18 02:50	
Method: EPA 1640 **Batch ID:** W8K0181 **Instr:** ICPMS03 **Prepared:** 11/05/18 12:43 **Analyst:** aln							
Copper, Total	**87**	0.19	0.50	ug/l	50	11/14/18 01:10	

Sample: Basin2-Top-T5
8J25060-53 (Water)
Sampled: 10/23/18 17:50 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8J1688 **Instr:** OVEN11 **Prepared:** 10/26/18 13:15 **Analyst:** sar							
Total Suspended Solids	**7**		5	mg/l	1	10/29/18 11:10	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8K0130 **Instr:** icpms03 **Prepared:** 11/04/18 14:49 **Analyst:** aln							
Copper, Dissolved	**42**	0.19	0.50	ug/l	50	12/04/18 03:04	
Method: EPA 1640 **Batch ID:** W8K0181 **Instr:** ICPMS03 **Prepared:** 11/05/18 12:43 **Analyst:** aln							
Copper, Total	**74**	0.19	0.50	ug/l	50	11/14/18 01:23	

Sample: Basin2-Bottom-T5
8J25060-54 (Water)
Sampled: 10/23/18 17:55 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8J1688 **Instr:** OVEN11 **Prepared:** 10/26/18 13:15 **Analyst:** sar							
Total Suspended Solids	**9**		5	mg/l	1	10/29/18 11:10	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8K0130 **Instr:** icpms03 **Prepared:** 11/04/18 14:49 **Analyst:** aln							
Copper, Dissolved	**46**	0.19	0.50	ug/l	50	12/04/18 03:18	
Method: EPA 1640 **Batch ID:** W8K0181 **Instr:** ICPMS03 **Prepared:** 11/05/18 12:43 **Analyst:** aln							
Copper, Total	**84**	0.19	0.50	ug/l	50	11/14/18 01:37	

Quality Control Results

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W8J1640 - SM 2540D											
Blank (W8J1640-BLK1)					**Prepared: 10/25/18 Analyzed: 10/26/18**						
Total Suspended Solids	ND		5	mg/l							
LCS (W8J1640-BS1)					**Prepared: 10/25/18 Analyzed: 10/26/18**						
Total Suspended Solids	67.7		5	mg/l	64.0		106	90-110			
Duplicate (W8J1640-DUP1)	**Source: 8J25060-05**				**Prepared: 10/25/18 Analyzed: 10/26/18**						
Total Suspended Solids	4.00		5	mg/l		3.80			5	20	J
Duplicate (W8J1640-DUP2)	**Source: 8J25060-13**				**Prepared: 10/25/18 Analyzed: 10/26/18**						
Total Suspended Solids	4.00		5	mg/l		3.50			13	20	J
Batch: W8J1673 - SM 2540D											
Blank (W8J1673-BLK1)					**Prepared & Analyzed: 10/26/18**						
Total Suspended Solids	ND		5	mg/l							
LCS (W8J1673-BS1)					**Prepared & Analyzed: 10/26/18**						
Total Suspended Solids	57.9		5	mg/l	53.0		109	90-110			
Duplicate (W8J1673-DUP1)	**Source: 8J25069-03**				**Prepared & Analyzed: 10/26/18**						
Total Suspended Solids	154		5	mg/l		141			9	20	
Duplicate (W8J1673-DUP2)	**Source: 8J25060-22**				**Prepared & Analyzed: 10/26/18**						
Total Suspended Solids	5.00		5	mg/l		4.60			8	20	
Batch: W8J1688 - SM 2540D											
Blank (W8J1688-BLK1)					**Prepared: 10/26/18 Analyzed: 10/29/18**						
Total Suspended Solids	ND		5	mg/l							
LCS (W8J1688-BS1)					**Prepared: 10/26/18 Analyzed: 10/29/18**						
Total Suspended Solids	60.0		5	mg/l	55.4		108	90-110			
Duplicate (W8J1688-DUP1)	**Source: 8J25060-40**				**Prepared: 10/26/18 Analyzed: 10/29/18**						
Total Suspended Solids	10.0		5	mg/l		11.0			10	20	
Duplicate (W8J1688-DUP2)	**Source: 8J25060-54**				**Prepared: 10/26/18 Analyzed: 10/29/18**						
Total Suspended Solids	10.0		5	mg/l		9.00			11	20	
Batch: W8J1768 - EPA 160.3M											
Duplicate (W8J1768-DUP1)	**Source: 8J25060-46**				**Prepared: 10/29/18 Analyzed: 10/30/18**						
% Solids	6.69		0.100	% by Weight		7.41			10	20	

Quality Control Results

(Continued)

Metals - Low Level by 1600 Series Methods

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W8J1723 - EPA 1640											
Blank (W8J1723-BLK1)					**Prepared: 10/28/18 Analyzed: 10/29/18**						
Copper, Total	ND	0.0038	0.010	ug/l							
LCS (W8J1723-BS1)					**Prepared: 10/28/18 Analyzed: 10/29/18**						
Copper, Total	2.03	0.0038	0.010	ug/l	2.00		101	73-122			
Matrix Spike (W8J1723-MS1)	**Source: 8J25060-17**				**Prepared: 10/28/18 Analyzed: 10/29/18**						
Copper, Total	7.94	0.0038	0.010	ug/l	2.00	5.91	101	60-138			
Matrix Spike (W8J1723-MS2)	**Source: 8J25060-18**				**Prepared: 10/28/18 Analyzed: 10/29/18**						
Copper, Total	10.2	0.0038	0.010	ug/l	2.00	8.27	96	60-138			
Matrix Spike Dup (W8J1723-MSD1)	**Source: 8J25060-17**				**Prepared: 10/28/18 Analyzed: 10/29/18**						
Copper, Total	7.75	0.0038	0.010	ug/l	2.00	5.91	92	60-138	2	30	
Matrix Spike Dup (W8J1723-MSD2)	**Source: 8J25060-18**				**Prepared: 10/28/18 Analyzed: 10/29/18**						
Copper, Total	10.6	0.0038	0.010	ug/l	2.00	8.27	116	60-138	4	30	
Batch: W8J1816 - EPA 1640											
Blank (W8J1816-BLK1)					**Prepared: 10/29/18 Analyzed: 10/30/18**						
Copper, Dissolved	ND	0.0038	0.010	ug/l							
LCS (W8J1816-BS1)					**Prepared: 10/29/18 Analyzed: 10/30/18**						
Copper, Dissolved	1.80	0.0038	0.010	ug/l	2.00		90	70-130			
Matrix Spike (W8J1816-MS1)	**Source: 8J25060-17**				**Prepared: 10/29/18 Analyzed: 10/30/18**						
Copper, Dissolved	6.29	0.0038	0.010	ug/l	2.00	4.56	87	70-130			
Matrix Spike (W8J1816-MS2)	**Source: 8J25060-18**				**Prepared: 10/29/18 Analyzed: 10/30/18**						
Copper, Dissolved	9.16	0.0038	0.010	ug/l	2.00	7.15	101	70-130			
Matrix Spike Dup (W8J1816-MSD1)	**Source: 8J25060-17**				**Prepared: 10/29/18 Analyzed: 10/30/18**						
Copper, Dissolved	6.46	0.0038	0.010	ug/l	2.00	4.56	95	70-130	3	30	
Matrix Spike Dup (W8J1816-MSD2)	**Source: 8J25060-18**				**Prepared: 10/29/18 Analyzed: 10/30/18**						
Copper, Dissolved	9.18	0.0038	0.010	ug/l	2.00	7.15	102	70-130	0.2	30	
Batch: W8J1927 - EPA 1640											
Blank (W8J1927-BLK1)					**Prepared & Analyzed: 10/31/18**						
Copper, Total	ND	0.0038	0.010	ug/l							
Blank (W8J1927-BLK2)					**Prepared: 10/31/18 Analyzed: 11/01/18**						
Copper, Total	ND	0.0038	0.010	ug/l							
LCS (W8J1927-BS1)					**Prepared & Analyzed: 10/31/18**						
Copper, Total	1.97	0.0038	0.010	ug/l	2.00		98	73-122			
LCS (W8J1927-BS2)					**Prepared: 10/31/18 Analyzed: 11/01/18**						
Copper, Total	2.03	0.0038	0.010	ug/l	2.00		101	73-122			
Matrix Spike (W8J1927-MS1)	**Source: 8J25060-21**				**Prepared & Analyzed: 10/31/18**						
Copper, Total	30.8	0.0038	0.010	ug/l	2.00	27.6	159	60-138			MS-02
Matrix Spike (W8J1927-MS2)	**Source: 8J25060-22**				**Prepared & Analyzed: 10/31/18**						
Copper, Total	25.7	0.0038	0.010	ug/l	2.00	23.9	92	60-138			

Quality Control Results

(Continued)

Metals - Low Level by 1600 Series Methods (Continued)

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W8J1927 - EPA 1640 (Continued)											
Matrix Spike (W8J1927-MS3)	**Source: 8J25060-21**				**Prepared: 10/31/18 Analyzed: 11/01/18**						
Copper, Total	30.5	0.0038	0.010	ug/l	2.00	27.6	143	60-138			MS-02
Matrix Spike Dup (W8J1927-MSD1)	**Source: 8J25060-21**				**Prepared & Analyzed: 10/31/18**						
Copper, Total	30.9	0.0038	0.010	ug/l	2.00	27.6	161	60-138	0.1	30	MS-02
Matrix Spike Dup (W8J1927-MSD2)	**Source: 8J25060-22**				**Prepared & Analyzed: 10/31/18**						
Copper, Total	26.4	0.0038	0.010	ug/l	2.00	23.9	126	60-138	3	30	
Matrix Spike Dup (W8J1927-MSD3)	**Source: 8J25060-21**				**Prepared: 10/31/18 Analyzed: 11/01/18**						
Copper, Total	30.6	0.0038	0.010	ug/l	2.00	27.6	150	60-138	0.4	30	MS-02
Batch: W8K0046 - EPA 1640											
Blank (W8K0046-BLK1)					**Prepared: 11/01/18 Analyzed: 11/06/18**						
Copper, Dissolved	ND	0.0038	0.010	ug/l							
LCS (W8K0046-BS1)					**Prepared: 11/01/18 Analyzed: 11/06/18**						
Copper, Dissolved	1.99	0.0038	0.010	ug/l	2.00		100	70-130			
Matrix Spike (W8K0046-MS1)	**Source: 8J25060-21**				**Prepared: 11/01/18 Analyzed: 11/06/18**						
Copper, Dissolved	18.2	0.0038	0.010	ug/l	2.00	16.2	103	70-130			
Matrix Spike (W8K0046-MS2)	**Source: 8J25060-22**				**Prepared: 11/01/18 Analyzed: 11/06/18**						
Copper, Dissolved	17.8	0.0038	0.010	ug/l	2.00	15.2	127	70-130			
Matrix Spike Dup (W8K0046-MSD1)	**Source: 8J25060-21**				**Prepared: 11/01/18 Analyzed: 11/06/18**						
Copper, Dissolved	17.8	0.0038	0.010	ug/l	2.00	16.2	83	70-130	2	30	
Matrix Spike Dup (W8K0046-MSD2)	**Source: 8J25060-22**				**Prepared: 11/01/18 Analyzed: 11/06/18**						
Copper, Dissolved	17.6	0.0038	0.010	ug/l	2.00	15.2	118	70-130	1	30	
Batch: W8K0130 - EPA 1640											
Blank (W8K0130-BLK1)					**Prepared: 11/04/18 Analyzed: 12/04/18**						
Copper, Dissolved	0.0187	0.0038	0.010	ug/l							B-06
LCS (W8K0130-BS1)					**Prepared: 11/04/18 Analyzed: 12/04/18**						
Copper, Dissolved	1.99	0.0038	0.010	ug/l	2.00		99	70-130			
Matrix Spike (W8K0130-MS1)	**Source: 8J25060-41**				**Prepared: 11/04/18 Analyzed: 12/04/18**						
Copper, Dissolved	143	0.19	0.50	ug/l	100	47.1	96	70-130			
Matrix Spike (W8K0130-MS2)	**Source: 8J25060-42**				**Prepared: 11/04/18 Analyzed: 12/04/18**						
Copper, Dissolved	150	0.19	0.50	ug/l	100	48.4	102	70-130			
Matrix Spike Dup (W8K0130-MSD1)	**Source: 8J25060-41**				**Prepared: 11/04/18 Analyzed: 12/04/18**						
Copper, Dissolved	141	0.19	0.50	ug/l	100	47.1	94	70-130	1	30	
Matrix Spike Dup (W8K0130-MSD2)	**Source: 8J25060-42**				**Prepared: 11/04/18 Analyzed: 12/04/18**						
Copper, Dissolved	151	0.19	0.50	ug/l	100	48.4	102	70-130	0.3	30	
Batch: W8K0181 - EPA 1640											
Blank (W8K0181-BLK1)					**Prepared: 11/05/18 Analyzed: 11/13/18**						
Copper, Total	ND	0.0038	0.010	ug/l							
LCS (W8K0181-BS1)					**Prepared: 11/05/18 Analyzed: 11/13/18**						

Quality Control Results

(Continued)

Metals - Low Level by 1600 Series Methods (Continued)

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W8K0181 - EPA 1640 (Continued)											
LCS (W8K0181-BS1)					**Prepared: 11/05/18**	**Analyzed: 11/13/18**					
Copper, Total	2.04	0.0038	0.010	ug/l	2.00		102	73-122			
Matrix Spike (W8K0181-MS1)	**Source: 8J25060-41**				**Prepared: 11/05/18**	**Analyzed: 11/13/18**					
Copper, Total	90.5	0.19	0.50	ug/l	2.00	87.2	163	60-138			MS-02
Matrix Spike (W8K0181-MS2)	**Source: 8J25060-42**				**Prepared: 11/05/18**	**Analyzed: 11/14/18**					
Copper, Total	104	0.19	0.50	ug/l	2.00	97.6	322	60-138			MS-02
Matrix Spike Dup (W8K0181-MSD1)	**Source: 8J25060-41**				**Prepared: 11/05/18**	**Analyzed: 11/14/18**					
Copper, Total	89.8	0.19	0.50	ug/l	2.00	87.2	129	60-138	0.8	30	
Matrix Spike Dup (W8K0181-MSD2)	**Source: 8J25060-42**				**Prepared: 11/05/18**	**Analyzed: 11/14/18**					
Copper, Total	96.9	0.19	0.50	ug/l	2.00	97.6	NR	60-138	7	30	MS-02

Metals (Non-Aqueous) by EPA 6000/7000 Series Methods

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W8K0078 - EPA 6020B											
Blank (W8K0078-BLK1)					**Prepared: 11/02/18**	**Analyzed: 11/07/18**					
Copper, Total	ND	0.29	0.50	mg/kg							
LCS (W8K0078-BS1)					**Prepared: 11/02/18**	**Analyzed: 11/07/18**					
Copper, Total	49.9	0.29	0.50	mg/kg	50.0		100	80-120			
Matrix Spike (W8K0078-MS1)	**Source: 8J25060-46**				**Prepared: 11/02/18**	**Analyzed: 11/07/18**					
Copper, Total	460	2.9	5.0	mg/kg	9.95	414	454	75-125			MS-02
Matrix Spike Dup (W8K0078-MSD1)	**Source: 8J25060-46**				**Prepared: 11/02/18**	**Analyzed: 11/07/18**					
Copper, Total	425	2.9	5.0	mg/kg	9.92	414	105	75-125	8	20	

Notes and Definitions

Item	Definition
B	Blank contamination. The analyte was found in the associated blank as well as in the sample.
B-06	This analyte was found in the method blank, which was possibly contaminated during sample preparation. The batch was accepted since this analyte was either not detected or more than 10 times of the blank value for all the samples in the batch.
J	Estimated conc. detected <MRL and >MDL.
MS-02	The RPD and/or percent recovery for this QC spike sample cannot be accurately calculated due to the high concentration of analyte inherent in the sample.
ND	NOT DETECTED at or above the Method Reporting Limit (MRL). If Method Detection Limit (MDL) is reported, then ND means not detected at or above the MDL.
Dil	Dilution
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
% Rec	Percent Recovery
Source	Sample that was matrix spiked or duplicated.
MDL	Method Detection Limit
MRL	The minimum levels, concentrations, or quantities of a target variable (e.g., target analyte) that can be reported with a specified degree of confidence. The MRL is also known as Limit of Quantitation (LOQ) and Detection Limit for Reporting (DLR)
MDA	Minimum Detectable Activity
NR	Not Reportable
TIC	Tentatively Identified Compound (TIC) using mass spectrometry. The reported concentration is relative concentration based on the nearest internal standard. If the library search produces no matches at, or above 85%, the compound is reported as unknown.

Any remaining sample(s) will be disposed of one month from the final report date unless other arrangements are made in advance.
An Absence of Total Coliform meets the drinking water standards as established by the California State Water Resources Control Board (SWRCB)
All results are expressed on wet weight basis unless otherwise specified.
All samples collected by Weck Laboratories have been sampled in accordance to laboratory SOP Number MIS 002.

WECK LABORATORIES, INC.

Certificate of Analysis

FINAL REPORT

Work Orders: 8J25059

Project: Boatwash Pilot Study

Attn: Barry Snyder

Client: Wood - San Diego 2
9210 Sky Park Court, Suite 200
San Diego, CA 92123

Report Date: 11/12/2018

Received Date: 10/25/2018

Turnaround Time: Normal

Phones: (858) 300-4320

Fax: (858) 300-4301

P.O. #:

Billing Code:

ELAP-CA #1132 • EPA-UCMR #CA00211 • Guam-EPA #17-008R • HW-DOH # • ISO 17025 #L2457.01 • LACSD #10143 • NELAP-CA #04229CA • NELAP-OR #4047 • NJ-DEP #CA015 • NV-DEP #NAC 445A • SCAQMD #93LA1006

This is a complete final report. The information in this report applies to the samples analyzed in accordance with the chain-of-custody document. Weck Laboratories certifies that the test results meet all requirements of TNI unless noted by qualifiers or written in the Case Narrative. This analytical report must be reproduced in its entirety.

Dear Barry Snyder,

Enclosed are the results of analyses for samples received 10/25/18 with the Chain-of-Custody document. The samples were received in good condition, at 1.4 °C and on ice. All analyses met the method criteria except as noted in the case narrative or in the report with data qualifiers.

Reviewed by:

Chris Samatmanakit
Project Manager

Certificate of Analysis

FINAL REPORT

Wood - San Diego 2
9210 Sky Park Court, Suite 200
San Diego, CA 92123

Project Number: Boatwash Pilot Study

Project Manager: Barry Snyder

Reported:
11/12/2018 09:28

Sample Summary

Sample Name	Sampled By	Lab ID	Matrix	Sampled	Qualifiers
Gate1-Top-P1	Corey Sheredy/Marissa Swiderski	8J25059-01	Water	10/24/18 10:25	
Gate1-Bottom-P1	Corey Sheredy/Marissa Swiderski	8J25059-02	Water	10/24/18 10:30	
Gate2-Top-P1	Corey Sheredy/Marissa Swiderski	8J25059-03	Water	10/24/18 10:35	
Gate2-Bottom-P1	Corey Sheredy/Marissa Swiderski	8J25059-04	Water	10/24/18 10:40	
Basin1-Top-P1	Corey Sheredy/Marissa Swiderski	8J25059-05	Water	10/24/18 10:50	
Basin1-Bottom-P1	Corey Sheredy/Marissa Swiderski	8J25059-06	Water	10/24/18 10:55	
Basin2-Top-P1	Corey Sheredy/Marissa Swiderski	8J25059-07	Water	10/24/18 11:00	
Basin2-Bottom-P1	Corey Sheredy/Marissa Swiderski	8J25059-08	Water	10/24/18 11:05	

Sample Results

Sample: Gate1-Top-P1
8J25059-01 (Water)
Sampled: 10/24/18 10:25 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8J1688 **Instr:** OVEN11 **Prepared:** 10/26/18 13:15 **Analyst:** sar							
Total Suspended Solids	**3**		5	mg/l	1	10/29/18 11:10	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8J1724 **Instr:** ICPMS03 **Prepared:** 10/28/18 15:46 **Analyst:** aln							
Copper, Total	**8.8**	0.0038	0.010	ug/l	1	10/29/18 03:13	
Method: EPA 1640 **Batch ID:** W8J1727 **Instr:** ICPMS03 **Prepared:** 10/28/18 17:32 **Analyst:** aln							
Copper, Dissolved	**7.2**	0.0038	0.010	ug/l	1	10/28/18 22:53	

Sample: Gate1-Bottom-P1
8J25059-02 (Water)
Sampled: 10/24/18 10:30 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8J1688 **Instr:** OVEN11 **Prepared:** 10/26/18 13:15 **Analyst:** sar							
Total Suspended Solids	**4**		5	mg/l	1	10/29/18 11:10	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8J1724 **Instr:** ICPMS03 **Prepared:** 10/28/18 15:46 **Analyst:** aln							
Copper, Total	**7.2**	0.0038	0.010	ug/l	1	10/29/18 04:07	
Method: EPA 1640 **Batch ID:** W8J1727 **Instr:** ICPMS03 **Prepared:** 10/28/18 17:32 **Analyst:** aln							
Copper, Dissolved	**6.6**	0.0038	0.010	ug/l	1	10/28/18 23:48	

Sample: Gate2-Top-P1
8J25059-03 (Water)
Sampled: 10/24/18 10:35 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8J1688 **Instr:** OVEN11 **Prepared:** 10/26/18 13:15 **Analyst:** sar							
Total Suspended Solids	**5**		5	mg/l	1	10/29/18 11:10	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8J1724 **Instr:** ICPMS03 **Prepared:** 10/28/18 15:46 **Analyst:** aln							
Copper, Total	**6.8**	0.0038	0.010	ug/l	1	10/29/18 04:21	
Method: EPA 1640 **Batch ID:** W8J1727 **Instr:** ICPMS03 **Prepared:** 10/28/18 17:32 **Analyst:** aln							
Copper, Dissolved	**6.1**	0.0038	0.010	ug/l	1	10/29/18 00:01	

Sample Results

(Continued)

Sample: Gate2-Bottom-P1 — Sampled: 10/24/18 10:40 by Corey Sheredy/Marissa Swiderski
8J25059-04 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8J1766 **Instr:** OVEN11 **Prepared:** 10/29/18 11:17 **Analyst:** sar							
Total Suspended Solids	**2**		5	mg/l	1	10/30/18 14:37	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8J1724 **Instr:** ICPMS03 **Prepared:** 10/28/18 15:46 **Analyst:** aln							
Copper, Total	**6.7**	0.0038	0.010	ug/l	1	10/29/18 04:35	
Method: EPA 1640 **Batch ID:** W8J1727 **Instr:** ICPMS03 **Prepared:** 10/28/18 17:32 **Analyst:** aln							
Copper, Dissolved	**5.9**	0.0038	0.010	ug/l	1	10/29/18 00:15	

Sample: Basin1-Top-P1 — Sampled: 10/24/18 10:50 by Corey Sheredy/Marissa Swiderski
8J25059-05 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8J1766 **Instr:** OVEN11 **Prepared:** 10/29/18 11:17 **Analyst:** sar							
Total Suspended Solids	**2**		5	mg/l	1	10/30/18 14:37	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8J1724 **Instr:** ICPMS03 **Prepared:** 10/28/18 15:46 **Analyst:** aln							
Copper, Total	**27**	0.0038	0.010	ug/l	1	10/29/18 04:48	
Method: EPA 1640 **Batch ID:** W8J1727 **Instr:** ICPMS03 **Prepared:** 10/28/18 17:32 **Analyst:** aln							
Copper, Dissolved	**23**	0.0038	0.010	ug/l	1	10/29/18 00:29	

Sample: Basin1-Bottom-P1 — Sampled: 10/24/18 10:55 by Corey Sheredy/Marissa Swiderski
8J25059-06 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8J1766 **Instr:** OVEN11 **Prepared:** 10/29/18 11:17 **Analyst:** sar							
Total Suspended Solids	**2**		5	mg/l	1	10/30/18 14:37	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8J1724 **Instr:** ICPMS03 **Prepared:** 10/28/18 15:46 **Analyst:** aln							
Copper, Total	**26**	0.0038	0.010	ug/l	1	10/29/18 05:02	
Method: EPA 1640 **Batch ID:** W8J1727 **Instr:** ICPMS03 **Prepared:** 10/28/18 17:32 **Analyst:** aln							
Copper, Dissolved	**25**	0.0038	0.010	ug/l	1	10/29/18 00:42	

Sample Results

(Continued)

Sample: Basin2-Top-P1 — Sampled: 10/24/18 11:00 by Corey Sheredy/Marissa Swiderski

8J25059-07 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D — **Batch ID:** W8J1766 — **Instr:** OVEN11 — **Prepared:** 10/29/18 11:17 — **Analyst:** sar							
Total Suspended Solids	**4**		5	mg/l	1	10/30/18 14:37	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 — **Batch ID:** W8J1724 — **Instr:** ICPMS03 — **Prepared:** 10/28/18 15:46 — **Analyst:** aln							
Copper, Total	**23**	0.0038	0.010	ug/l	1	10/29/18 05:16	
Method: EPA 1640 — **Batch ID:** W8J1727 — **Instr:** ICPMS03 — **Prepared:** 10/28/18 17:32 — **Analyst:** aln							
Copper, Dissolved	**22**	0.0038	0.010	ug/l	1	10/29/18 00:56	

Sample: Basin2-Bottom-P1 — Sampled: 10/24/18 11:05 by Corey Sheredy/Marissa Swiderski

8J25059-08 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D — **Batch ID:** W8J1766 — **Instr:** OVEN11 — **Prepared:** 10/29/18 11:17 — **Analyst:** sar							
Total Suspended Solids	**4**		5	mg/l	1	10/30/18 14:37	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 — **Batch ID:** W8J1724 — **Instr:** ICPMS03 — **Prepared:** 10/28/18 15:46 — **Analyst:** aln							
Copper, Total	**21**	0.0038	0.010	ug/l	1	10/29/18 05:29	
Method: EPA 1640 — **Batch ID:** W8J1727 — **Instr:** ICPMS03 — **Prepared:** 10/28/18 17:32 — **Analyst:** aln							
Copper, Dissolved	**19**	0.0038	0.010	ug/l	1	10/29/18 01:10	

Quality Control Results

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W8J1688 - SM 2540D											
Blank (W8J1688-BLK1)					**Prepared: 10/26/18 Analyzed: 10/29/18**						
Total Suspended Solids	ND		5	mg/l							
LCS (W8J1688-BS1)					**Prepared: 10/26/18 Analyzed: 10/29/18**						
Total Suspended Solids	60.0		5	mg/l	55.4		108	90-110			
Duplicate (W8J1688-DUP1)	**Source: 8J25060-40**				**Prepared: 10/26/18 Analyzed: 10/29/18**						
Total Suspended Solids	10.0		5	mg/l		11.0			10	20	
Duplicate (W8J1688-DUP2)	**Source: 8J25060-54**				**Prepared: 10/26/18 Analyzed: 10/29/18**						
Total Suspended Solids	10.0		5	mg/l		9.00			11	20	
Batch: W8J1766 - SM 2540D											
Blank (W8J1766-BLK1)					**Prepared: 10/29/18 Analyzed: 10/30/18**						
Total Suspended Solids	0.100		5	mg/l							J
LCS (W8J1766-BS1)					**Prepared: 10/29/18 Analyzed: 10/30/18**						
Total Suspended Solids	70.9		5	mg/l	65.3		109	90-110			
Duplicate (W8J1766-DUP1)	**Source: 8J25059-07**				**Prepared: 10/29/18 Analyzed: 10/30/18**						
Total Suspended Solids	3.20		5	mg/l		3.50			9	20	J
Duplicate (W8J1766-DUP2)	**Source: 8J26088-05**				**Prepared: 10/29/18 Analyzed: 10/30/18**						
Total Suspended Solids	3.60		5	mg/l		3.60			0	20	J

Metals - Low Level by 1600 Series Methods

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W8J1724 - EPA 1640											
Blank (W8J1724-BLK1)					**Prepared: 10/28/18 Analyzed: 10/29/18**						
Copper, Total	0.0414	0.0038	0.010	ug/l							B-06
LCS (W8J1724-BS1)					**Prepared: 10/28/18 Analyzed: 10/29/18**						
Copper, Total	2.06	0.0038	0.010	ug/l	2.00		103	73-122			
Matrix Spike (W8J1724-MS1)	**Source: 8J25059-01**				**Prepared: 10/28/18 Analyzed: 10/29/18**						
Copper, Total	10.7	0.0038	0.010	ug/l	2.00	8.79	97	60-138			
Matrix Spike Dup (W8J1724-MSD1)	**Source: 8J25059-01**				**Prepared: 10/28/18 Analyzed: 10/29/18**						
Copper, Total	10.5	0.0038	0.010	ug/l	2.00	8.79	84	60-138	2	30	
Batch: W8J1727 - EPA 1640											
Blank (W8J1727-BLK1)					**Prepared & Analyzed: 10/28/18**						
Copper, Dissolved	ND	0.0038	0.010	ug/l							
LCS (W8J1727-BS1)					**Prepared & Analyzed: 10/28/18**						
Copper, Dissolved	1.97	0.0038	0.010	ug/l	2.00		98	70-130			
Matrix Spike (W8J1727-MS1)	**Source: 8J25059-01**				**Prepared & Analyzed: 10/28/18**						
Copper, Dissolved	9.28	0.0038	0.010	ug/l	2.00	7.17	106	70-130			
Matrix Spike Dup (W8J1727-MSD1)	**Source: 8J25059-01**				**Prepared & Analyzed: 10/28/18**						
Copper, Dissolved	9.51	0.0038	0.010	ug/l	2.00	7.17	117	70-130	2	30	

Notes and Definitions

Item	Definition
B-06	This analyte was found in the method blank, which was possibly contaminated during sample preparation. The batch was accepted since this analyte was either not detected or more than 10 times of the blank value for all the samples in the batch.
J	Estimated conc. detected <MRL and >MDL.
ND	NOT DETECTED at or above the Method Reporting Limit (MRL). If Method Detection Limit (MDL) is reported, then ND means not detected at or above the MDL.
Dil	Dilution
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
% Rec	Percent Recovery
Source	Sample that was matrix spiked or duplicated.
MDL	Method Detection Limit
MRL	The minimum levels, concentrations, or quantities of a target variable (e.g., target analyte) that can be reported with a specified degree of confidence. The MRL is also known as Limit of Quantitation (LOQ) and Detection Limit for Reporting (DLR)
MDA	Minimum Detectable Activity
NR	Not Reportable
TIC	Tentatively Identified Compound (TIC) using mass spectrometry. The reported concentration is relative concentration based on the nearest internal standard. If the library search produces no matches at, or above 85%, the compound is reported as unknown.

Any remaining sample(s) will be disposed of one month from the final report date unless other arrangements are made in advance.
An Absence of Total Coliform meets the drinking water standards as established by the California State Water Resources Control Board (SWRCB)
All results are expressed on wet weight basis unless otherwise specified.
All samples collected by Weck Laboratories have been sampled in accordance to laboratory SOP Number MIS 002.

WECK LABORATORIES, INC.

Certificate of Analysis

FINAL REPORT

Work Orders: 8J26088

Project: Boatwash Pilot Study

Attn: Barry Snyder

Client: Wood - San Diego 2
9210 Sky Park Court, Suite 200
San Diego, CA 92123

Report Date: 12/07/2018
Received Date: 10/26/2018
Turnaround Time: Normal
Phones: (858) 300-4320
Fax: (858) 300-4301
P.O. #:
Billing Code:

ELAP-CA #1132 • EPA-UCMR #CA00211 • Guam-EPA #17-008R • HW-DOH # • ISO 17025 #L2457.01 • LACSD #10143 • NELAP-CA #04229CA • NELAP-OR #4047 • NJ-DEP #CA015 • NV-DEP #NAC 445A • SCAQMD #93LA1006

This is a complete final report. The information in this report applies to the samples analyzed in accordance with the chain-of-custody document. Weck Laboratories certifies that the test results meet all requirements of TNI unless noted by qualifiers or written in the Case Narrative. This analytical report must be reproduced in its entirety.

Dear Barry Snyder,

Enclosed are the results of analyses for samples received 10/26/18 with the Chain-of-Custody document. The samples were received in good condition, at 4.8 °C and on ice. All analyses met the method criteria except as noted in the case narrative or in the report with data qualifiers.

Reviewed by:

Chris Samatmanakit
Project Manager

Certificate of Analysis

FINAL REPORT

Wood - San Diego 2
9210 Sky Park Court, Suite 200
San Diego, CA 92123

Project Number: Boatwash Pilot Study

Project Manager: Barry Snyder

Reported: 12/07/2018 16:51

Sample Summary

Sample Name	Sampled By	Lab ID	Matrix	Sampled	Qualifiers
Gate1-Top-P2	Corey Sheredy/Marissa Swiderski	8J26088-01	Water	10/25/18 10:45	
Gate1-Bottom-P2	Corey Sheredy/Marissa Swiderski	8J26088-02	Water	10/25/18 10:50	
Gate2-Top-P2	Corey Sheredy/Marissa Swiderski	8J26088-03	Water	10/25/18 10:55	
Gate2-Bottom-P2	Corey Sheredy/Marissa Swiderski	8J26088-04	Water	10/25/18 11:00	
Basin1-Top-P2	Corey Sheredy/Marissa Swiderski	8J26088-05	Water	10/25/18 11:10	
Basin1-Bottom-P2	Corey Sheredy/Marissa Swiderski	8J26088-06	Water	10/25/18 11:15	
Basin2-Top-P2	Corey Sheredy/Marissa Swiderski	8J26088-07	Water	10/25/18 11:20	
Basin2-Bottom-P2	Corey Sheredy/Marissa Swiderski	8J26088-08	Water	10/25/18 11:25	
Gate1-Top-P3	Corey Sheredy/Marissa Swiderski	8J26088-09	Water	10/26/18 11:00	
Gate1-Bottom-P3	Corey Sheredy/Marissa Swiderski	8J26088-10	Water	10/26/18 11:05	
Gate2-Top-P3	Corey Sheredy/Marissa Swiderski	8J26088-11	Water	10/26/18 11:10	
Gate2-Bottom-P3	Corey Sheredy/Marissa Swiderski	8J26088-12	Water	10/26/18 11:15	
Basin1-Top-P3	Corey Sheredy/Marissa Swiderski	8J26088-13	Water	10/26/18 11:25	
Basin1-Bottom-P3	Corey Sheredy/Marissa Swiderski	8J26088-14	Water	10/26/18 11:30	
Basin2-Top-P3	Corey Sheredy/Marissa Swiderski	8J26088-15	Water	10/26/18 11:35	
Basin2-Bottom-P3	Corey Sheredy/Marissa Swiderski	8J26088-16	Water	10/26/18 11:40	

Sample Results

Sample: Gate1-Top-P2 Sampled: 10/25/18 10:45 by Corey Sheredy/Marissa Swiderski
8J26088-01 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8J1766 **Instr:** OVEN11 **Prepared:** 10/29/18 11:17 **Analyst:** sar							
Total Suspended Solids	**6**		5	mg/l	1	10/30/18 14:37	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8L0265 **Instr:** icpms03 **Prepared:** 12/04/18 09:44 **Analyst:** aln							
Copper, Dissolved	**6.1**	0.0076	0.020	ug/l	2	12/04/18 21:35	
Method: EPA 1640 **Batch ID:** W8L0326 **Instr:** icpms03 **Prepared:** 12/04/18 15:30 **Analyst:** aln							
Copper, Total	**6.8**	0.0076	0.020	ug/l	2	12/05/18 01:13	

Sample: Gate1-Bottom-P2 Sampled: 10/25/18 10:50 by Corey Sheredy/Marissa Swiderski
8J26088-02 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8J1766 **Instr:** OVEN11 **Prepared:** 10/29/18 11:17 **Analyst:** sar							
Total Suspended Solids	**4**		5	mg/l	1	10/30/18 14:37	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8L0265 **Instr:** icpms03 **Prepared:** 12/04/18 09:44 **Analyst:** aln							
Copper, Dissolved	**5.9**	0.0076	0.020	ug/l	2	12/04/18 21:48	
Method: EPA 1640 **Batch ID:** W8L0326 **Instr:** icpms03 **Prepared:** 12/04/18 15:30 **Analyst:** aln							
Copper, Total	**6.3**	0.0076	0.020	ug/l	2	12/05/18 01:27	

Sample: Gate2-Top-P2 Sampled: 10/25/18 10:55 by Corey Sheredy/Marissa Swiderski
8J26088-03 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8J1766 **Instr:** OVEN11 **Prepared:** 10/29/18 11:17 **Analyst:** sar							
Total Suspended Solids	**6**		5	mg/l	1	10/30/18 14:37	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8L0265 **Instr:** icpms03 **Prepared:** 12/04/18 09:44 **Analyst:** aln							
Copper, Dissolved	**5.7**	0.0076	0.020	ug/l	2	12/04/18 22:02	
Method: EPA 1640 **Batch ID:** W8L0326 **Instr:** icpms03 **Prepared:** 12/04/18 15:30 **Analyst:** aln							
Copper, Total	**6.5**	0.0076	0.020	ug/l	2	12/05/18 01:41	

Sample Results

(Continued)

Sample: Gate2-Bottom-P2
8J26088-04 (Water)

Sampled: 10/25/18 11:00 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D	**Batch ID:** W8J1766	**Instr:** OVEN11	**Prepared:** 10/29/18 11:17			**Analyst:** sar	
Total Suspended Solids	**5**		5	mg/l	1	10/30/18 14:37	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640	**Batch ID:** W8L0265	**Instr:** icpms03	**Prepared:** 12/04/18 09:44			**Analyst:** aln	
Copper, Dissolved	**6.5**	0.0076	0.020	ug/l	2	12/04/18 22:16	
Method: EPA 1640	**Batch ID:** W8L0326	**Instr:** icpms03	**Prepared:** 12/04/18 15:30			**Analyst:** aln	
Copper, Total	**6.9**	0.0076	0.020	ug/l	2	12/05/18 01:54	

Sample: Basin1-Top-P2
8J26088-05 (Water)

Sampled: 10/25/18 11:10 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D	**Batch ID:** W8J1766	**Instr:** OVEN11	**Prepared:** 10/29/18 11:17			**Analyst:** sar	
Total Suspended Solids	**4**		5	mg/l	1	10/30/18 14:37	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640	**Batch ID:** W8L0265	**Instr:** icpms03	**Prepared:** 12/04/18 09:44			**Analyst:** aln	
Copper, Dissolved	**9.7**	0.0076	0.020	ug/l	2	12/04/18 22:29	
Method: EPA 1640	**Batch ID:** W8L0326	**Instr:** icpms03	**Prepared:** 12/04/18 15:30			**Analyst:** aln	
Copper, Total	**9.1**	0.0076	0.020	ug/l	2	12/05/18 02:08	

Sample: Basin1-Bottom-P2
8J26088-06 (Water)

Sampled: 10/25/18 11:15 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D	**Batch ID:** W8J1766	**Instr:** OVEN11	**Prepared:** 10/29/18 11:17			**Analyst:** sar	
Total Suspended Solids	**4**		5	mg/l	1	10/30/18 14:37	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640	**Batch ID:** W8L0265	**Instr:** icpms03	**Prepared:** 12/04/18 09:44			**Analyst:** aln	
Copper, Dissolved	**9.5**	0.0076	0.020	ug/l	2	12/04/18 22:43	
Method: EPA 1640	**Batch ID:** W8L0326	**Instr:** icpms03	**Prepared:** 12/04/18 15:30			**Analyst:** aln	
Copper, Total	**9.9**	0.0076	0.020	ug/l	2	12/05/18 02:22	

Sample Results

(Continued)

Sample: Basin2-Top-P2 — Sampled: 10/25/18 11:20 by Corey Sheredy/Marissa Swiderski
8J26088-07 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8J1766 **Instr:** OVEN11 **Prepared:** 10/29/18 11:17 **Analyst:** sar							
Total Suspended Solids	**4**		5	mg/l	1	10/30/18 14:37	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8L0265 **Instr:** icpms03 **Prepared:** 12/04/18 09:44 **Analyst:** aln							
Copper, Dissolved	**8.9**	0.0076	0.020	ug/l	2	12/04/18 22:57	
Method: EPA 1640 **Batch ID:** W8L0326 **Instr:** icpms03 **Prepared:** 12/04/18 15:30 **Analyst:** aln							
Copper, Total	**9.2**	0.0076	0.020	ug/l	2	12/05/18 02:36	

Sample: Basin2-Bottom-P2 — Sampled: 10/25/18 11:25 by Corey Sheredy/Marissa Swiderski
8J26088-08 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8J1766 **Instr:** OVEN11 **Prepared:** 10/29/18 11:17 **Analyst:** sar							
Total Suspended Solids	**3**		5	mg/l	1	10/30/18 14:37	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8K1355 **Instr:** icpms03 **Prepared:** 11/27/18 13:25 **Analyst:** aln							
Copper, Total	**9.6**	0.019	0.050	ug/l	5	12/06/18 05:46	
Method: EPA 1640 **Batch ID:** W8L0333 **Instr:** icpms03 **Prepared:** 12/05/18 16:59 **Analyst:** aln							
Copper, Dissolved	**9.2**	0.019	0.050	ug/l	1	12/05/18 22:42	

Sample: Gate1-Top-P3 — Sampled: 10/26/18 11:00 by Corey Sheredy/Marissa Swiderski
8J26088-09 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8J1766 **Instr:** OVEN11 **Prepared:** 10/29/18 11:17 **Analyst:** sar							
Total Suspended Solids	**4**		5	mg/l	1	10/30/18 14:37	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8K1355 **Instr:** icpms03 **Prepared:** 11/27/18 13:25 **Analyst:** aln							
Copper, Total	**8.4**	0.019	0.050	ug/l	5	12/06/18 06:00	
Method: EPA 1640 **Batch ID:** W8L0333 **Instr:** icpms03 **Prepared:** 12/05/18 16:59 **Analyst:** aln							
Copper, Dissolved	**7.3**	0.019	0.050	ug/l	1	12/05/18 22:56	

Sample Results

(Continued)

Sample: Gate1-Bottom-P3
8J26088-10 (Water)

Sampled: 10/26/18 11:05 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8J1766 **Instr:** OVEN11 **Prepared:** 10/29/18 11:17 **Analyst:** sar							
Total Suspended Solids	**4**		5	mg/l	1	10/30/18 14:37	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8K1355 **Instr:** icpms03 **Prepared:** 11/27/18 13:25 **Analyst:** aln							
Copper, Total	**6.6**	0.019	0.050	ug/l	5	12/06/18 06:14	
Method: EPA 1640 **Batch ID:** W8L0333 **Instr:** icpms03 **Prepared:** 12/05/18 16:59 **Analyst:** aln							
Copper, Dissolved	**6.3**	0.019	0.050	ug/l	5	12/05/18 23:09	

Sample: Gate2-Top-P3
8J26088-11 (Water)

Sampled: 10/26/18 11:10 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8K0081 **Instr:** OVEN11 **Prepared:** 11/02/18 10:02 **Analyst:** sar							
Total Suspended Solids	**7**		5	mg/l	1	11/02/18 16:30	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8K1355 **Instr:** icpms03 **Prepared:** 11/27/18 13:25 **Analyst:** aln							
Copper, Total	**9.4**	0.019	0.050	ug/l	5	12/06/18 06:27	
Method: EPA 1640 **Batch ID:** W8L0333 **Instr:** icpms03 **Prepared:** 12/05/18 16:59 **Analyst:** aln							
Copper, Dissolved	**7.6**	0.019	0.050	ug/l	5	12/05/18 23:23	

Sample: Gate2-Bottom-P3
8J26088-12 (Water)

Sampled: 10/26/18 11:15 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8J1766 **Instr:** OVEN11 **Prepared:** 10/29/18 11:17 **Analyst:** sar							
Total Suspended Solids	**4**		5	mg/l	1	10/30/18 14:37	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8K1355 **Instr:** icpms03 **Prepared:** 11/27/18 13:25 **Analyst:** aln							
Copper, Total	**7.2**	0.019	0.050	ug/l	5	12/06/18 06:41	
Method: EPA 1640 **Batch ID:** W8L0333 **Instr:** icpms03 **Prepared:** 12/05/18 16:59 **Analyst:** aln							
Copper, Dissolved	**6.4**	0.019	0.050	ug/l	5	12/05/18 23:37	

Sample Results

(Continued)

Sample: Basin1-Top-P3 | Sampled: 10/26/18 11:25 by Corey Sheredy/Marissa Swiderski
8J26088-13 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D	**Batch ID:** W8J1766	**Instr:** OVEN11	**Prepared:** 10/29/18 11:17			**Analyst:** sar	
Total Suspended Solids	**3**		5	mg/l	1	10/30/18 14:37	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640	**Batch ID:** W8K1355	**Instr:** icpms03	**Prepared:** 11/27/18 13:25			**Analyst:** aln	
Copper, Total	**8.5**	0.019	0.050	ug/l	5	12/06/18 06:55	
Method: EPA 1640	**Batch ID:** W8L0333	**Instr:** icpms03	**Prepared:** 12/05/18 16:59			**Analyst:** aln	
Copper, Dissolved	**7.9**	0.019	0.050	ug/l	5	12/05/18 23:51	

Sample: Basin1-Bottom-P3 | Sampled: 10/26/18 11:30 by Corey Sheredy/Marissa Swiderski
8J26088-14 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D	**Batch ID:** W8J1766	**Instr:** OVEN11	**Prepared:** 10/29/18 11:17			**Analyst:** sar	
Total Suspended Solids	**2**		5	mg/l	1	10/30/18 14:37	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640	**Batch ID:** W8K1355	**Instr:** icpms03	**Prepared:** 11/27/18 13:25			**Analyst:** aln	
Copper, Total	**8.5**	0.019	0.050	ug/l	5	12/06/18 07:08	
Method: EPA 1640	**Batch ID:** W8L0333	**Instr:** icpms03	**Prepared:** 12/05/18 16:59			**Analyst:** aln	
Copper, Dissolved	**8.4**	0.019	0.050	ug/l	5	12/06/18 00:05	

Sample: Basin2-Top-P3 | Sampled: 10/26/18 11:35 by Corey Sheredy/Marissa Swiderski
8J26088-15 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D	**Batch ID:** W8J1766	**Instr:** OVEN11	**Prepared:** 10/29/18 11:17			**Analyst:** sar	
Total Suspended Solids	**2**		5	mg/l	1	10/30/18 14:37	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640	**Batch ID:** W8K1355	**Instr:** icpms03	**Prepared:** 11/27/18 13:25			**Analyst:** aln	
Copper, Total	**8.5**	0.019	0.050	ug/l	5	12/06/18 07:22	
Method: EPA 1640	**Batch ID:** W8L0333	**Instr:** icpms03	**Prepared:** 12/05/18 16:59			**Analyst:** aln	
Copper, Dissolved	**8.4**	0.019	0.050	ug/l	5	12/06/18 00:18	

Wood - San Diego 2
9210 Sky Park Court, Suite 200
San Diego, CA 92123

Project Number: Boatwash Pilot Study

Project Manager: Barry Snyder

Reported:
12/07/2018 16:51

Sample Results

(Continued)

Sample: Basin2-Bottom-P3
8J26088-16 (Water)

Sampled: 10/26/18 11:40 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8J1766 **Instr:** OVEN11 **Prepared:** 10/29/18 11:17 **Analyst:** sar							
Total Suspended Solids	**3**		5	mg/l	1	10/30/18 14:37	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8K1355 **Instr:** icpms03 **Prepared:** 11/27/18 13:25 **Analyst:** aln							
Copper, Total	**8.5**	0.019	0.050	ug/l	5	12/06/18 07:36	
Method: EPA 1640 **Batch ID:** W8L0333 **Instr:** icpms03 **Prepared:** 12/05/18 16:59 **Analyst:** aln							
Copper, Dissolved	**8.2**	0.019	0.050	ug/l	5	12/06/18 00:32	

Quality Control Results

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W8J1766 - SM 2540D											
Blank (W8J1766-BLK1)					**Prepared: 10/29/18 Analyzed: 10/30/18**						
Total Suspended Solids	0.100		5	mg/l							J
LCS (W8J1766-BS1)					**Prepared: 10/29/18 Analyzed: 10/30/18**						
Total Suspended Solids	70.9		5	mg/l	65.3		109	90-110			
Duplicate (W8J1766-DUP1)	**Source: 8J25059-07**				**Prepared: 10/29/18 Analyzed: 10/30/18**						
Total Suspended Solids	3.20		5	mg/l		3.50			9	20	J
Duplicate (W8J1766-DUP2)	**Source: 8J26088-05**				**Prepared: 10/29/18 Analyzed: 10/30/18**						
Total Suspended Solids	3.60		5	mg/l		3.60			0	20	J
Batch: W8K0081 - SM 2540D											
Blank (W8K0081-BLK1)					**Prepared & Analyzed: 11/02/18**						
Total Suspended Solids	ND		5	mg/l							
LCS (W8K0081-BS1)					**Prepared & Analyzed: 11/02/18**						
Total Suspended Solids	62.0		5	mg/l	65.7		94	90-110			
Duplicate (W8K0081-DUP1)	**Source: 8J29093-02**				**Prepared & Analyzed: 11/02/18**						
Total Suspended Solids	ND		5	mg/l		ND				20	
Duplicate (W8K0081-DUP2)	**Source: 8J30091-01**				**Prepared & Analyzed: 11/02/18**						
Total Suspended Solids	12.0		5	mg/l		14.0			15	20	

Quality Control Results

(Continued)

Metals - Low Level by 1600 Series Methods

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W8K1355 - EPA 1640											
Blank (W8K1355-BLK1)					**Prepared: 11/27/18 Analyzed: 12/06/18**						
Copper, Total	ND	0.0038	0.010	ug/l							
LCS (W8K1355-BS1)					**Prepared: 11/27/18 Analyzed: 12/06/18**						
Copper, Total	1.87	0.0038	0.010	ug/l	2.00		93	73-122			
Matrix Spike (W8K1355-MS1)	**Source: 8J26088-09**				**Prepared: 11/27/18 Analyzed: 12/06/18**						
Copper, Total	10.4	0.019	0.050	ug/l	2.00	8.41	99	60-138			
Matrix Spike (W8K1355-MS2)	**Source: 8J26088-10**				**Prepared: 11/27/18 Analyzed: 12/06/18**						
Copper, Total	8.87	0.019	0.050	ug/l	2.00	6.60	113	60-138			
Matrix Spike Dup (W8K1355-MSD1)	**Source: 8J26088-09**				**Prepared: 11/27/18 Analyzed: 12/06/18**						
Copper, Total	9.66	0.019	0.050	ug/l	2.00	8.41	62	60-138	7	30	
Matrix Spike Dup (W8K1355-MSD2)	**Source: 8J26088-10**				**Prepared: 11/27/18 Analyzed: 12/06/18**						
Copper, Total	8.44	0.019	0.050	ug/l	2.00	6.60	92	60-138	5	30	
Batch: W8L0265 - EPA 1640											
Blank (W8L0265-BLK1)					**Prepared & Analyzed: 12/04/18**						
Copper, Dissolved	ND	0.0038	0.010	ug/l							
LCS (W8L0265-BS1)					**Prepared & Analyzed: 12/04/18**						
Copper, Dissolved	1.91	0.0038	0.010	ug/l	2.00		96	70-130			
Matrix Spike (W8L0265-MS1)	**Source: 8J26088-01**				**Prepared & Analyzed: 12/04/18**						
Copper, Dissolved	10.1	0.0076	0.020	ug/l	4.00	6.13	100	70-130			
Matrix Spike Dup (W8L0265-MSD1)	**Source: 8J26088-01**				**Prepared & Analyzed: 12/04/18**						
Copper, Dissolved	10.0	0.0076	0.020	ug/l	4.00	6.13	98	70-130	0.8	30	
Batch: W8L0326 - EPA 1640											
Blank (W8L0326-BLK1)					**Prepared: 12/04/18 Analyzed: 12/05/18**						
Copper, Total	ND	0.0038	0.010	ug/l							
LCS (W8L0326-BS1)					**Prepared: 12/04/18 Analyzed: 12/05/18**						
Copper, Total	1.91	0.0038	0.010	ug/l	2.00		96	73-122			
Matrix Spike (W8L0326-MS1)	**Source: 8J26088-01**				**Prepared: 12/04/18 Analyzed: 12/05/18**						
Copper, Total	10.5	0.0076	0.020	ug/l	4.00	6.83	92	60-138			
Matrix Spike Dup (W8L0326-MSD1)	**Source: 8J26088-01**				**Prepared: 12/04/18 Analyzed: 12/05/18**						
Copper, Total	10.9	0.0076	0.020	ug/l	4.00	6.83	103	60-138	4	30	
Batch: W8L0333 - EPA 1640											
Blank (W8L0333-BLK1)					**Prepared & Analyzed: 12/05/18**						
Copper, Dissolved	ND	0.0038	0.010	ug/l							
LCS (W8L0333-BS1)					**Prepared & Analyzed: 12/05/18**						
Copper, Dissolved	1.93	0.0038	0.010	ug/l	2.00		97	70-130			
Matrix Spike (W8L0333-MS1)	**Source: 8J26088-08**				**Prepared & Analyzed: 12/05/18**						
Copper, Dissolved	18.1	0.019	0.050	ug/l	10.0	9.15	89	70-130			
Matrix Spike (W8L0333-MS2)	**Source: 8J26088-09**				**Prepared & Analyzed: 12/05/18**						

Quality Control Results

(Continued)

Metals - Low Level by 1600 Series Methods (Continued)

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W8L0333 - EPA 1640 (Continued)											
Matrix Spike (W8L0333-MS2)	**Source: 8J26088-09**				**Prepared & Analyzed: 12/05/18**						
Copper, Dissolved	16.4	0.019	0.050	ug/l	10.0	7.30	91	70-130			
Matrix Spike Dup (W8L0333-MSD1)	**Source: 8J26088-08**				**Prepared & Analyzed: 12/05/18**						
Copper, Dissolved	18.0	0.019	0.050	ug/l	10.0	9.15	88	70-130	0.6	30	
Matrix Spike Dup (W8L0333-MSD2)	**Source: 8J26088-09**				**Prepared & Analyzed: 12/05/18**						
Copper, Dissolved	17.2	0.019	0.050	ug/l	10.0	7.30	99	70-130	4	30	

Notes and Definitions

Item	Definition
J	Estimated conc. detected <MRL and >MDL.
ND	NOT DETECTED at or above the Method Reporting Limit (MRL). If Method Detection Limit (MDL) is reported, then ND means not detected at or above the MDL.
Dil	Dilution
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
% Rec	Percent Recovery
Source	Sample that was matrix spiked or duplicated.
MDL	Method Detection Limit
MRL	The minimum levels, concentrations, or quantities of a target variable (e.g., target analyte) that can be reported with a specified degree of confidence. The MRL is also known as Limit of Quantitation (LOQ) and Detection Limit for Reporting (DLR)
MDA	Minimum Detectable Activity
NR	Not Reportable
TIC	Tentatively Identified Compound (TIC) using mass spectrometry. The reported concentration is relative concentration based on the nearest internal standard. If the library search produces no matches at, or above 85%, the compound is reported as unknown.

Any remaining sample(s) will be disposed of one month from the final report date unless other arrangements are made in advance.
An Absence of Total Coliform meets the drinking water standards as established by the California State Water Resources Control Board (SWRCB)
All results are expressed on wet weight basis unless otherwise specified.
All samples collected by Weck Laboratories have been sampled in accordance to laboratory SOP Number MIS 002.

WECK LABORATORIES, INC.

Certificate of Analysis

FINAL REPORT

Work Orders: 8J31052

Report Date: 12/07/2018

Received Date: 10/31/2018

Turnaround Time: Normal

Project: Boatwash Pilot Study

Phones: (858) 300-4320

Fax: (858) 300-4301

P.O. #:

Attn: Barry Snyder

Billing Code:

Client: Wood - San Diego 2
9210 Sky Park Court, Suite 200
San Diego, CA 92123

ELAP-CA #1132 • EPA-UCMR #CA00211 • Guam-EPA #17-008R • HW-DOH # • ISO 17025 #L2457.01 • LACSD #10143 • NELAP-CA #04229CA • NELAP-OR #4047 • NJ-DEP #CA015 • NV-DEP #NAC 445A • SCAQMD #93LA1006

This is a complete final report. The information in this report applies to the samples analyzed in accordance with the chain-of-custody document. Weck Laboratories certifies that the test results meet all requirements of TNI unless noted by qualifiers or written in the Case Narrative. This analytical report must be reproduced in its entirety.

Dear Barry Snyder,

Enclosed are the results of analyses for samples received 10/31/18 with the Chain-of-Custody document. The samples were received in good condition, at 4.3 °C and on ice. All analyses met the method criteria except as noted in the case narrative or in the report with data qualifiers.

Reviewed by:

Chris Samatmanakit
Project Manager

Wood - San Diego 2
9210 Sky Park Court, Suite 200
San Diego, CA 92123

Project Number: Boatwash Pilot Study

Project Manager: Barry Snyder

Reported:
12/07/2018 16:56

Sample Summary

Sample Name	Sampled By	Lab ID	Matrix	Sampled	Qualifiers
Gate1-Top-P7	Corey Sheredy/Marissa Swiderski	8J31052-01	Water	10/30/18 10:55	
Gate1-Bottom-P7	Corey Sheredy/Marissa Swiderski	8J31052-02	Water	10/30/18 11:00	
Gate2-Top-P7	Corey Sheredy/Marissa Swiderski	8J31052-03	Water	10/30/18 11:05	
Gate2-Bottom-P7	Corey Sheredy/Marissa Swiderski	8J31052-04	Water	10/30/18 11:10	
Basin1-Top-P7	Corey Sheredy/Marissa Swiderski	8J31052-05	Water	10/30/18 11:20	
Basin1-Bottom-P7	Corey Sheredy/Marissa Swiderski	8J31052-06	Water	10/30/18 11:25	
Basin2-Top-P7	Corey Sheredy/Marissa Swiderski	8J31052-07	Water	10/30/18 11:30	
Basin2-Bottom-P7	Corey Sheredy/Marissa Swiderski	8J31052-08	Water	10/30/18 11:35	

Wood - San Diego 2
9210 Sky Park Court, Suite 200
San Diego, CA 92123

Project Number: Boatwash Pilot Study

Project Manager: Barry Snyder

Reported:
12/07/2018 16:56

Sample Results

Sample: Gate1-Top-P7
8J31052-01 (Water)
Sampled: 10/30/18 10:55 by Corey Sheredy/Marissa Swiderski

Analyte			Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods									
Method: SM 2540D	**Batch ID:** W8K0081	**Instr:** OVEN11			**Prepared:** 11/02/18 10:02			**Analyst:** sar	
Total Suspended Solids			**4**		5	mg/l	1	11/02/18 16:30	J
Metals - Low Level by 1600 Series Methods									
Method: EPA 1640	**Batch ID:** W8K1355	**Instr:** icpms03			**Prepared:** 11/27/18 13:25			**Analyst:** aln	
Copper, Total			**5.9**	0.019	0.050	ug/l	5	12/06/18 08:44	
Method: EPA 1640	**Batch ID:** W8L0333	**Instr:** icpms03			**Prepared:** 12/05/18 16:59			**Analyst:** aln	
Copper, Dissolved			**4.8**	0.019	0.050	ug/l	5	12/06/18 01:40	

Sample: Gate1-Bottom-P7
8J31052-02 (Water)
Sampled: 10/30/18 11:00 by Corey Sheredy/Marissa Swiderski

Analyte			Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods									
Method: SM 2540D	**Batch ID:** W8K0081	**Instr:** OVEN11			**Prepared:** 11/02/18 10:02			**Analyst:** sar	
Total Suspended Solids			**7**		5	mg/l	1	11/02/18 16:30	
Metals - Low Level by 1600 Series Methods									
Method: EPA 1640	**Batch ID:** W8K1355	**Instr:** icpms03			**Prepared:** 11/27/18 13:25			**Analyst:** aln	
Copper, Total			**6.0**	0.019	0.050	ug/l	5	12/06/18 08:58	
Method: EPA 1640	**Batch ID:** W8L0333	**Instr:** icpms03			**Prepared:** 12/05/18 16:59			**Analyst:** aln	
Copper, Dissolved			**5.3**	0.019	0.050	ug/l	5	12/06/18 01:54	

Sample: Gate2-Top-P7
8J31052-03 (Water)
Sampled: 10/30/18 11:05 by Corey Sheredy/Marissa Swiderski

Analyte			Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods									
Method: SM 2540D	**Batch ID:** W8K0081	**Instr:** OVEN11			**Prepared:** 11/02/18 10:02			**Analyst:** sar	
Total Suspended Solids			**17**		5	mg/l	1	11/02/18 16:30	
Metals - Low Level by 1600 Series Methods									
Method: EPA 1640	**Batch ID:** W8K1355	**Instr:** icpms03			**Prepared:** 11/27/18 13:25			**Analyst:** aln	
Copper, Total			**8.5**	0.019	0.050	ug/l	5	12/06/18 09:11	
Method: EPA 1640	**Batch ID:** W8L0333	**Instr:** icpms03			**Prepared:** 12/05/18 16:59			**Analyst:** aln	
Copper, Dissolved			**5.2**	0.019	0.050	ug/l	5	12/06/18 02:08	

Sample Results

(Continued)

Sample: Gate2-Bottom-P7 — Sampled: 10/30/18 11:10 by Corey Sheredy/Marissa Swiderski

8J31052-04 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D	**Batch ID:** W8K0081	**Instr:** OVEN11	**Prepared:** 11/02/18 10:02			**Analyst:** sar	
Total Suspended Solids	**7**		5	mg/l	1	11/02/18 16:30	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640	**Batch ID:** W8K1355	**Instr:** icpms03	**Prepared:** 11/27/18 13:25			**Analyst:** aln	
Copper, Total	**6.3**	0.019	0.050	ug/l	5	12/06/18 09:25	
Method: EPA 1640	**Batch ID:** W8L0333	**Instr:** icpms03	**Prepared:** 12/05/18 16:59			**Analyst:** aln	
Copper, Dissolved	**4.3**	0.019	0.050	ug/l	5	12/06/18 02:21	

Sample: Basin1-Top-P7 — Sampled: 10/30/18 11:20 by Corey Sheredy/Marissa Swiderski

8J31052-05 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D	**Batch ID:** W8K0081	**Instr:** OVEN11	**Prepared:** 11/02/18 10:02			**Analyst:** sar	
Total Suspended Solids	**4**		5	mg/l	1	11/02/18 16:30	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640	**Batch ID:** W8K1355	**Instr:** icpms03	**Prepared:** 11/27/18 13:25			**Analyst:** aln	
Copper, Total	**6.0**	0.019	0.050	ug/l	5	12/06/18 09:39	
Method: EPA 1640	**Batch ID:** W8L0333	**Instr:** icpms03	**Prepared:** 12/05/18 16:59			**Analyst:** aln	
Copper, Dissolved	**5.5**	0.019	0.050	ug/l	5	12/06/18 02:35	

Sample: Basin1-Bottom-P7 — Sampled: 10/30/18 11:25 by Corey Sheredy/Marissa Swiderski

8J31052-06 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D	**Batch ID:** W8K0154	**Instr:** OVEN11	**Prepared:** 11/05/18 10:08			**Analyst:** sar	
Total Suspended Solids	**3**		5	mg/l	1	11/05/18 15:18	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640	**Batch ID:** W8K1355	**Instr:** icpms03	**Prepared:** 11/27/18 13:25			**Analyst:** aln	
Copper, Total	**6.0**	0.019	0.050	ug/l	5	12/06/18 09:53	
Method: EPA 1640	**Batch ID:** W8L0333	**Instr:** icpms03	**Prepared:** 12/05/18 16:59			**Analyst:** aln	
Copper, Dissolved	**5.5**	0.019	0.050	ug/l	5	12/06/18 02:49	

Sample Results

(Continued)

Sample: Basin2-Top-P7
8J31052-07 (Water)

Sampled: 10/30/18 11:30 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8K0154 **Instr:** OVEN11 **Prepared:** 11/05/18 10:08 **Analyst:** sar							
Total Suspended Solids	**3**		5	mg/l	1	11/05/18 15:18	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8K1355 **Instr:** icpms03 **Prepared:** 11/27/18 13:25 **Analyst:** aln							
Copper, Total	**5.8**	0.019	0.050	ug/l	5	12/06/18 10:06	
Method: EPA 1640 **Batch ID:** W8L0333 **Instr:** icpms03 **Prepared:** 12/05/18 16:59 **Analyst:** aln							
Copper, Dissolved	**5.2**	0.019	0.050	ug/l	5	12/06/18 03:02	

Sample: Basin2-Bottom-P7
8J31052-08 (Water)

Sampled: 10/30/18 11:35 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8K0154 **Instr:** OVEN11 **Prepared:** 11/05/18 10:08 **Analyst:** sar							
Total Suspended Solids	**5**		5	mg/l	1	11/05/18 15:18	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8K1355 **Instr:** icpms03 **Prepared:** 11/27/18 13:25 **Analyst:** aln							
Copper, Total	**6.0**	0.019	0.050	ug/l	5	12/06/18 10:20	
Method: EPA 1640 **Batch ID:** W8L0333 **Instr:** icpms03 **Prepared:** 12/05/18 16:59 **Analyst:** aln							
Copper, Dissolved	**5.4**	0.019	0.050	ug/l	5	12/06/18 03:16	

Quality Control Results

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W8K0081 - SM 2540D											
Blank (W8K0081-BLK1)					**Prepared & Analyzed: 11/02/18**						
Total Suspended Solids	ND		5	mg/l							
LCS (W8K0081-BS1)					**Prepared & Analyzed: 11/02/18**						
Total Suspended Solids	62.0		5	mg/l	65.7		94	90-110			
Duplicate (W8K0081-DUP1)	**Source: 8J29093-02**				**Prepared & Analyzed: 11/02/18**						
Total Suspended Solids	ND		5	mg/l		ND				20	
Duplicate (W8K0081-DUP2)	**Source: 8J30091-01**				**Prepared & Analyzed: 11/02/18**						
Total Suspended Solids	12.0		5	mg/l		14.0			15	20	
Batch: W8K0154 - SM 2540D											
Blank (W8K0154-BLK1)					**Prepared & Analyzed: 11/05/18**						
Total Suspended Solids	ND		5	mg/l							
LCS (W8K0154-BS1)					**Prepared & Analyzed: 11/05/18**						
Total Suspended Solids	65.0		5	mg/l	61.3		106	90-110			
Duplicate (W8K0154-DUP1)	**Source: 8K02057-01**				**Prepared & Analyzed: 11/05/18**						
Total Suspended Solids	2.00		5	mg/l		2.00			0	20	J
Duplicate (W8K0154-DUP2)	**Source: 8J31076-01**				**Prepared & Analyzed: 11/05/18**						
Total Suspended Solids	290		5	mg/l		303			4	20	

Quality Control Results

(Continued)

Metals - Low Level by 1600 Series Methods

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W8K1355 - EPA 1640											
Blank (W8K1355-BLK1)					**Prepared: 11/27/18 Analyzed: 12/06/18**						
Copper, Total	ND	0.0038	0.010	ug/l							
LCS (W8K1355-BS1)					**Prepared: 11/27/18 Analyzed: 12/06/18**						
Copper, Total	1.87	0.0038	0.010	ug/l	2.00		93	73-122			
Matrix Spike (W8K1355-MS1)	**Source: 8J26088-09**				**Prepared: 11/27/18 Analyzed: 12/06/18**						
Copper, Total	10.4	0.019	0.050	ug/l	2.00	8.41	99	60-138			
Matrix Spike (W8K1355-MS2)	**Source: 8J26088-10**				**Prepared: 11/27/18 Analyzed: 12/06/18**						
Copper, Total	8.87	0.019	0.050	ug/l	2.00	6.60	113	60-138			
Matrix Spike Dup (W8K1355-MSD1)	**Source: 8J26088-09**				**Prepared: 11/27/18 Analyzed: 12/06/18**						
Copper, Total	9.66	0.019	0.050	ug/l	2.00	8.41	62	60-138	7	30	
Matrix Spike Dup (W8K1355-MSD2)	**Source: 8J26088-10**				**Prepared: 11/27/18 Analyzed: 12/06/18**						
Copper, Total	8.44	0.019	0.050	ug/l	2.00	6.60	92	60-138	5	30	
Batch: W8L0333 - EPA 1640											
Blank (W8L0333-BLK1)					**Prepared & Analyzed: 12/05/18**						
Copper, Dissolved	ND	0.0038	0.010	ug/l							
LCS (W8L0333-BS1)					**Prepared & Analyzed: 12/05/18**						
Copper, Dissolved	1.93	0.0038	0.010	ug/l	2.00		97	70-130			
Matrix Spike (W8L0333-MS1)	**Source: 8J26088-08**				**Prepared & Analyzed: 12/05/18**						
Copper, Dissolved	18.1	0.019	0.050	ug/l	10.0	9.15	89	70-130			
Matrix Spike (W8L0333-MS2)	**Source: 8J26088-09**				**Prepared & Analyzed: 12/05/18**						
Copper, Dissolved	16.4	0.019	0.050	ug/l	10.0	7.30	91	70-130			
Matrix Spike Dup (W8L0333-MSD1)	**Source: 8J26088-08**				**Prepared & Analyzed: 12/05/18**						
Copper, Dissolved	18.0	0.019	0.050	ug/l	10.0	9.15	88	70-130	0.6	30	
Matrix Spike Dup (W8L0333-MSD2)	**Source: 8J26088-09**				**Prepared & Analyzed: 12/05/18**						
Copper, Dissolved	17.2	0.019	0.050	ug/l	10.0	7.30	99	70-130	4	30	

Notes and Definitions

Item	Definition
J	Estimated conc. detected <MRL and >MDL.
ND	NOT DETECTED at or above the Method Reporting Limit (MRL). If Method Detection Limit (MDL) is reported, then ND means not detected at or above the MDL.
Dil	Dilution
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
% Rec	Percent Recovery
Source	Sample that was matrix spiked or duplicated.
MDL	Method Detection Limit
MRL	The minimum levels, concentrations, or quantities of a target variable (e.g., target analyte) that can be reported with a specified degree of confidence. The MRL is also known as Limit of Quantitation (LOQ) and Detection Limit for Reporting (DLR)
MDA	Minimum Detectable Activity
NR	Not Reportable
TIC	Tentatively Identified Compound (TIC) using mass spectrometry. The reported concentration is relative concentration based on the nearest internal standard. If the library search produces no matches at, or above 85%, the compound is reported as unknown.

Any remaining sample(s) will be disposed of one month from the final report date unless other arrangements are made in advance.
An Absence of Total Coliform meets the drinking water standards as established by the California State Water Resources Control Board (SWRCB)
All results are expressed on wet weight basis unless otherwise specified.
All samples collected by Weck Laboratories have been sampled in accordance to laboratory SOP Number MIS 002.

WECK LABORATORIES, INC.

Certificate of Analysis

FINAL REPORT

Work Orders: 8K07047

Project: Boatwash Pilot Study

Attn: Barry Snyder

Client: Wood - San Diego 2
9210 Sky Park Court, Suite 200
San Diego, CA 92123

Report Date: 12/10/2018

Received Date: 11/7/2018

Turnaround Time: Normal

Phones: (858) 300-4320

Fax: (858) 300-4301

P.O. #:

Billing Code:

ELAP-CA #1132 • EPA-UCMR #CA00211 • Guam-EPA #17-008R • HW-DOH # • ISO 17025 #L2457.01 • LACSD #10143 • NELAP-CA #04229CA • NELAP-OR #4047 • NJ-DEP #CA015 • NV-DEP #NAC 445A • SCAQMD #93LA1006

This is a complete final report. The information in this report applies to the samples analyzed in accordance with the chain-of-custody document. Weck Laboratories certifies that the test results meet all requirements of TNI unless noted by qualifiers or written in the Case Narrative. This analytical report must be reproduced in its entirety.

Dear Barry Snyder,

Enclosed are the results of analyses for samples received 11/07/18 with the Chain-of-Custody document. The samples were received in good condition, at 3.2 °C and on ice. All analyses met the method criteria except as noted in the case narrative or in the report with data qualifiers.

Reviewed by:

Chris Samatmanakit
Project Manager

Wood - San Diego 2
9210 Sky Park Court, Suite 200
San Diego, CA 92123

Project Number: Boatwash Pilot Study

Project Manager: Barry Snyder

Reported:
12/10/2018 16:19

Sample Summary

Sample Name	Sampled By	Lab ID	Matrix	Sampled	Qualifiers
Gate1-Top-P14	Corey Sheredy/Marissa Swiderski	8K07047-01	Water	11/06/18 12:30	
Gate1-Bottom-P14	Corey Sheredy/Marissa Swiderski	8K07047-02	Water	11/06/18 12:35	
Gate2-Top-P14	Corey Sheredy/Marissa Swiderski	8K07047-03	Water	11/06/18 12:40	
Gate2-Bottom-P14	Corey Sheredy/Marissa Swiderski	8K07047-04	Water	11/06/18 12:45	
Basin1-Top-P14	Corey Sheredy/Marissa Swiderski	8K07047-05	Water	11/06/18 12:55	
Basin1-Bottom-P14	Corey Sheredy/Marissa Swiderski	8K07047-06	Water	11/06/18 13:00	
Basin2-Top-P14	Corey Sheredy/Marissa Swiderski	8K07047-07	Water	11/06/18 13:05	
Basin2-Bottom-P14	Corey Sheredy/Marissa Swiderski	8K07047-08	Water	11/06/18 13:10	

Wood - San Diego 2
9210 Sky Park Court, Suite 200
San Diego, CA 92123

Project Number: Boatwash Pilot Study

Project Manager: Barry Snyder

Reported:
12/10/2018 16:19

Sample Results

Sample: Gate1-Top-P14
8K07047-01 (Water)

Sampled: 11/06/18 12:30 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8K0509	**Instr:** Inst		**Prepared:** 11/09/18 10:33			**Analyst:** sar	
Total Suspended Solids	**9**		5	mg/l	1	11/09/18 12:51	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8L0402	**Instr:** icpms03		**Prepared:** 12/06/18 14:30			**Analyst:** aln	
Copper, Total	**7.9**	0.0076	0.020	ug/l	2	12/07/18 02:49	
Method: EPA 1640 **Batch ID:** W8L0403	**Instr:** icpms03		**Prepared:** 12/06/18 14:32			**Analyst:** aln	
Copper, Dissolved	**7.4**	0.0076	0.020	ug/l	2	12/06/18 23:10	

Sample: Gate1-Bottom-P14
8K07047-02 (Water)

Sampled: 11/06/18 12:35 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8K0509	**Instr:** Inst		**Prepared:** 11/09/18 10:33			**Analyst:** sar	
Total Suspended Solids	**6**		5	mg/l	1	11/09/18 12:51	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8L0402	**Instr:** icpms03		**Prepared:** 12/06/18 14:30			**Analyst:** aln	
Copper, Total	**8.5**	0.0076	0.020	ug/l	2	12/07/18 03:02	
Method: EPA 1640 **Batch ID:** W8L0403	**Instr:** icpms03		**Prepared:** 12/06/18 14:32			**Analyst:** aln	
Copper, Dissolved	**7.5**	0.0076	0.020	ug/l	2	12/06/18 23:24	

Sample: Gate2-Top-P14
8K07047-03 (Water)

Sampled: 11/06/18 12:40 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8K0509	**Instr:** Inst		**Prepared:** 11/09/18 10:33			**Analyst:** sar	
Total Suspended Solids	**10**		5	mg/l	1	11/09/18 12:51	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8L0402	**Instr:** icpms03		**Prepared:** 12/06/18 14:30			**Analyst:** aln	
Copper, Total	**8.7**	0.019	0.050	ug/l	5	12/07/18 03:16	
Method: EPA 1640 **Batch ID:** W8L0403	**Instr:** icpms03		**Prepared:** 12/06/18 14:32			**Analyst:** aln	
Copper, Dissolved	**7.3**	0.019	0.050	ug/l	5	12/06/18 23:37	

Sample Results

(Continued)

Sample: Gate2-Bottom-P14
8K07047-04 (Water)

Sampled: 11/06/18 12:45 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8K0509 **Instr:** Inst			**Prepared:** 11/09/18 10:33			**Analyst:** sar	
Total Suspended Solids	**6**		5	mg/l	1	11/09/18 12:51	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8L0402 **Instr:** icpms03			**Prepared:** 12/06/18 14:30			**Analyst:** aln	
Copper, Total	**8.3**	0.0076	0.020	ug/l	2	12/07/18 03:30	
Method: EPA 1640 **Batch ID:** W8L0403 **Instr:** icpms03			**Prepared:** 12/06/18 14:32			**Analyst:** aln	
Copper, Dissolved	**7.4**	0.0076	0.020	ug/l	2	12/06/18 23:51	

Sample: Basin1-Top-P14
8K07047-05 (Water)

Sampled: 11/06/18 12:55 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8K0509 **Instr:** Inst			**Prepared:** 11/09/18 10:33			**Analyst:** sar	
Total Suspended Solids	**4**		5	mg/l	1	11/09/18 12:51	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8L0402 **Instr:** icpms03			**Prepared:** 12/06/18 14:30			**Analyst:** aln	
Copper, Total	**5.3**	0.0076	0.020	ug/l	2	12/07/18 03:43	
Method: EPA 1640 **Batch ID:** W8L0403 **Instr:** icpms03			**Prepared:** 12/06/18 14:32			**Analyst:** aln	
Copper, Dissolved	**5.0**	0.0076	0.020	ug/l	2	12/07/18 00:05	

Sample: Basin1-Bottom-P14
8K07047-06 (Water)

Sampled: 11/06/18 13:00 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8K0527 **Instr:** Inst			**Prepared:** 11/09/18 12:55			**Analyst:** sar	
Total Suspended Solids	**3**		5	mg/l	1	11/12/18 17:16	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8L0402 **Instr:** icpms03			**Prepared:** 12/06/18 14:30			**Analyst:** aln	
Copper, Total	**5.8**	0.0076	0.020	ug/l	2	12/07/18 03:57	
Method: EPA 1640 **Batch ID:** W8L0403 **Instr:** icpms03			**Prepared:** 12/06/18 14:32			**Analyst:** aln	
Copper, Dissolved	**5.2**	0.0076	0.020	ug/l	2	12/07/18 00:18	

Sample Results

(Continued)

Sample: Basin2-Top-P14
8K07047-07 (Water)

Sampled: 11/06/18 13:05 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8K0527 **Instr:** Inst **Prepared:** 11/09/18 12:55 **Analyst:** sar							
Total Suspended Solids	**2**		5	mg/l	1	11/12/18 17:16	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8L0402 **Instr:** icpms03 **Prepared:** 12/06/18 14:30 **Analyst:** aln							
Copper, Total	**6.2**	0.0076	0.020	ug/l	2	12/07/18 04:11	
Method: EPA 1640 **Batch ID:** W8L0403 **Instr:** icpms03 **Prepared:** 12/06/18 14:32 **Analyst:** aln							
Copper, Dissolved	**5.2**	0.0076	0.020	ug/l	2	12/07/18 00:32	

Sample: Basin2-Bottom-P14
8K07047-08 (Water)

Sampled: 11/06/18 13:10 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W8K0527 **Instr:** Inst **Prepared:** 11/09/18 12:55 **Analyst:** sar							
Total Suspended Solids	**4**		5	mg/l	1	11/12/18 17:16	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W8L0402 **Instr:** icpms03 **Prepared:** 12/06/18 14:30 **Analyst:** aln							
Copper, Total	**5.9**	0.0076	0.020	ug/l	2	12/07/18 04:24	
Method: EPA 1640 **Batch ID:** W8L0403 **Instr:** icpms03 **Prepared:** 12/06/18 14:32 **Analyst:** aln							
Copper, Dissolved	**5.6**	0.0076	0.020	ug/l	2	12/07/18 00:46	

Quality Control Results

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W8K0509 - SM 2540D											
Blank (W8K0509-BLK1)					**Prepared & Analyzed: 11/09/18**						
Total Suspended Solids	1.00		5	mg/l							J
LCS (W8K0509-BS1)					**Prepared & Analyzed: 11/09/18**						
Total Suspended Solids	65.0		5	mg/l	64.1		101	90-110			
Duplicate (W8K0509-DUP1)	**Source: 8K06091-01**				**Prepared & Analyzed: 11/09/18**						
Total Suspended Solids	59.0		5	mg/l		61.0			3	20	
Duplicate (W8K0509-DUP2)	**Source: 8K06040-01**				**Prepared & Analyzed: 11/09/18**						
Total Suspended Solids	272		5	mg/l		236			14	20	
Batch: W8K0527 - SM 2540D											
Blank (W8K0527-BLK1)					**Prepared: 11/09/18 Analyzed: 11/12/18**						
Total Suspended Solids	ND		5	mg/l							
LCS (W8K0527-BS1)					**Prepared: 11/09/18 Analyzed: 11/12/18**						
Total Suspended Solids	56.7		5	mg/l	62.2		91	90-110			
Duplicate (W8K0527-DUP1)	**Source: 8K09036-01**				**Prepared: 11/09/18 Analyzed: 11/12/18**						
Total Suspended Solids	42.0		5	mg/l		41.0			2	20	
Duplicate (W8K0527-DUP2)	**Source: 8K09047-01**				**Prepared: 11/09/18 Analyzed: 11/12/18**						
Total Suspended Solids	47.0		5	mg/l		46.0			2	20	

Metals - Low Level by 1600 Series Methods

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W8L0402 - EPA 1640											
Blank (W8L0402-BLK1)					**Prepared: 12/06/18 Analyzed: 12/07/18**						
Copper, Total	ND	0.0038	0.010	ug/l							
LCS (W8L0402-BS1)					**Prepared: 12/06/18 Analyzed: 12/07/18**						
Copper, Total	1.95	0.0038	0.010	ug/l	2.00		97	73-122			
Matrix Spike (W8L0402-MS1)	**Source: 8K07047-01**				**Prepared: 12/06/18 Analyzed: 12/07/18**						
Copper, Total	10.0	0.0076	0.020	ug/l	2.00	7.91	106	60-138			
Matrix Spike Dup (W8L0402-MSD1)	**Source: 8K07047-01**				**Prepared: 12/06/18 Analyzed: 12/07/18**						
Copper, Total	9.66	0.0076	0.020	ug/l	2.00	7.91	87	60-138	4	30	
Batch: W8L0403 - EPA 1640											
Blank (W8L0403-BLK1)					**Prepared & Analyzed: 12/06/18**						
Copper, Dissolved	ND	0.0038	0.010	ug/l							
LCS (W8L0403-BS1)					**Prepared & Analyzed: 12/06/18**						
Copper, Dissolved	2.04	0.0038	0.010	ug/l	2.00		102	70-130			
Matrix Spike (W8L0403-MS1)	**Source: 8K07047-01**				**Prepared & Analyzed: 12/06/18**						
Copper, Dissolved	11.0	0.0076	0.020	ug/l	4.00	7.41	90	70-130			
Matrix Spike Dup (W8L0403-MSD1)	**Source: 8K07047-01**				**Prepared & Analyzed: 12/06/18**						
Copper, Dissolved	10.7	0.0076	0.020	ug/l	4.00	7.41	82	70-130	3	30	

Certificate of Analysis

FINAL REPORT

Wood - San Diego 2
9210 Sky Park Court, Suite 200
San Diego, CA 92123

Project Number: Boatwash Pilot Study

Project Manager: Barry Snyder

Reported:
12/10/2018 16:19

Notes and Definitions

Item	Definition
J	Estimated conc. detected <MRL and >MDL.
ND	NOT DETECTED at or above the Method Reporting Limit (MRL). If Method Detection Limit (MDL) is reported, then ND means not detected at or above the MDL.
Dil	Dilution
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
% Rec	Percent Recovery
Source	Sample that was matrix spiked or duplicated.
MDL	Method Detection Limit
MRL	The minimum levels, concentrations, or quantities of a target variable (e.g., target analyte) that can be reported with a specified degree of confidence. The MRL is also known as Limit of Quantitation (LOQ) and Detection Limit for Reporting (DLR)
MDA	Minimum Detectable Activity
NR	Not Reportable
TIC	Tentatively Identified Compound (TIC) using mass spectrometry. The reported concentration is relative concentration based on the nearest internal standard. If the library search produces no matches at, or above 85%, the compound is reported as unknown.

Any remaining sample(s) will be disposed of one month from the final report date unless other arrangements are made in advance.
An Absence of Total Coliform meets the drinking water standards as established by the California State Water Resources Control Board (SWRCB)
All results are expressed on wet weight basis unless otherwise specified.
All samples collected by Weck Laboratories have been sampled in accordance to laboratory SOP Number MIS 002.

EVENT 2 (DIVER CLEANING)
TOXICITY LAB REPORTS

Results of Chronic Toxicity Tests for Shelter Island Yacht Basin Boatwash Pilot Project – October Testing

Sample Collections: October 23, 2018
Project Number: 1715100615.0002.

Submitted to:

Wood Environment & Infrastructure Solutions, Inc.
9177 Sky Park Court
San Diego, CA 92123

Testing Performed by:

wood.

Wood Environment & Infrastructure Solutions, Inc.
Aquatic Toxicity Laboratory
4905 Morena Blvd., Suite 1304
San Diego, California 92117

The Wood aquatic toxicity laboratory is certified by the State of California Department of Health Services – Environmental Lab Accreditation Program (ELAP) under Certificate Number 3010. All test results were obtained following EPA Protocol guidelines and internal QA Program requirements. The data and test results have been reviewed and verified by the following laboratory representative:

Verified by: ______________________ **Date:** 3/25/19 .

MATERIALS & METHODS

Sample Information

Client:	Wood Environment & Infrastructure Solutions
Project:	Shelter Island Yacht Basin – Boatwash Pilot Study
Monitoring Period:	October 2018 (round 3 of 3)
Sample IDs:	Gate1-T0, Gate2-T0, Basin1-T0, Basin2-T0, and Gate1-T4, Gate2-T4, Basin1-T4, Basin2-T4
Sample Collection Date, Time:	10/23/18, 07:00 – 07:25 and 15:40 – 15:50
Sample Receipt Date, Time:	10/23/18, 16:25 and 18:47
Sample Collection Method:	Grab samples

Table 1. Water Quality Measured Upon Sample Receipt

Sample ID	Temp. (°C)	pH (units)	Dissolved Oxygen (mg/L)	Salinity (ppt)	Alkalinity (mg/L)	Total Chlorine (mg/L)
Gate1-T0	8.4	8.03	8.6	34.5	105	<0.02
Gate2-T0	8.8	8.03	8.9	34.5	116	<0.02
Basin1-T0	8.9	8.01	9.3	34.3	115	<0.02
Basin2-T0	8.6	8.00	9.4	34.5	98	<0.02
Gate1-T4	12.5	7.96	8.6	34.2	109	<0.02
Gate2-T4	12.5	7.99	8.7	34.3	105	<0.02
Basin1-T4	12.5	7.96	8.7	34.4	110	<0.02
Basin2-T4	12.5	7.96	8.7	34.3	108	<0.02

Note: samples were received the same day as collected. Water quality measurements were taken and then the samples were placed in cold storage until testing.

Chronic Mussel Development Test Specifications

Test Period:	10/24/18; 14:25 – 10/26/18; 14:00
Test Organism:	*Mytilus galloprovincialis* (bivalve - mussel)
Test Organism Source:	Field-collected – Mission Bay (San Diego, CA)
Test Organism Age at start:	Fertilized embryos (<4 hours old)
Test Procedure:	48-hour embryo-larval development
Test Endpoint (statistical analysis):	48-hour Combined Proportion Normal (ASTM)
Test Concentrations:	25, 50, and 100% sample; plus Lab Control
Control/Dilution Water:	Natural seawater collected from the inlet at Scripps Institution of Oceanography (20-µm filtered)
Test Recordings:	Development in the 100% concentration was recorded first. If an adverse effect was observed, the 25% and 50% concentrations were also recorded.
Protocols Used:	EPA, 1995 West Coast Manual (EPA/600/R-95/136); and ASTM, 1998 (E 724-98).
EPA Test Acceptability Criteria:	Control must have ≥50% survival; ≥90% proportion normal; and the minimum significant difference (MSD) must be < 25%.
Statistical Analysis Software:	CETIS™ v.1.9.3.0

RESULTS

After test completion, the results of the 100% concentration were recorded first on a microscope. If the percent effect or difference from the control was greater than 10%, then the 25 and 50% concentrations were also recorded. The 100% samples of Gate1-T0, Gate2-T0, Basin1-T0, Basin2-T0, as well as Gate1-T4 and Gate2-T4 all produced less than an 8.0% effect compared to the control. Therefore, the 25 and 50% concentrations were not measured. Even with less than an 8.0% effect, three of these samples were still found to be statistically significant (using the standard approach to analysis), due to very low Percent Minimum Significant Difference (PMSD) values with the statistical analysis. These effects, however, were not considered biologically significant.

To confirm there were no significant biological effects with the samples, test results were also evaluated using the EPA Test of Significant Toxicity (TST) approach. This approach to analysis applies a modified t-Test that accounts for the statistical power of the test and the magnitude of the biological effect in determining the presence of toxicity. The instream waste concentration (IWC) for this analysis is the 100 percent sample. The IWC was compared to the Lab Control for statistical analysis. All six of these samples resulted in a "Pass" for the TST analysis. Therefore, no biologically significant effects were observed, and the samples are considered non-toxic.

The remaining two samples, Basin1-T4 and Basin2-T4, both resulted in a 100% effect (0% normal development in the mussels) and were considered toxic. The 25 and 50% concentrations were also measured, and these concentrations also resulted in 100% effects. There was no normal development observed with the mussels in any of the concentrations of these two sites. A summary of the test results for the four "T0" samples is provided in Table 2, and the four "T4" samples is provided in Table 3. The full statistical analyses and raw bench sheets are provided in Appendix A. Sample receipt information and the chain of custody form are included in Appendix B and C, respectively.

Table 2. Summary of Results for "T0" Samples – Combined Proportion Normal (%)

Sample Concentration (%)	Gate1-T0	Gate2-T0	Basin1-T0	Basin2-T0
Lab Control	83.5	83.5	81.6	81.6
25	NR	NR	NR	NR
50	NR	NR	NR	NR
100	77.0 *	78.5 *	79.1	82.5
NOEC =	< 100	< 100	100	100
EC_{50} =	> 100	> 100	> 100	> 100
Percent Effect = (in 100% sample)	7.8	6.0	3.1	-1.1
TST (Pass/Fail) =	Pass	Pass	Pass	Pass

* An asterisk indicates a statistically significant difference compared to the control (using standard analysis).

NR = Not Recorded; these concentrations were not read due to < 10% effect in the 100% concentration.

NOEC = the highest Concentration tested that results in No Observed Effect (using standard analysis).

Percent Effect = the percent difference from the control. A negative value indicates a positive effect.

TST = Test of Significant Toxicity (a new approach to statistical analysis). A "Pass" indicates the percent effect is not biologically significant and the sample is considered non-toxic.

Table 3. Summary of Results for "T4" Samples – Combined Proportion Normal (%)

Sample Concentration (%)	Gate1-T4	Gate2-T4	Basin1-T4	Basin2-T4
Lab Control	85.7	85.7	84.9	84.9
25	NR	NR	0.0 *	0.0 *
50	NR	NR	0.0 *	0.0 *
100	83.0	82.4 *	0.0 *	0.0 *
NOEC =	100	< 100	< 25	< 25
EC_{50} =	> 100	> 100	< 12.5	< 12.5
Percent Effect =	3.2	3.8	100	100
TST (Pass/Fail) =	Pass	Pass	**Fail**	**Fail**

* An asterisk indicates a statistically significant difference compared to the control (using standard analysis).

NR = Not Recorded; these concentrations were not read due to < 10% effect in the 100% concentration.

NOEC = the highest Concentration tested that results in No Observed Effect (using standard analysis).

Percent Effect = the percent difference from the control. A negative value indicates a positive effect.

TST = Test of Significant Toxicity (a new approach to statistical analysis). A "Pass" indicates the percent effect is not biologically significant and the sample is considered non-toxic. A "Fail" is considered toxic.

QUALITY ASSURANCE

Samples were collected on 10/23/2018 and delivered to the testing laboratory later the same evening. Water quality measurements were recorded, and the samples were placed in cold storage overnight until testing was initiated the following day. All tests were initiated within the appropriate 36-hour holding time. The lab controls for each set of samples met the minimum test acceptability criteria (TAC) for both Percent Survival and the PMSD. However, the Proportion Normal was between 86% and 87%, which was slightly below the 90% criterion under the EPA guidelines. The concurrent reference toxicant test control, however, resulted in 96% Proportion Normal, which exceeded the EPA criteria. In addition, all the samples were analyzed and reported for the Combined Proportion Normal endpoint, which uses the ASTM guidelines. According to ASTM, the bivalve test meets acceptability criteria if the control results in >70% for the Combined Proportion Normal endpoint. All test controls for this round of testing ranged from 81% to 86% for the combined endpoint (exceeding the ASTM acceptability criteria). Therefore, all test results were deemed valid for reporting.

The concurrent reference toxicant test met all TAC and was deemed valid. The median effect concentration (EC_{50}) was within two standard deviations of the historical control chart mean for the laboratory, indicating a typical response and sensitivity to copper. The reference toxicant test results are summarized in Table 4 and presented in full in Appendix D

Table 4. Summary of Copper Reference Toxicant Test Results

Test Concentration (µg/L copper)	Combined Proportion Normal (%)	Statistical Results (in µg/L copper)
Lab Control	89.1	NOEC = 5.0 EC_{50} = 10.4 Historical EC_{50} ±2SD = 9.05 – 15.3 range
2.5	85.3	
5.0	89.9	
10	49.5 *	
20	0.1 *	
40	0.0 *	

* An asterisk indicates a statistically significant difference compared to the control.
NOEC = the highest concentration tested that results in No Observed Effect.
EC_{50} = the median effect concentration expected to cause an adverse effect to 50% of the test organisms.
Historical EC_{50} = the mean EC_{50} for previous testing by the lab, plus or minus two standard deviations.

REFERENCES

ASTM. 1998. Standard Guide for Conducting Static Acute Toxicity Tests Starting with Embryos of Four Species of Saltwater Bivalve Molluscs. ASTM E 724-98.

Tidepool Scientific Software, 2001-2015. CETIS: Comprehensive Environmental Toxicity Information System software, version 1.9.3.0.

USEPA (U.S. Environmental Protection Agency). 1995. Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine and Estuarine Organisms (EPA/600/R-95/136). The USEPA, Office of Research and Development, Washington, DC.

USEPA (U.S. Environmental Protection Agency). 2010. Test of Significant Toxicity Implementation Document (EPA/833/R-10/003). The USEPA, Office of Wastewater Management, Washington, DC.

Results of Chronic Toxicity Tests for Shelter Island Yacht Basin Boatwash Pilot Project – November Testing

Sample Collections: November 6, 2018
Project Number: 1715100615.0002.

Submitted to:

**Wood Environment & Infrastructure Solutions, Inc.
9177 Sky Park Court
San Diego, CA 92123**

Testing Performed by:

wood.

**Wood Environment & Infrastructure Solutions, Inc.
Aquatic Toxicity Laboratory
4905 Morena Blvd., Suite 1304
San Diego, California 92117**

The Wood aquatic toxicity laboratory is certified by the State of California Department of Health Services – Environmental Lab Accreditation Program (ELAP) under Certificate Number 3010. All test results were obtained following EPA Protocol guidelines and internal QA Program requirements. The data and test results have been reviewed and verified by the following laboratory representative:

Verified by: Steve Carlton **Date:** 4/8/19 revised.

MATERIALS & METHODS

Sample Information

Client:	Wood Environment & Infrastructure Solutions
Project:	Shelter Island Yacht Basin – Boatwash Monitoring
Monitoring Period:	November 2018
Sample IDs:	Basin-1, Basin-2, Gate-1, and Gate-2
Sample Collection Date, Time:	11/6/18, 12:30 – 13:05
Sample Receipt Date, Time:	11/6/18, 14:34
Sample Collection Method:	Grab samples
Water Quality Parameters:	See Table 1 (measured upon sample receipt)

Chronic Mussel Development Test Specifications

Test Period:	11/7/18, 14:40 – 11/9/18, 15:30
Test Organism:	*Mytilus galloprovincialis* (bivalve - mussel)
Test Organism Source:	Field-collected – Mission Bay (San Diego, CA)
Test Organism Age at start:	Fertilized embryos (<4 hours old)
Test Procedure:	48-hour embryo-larval development
Test Endpoint (statistical analysis):	48-hour Combined Proportion Normal (ASTM)
Test Concentrations:	25, 50, and 100% sample; plus Lab Control
Control/Dilution Water:	Natural seawater (diluted to 32ppt) from the inlet at Scripps Institution of Oceanography (20-μm filtered)
Test Recordings:	Development in the 100% concentration was recorded first. If >10% effect was observed, the 25% and 50% concentrations were also recorded.
Protocols Used:	EPA, 1995 West Coast Manual (EPA/600/R-95/136); and ASTM, 1998 (E 724-98).
EPA Test Acceptability Criteria:	Control must have ≥50% survival; ≥90% proportion normal; and the minimum significant difference (MSD) must be <25%.
Statistical Analysis Software:	CETIS™ v.1.9.3.0

Table 1. Water Quality Measured Upon Sample Receipt

Sample ID	Temp. (℃)	pH (units)	Dissolved Oxygen (mg/L)	Salinity (ppt)	Alkalinity (mg/L)	Total Chlorine (mg/L)
Basin-1	14.0	7.89	7.8	34.6	89	<0.02
Basin-2	9.0	7.92	7.9	34.1	91	<0.02
Gate-1	9.0	7.93	8.4	34.3	98	<0.02
Gate-2	7.0	7.94	7.9	34.2	101	<0.02

RESULTS

After test completion, the results of the 100% concentration were recorded first on a microscope. If there was greater than a 10% effect observed, then the 25% and 50% concentrations were also recorded. This was not necessary, as all four samples resulted in less than a 10% effect. All four of the 100% undiluted samples resulted in no statistically significant effects using the standard statistical analysis method. A summary of the test results is provided in Table 2. The full statistical analyses and raw bench sheets are provided in Appendix A. Sample receipt information and the chain of custody form are included in Appendix B and C, respectively.

To confirm whether there were biologically significant effects with the samples, test results were also evaluated using the EPA Test of Significant Toxicity (TST) approach. This approach to analysis applies a modified t-Test that accounts for the statistical power of the test and the magnitude of the biological effect in determining the presence of toxicity. The instream waste concentration (IWC) for this analysis is the 100 percent sample. The IWC was compared to the Lab Control for statistical analysis. All four samples resulted in a "Pass" for the TST analysis. Therefore, no biologically significant effects were observed, and the samples are considered non-toxic.

Table 2. Summary of Test Results – Combined Proportion Normal (%)

Sample Concentration (%)	Basin-1	Basin-2	Gate-1	Gate-2
Lab Control	89.8	89.8	89.3	89.3
100	92.9	91.4	86.1	89.3
NOEC =	100	100	100	100
EC_{50} =	> 100	> 100	> 100	> 100
Percent Effect = (in 100% sample)	-3.5	-1.8	3.6	0.1
TST (Pass/Fail) =	Pass	Pass	Pass	Pass

NOEC = the highest Concentration tested that results in No Observed Effect (using standard analysis).

EC_{50} = the effect concentration expected to cause an adverse effect to 50% of the test organisms.

Percent Effect = the percent difference from the control. A negative value indicates a positive effect.

TST = Test of Significant Toxicity (a new approach to statistical analysis). A "Pass" indicates the percent effect is not biologically significant and the sample results are considered non-toxic.

QUALITY ASSURANCE

Samples were collected and delivered to the testing lab the same day. Water quality measurements were recorded, and the samples were placed in cold storage until testing. The testing was initiated within the appropriate 36-hour sample holding time. There were two sets of lab controls conducted during this round of testing (1 control per 2 samples), and both controls met the EPA's minimum test acceptability criteria (TAC) for Percent Survival, Proportion Normal, and the Percent Minimum Significant Difference (PMSD). Therefore, the test results were deemed valid for reporting. In addition, the samples were analyzed for the Combined Proportion Normal endpoint. According to the ASTM guidance document, the bivalve test meets acceptability criteria if the control has > 70% for the Combined Proportion Normal endpoint. Both test controls also exceeded the ASTM acceptability criteria for the combined endpoint.

The concurrent reference toxicant test met all TAC for survival, proportion normal, and the PMSD. Therefore, the reference toxicant test was deemed valid. The median effect concentration (EC_{50}), however, was more than two standard deviations below the historical control chart mean for the laboratory. This would indicate this batch of mussels may have been more sensitive to copper than typical. The reference toxicant test results are summarized in Table 3 and presented in full in Appendix D.

Table 3. Summary of Copper Reference Toxicant Test Results

Test Concentration (µg/L copper)	Combined Proportion Normal (%)	Statistical Results (in µg/L copper)
Lab Control	89.4	NOEC = 5.0 EC_{50} = **7.29** Historical EC_{50} ±2SD = 8.94 – 15.0 range
2.5	88.9	
5.0	87.5	
10	6.1 *	
20	0.0 *	
40	0.0 *	

* An asterisk indicates a statistically significant effect compared to the control (using standard analysis).

NOEC = the highest concentration tested that results in No Observed Effect.

EC_{50} = the median effect concentration expected to cause an adverse effect to 50% of the test organisms. A **bold** value indicates the test results were more than 2 standard deviations outside the historical range.

Historical EC_{50} = the mean EC_{50} for previous testing by the lab, plus or minus two standard deviations.

REFERENCES

ASTM. 1998. Standard Guide for Conducting Static Acute Toxicity Tests Starting with Embryos of Four Species of Saltwater Bivalve Molluscs. ASTM E 724-98.

Tidepool Scientific Software, 2001-2015. CETIS: Comprehensive Environmental Toxicity Information System software, version 1.9.3.0.

USEPA (U.S. Environmental Protection Agency). 1995. Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine and Estuarine Organisms (EPA/600/R-95/136). The USEPA, Office of Research and Development, Washington, DC.

USEPA (U.S. Environmental Protection Agency). 2010. Test of Significant Toxicity Implementation Document (EPA/833/R-10/003). The USEPA, Office of Wastewater Management, Washington, DC.

APPENDIX A

Statistical Analysis & Raw Data

Basin-1 & Basin-2

CETIS Summary Report

Report Date: 08 Apr-19 12:37 (p 1 of 1)
Test Code: 18-11-006 | 00-6957-7611

Bivalve Larval Survival and Development Test

Wood Environment & Infrastructure Solutions

Batch ID:	20-8314-4308	**Test Type:**	Development-Survival	**Analyst:**	
Start Date:	07 Nov-18 14:40	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Natural Seawater
Ending Date:	09 Nov-18 15:30	**Species:**	Mytilis galloprovincialis	**Brine:**	Not Applicable
Duration:	49h	**Source:**	Field Collected	**Age:**	

Sample ID:	09-2920-5039	**Code:**	18-W0067	**Client:**	Wood Environment and Infastructure
Sample Date:	06 Nov-18 12:55	**Material:**	Seawater	**Project:**	Boat Wash Study
Receipt Date:	06 Nov-18 14:34	**Source:**	Shelter Island Yacht Basin		
Sample Age:	26h	**Station:**	Basin 1		

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
16-1932-9272	Combined Proportion Norma	TST-Welch's t Test	6.0E-05	100% passed combined proportion normal
06-7554-6753	Proportion Normal	Equal Variance t Two-Sample Test	0.3544	100% passed proportion normal
04-4863-0102	Survival Rate	Unequal Variance t Two-Sample Test	0.9439	100% passed survival rate

Test Acceptability

				TAC Limits			
Analysis ID	**Endpoint**	**Attribute**	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
06-7554-6753	Proportion Normal	Control Resp	0.9419	0.9	>>	Yes	Passes Criteria
04-4863-0102	Survival Rate	Control Resp	0.9536	0.5	>>	Yes	Passes Criteria

Combined Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.8979	0.8365	0.9593	0.8389	0.9585	0.0221	0.0495	5.51%	0.00%
100		5	0.9292	0.8781	0.9802	0.8815	0.9817	0.0184	0.0411	4.43%	-3.48%

Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9419	0.9155	0.9683	0.9055	0.9585	0.0095	0.0213	2.26%	0.00%
100		5	0.9300	0.8804	0.9796	0.8857	0.9817	0.0179	0.0400	4.30%	1.26%

Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9536	0.8868	1.0000	0.8910	1.0000	0.0240	0.0538	5.64%	0.00%
100		5	0.9991	0.9964	1.0000	0.9953	1.0000	0.0009	0.0021	0.21%	-4.77%

Combined Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9289	0.8389	0.8578	0.9585	0.9055
25						
50						
100		0.9583	0.8815	0.8996	0.9817	0.9247

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9515	0.9415	0.9526	0.9585	0.9055
25						
50						
100		0.9583	0.8857	0.8996	0.9817	0.9247

Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9763	0.8910	0.9005	1.0000	1.0000
25						
50						
100		1.0000	0.9953	1.0000	1.0000	1.0000

Analyst: JVV QA: 4/8/19

CETIS Analytical Report

Report Date:	08 Apr-19 12:37 (p 1 of 3)
Test Code:	18-11-006 | 00-6957-7611

Bivalve Larval Survival and Development Test — **Wood Environment & Infrastructure Solutions**

Analysis ID:	16-1932-9272	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	08 Apr-19 12:36	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Data Transform	Alt Hyp	TST_b	Comparison Result
Angular (Corrected)	C*b < T	0.75	100% passed combined proportion normal

TST-Welch's t Test

Control	vs	Control II	Test Stat	Critical	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		100*	7.664	1.895	7	CDF	6.0E-05	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0086409	0.0086409	1	1.156	0.3136	Non-Significant Effect
Error	0.0597743	0.0074718	8			
Total	0.0684152		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.073	23.15	0.9474	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9131	0.7411	0.3029	Normal Distribution

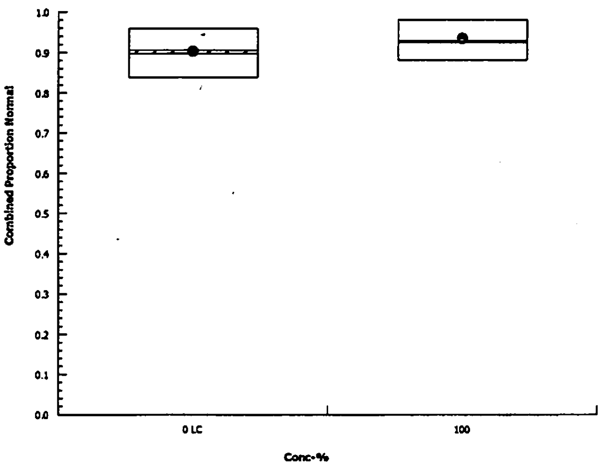
Combined Proportion Normal Summary

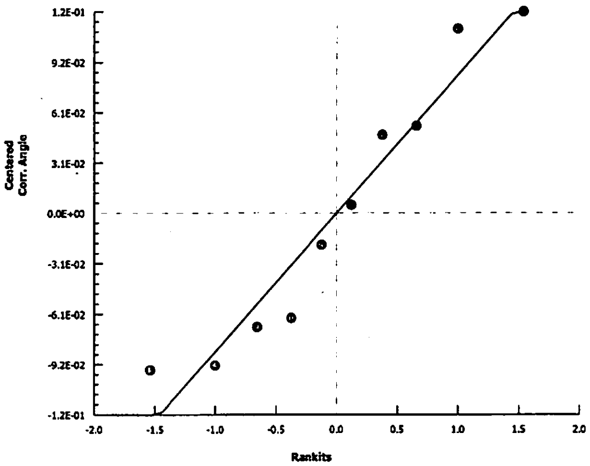
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.8979	0.8365	0.9593	0.9055	0.8389	0.9585	0.0221	5.51%	0.00%
100		5	0.9292	0.8781	0.9802	0.9247	0.8815	0.9817	0.0184	4.43%	-3.48%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.253	1.148	1.359	1.258	1.158	1.366	0.03797	6.77%	0.00%
100		5	1.312	1.203	1.421	1.293	1.219	1.435	0.03933	6.70%	-4.69%

Graphics





Analyst: JW QA:

Bivalve Larval Survival and Development Test — **Wood Environment & Infrastructure Solutions**

Analysis ID:	06-7554-6753	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	18 Dec-18 12:10	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	100% passed proportion normal	4.38%

Equal Variance t Two-Sample Test

Control	vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		100	0.387	1.86	0.08	8	CDF	0.3544	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0006926	0.0006926	1	0.1498	0.7088	Non-Significant Effect
Error	0.0369964	0.0046246	8			
Total	0.037689		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.109	23.15	0.1999	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9572	0.7411	0.7539	Normal Distribution

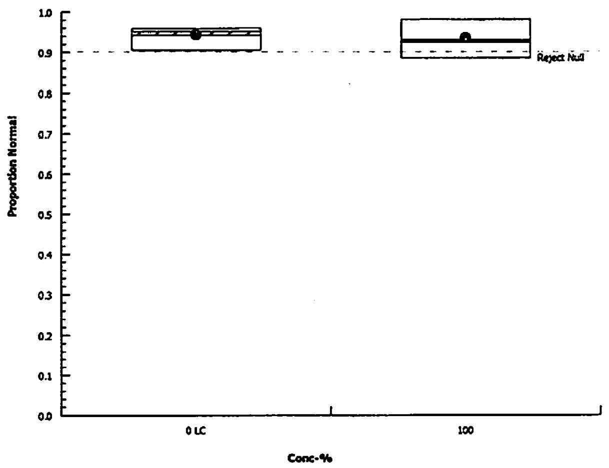
Proportion Normal Summary

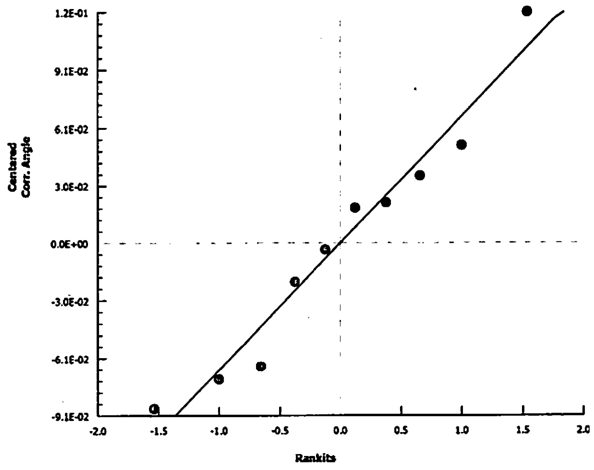
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9419	0.9155	0.9683	0.9515	0.9055	0.9585	0.0095	2.26%	0.00%
100		5	0.9300	0.8804	0.9796	0.9247	0.8857	0.9817	0.0179	4.30%	1.26%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.33	1.277	1.383	1.349	1.258	1.366	0.01903	3.20%	0.00%
100		5	1.313	1.206	1.421	1.293	1.226	1.435	0.03857	6.57%	1.25%

Graphics





Analyst: JW QA:

Bivalve Larval Survival and Development Test	**Wood Environment & Infrastructure Solutions**

Analysis ID:	04-4863-0102	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.3
Analyzed:	18 Dec-18 12:10	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	100% passed survival rate	5.37%

Unequal Variance t Two-Sample Test

Control	vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		100	-2.03	2.132	0.142	4	CDF	0.9439	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0454585	0.0454585	1	4.12	0.0769	Non-Significant Effect
Error	0.08826	0.0110325	8			
Total	0.133719		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	91.86	23.15	6.9E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.8762	0.7411	0.1180	Normal Distribution

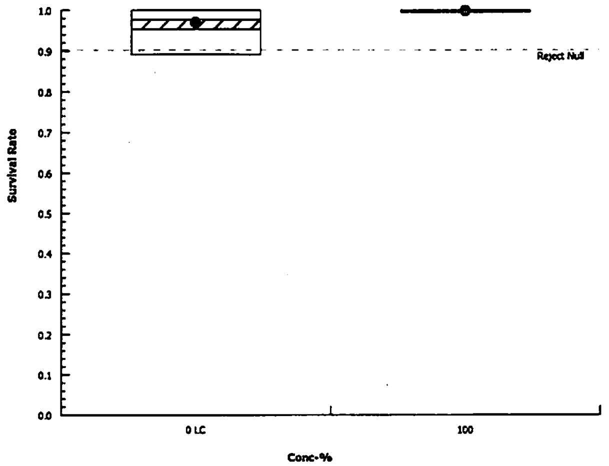
Survival Rate Summary

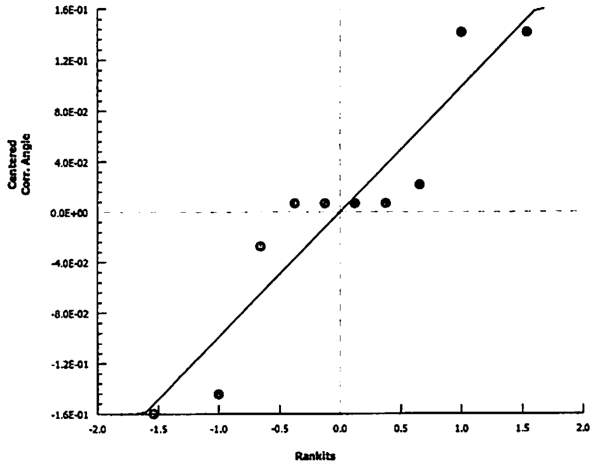
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9536	0.8868	1.0000	0.9763	0.8910	1.0000	0.0240	5.64%	0.00%
100		5	0.9991	0.9964	1.0000	1.0000	0.9953	1.0000	0.0009	0.21%	-4.77%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.395	1.211	1.578	1.416	1.234	1.536	0.06607	10.59%	0.00%
100		5	1.529	1.51	1.549	1.536	1.502	1.536	0.006895	1.01%	-9.67%

Graphics





CETIS Summary Report

Report Date: 08 Apr-19 12:42 (p 1 of 1)
Test Code: 18-11-007 | 00-1996-0916

Bivalve Larval Survival and Development Test — **Wood Environment & Infrastructure Solutions**

Batch ID:	18-9890-8894	**Test Type:**	Development-Survival	**Analyst:**	
Start Date:	07 Nov-18 14:40	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Natural Seawater
Ending Date:	09 Nov-18 15:30	**Species:**	Mytilis galloprovincialis	**Brine:**	Not Applicable
Duration:	49h	**Source:**	Field Collected	**Age:**	

Sample ID:	17-2099-1969	**Code:**	18-W0068	**Client:**	Wood Environment and Infastructure
Sample Date:	06 Nov-18 13:05	**Material:**	Seawater	**Project:**	Boat Wash Study
Receipt Date:	06 Nov-18 14:34	**Source:**	Shelter Island Yacht Basin		
Sample Age:	26h	**Station:**	Basin 2		

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
16-5217-1325	Combined Proportion Norma	TST-Welch's t Test	8.7E-05	100% passed combined proportion normal
04-6313-1376	Proportion Normal	Equal Variance t Two-Sample Test	0.2271	100% passed proportion normal
08-2714-2119	Survival Rate	Equal Variance t Two-Sample Test	0.8399	100% passed survival rate

Test Acceptability

				TAC Limits			
Analysis ID	**Endpoint**	**Attribute**	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
04-6313-1376	Proportion Normal	Control Resp	0.9419	0.9	>>	Yes	Passes Criteria
08-2714-2119	Survival Rate	Control Resp	0.9536	0.5	>>	Yes	Passes Criteria

Combined Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.8979	0.8365	0.9593	0.8389	0.9585	0.0221	0.0495	5.51%	0.00%
100		5	0.9137	0.8551	0.9723	0.8436	0.9612	0.0211	0.0472	5.17%	-1.76%

Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9419	0.9155	0.9683	0.9055	0.9585	0.0095	0.0213	2.26%	0.00%
100		5	0.9294	0.8963	0.9625	0.9048	0.9612	0.0119	0.0266	2.87%	1.33%

Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9536	0.8868	1.0000	0.8910	1.0000	0.0240	0.0538	5.64%	0.00%
100		5	0.9829	0.9356	1.0000	0.9147	1.0000	0.0171	0.0382	3.88%	-3.08%

Combined Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9289	0.8389	0.8578	0.9585	0.9055
25						
50						
100		0.9052	0.9612	0.9048	0.8436	0.9536

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9515	0.9415	0.9526	0.9585	0.9055
25						
50						
100		0.9052	0.9612	0.9048	0.9223	0.9536

Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9763	0.8910	0.9005	1.0000	1.0000
25						
50						
100		1.0000	1.0000	1.0000	0.9147	1.0000

Analyst: JW QA: 4/8/19

CETIS Analytical Report

Report Date: 08 Apr-19 12:42 (p 1 of 3)
Test Code: 18-11-007 | 00-1996-0916

Bivalve Larval Survival and Development Test	**Wood Environment & Infrastructure Solutions**

Analysis ID:	16-5217-1325	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	08 Apr-19 12:42	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Data Transform	Alt Hyp	TST_b	Comparison Result
Angular (Corrected)	C*b < T	0.75	100% passed combined proportion normal

TST-Welch's t Test

Control	vs	Control II	Test Stat	Critical	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		100*	7.22	1.895	7	CDF	8.7E-05	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0019198	0.0019198	1	0.2683	0.6185	Non-Significant Effect
Error	0.0572457	0.0071557	8			
Total	0.0591654		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.015	23.15	0.9887	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9512	0.7411	0.6828	Normal Distribution

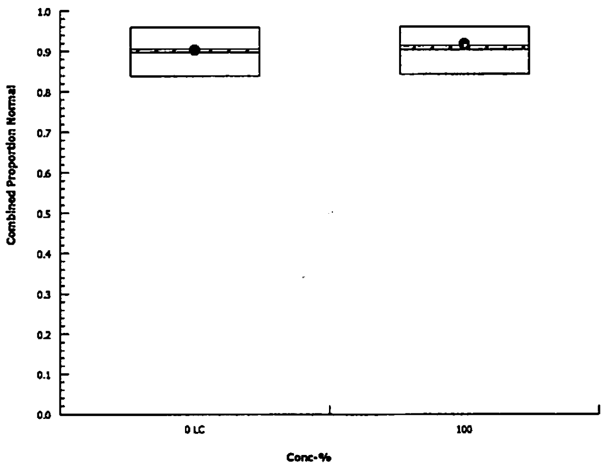
Combined Proportion Normal Summary

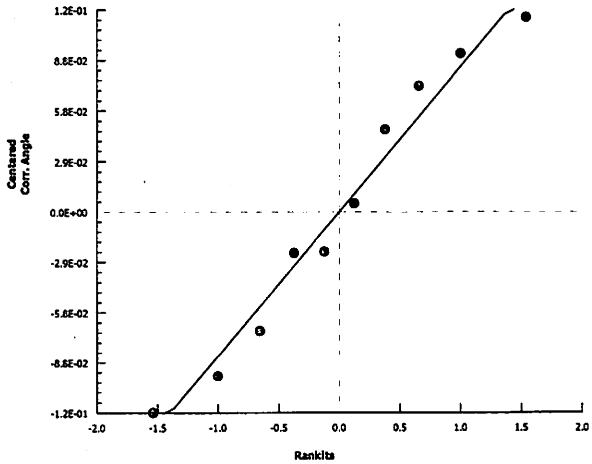
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.8979	0.8365	0.9593	0.9055	0.8389	0.9585	0.0221	5.51%	0.00%
100		5	0.9137	0.8551	0.9723	0.9052	0.8436	0.9612	0.0211	5.17%	-1.76%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.253	1.148	1.359	1.258	1.158	1.366	0.03797	6.77%	0.00%
100		5	1.281	1.176	1.386	1.258	1.164	1.373	0.03769	6.58%	-2.21%

Graphics





Analyst: JW QA:

CETIS Analytical Report

Report Date: 08 Apr-19 12:42 (p 2 of 3)
Test Code: 18-11-007 | 00-1996-0916

Bivalve Larval Survival and Development Test — **Nood Environment & Infrastructure Solutions**

Analysis ID:	04-6313-1376	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	08 Apr-19 12:41	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	100% passed proportion normal	2.98%

Equal Variance t Two-Sample Test

Control	vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		100	0.7866	1.86	0.057	8	CDF	0.2271	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0014669	0.0014669	1	0.6187	0.4542	Non-Significant Effect
Error	0.0189679	0.002371	8			
Total	0.0204348		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.62	23.15	0.6519	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9585	0.7411	0.7688	Normal Distribution

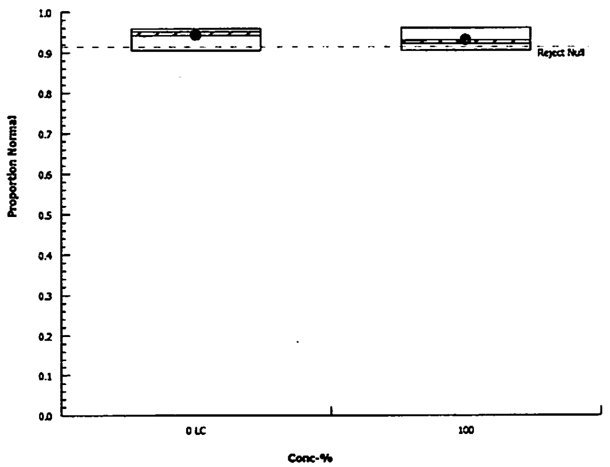
Proportion Normal Summary

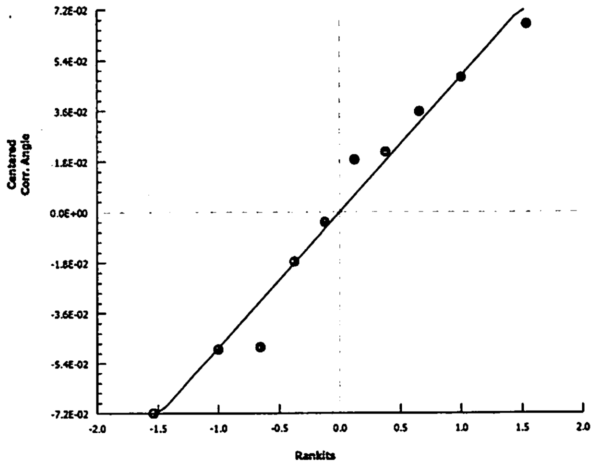
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9419	0.9155	0.9683	0.9515	0.9055	0.9585	0.0095	2.26%	0.00%
100		5	0.9294	0.8963	0.9625	0.9223	0.9048	0.9612	0.0119	2.87%	1.33%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.33	1.277	1.383	1.349	1.258	1.366	0.01903	3.20%	0.00%
100		5	1.306	1.239	1.373	1.288	1.257	1.373	0.02421	4.15%	1.82%

Graphics





Analyst: JW QA:

Bivalve Larval Survival and Development Test — **Wood Environment & Infrastructure Solutions**

Analysis ID:	08-2714-2119	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.3
Analyzed:	08 Apr-19 12:41	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	100% passed survival rate	6.33%

Equal Variance t Two-Sample Test

Control	vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		100	-1.06	1.86	0.157	8	CDF	0.8399	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0199568	0.0199568	1	1.123	0.3203	Non-Significant Effect
Error	0.142211	0.0177764	8			
Total	0.162168		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.59	23.15	0.6641	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.8465	0.7411	0.0528	Normal Distribution

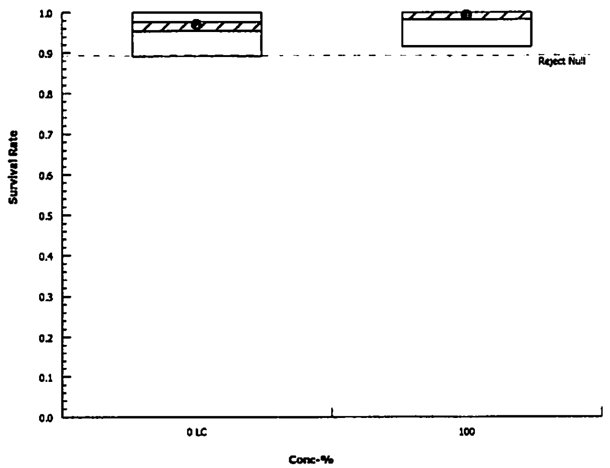
Survival Rate Summary

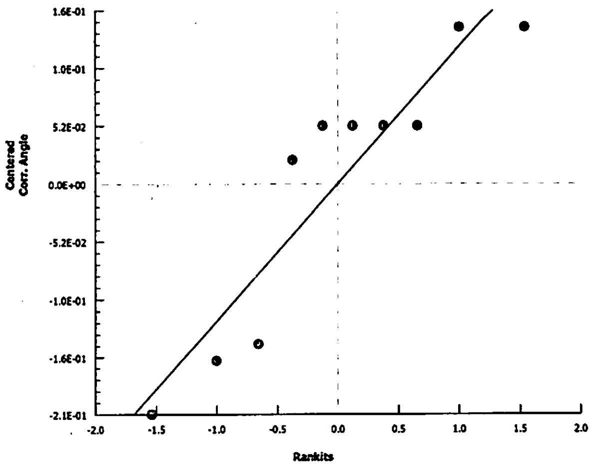
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9536	0.8868	1.0000	0.9763	0.8910	1.0000	0.0240	5.64%	0.00%
100		5	0.9829	0.9356	1.0000	1.0000	0.9147	1.0000	0.0171	3.88%	-3.08%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.395	1.211	1.578	1.416	1.234	1.536	0.06607	10.59%	0.00%
100		5	1.484	1.339	1.629	1.536	1.274	1.536	0.05239	7.89%	-6.41%

Graphics





Analyst: JW QA:

Embryo-Larval Development Test
Scoring Worksheet

Client: Amec FW (Wood)
Project ID: SIYB Basin 1; Basin 2
Test No.: 18-11-006, -007

Test Species: *M. galloprovincialis*
Start Date: 11/7/2018 1440
End Date: 11/9/2018 1530

Random #	# Counted	# Normal	Tech Initials	Notes
36			EN	$\bar{X}=211$
37	210	186 ~~210~~ EN		
38				
39	239	221		
40				
41	275	249		
42				
43	216	207		
44				
45	188	177		
46				
47				
48				
49				
50	211	191		
51				
52	231	209		
53				
54	190	181		
55				
56	206	196		
57	232	223		
58				
59	193	178		
60	218	214		
61	217	208		
62	237	226		
63				
64				
65				
66				
67				
68	249	224		
69			✓	
70				

QC Check: Sc 12/17/18

Final Review: Jw 12/20/18

Amec FW
SIYB Basin 1; Basin 2
Random Numbers
11/7/18

SAMPLE ID	Rand#
Lab Control 2	56
	45
	54
	61
	41
Basin 1 25%	36
	58
	48
	63
	64
Basin 1 50%	65
	55
	38
	51
	42
Basin 1 100%	43
	37
	68
	60
	39
Basin 2 25%	70
	49
	47
	67
	66
Basin 2 50%	44
	53
	40
	46
	69
Basin 2 100%	50
	57
	52
	59
	62

QC Check - Mussel: ________

Final QC: 12/17/18

Water Quality for Bivalve Development

Client: AMEC FW
Project ID: SIYB - Basin 1, Basin 2
Test No. 18-11-006, 007

Test Species: *M. galloprovincialis*
Start Date/Time: 11/7/2018 1440
End Date/Time: 11/9/2018 1530

Test Conc. (%)	Water Quality Measurements			
	Parameter	**0hr**	**24hr**	**48hr**
Lab Control	Temp. (°C)	15.7	14.8	14.5
	Salinity (ppt)	32.0	31.8	31.9
	pH (units)	8.00	7.91	7.88
	DO (mg/L)	7.9	8.7	8.6
Basin 1 25	Temp. (°C)	15.7	14.8	14.5
	Salinity (ppt)	32.5	32.6	32.6
	pH (units)	7.98	7.91	7.88
	DO (mg/L)	8.4	8.7	8.5
Basin 1 50	Temp. (°C)	15.2	14.8	14.5
	Salinity (ppt)	33.1	33.2	33.1
	pH (units)	7.97	7.90	7.89
	DO (mg/L)	8.7	8.8	8.6
Basin 1 100	Temp. (°C)	14.7	14.9	14.5
	Salinity (ppt)	34.1	34.2	34.3
	pH (units)	7.96	7.89	7.88
	DO (mg/L)	8.7	8.8	8.5
Basin 2 25	Temp. (°C)	15.2	14.8	14.4
	Salinity (ppt)	32.7	32.7	32.8
	pH (units)	7.98	7.90	7.89
	DO (mg/L)	8.7	8.8	8.5
Basin 2 50	Temp. (°C)	15.2	14.8	14.4
	Salinity (ppt)	33.2	33.3	33.4
	pH (units)	7.98	7.89	7.89
	DO (mg/L)	8.7	8.8	8.6
Basin 2 100	Temp. (°C)	14.7	14.9	14.4
	Salinity (ppt)	34.2	34.2	34.4
	pH (units)	7.98	7.89	7.89
	DO (mg/L)	8.9	8.8	8.4
	Tech Initials:	AD	AD	AD

Source of Animals: Mission Bay
Date Received: 8/14/18 & 11/7/18
Comments:

QC Check: JC 12/17/18
Final Review: JW 12/20/18

Wood Environmental Toxicology Lab, 4905 Morena Blvd, Ste. 1304, San Diego, CA 92117

Gate-1 & Gate-2

CETIS Summary Report

Report Date:	08 Apr-19 12:46 (p 1 of 1)
Test Code:	18-11-008 | 02-0943-8716

Bivalve Larval Survival and Development Test — **Wood Environment & Infrastructure Solutions**

Batch ID:	12-1539-8878	**Test Type:**	Development-Survival	**Analyst:**	
Start Date:	07 Nov-18 14:40	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Natural Seawater
Ending Date:	09 Nov-18 15:30	**Species:**	Mytilis galloprovincialis	**Brine:**	Not Applicable
Duration:	49h	**Source:**	Field Collected	**Age:**	

Sample ID:	00-2535-9354	**Code:**	18-W0069	**Client:**	Wood Environment and Infastructure
Sample Date:	06 Nov-18 12:30	**Material:**	Seawater	**Project:**	Boat Wash Study
Receipt Date:	06 Nov-18 14:34	**Source:**	Shelter Island Yacht Basin		
Sample Age:	26h	**Station:**	Gate 1		

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
08-6228-4046	Combined Proportion Norma	TST-Welch's t Test	1.7E-05	100% passed combined proportion normal
17-4637-8990	Proportion Normal	Equal Variance t Two-Sample Test	0.0667	100% passed proportion normal
16-1154-1274	Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	100% passed survival rate

Test Acceptability

				TAC Limits			
Analysis ID	Endpoint	Attribute	Test Stat	Lower	Upper	Overlap	Decision
17-4637-8990	Proportion Normal	Control Resp	0.9005	0.9	>>	Yes	Passes Criteria
16-1154-1274	Survival Rate	Control Resp	0.9924	0.5	>>	Yes	Passes Criteria

Combined Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.8933	0.8452	0.9413	0.8341	0.9345	0.0173	0.0387	4.33%	0.00%
100		5	0.8613	0.8247	0.8978	0.8145	0.8941	0.0132	0.0295	3.42%	3.58%

Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9005	0.8430	0.9580	0.8341	0.9507	0.0207	0.0463	5.14%	0.00%
100		5	0.8613	0.8247	0.8978	0.8145	0.8941	0.0132	0.0295	3.42%	4.36%

Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9924	0.9714	1.0000	0.9621	1.0000	0.0076	0.0170	1.71%	0.00%
100		5	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-0.76%

Combined Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9043	0.8341	0.9147	0.8788	0.9345
25						
50						
100		0.8145	0.8941	0.8656	0.8745	0.8577

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9043	0.8341	0.9507	0.8788	0.9345
25						
50						
100		0.8145	0.8941	0.8656	0.8745	0.8577

Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	1.0000	1.0000	0.9621	1.0000	1.0000
25						
50						
100		1.0000	1.0000	1.0000	1.0000	1.0000

Analyst: JW QA: 4/8/19

CETIS Analytical Report

Report Date: 08 Apr-19 12:46 (p 1 of 3)
Test Code: 18-11-008 | 02-0943-8716

Bivalve Larval Survival and Development Test — **Wood Environment & Infrastructure Solutions**

Analysis ID:	08-6228-4046	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	08 Apr-19 12:45	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Data Transform	Alt Hyp	TST_b	Comparison Result
Angular (Corrected)	C*b < T	0.75	100% passed combined proportion normal

TST-Welch's t Test

Control	vs	Control II	Test Stat	Critical	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		100*	9.314	1.895	7	CDF	1.7E-05	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0065715	0.0065715	1	2.38	0.1615	Non-Significant Effect
Error	0.0220929	0.0027616	8			
Total	0.0286645		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.157	23.15	0.4749	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9608	0.7411	0.7951	Normal Distribution

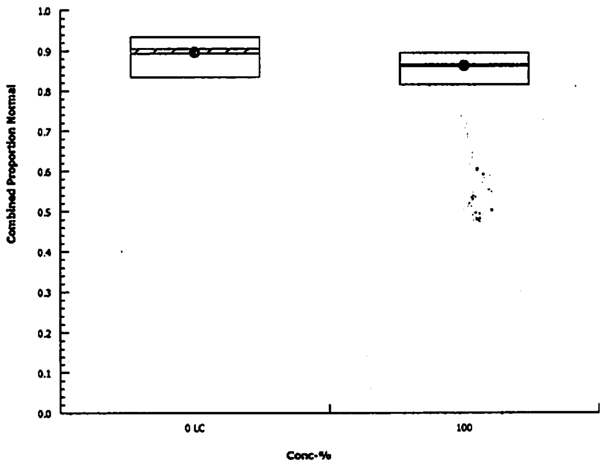
Combined Proportion Normal Summary

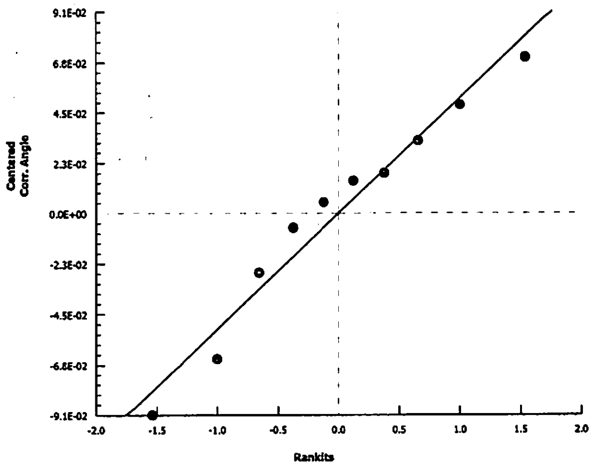
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.8933	0.8452	0.9413	0.9043	0.8341	0.9345	0.0173	4.33%	0.00%
100		5	0.8613	0.8247	0.8978	0.8656	0.8145	0.8941	0.0132	3.42%	3.58%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.242	1.166	1.318	1.256	1.151	1.312	0.02747	4.95%	0.00%
100		5	1.191	1.139	1.243	1.195	1.126	1.239	0.01871	3.51%	4.13%

Graphics





Analyst: JW QA:

Bivalve Larval Survival and Development Test				**Wood Environment & Infrastructure Solutions**	
Analysis ID:	17-4637-8990	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	18 Dec-18 12:31	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	100% passed proportion normal	4.82%

Equal Variance t Two-Sample Test

Control	vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		100	1.67	1.86	0.073	8	CDF	0.0667	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0108198	0.0108198	1	2.789	0.1334	Non-Significant Effect
Error	0.0310325	0.0038791	8			
Total	0.0418523		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.434	23.15	0.2593	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9805	0.7411	0.9677	Normal Distribution

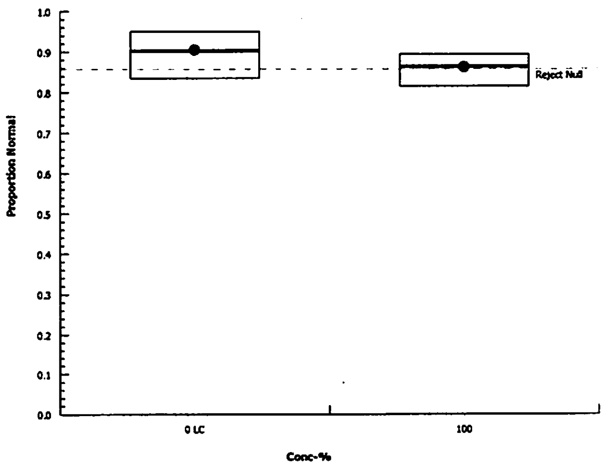
Proportion Normal Summary

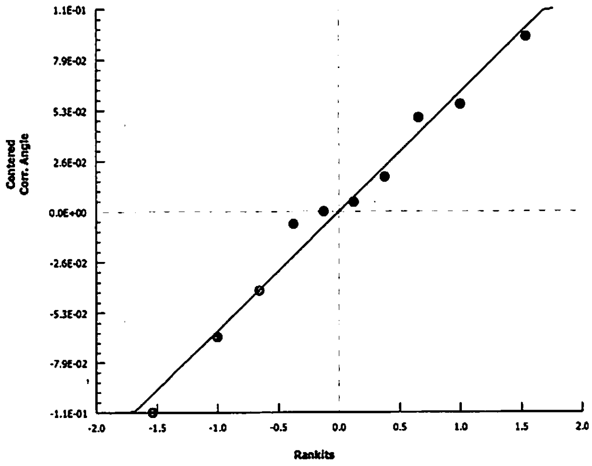
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9005	0.8430	0.9580	0.9043	0.8341	0.9507	0.0207	5.14%	0.00%
100		5	0.8613	0.8247	0.8978	0.8656	0.8145	0.8941	0.0132	3.42%	4.36%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.256	1.16	1.353	1.256	1.151	1.347	0.03467	6.17%	0.00%
100		5	1.191	1.139	1.243	1.195	1.126	1.239	0.01871	3.51%	5.24%

Graphics





Analyst: JW QA:

Bivalve Larval Survival and Development Test				**Wood Environment & Infrastructure Solutions**	
Analysis ID:	16-1154-1274	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.3
Analyzed:	18 Dec-18 12:32	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	100% passed survival rate	0.85%

Wilcoxon Rank Sum Two-Sample Test

Control	vs	Conc-%	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		100	30	n/a	1	8	Exact	1.0000	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0026095	0.0026095	1	1	0.3466	Non-Significant Effect
Error	0.0208763	0.0026095	8			
Total	0.0234858		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	7.111	11.26	0.0285	Equal Variances
Variances	Mod Levene Equality of Variance Test	1	13.75	0.3559	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.6247	0.7411	1.1E-04	Non-Normal Distribution

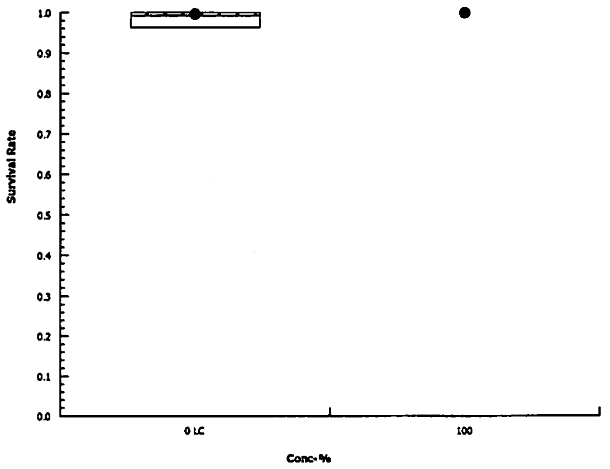
Survival Rate Summary

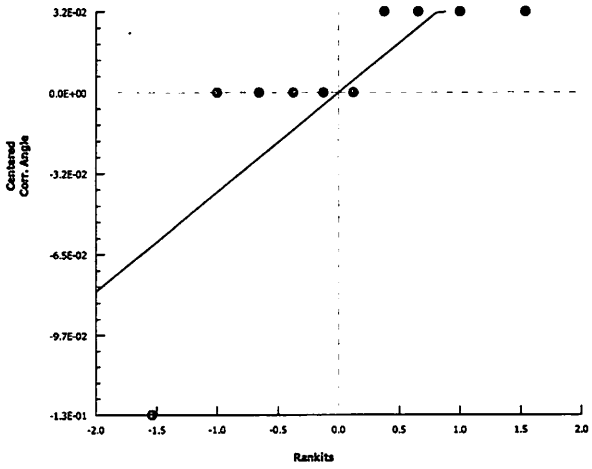
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9924	0.9714	1.0000	1.0000	0.9621	1.0000	0.0076	1.71%	0.00%
100		5	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-0.76%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.504	1.414	1.594	1.536	1.375	1.536	0.03231	4.80%	0.00%
100		5	1.536	1.536	1.537	1.536	1.536	1.536	0	0.00%	-2.15%

Graphics





Analyst: JW QA:

CETIS Summary Report

Report Date: 08 Apr-19 12:50 (p 1 of 1)
Test Code: 18-11-009 | 04-7819-0950

Bivalve Larval Survival and Development Test — **Wood Environment & Infrastructure Solutions**

Batch ID:	18-6575-3279	**Test Type:**	Development-Survival	**Analyst:**	
Start Date:	07 Nov-18 14:40	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Natural Seawater
Ending Date:	09 Nov-18 15:30	**Species:**	Mytilis galloprovincialis	**Brine:**	Not Applicable
Duration:	49h	**Source:**	Field Collected	**Age:**	

Sample ID:	06-1996-5185	**Code:**	18-W0070	**Client:**	Wood Environment and Infastructure
Sample Date:	06 Nov-18 12:40	**Material:**	Seawater	**Project:**	Boat Wash Study
Receipt Date:	06 Nov-18 14:34	**Source:**	Shelter Island Yacht Basin		
Sample Age:	26h	**Station:**	Gate 2		

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
15-6955-6500	Combined Proportion Norma	TST-Welch's t Test	6.9E-05	100% passed combined proportion normal
07-2899-2926	Proportion Normal	Unequal Variance t Two-Sample Test	0.3042	100% passed proportion normal
20-7375-2386	Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	100% passed survival rate

Test Acceptability

				TAC Limits			
Analysis ID	**Endpoint**	**Attribute**	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
07-2899-2926	Proportion Normal	Control Resp	0.9005	0.9	>>	Yes	Passes Criteria
20-7375-2386	Survival Rate	Control Resp	0.9924	0.5	>>	Yes	Passes Criteria

Combined Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.8933	0.8452	0.9413	0.8341	0.9345	0.0173	0.0387	4.33%	0.00%
100		5	0.8925	0.8829	0.9021	0.8821	0.9017	0.0034	0.0077	0.86%	0.09%

Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9005	0.8430	0.9580	0.8341	0.9507	0.0207	0.0463	5.14%	0.00%
100		5	0.8925	0.8829	0.9021	0.8821	0.9017	0.0034	0.0077	0.86%	0.89%

Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9924	0.9714	1.0000	0.9621	1.0000	0.0076	0.0170	1.71%	0.00%
100		5	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-0.76%

Combined Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9043	0.8341	0.9147	0.8788	0.9345
25						
50						
100		0.8879	0.9017	0.8821	0.8935	0.8972

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9043	0.8341	0.9507	0.8788	0.9345
25						
50						
100		0.8879	0.9017	0.8821	0.8935	0.8972

Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	1.0000	1.0000	0.9621	1.0000	1.0000
25						
50						
100		1.0000	1.0000	1.0000	1.0000	1.0000

Analyst: JW QA/SC 4/8/19

CETIS Analytical Report

Report Date:	08 Apr-19 12:50 (p 1 of 3)
Test Code:	18-11-009 | 04-7819-0950

Bivalve Larval Survival and Development Test — **Wood Environment & Infrastructure Solutions**

Analysis ID:	15-6955-6500	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	08 Apr-19 12:50	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Data Transform	Alt Hyp	TST_b	Comparison Result
Angular (Corrected)	C*b < T	0.75	100% passed combined proportion normal

TST-Welch's t Test

Control	vs	Control II	Test Stat	Critical	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		100*	14.32	2.132	4	CDF	6.9E-05	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	6.171E-05	6.171E-05	1	0.03142	0.8637	Non-Significant Effect
Error	0.0157117	0.001964	8			
Total	0.0157734		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	24.46	23.15	0.0090	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9376	0.7411	0.5270	Normal Distribution

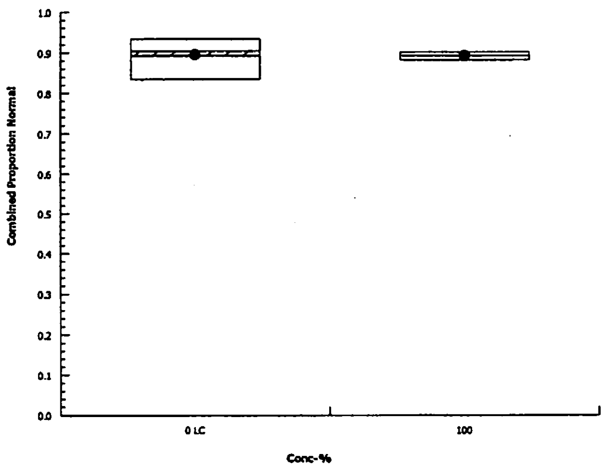
Combined Proportion Normal Summary

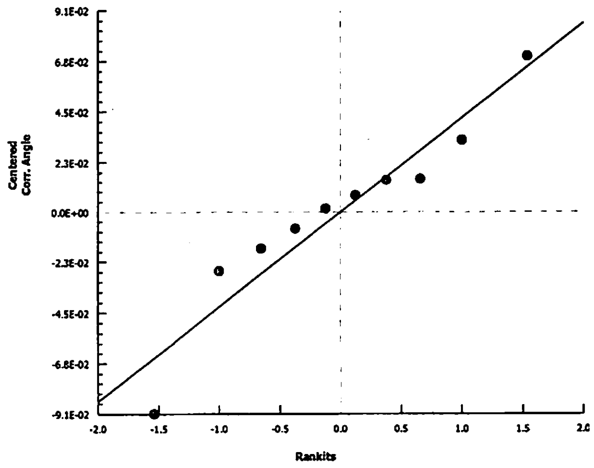
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.8933	0.8452	0.9413	0.9043	0.8341	0.9345	0.0173	4.33%	0.00%
100		5	0.8925	0.8829	0.9021	0.8935	0.8821	0.9017	0.0034	0.86%	0.09%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.242	1.166	1.318	1.256	1.151	1.312	0.02747	4.95%	0.00%
100		5	1.237	1.221	1.252	1.238	1.22	1.252	0.005555	1.00%	0.40%

Graphics





Analyst: JUV QA: JC

Bivalve Larval Survival and Development Test				**Wood Environment & Infrastructure Solutions**	
Analysis ID:	07-2899-2926	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	08 Apr-19 12:49	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	100% passed proportion normal	4.95%

Unequal Variance t Two-Sample Test

Control	vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		100	0.555	2.132	0.075	4	CDF	0.3042	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0009492	0.0009492	1	0.308	0.5941	Non-Significant Effect
Error	0.0246513	0.0030814	8			
Total	0.0256005		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	38.94	23.15	0.0037	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.947	0.7411	0.6328	Normal Distribution

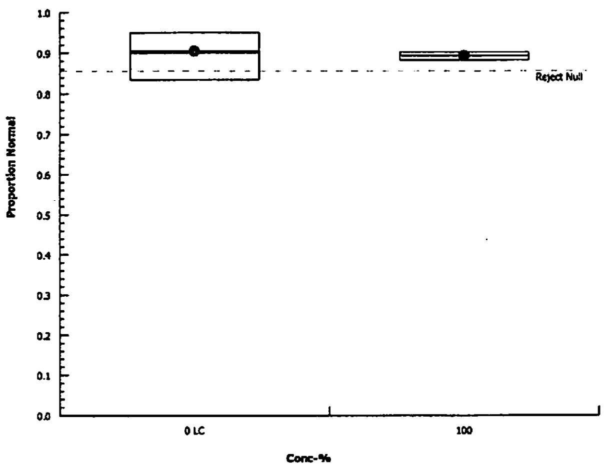
Proportion Normal Summary

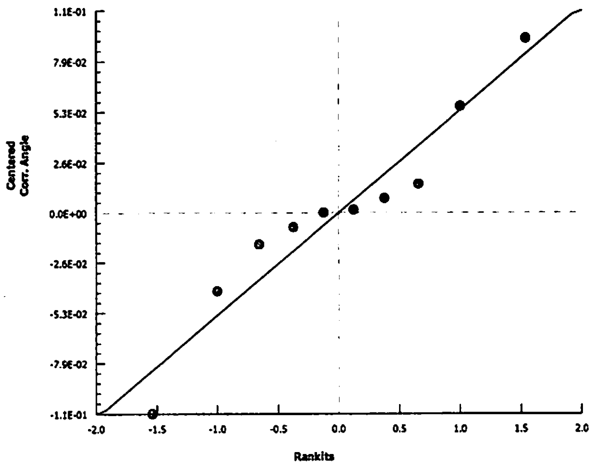
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9005	0.8430	0.9580	0.9043	0.8341	0.9507	0.0207	5.14%	0.00%
100		5	0.8925	0.8829	0.9021	0.8935	0.8821	0.9017	0.0034	0.86%	0.89%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.256	1.16	1.353	1.256	1.151	1.347	0.03467	6.17%	0.00%
100		5	1.237	1.221	1.252	1.238	1.22	1.252	0.005555	1.00%	1.55%

Graphics





CETIS Analytical Report

Report Date: 08 Apr-19 12:50 (p 3 of 3)
Test Code: 18-11-009 | 04-7819-0950

Bivalve Larval Survival and Development Test — **Wood Environment & Infrastructure Solutions**

Analysis ID: 20-7375-2386 **Endpoint:** Survival Rate **CETIS Version:** CETISv1.9.3
Analyzed: 08 Apr-19 12:49 **Analysis:** Nonparametric-Two Sample **Official Results:** Yes

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	100% passed survival rate	0.85%

Wilcoxon Rank Sum Two-Sample Test

Control	vs	Conc-%	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		100	30	n/a	1	8	Exact	1.0000	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0026095	0.0026095	1	1	0.3466	Non-Significant Effect
Error	0.0208763	0.0026095	8			
Total	0.0234858		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	7.111	11.26	0.0285	Equal Variances
Variances	Mod Levene Equality of Variance Test	1	13.75	0.3559	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.6247	0.7411	1.1E-04	Non-Normal Distribution

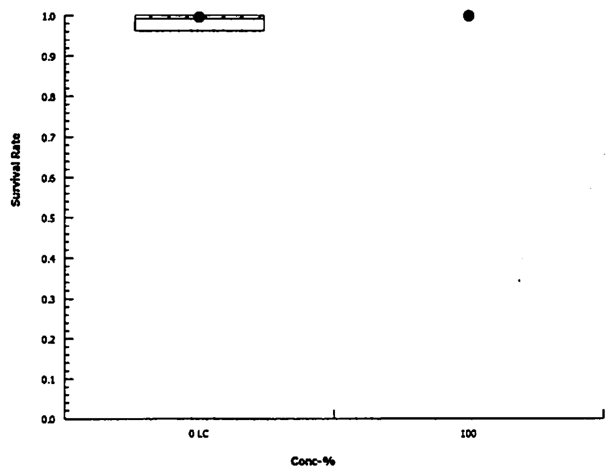
Survival Rate Summary

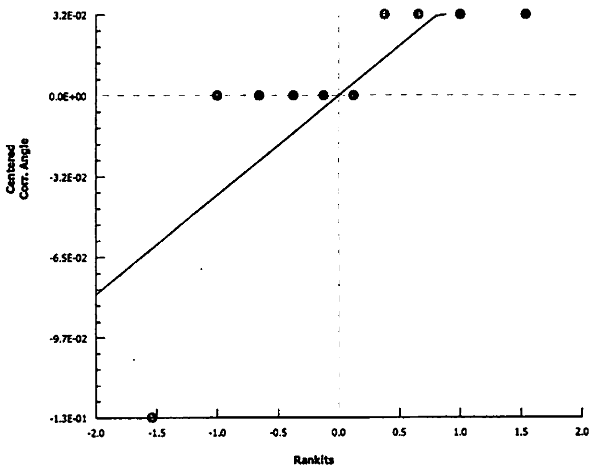
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9924	0.9714	1.0000	1.0000	0.9621	1.0000	0.0076	1.71%	0.00%
100		5	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-0.76%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.504	1.414	1.594	1.536	1.375	1.536	0.03231	4.80%	0.00%
100		5	1.536	1.536	1.537	1.536	1.536	1.536	0	0.00%	-2.15%

Graphics





Analyst: JUU QA:

Embryo-Larval Development Test
Scoring Worksheet

Client: Amec FW (Wood)
Project ID: SIYB Gate 1; Gate 2
Test No.: 18-11-008, 009

Test Species: *M. galloprovincialis*
Start Date: 11/7/2018 1440
End Date: 11/9/2018 1530

Random #	# Counted	# Normal	Tech Initials	Notes
1			EN	$\bar{X}$=211
2				
3	263	235		
4				
5	246	217		
6				
7				
8	239	205		
9	236	211		
10	253	227		
11				
12				
13	253	219		
14	203	193		
15				
16	214	190		
17				
18	211	176		
19				
20	230	208		
21	231	203		
22	234	211		
23				
24	229	214		
25				
26	221	180		
27				
28				
29				
30				
31	231	202		
32				
33				
34				
35				

QC Check: SC 12/17/18
Final Review: JW 12/20/18

Amec FW
SIYB Gate 1; Gate 2
Random Numbers
11/7/18

SAMPLE ID	Rand#
Lab Control 1	20 18 14 21 24
Gate 1 25%	29 19 32 34 30
Gate 1 50%	23 28 1 12 35
Gate 1 100%	26 9 13 31 8
Gate 2 25%	33 4 11 25 17
Gate 2 50%	7 2 15 6 27
Gate 2 100%	16 22 5 3 10

QC Check - Mussel: AG

Final QC: SC 12/17/18

Water Quality for Bivalve Development

Client: AMEC FW
Project ID: SIYB - Gate 1, Gate 2
Test No. 18-11-008, 009

Test Species: *M. galloprovincialis*
Start Date/Time: 11/7/2018 1440
End Date/Time: 11/9/2018 1530

Test Conc. (%)		Water Quality Measurements		
	Parameter	0hr	24hr	48hr
Lab Control	Temp. (°C)	15.8	15.0	15.1
	Salinity (ppt)	31.9	32.1	32.0
	pH (units)	7.90	7.84	7.80
	DO (mg/L)	7.7	8.7	8.0
Gate 1 25	Temp. (°C)	15.7	14.7	14.7
	Salinity (ppt)	32.3	32.5	32.4
	pH (units)	7.98	7.88	7.82
	DO (mg/L)	8.3	8.7	8.3
Gate 1 50	Temp. (°C)	15.4	14.6	14.5
	Salinity (ppt)	33.0	33.2	33.2
	pH (units)	7.95	7.88	7.84
	DO (mg/L)	8.5	8.7	8.5
Gate 1 100	Temp. (°C)	14.8	14.6	14.5
	Salinity (ppt)	34.2	34.5	34.6
	pH (units)	7.96	7.88	7.84
	DO (mg/L)	AG ~~34.2~~ 9.0	8.7	8.5
Gate 2 25	Temp. (°C)	15.8	14.7	14.5
	Salinity (ppt)	32.4	32.4	32.5
	pH (units)	7.96	7.90	7.87
	DO (mg/L)	8.5	8.7	8.4
Gate 2 50	Temp. (°C)	15.4	14.7	14.5
	Salinity (ppt)	33.1	33.1	33.1
	pH (units)	7.97	7.90	7.87
	DO (mg/L)	8.8	8.7	8.5
Gate 2 100	Temp. (°C)	14.6	14.7	14.5
	Salinity (ppt)	34.2	34.2	34.3
	pH (units)	7.97	7.90	7.88
	DO (mg/L)	8.8	8.7	8.5
	Tech Initials:	AG	AD	AG

Source of Animals: Mission Bay

Date Received: 8/14/18 & 11/7/18

Comments:

QC Check: 12/17/18

Final Review: JW 12/19/18

Wood Environmental Toxicology Lab, 4905 Morena Blvd, Ste. 1304, San Diego, CA 92117

Embryo-Larval Development Test

Stock Preparation Worksheet

Test Species: *M. galloprovincialis*
Batch ID: 11/7/18
Test Type: Mg-d

Test Date: 11/7/2018 | 1440
Analyst: AG

Task	
Spawning Induction	0955
Spawning Begins	1040
# Males/# Females	5/4
Spawn Condition	good
Fertilization Initiated	1130
Fertilzation End/Eggs Rinsed	1200
Embryo Counts	1340
Test Initiation	~~1340~~ 1440 AG

Embryo Density Counts **# per 100 µL**

Stock #	Stock Volume (mL)	Rep 1	Rep 2	Rep 3	Rep 4	Mean #/100 µL	Mean #/mL (x10)
Stock 1	200	123	150	135	146	138.5	1,385
Stock 2	200	96	81	114	90	95.3	953
Stock 3							

x = 1,169

Cell Division:

	% Divided
Stock 1	97
Stock 2	97
Stock 3	

Selected Stock:	1 & 2

Stock Density **Dil Factor**

Adjust selected embryo stock to 500 embryos/mL. 1,169 / 500 2.3
Dilution Factor = Stock Density/mL/500

In 10 mL sample volume add 500 µl of 500 embryo/ml stock to obtain 25 embryos/mL in test vials.

Notes: QC1 = 185/206 = 90% QC2 =

TØ1 = 233 TØ2 = 207 TØ3 = 201 TØ4 = 203 TØ5 = 209

QA Review: 12/17/18 X̄ = 211 **Final Review:** 12/19/18

APPENDIX B

Sample Receipt Information

Sample Check-In: Effluent/Water

Client: Wood E&IS
Project Name: SIYB - Boatwash Pilot Study
Sample ID: Basin 1, Basin 2, Gate 1, Gate 2
Test ID No.: 18-11-006, 007, 008, 009

Wood Aquatic Toxicity Lab
4905 Morena Blvd, Ste. 1304
San Diego, CA 92117

Sample ID (or A, B, C):	Basin 1	Basin 2	Gate 1	Gate 2
Sample Number:	2018-W0067	-W0068	-W0069	-W0070
Collection Date & Time:	11/6/18 1255	11/6/18 1305	11/6/18 1230	11/6/18 1240
Receipt Date & Time:	11/6/18 1434	→	→	→
Total Sample Volume (L):	4L	4L	4L	4L
Receipt Temperature (°C):	14.0	9.0	9.0	7.0
Appropriate Temp (Yes/No)[1]:	Y	Y	Y	Y
pH (units):	7.89	7.92	7.93	7.94
DO (mg/L):	7.8 ~~34.9~~ AD	7.9	8.4	7.9
Conductivity (µS/cm)[2]:	—		—	—
Salinity (ppt):	34.6	AD ~~33.~~ 34.1	34.3	34.2
Alkalinity (mg/L):	89	91	98	101
Hardness (mg/L)[2]:	-	-	-	-
Total Chlorine (mg/L)[3]:	<0.02	<0.02	<0.02	<0.02
Free Chlorine (mg/L)[3]:	—	—	—	—
Technician Initials:	AD/AG	→	→	→

Notes:

[1] Temperature should be 0 - 6°C if received > 24 hours past collection
[2] Only measured on samples with less than 3 ppt salinity
[3] If total chlorine is above 0.10 mg/L, the free chlorine will be measured
[4] Debris, odor, and color is described only if observed in the sample

Sample Descriptions[4]:

Basin 1: No debris, odorless, colorless
Basin 2: No debris, odorless, colorless
Gate 1: No debris, odorless, colorless
Gate 2: No debris, odorless, colorless

Test Organism: Mussels	Dilution Water: [✓ Nat-SW] Art-SW, RW, DMW, Other________	Salinity 32 ppt
	Additional Control:________________________	Salinity______
Test Organism:__________	Dilution Water: Nat-SW, Art-SW, RW, DMW, Other________	Salinity______
	Additional Control:________________________	Salinity______
Test Organism:__________	Dilution Water: Nat-SW, Art-SW, RW, DMW, Other________	Salinity______
	Additional Control:________________________	Salinity______

Additional Comments:

Initial QC: 12/17/18
Final Review: JW 12/19/18

APPENDIX C

Chain of Custody Form

wood.

Wood Environmental Toxicology Lab
4905 Morena Blvd, Ste. 1304
San Diego, CA 92117
Phone: (858) 299-5368

Chain of Custody Form

Page 1 **of** 1

Client/Send Report To:

Company Wood
Address
Contact/PM Corey Sheredy
Phone Number
Email Address

Project Information (if needed):

Project Name Boatwash Monitoring
Project No. 1715100615
PO Number

Personal Cooler Shipped:
Return Requested: YES____ NO____.

Analysis Requested (write out or use codes below)

Sample ID	Collection Date	Collection Time	Sample Volume	Sample Type: Grab/Comp.	Sample Number (for lab use)	Mg-dv							Receipt Temp (°C)
BASIN 1	11/06/18	1255	4L	Comp	2018-W0067	X							14.0
BASIN 2	11/06/18	1305	4L	Comp	-W0068	X							9.0
GATE 1	11/06/18	1230	4L	Comp	-W0069	X							9.0
GATE 2	11/06/18	1240	4L	Comp	-W0070	X							7.0

Samples Collected By: Corey Sheredy / Marisa Swiderski

Additional Comments:

Samples Shipped via:
Condition Upon Receipt:

Relinquished/Shipped By:
Signature:
Print Name: Marisa Swiderski
Date/Time: 11/06/18 1434

Received By:
Signature:
Print Name: Steve Carlson
Date/Time: 11/6/18 1434

Relinquished By:
Signature:
Print Name:
Date/Time:

Received By:
Signature:
Print Name:
Date/Time:

Test Codes (marine):

Mp-c: Chronic Kelp
Hr-dv: Chronic Abalone
Aa-a: Acute Topsmelt
Aa-c: Chronic Topsmelt
Mb-a: Acute Menidia/Silverside
Mb-c: Chronic Menidia/Silverside
Ab-a: Acute Mysid Shrimp
Ab-c: Chronic Mysid Shrimp
Sp-c: Chronic Urchin Fertilization
Sp-dv: Chronic Urchin Development
Mg-dv: Chronic Mussel Development
Other: Write out the test organism

Test Codes (freshwater):

Cd-a: Acute Ceriodaphnia
Cd-c: Chronic Ceriodaphnia
Pp-a: Acute Fathead Minnow
Pp-c: Chronic Fathead Minno
Sc-c: Chronic Green Algae
Ha-a: Acute Hyalella amphipod
Ha-c: Chronic Hyalella amphipod
T-22: CA Title 22 Hazardous Waste

APPENDIX D

Reference Toxicant Test

CETIS Summary Report

Report Date: 20 Dec-18 11:10 (p 1 of 2)
Test Code: 181107mgrd | 21-2560-8966

Bivalve Larval Survival and Development Test — **Amec Foster Wheeler - San Diego**

Batch ID:	10-8754-2954	**Test Type:**	Development-Survival	**Analyst:**	
Start Date:	07 Nov-18 14:40	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Natural Seawater
Ending Date:	09 Nov-18 15:30	**Species:**	Mytilis galloprovincialis	**Brine:**	Not Applicable
Duration:	49h	**Source:**	Field Collected	**Age:**	

Sample ID:	19-1960-4968	**Code:**	181107mgrd	**Client:**	Internal
Sample Date:	07 Nov-18	**Material:**	Total Copper	**Project:**	
Receipt Date:	07 Nov-18	**Source:**	Reference Toxicant		
Sample Age:	15h	**Station:**			

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	NOEL	LOEL	TOEL	TU	PMSD ✓
11-5458-1101	Combined Proportion Norma	Dunnett Multiple Comparison Test	5	10	7.071		6.06% ✓
18-9270-1565	Proportion Normal	Bonferroni Adj t Test	5	10	7.071		5.26% ✓
19-6531-4464	Survival Rate	Steel Many-One Rank Sum Test	20	40	28.28		6.91%

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	µg/L	95% LCL	95% UCL	TU ✓
08-1725-7308	Combined Proportion Norma	Trimmed Spearman-Kärber	EC50	7.288	7.201	7.377	

Test Acceptability

				TAC Limits			
Analysis ID	Endpoint	Attribute	Test Stat	Lower	Upper	Overlap	Decision
18-9270-1565	Proportion Normal	Control Resp	0.9127	0.9	>>	Yes	Passes Criteria
19-6531-4464	Survival Rate	Control Resp	0.9801	0.5	>>	Yes	Passes Criteria
11-5458-1101	Combined Proportion Norma	PMSD	0.06064	<<	0.25	No	Passes Criteria

Combined Proportion Normal Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.8942	0.8311	0.9573	0.8389	0.9638	0.0227	0.0508	5.68%	0.00%
2.5		5	0.8889	0.8741	0.9036	0.8773	0.9050	0.0053	0.0119	1.34%	0.59%
5		5	0.8746	0.8395	0.9097	0.8511	0.9213	0.0126	0.0283	3.23%	2.20%
10		5	0.0611	0.0170	0.1051	0.0284	0.1038	0.0159	0.0355	58.09%	93.17%
20		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%
40		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%

Survival Rate Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9801	0.9248	1.0000	0.9005	1.0000	0.0199	0.0445	4.54%	0.00%
2.5		5	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-2.03%
5		5	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-2.03%
10		5	0.9393	0.7928	1.0000	0.7299	1.0000	0.0528	0.1180	12.56%	4.16%
20		5	0.8701	0.7398	1.0000	0.7536	1.0000	0.0470	0.1050	12.07%	11.22%
40		5	0.0190	0.0000	0.0653	0.0000	0.0853	0.0167	0.0373	196.85%	98.07%

Analyst: JW QA: JC 12/20/18

Bivalve Larval Survival and Development Test — **Amec Foster Wheeler - San Diego**

Combined Proportion Normal Detail

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9263	0.8582	0.8389	0.8838	0.9638
2.5		0.9050	0.8773	0.8836	0.8977	0.8809
5		0.8511	0.8776	0.9213	0.8541	0.8689
10		0.0444	0.0284	0.1038	0.0340	0.0948
20		0.0000	0.0000	0.0000	0.0000	0.0000
40		0.0000	0.0000	0.0000	0.0000	0.0000

Survival Rate Detail

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	1.0000	1.0000	0.9005	1.0000	1.0000
2.5		1.0000	1.0000	1.0000	1.0000	1.0000
5		1.0000	1.0000	1.0000	1.0000	1.0000
10		1.0000	0.7299	1.0000	1.0000	0.9668
20		1.0000	0.7536	0.7725	0.9289	0.8957
40		0.0095	0.0000	0.0000	0.0000	0.0853

Combined Proportion Normal Binomials

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	201/217	224/261	177/211	213/241	213/221
2.5		200/221	193/220	205/232	193/215	207/235
5		200/235	215/245	199/216	199/233	212/244
10		11/248	6/211	22/212	8/235	20/211
20		0/227	0/211	0/211	0/211	0/211
40		0/211	0/211	0/211	0/211	0/211

Survival Rate Binomials

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	211/211	211/211	190/211	211/211	211/211
2.5		211/211	211/211	211/211	211/211	211/211
5		211/211	211/211	211/211	211/211	211/211
10		211/211	154/211	211/211	211/211	204/211
20		211/211	159/211	163/211	196/211	189/211
40		2/211	0/211	0/211	0/211	18/211

Analyst: Jw QA: JC

CETIS Analytical Report

Report Date: 20 Dec-18 11:10 (p 1 of 4)
Test Code: 181107mgrd | 21-2560-8966

Bivalve Larval Survival and Development Test — **Amec Foster Wheeler - San Diego**

Analysis ID:	11-5458-1101	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	20 Dec-18 11:10	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	C > T	5	10	7.071		6.06%

Dunnett Multiple Comparison Test

Control	vs	Conc-µg/L	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		2.5	0.4215	2.227	0.089	8	CDF	0.5793	Non-Significant Effect
		5	0.9383	2.227	0.089	8	CDF	0.3561	Non-Significant Effect
		10*	25.22	2.227	0.089	8	CDF	7.0E-07	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.66708	1.22236	3	307	<1.0E-37	Significant Effect
Error	0.0637118	0.003982	16			
Total	3.73079		19			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	7.387	11.34	0.0605	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9555	0.866	0.4576	Normal Distribution

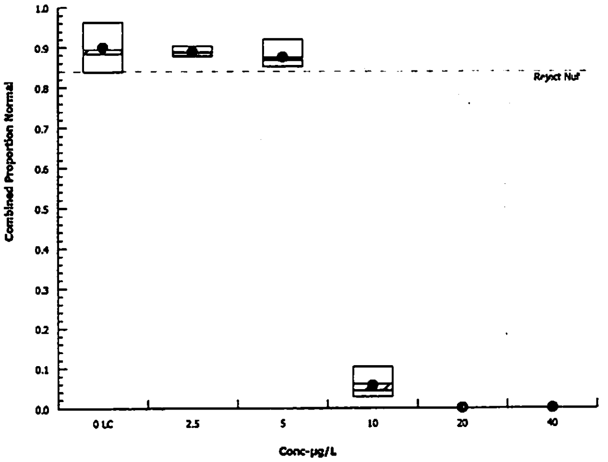
Combined Proportion Normal Summary

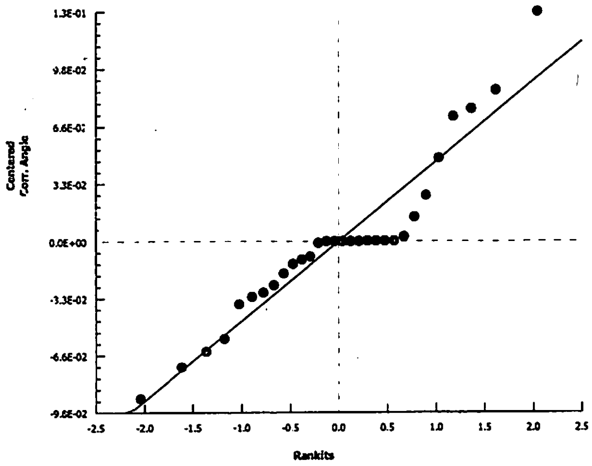
Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.8942	0.8311	0.9573	0.8838	0.8389	0.9638	0.0227	5.68%	0.00%
2.5		5	0.8889	0.8741	0.9036	0.8836	0.8773	0.9050	0.0053	1.34%	0.59%
5		5	0.8746	0.8395	0.9097	0.8689	0.8511	0.9213	0.0126	3.23%	2.20%
10		5	0.0611	0.0170	0.1051	0.0444	0.0284	0.1038	0.0159	58.09%	93.17%
20		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%
40		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%

Angular (Corrected) Transformed Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.248	1.137	1.36	1.223	1.158	1.379	0.0402	7.20%	0.00%
2.5		5	1.231	1.208	1.255	1.223	1.213	1.257	0.008536	1.55%	1.35%
5		5	1.211	1.155	1.267	1.2	1.175	1.286	0.02021	3.73%	3.00%
10		5	0.2416	0.15	0.3332	0.2122	0.1694	0.328	0.03299	30.53%	80.64%
20		5	0.03418	0.03349	0.03487	0.03443	0.03319	0.03443	0.0002472	1.62%	97.26%
40		5	0.03443	0.03442	0.03444	0.03443	0.03443	0.03443	0	0.00%	97.24%

Graphics





Analyst: SW QA:

Bivalve Larval Survival and Development Test — **Amec Foster Wheeler - San Diego**

Analysis ID:	18-9270-1565	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	20 Dec-18 11:09	**Analysis:**	Parametric-Multiple Comparison	**Official Results:**	Yes

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	C > T	5	10	7.071		5.26%

Bonferroni Adj t Test

Control	vs	Conc-µg/L	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		2.5	1.293	2.328	0.084	8	CDF	0.3213	Non-Significant Effect
		5	1.867	2.328	0.084	8	CDF	0.1205	Non-Significant Effect
		10*	28.63	2.328	0.084	8	CDF	<1.0E-37	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.69723	1.23241	3	381.3	<1.0E-37	Significant Effect
Error	0.0517076	0.0032317	16			
Total	3.74894		19			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	6.075	11.34	0.1080	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9665	0.866	0.6797	Normal Distribution

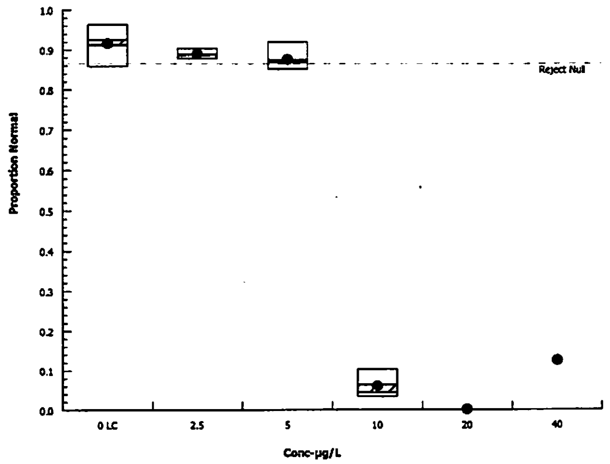
Proportion Normal Summary

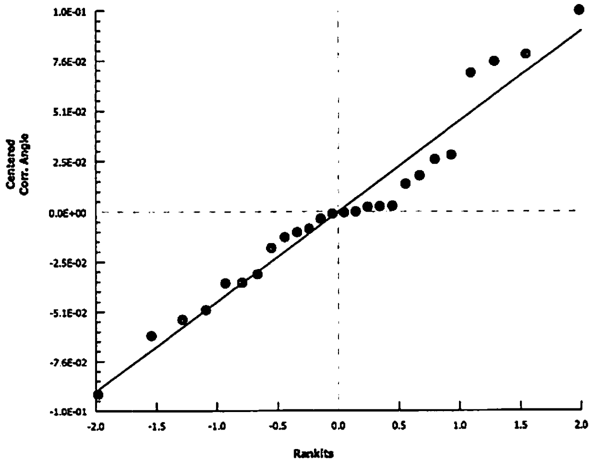
Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9127	0.8610	0.9645	0.9263	0.8582	0.9638	0.0186	4.57%	0.00%
2.5		5	0.8889	0.8741	0.9036	0.8836	0.8773	0.9050	0.0053	1.34%	2.61%
5		5	0.8746	0.8395	0.9097	0.8689	0.8511	0.9213	0.0126	3.23%	4.18%
10		5	0.0638	0.0215	0.1062	0.0444	0.0340	0.1038	0.0153	53.42%	93.01%
20		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%
40		1	0.0000			0.0000	0.0000	0.0000	0.0000		100.00%

Angular (Corrected) Transformed Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.278	1.183	1.372	1.296	1.185	1.379	0.03399	5.95%	0.00%
2.5		5	1.231	1.208	1.255	1.223	1.213	1.257	0.008536	1.55%	3.64%
5		5	1.211	1.155	1.267	1.2	1.175	1.286	0.02021	3.73%	5.25%
10		5	0.2486	0.1631	0.3341	0.2122	0.1856	0.328	0.0308	27.71%	80.55%
20		5	0.03683	0.03353	0.04012	0.03638	0.03319	0.03966	0.001187	7.21%	97.12%
40		1	0.3614			0.3614	0.3614	0.3614	0	0.00%	71.72%

Graphics





Bivalve Larval Survival and Development Test — **Amec Foster Wheeler - San Diego**

Analysis ID:	19-6531-4464	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.3
Analyzed:	18 Dec-18 11:52	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	C > T	20	40	28.28		6.91%

Steel Many-One Rank Sum Test

Control vs	Conc-µg/L	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Lab Control	2.5	30	16	1	8	Asymp	0.9446	Non-Significant Effect
	5	30	16	1	8	Asymp	0.9446	Non-Significant Effect
	10	25	16	1	8	Asymp	0.6353	Non-Significant Effect
	20	19	16	1	8	Asymp	0.1314	Non-Significant Effect
	40*	15	16	0	8	Asymp	0.0191	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	7.78608	1.55722	5	79.68	<1.0E-37	Significant Effect
Error	0.469042	0.0195434	24			
Total	8.25512		29			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	3.284	3.895	0.0212	Equal Variances
Variances	Mod Levene Equality of Variance Test	1.376	4.248	0.2796	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.902	0.9031	0.0094	Non-Normal Distribution

Survival Rate Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9801	0.9248	1.0000	1.0000	0.9005	1.0000	0.0199	4.54%	0.00%
2.5		5	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-2.03%
5		5	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-2.03%
10		5	0.9393	0.7928	1.0000	1.0000	0.7299	1.0000	0.0528	12.56%	4.16%
20		5	0.8701	0.7398	1.0000	0.8957	0.7536	1.0000	0.0470	12.07%	11.22%
40		5	0.0190	0.0000	0.0653	0.0000	0.0000	0.0853	0.0167	196.85%	98.07%

Angular (Corrected) Transformed Summary

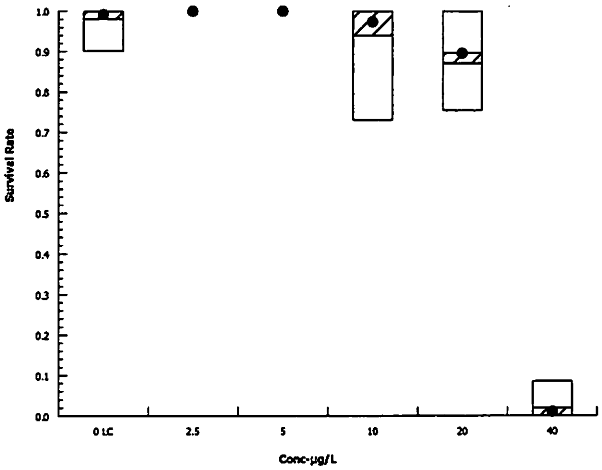
Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.479	1.32	1.638	1.536	1.25	1.536	0.05731	8.66%	0.00%
2.5		5	1.536	1.536	1.537	1.536	1.536	1.536	0	0.00%	-3.87%
5		5	1.536	1.536	1.537	1.536	1.536	1.536	0	0.00%	-3.87%
10		5	1.404	1.129	1.68	1.536	1.024	1.536	0.09926	15.81%	5.06%
20		5	1.241	0.9965	1.485	1.242	1.051	1.536	0.08799	15.86%	16.11%
40		5	0.09944	-0.04142	0.2403	0.03443	0.03443	0.2964	0.05073	114.08%	93.28%

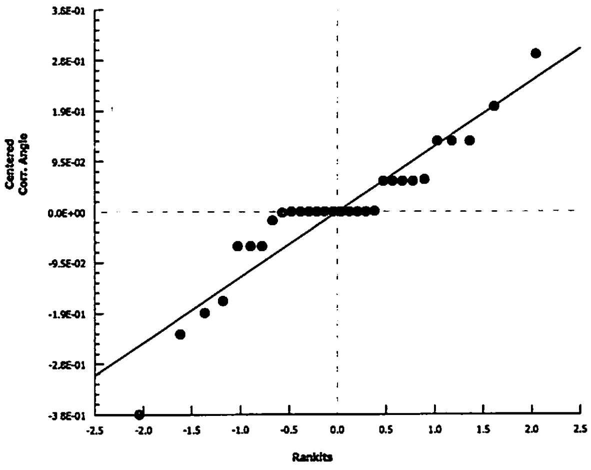
Analyst: JW QA: Sc

Bivalve Larval Survival and Development Test **Amec Foster Wheeler - San Diego**

Analysis ID:	19-6531-4464	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.3
Analyzed:	18 Dec-18 11:52	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Graphics





Analyst: SW QA:

CETIS Analytical Report

Report Date: 20 Dec-18 11:10 (p 1 of 1)
Test Code: 181107mgrd | 21-2560-8966

Bivalve Larval Survival and Development Test — **Amec Foster Wheeler - San Diego**

Analysis ID:	08-1725-7308	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	20 Dec-18 11:10	**Analysis:**	Trimmed Spearman-Kärber	**Official Results:**	Yes

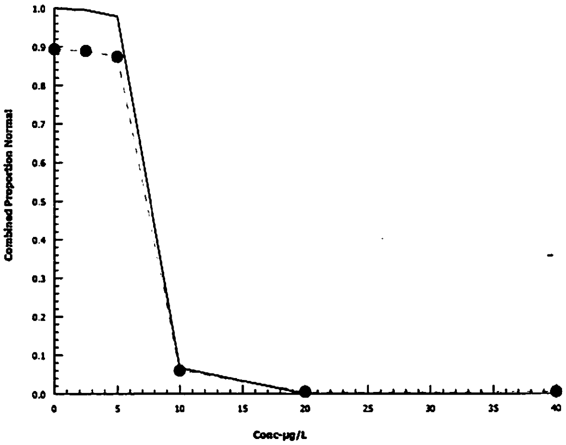
Trimmed Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0.1069	0.50%	0.8626	0.002632	7.288	7.201	7.377

Combined Proportion Normal Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-µg/L	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	LC	5	0.8942	0.8389	0.9638	0.0508	5.69%	0.0%	1028/1151	0.8942	0.0%
2.5		5	0.8889	0.8773	0.9050	0.0119	1.34%	0.59%	998/1123	0.8889	0.59%
5		5	0.8746	0.8511	0.9213	0.0283	3.23%	2.2%	1025/1173	0.8746	2.2%
10		5	0.0611	0.0284	0.1038	0.0355	58.09%	93.17%	67/1117	0.06108	93.17%
20		5	0.0000	0.0000	0.0000	0.0000		100.0%	0/1071	0	100.0%
40		5	0.0000	0.0000	0.0000	0.0000		100.0%	0/1055	0	100.0%

Graphics



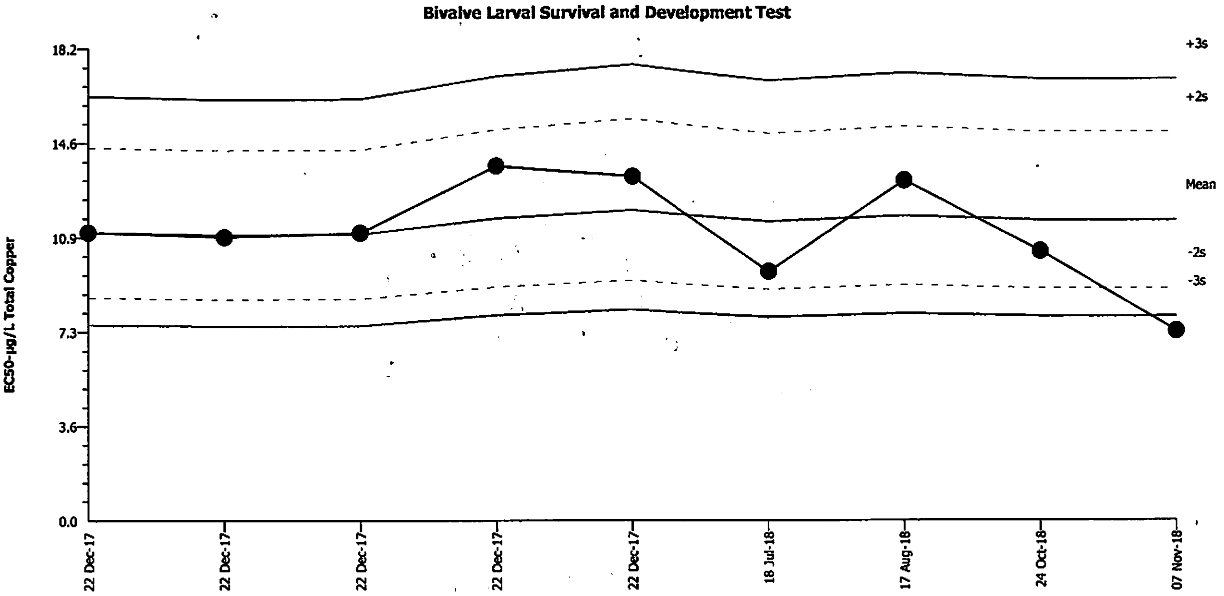
Analyst:______ QA:______

CETIS QC Plot

Report Date: 20 Dec-18 11:12 (1 of 1)

Bivalve Larval Survival and Development Test — **Amec Foster Wheeler - San Diego**

Test Type:	Development-Survival	**Organism:**	Mytilis galloprovincialis (Bay Mussel)	**Material:**	Total Copper
Protocol:	EPA/600/R-95/136 (1995)	**Endpoint:**	Combined Proportion Normal	**Source:**	Reference Toxicant-REF



Mean:	11.57	**Count:**	8	**-2s Warning Limit:**	8.943	**-3s Action Limit:**	7.864
Sigma:	n/a	**CV:**	12.90%	**+2s Warning Limit:**	14.96	**+3s Action Limit:**	17.01

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2017	Dec	22	15:00	11.13	-0.4365	-0.2992			19-1537-3013	20-7428-0259
2			22	15:00	10.95	-0.6189	-0.4276			13-8076-0092	04-7666-8867
3			22	15:00	11.1	-0.4605	-0.3159			18-9173-1279	00-8804-3805
4			22	15:10	13.69	2.122	1.31			05-2148-4604	14-2190-9809
5			22	15:10	13.26	1.696	1.064			07-4924-1298	02-9536-6591
6	2018	Jul	18	12:30	9.593	-1.972	-1.454			17-4700-2672	19-1834-7581
7		Aug	17	18:15	13.11	1.542	0.9733			06-6531-4070	03-3159-5721
8		Oct	24	14:25	10.37	-1.192	-0.8459			10-5049-1350	21-2167-7967
9		Nov	7	14:40	7.288	-4.277	-3.59	(-)	(-)	21-2560-8966	08-1725-7308

Analyst: ______ QA: 12/20/18

CETIS Test Data Worksheet

Report Date: 05 Nov-18 14:27 (p 1 of 1)
Test Code/ID: 21-2560-8966/181107mgrd

Bivalve Larval Survival and Development Test — **Amec Foster Wheeler - San Diego**

Start Date:	07 Nov-18 1440	**Species:**	Mytilis galloprovincialis	**Sample Code:**	181107mgrd
End Date:	09 Nov-18 1530	**Protocol:**	EPA/600/R-95/136 (1995)	**Sample Source:**	Reference Toxicant
Sample Date:	07 Nov-18	**Material:**	Total Copper	**Sample Station:**	

Conc-µg/L	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
			71			18	0	X̄=211
			72			232	205	
			73			221	200	
			74			216	199	
			75			221	213	
			76			217	201	
			77			163	0	
			78			212	22	
			79			190	177	
			80			204	20	
			81			154	~~148~~	6
			82			245	215	
			83			248	11	
			84			227	0	
			85			233	199	
			86			2	0	
			87			244	212	
			88			0	0	
			89			220	193	
			90			196	0	
			91			235	200	
			92			241	213	
			93			0	0	
			94			189	0	
			95			261	224	
			96			159	0	
			97			235	8	
			98			215	193	
			99			0	0	
			100			235	207	

Analyst: EN QA: 12/17/18

CETIS Test Data Worksheet

Report Date: 05 Nov-18 14:28 (p 1 of 1)
Test Code/ID: 21-2560-8966/181107mgrd

Bivalve Larval Survival and Development Test — **Amec Foster Wheeler - San Diego**

Start Date:	07 Nov-18	**Species:**	Mytilis galloprovincialis	**Sample Code:**	181107mgrd
End Date:	09 Nov-18	**Protocol:**	EPA/600/R-95/136 (1995)	**Sample Source:**	Reference Toxicant
Sample Date:	07 Nov-18	**Material:**	Total Copper	**Sample Station:**	

Conc-µg/L	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
0	LC	1	76					
0	LC	2	95					
0	LC	3	79					
0	LC	4	92					
0	LC	5	75					
2.5		1	73					
2.5		2	89					
2.5		3	72					
2.5		4	98					
2.5		5	100					
5		1	91					
5		2	82					
5		3	74					
5		4	85					
5		5	87					
10		1	83					
10		2	81					
10		3	78					
10		4	97					
10		5	80					
20		1	84					
20		2	96					
20		3	77					
20		4	90					
20		5	94					
40		1	86					
40		2	93					
40		3	88					
40		4	99					
40		5	71					

QC:AG

Analyst: AP QA: 12/17/18

Water Quality for Bivalve Development

Client: Internal
Project ID: Cu Reftox
Test No. 181107mgrd

Test Species: *M. galloprovincialis*
Start Date/Time: 11/7/2018 1440
End Date/Time: 11/9/2018 1530

Test Conc. (µg/L)	Water Quality Measurements			
	Parameter	**0hr**	**24hr**	**48hr**
Lab Control	Temp. (°C)	15.2	14.8	14.4
	Salinity (ppt)	31.7	32.1	32.4
	pH (units)	7.96	7.89	7.88
	DO (mg/L)	8.0	8.7	8.6
2.5	Temp. (°C)	14.8	14.6	14.4
	Salinity (ppt)	31.8	32.2	32.4
	pH (units)	7.97	7.89	7.90
	DO (mg/L)	8.2	8.8	8.6
5	Temp. (°C)	14.7	14.6	14.4
	Salinity (ppt)	31.9	32.3	32.6
	pH (units)	7.97	7.88	7.89
	DO (mg/L)	8.3	8.8	8.6
10	Temp. (°C)	14.7	14.6	14.3
	Salinity (ppt)	31.9	32.4	32.6
	pH (units)	7.97	7.89	7.89
	DO (mg/L)	8.3	8.8	8.6
20	Temp. (°C)	14.7	14.7	14.3
	Salinity (ppt)	31.9	32.4	32.6
	pH (units)	7.97	7.88	7.90
	DO (mg/L)	8.3	8.8	8.6
40	Temp. (°C)	14.8	14.7	AG ~~14.7~~ 14.3
	Salinity (ppt)	31.9	32.3	32.6
	pH (units)	7.97	7.88	7.90
	DO (mg/L)	8.3	8.8	8.5
	Tech Initials:	AG	AD	AG

Source of Animals: Mission Bay

Date Received: 8/14/18 & 11/7/18

Comments:

QC Check: jc 12/17/18

Final Review: JW 12/19/18

Wood Environmental Toxicology Lab, 4905 Morena Blvd, Ste. 1304, San Diego, CA 92117

Embryo-Larval Development Test
Stock Preparation Worksheet

Test Species: *M. galloprovincialis*
Batch ID: 11/7/18
Test Type: Mg-d

Test Date: 11/7/2018 1440
Analyst: AG

Task	
Spawning Induction	0955
Spawning Begins	1040
# Males/# Females	5/4
Spawn Condition	good
Fertilization Initiated	1130
Fertilzation End/Eggs Rinsed	1200
Embryo Counts	1340
Test Initiation	~~1340~~ AG 1440

Embryo Density Counts # per 100 µL

Stock #	Stock Volume (mL)	Rep 1	Rep 2	Rep 3	Rep 4	Mean #/100 µL	Mean #/mL (x10)
Stock 1	200	123	150	135	146	138.5	1,385
Stock 2	200	96	81	114	90	95.3	953
Stock 3							

x = 1,169

Cell Division:

	% Divided
Stock 1	97
Stock 2	97
Stock 3	

Selected Stock: 1 & 2

Adjust selected embryo stock to 500 embryos/mL.
Dilution Factor = Stock Density/mL/500

Stock Density $\frac{1,169}{500}$ **Dil Factor** 2.3

In 10 mL sample volume add 500 µl of 500 embryo/ml stock to obtain 25 embryos/mL in test vials.

Notes: QC_1 = 185/206 = 90% QC_2 =

$T0_1$ = 233 $T0_2$ = 207 $T0_3$ = 201 $T0_4$ = 203 $T0_5$ = 209

$\bar{X}$ = 211

QA Review: 12/17/18

Final Review: JW 12/19/18

EVENT 3 (BOATWASH CLEANING) CHEMISTRY LAB REPORTS

WECK LABORATORIES, INC.

Certificate of Analysis

FINAL REPORT

Work Orders: 9C28056

Project: Boatwash Pilot Study

Attn: Barry Snyder

Client: Wood - San Diego 2
9210 Sky Park Court, Suite 200
San Diego, CA 92123

Report Date: 4/19/2019

Received Date: 3/28/2019

Turnaround Time: Normal

Phones: (858) 300-4320

Fax: (858) 300-4301

P.O. #:

Billing Code:

EPA-UCMR #CA00211 • Guam-EPA #17-008R • HW-DOH # • ISO 17025 #L2457.01 • LACSD #10143 • NELAP-CA #04229CA • NELAP-OR #4047 • NJ-DEP #CA015 • NV-DEP #NAC 445A • SCAQMD #93LA1006

This is a complete final report. The information in this report applies to the samples analyzed in accordance with the chain-of-custody document. Weck Laboratories certifies that the test results meet all requirements of TNI unless noted by qualifiers or written in the Case Narrative. This analytical report must be reproduced in its entirety.

Dear Barry Snyder,

Enclosed are the results of analyses for samples received 3/28/19 with the Chain-of-Custody document. The samples were received in good condition, at 4.7 °C and on ice. All analyses met the method criteria except as noted in the case narrative or in the report with data qualifiers.

Reviewed by:

Chris Samatmanakit
Project Manager

Sample Summary

Sample Name	Sampled By	Lab ID	Matrix	Sampled	Qualifiers
Gate1-Top-T0	Corey Sheredy/Marissa Swiderski	9C28056-01	Water	03/27/19 08:15	
Gate1-Bottom-T0	Corey Sheredy/Marissa Swiderski	9C28056-02	Water	03/27/19 08:20	
Gate2-Top-T0	Corey Sheredy/Marissa Swiderski	9C28056-03	Water	03/27/19 08:25	
Gate2-Bottom-T0	Corey Sheredy/Marissa Swiderski	9C28056-04	Water	03/27/19 08:30	
Basin1-Top-T0	Corey Sheredy/Marissa Swiderski	9C28056-05	Water	03/27/19 08:15	
Basin1-Bottom-T0	Corey Sheredy/Marissa Swiderski	9C28056-06	Water	03/27/19 08:20	
Basin2-Top-T0	Corey Sheredy/Marissa Swiderski	9C28056-07	Water	03/27/19 08:25	
Basin2-Bottom-T0	Corey Sheredy/Marissa Swiderski	9C28056-08	Water	03/27/19 08:30	
Gate1-Top-T1	Corey Sheredy/Marissa Swiderski	9C28056-09	Water	03/27/19 10:20	
Gate1-Bottom-T1	Corey Sheredy/Marissa Swiderski	9C28056-10	Water	03/27/19 10:25	
Gate2-Top-T1	Corey Sheredy/Marissa Swiderski	9C28056-11	Water	03/27/19 10:30	
Gate2-Bottom-T1	Corey Sheredy/Marissa Swiderski	9C28056-12	Water	03/27/19 10:35	
Basin1-Top-T1	Corey Sheredy/Marissa Swiderski	9C28056-13	Water	03/27/19 10:20	
Basin1-Bottom-T1	Corey Sheredy/Marissa Swiderski	9C28056-14	Water	03/27/19 10:25	
Basin2-Top-T1	Corey Sheredy/Marissa Swiderski	9C28056-15	Water	03/27/19 10:30	
Basin2-Bottom-T1	Corey Sheredy/Marissa Swiderski	9C28056-16	Water	03/27/19 10:35	
Gate1-Top-T2	Corey Sheredy/Marissa Swiderski	9C28056-17	Water	03/27/19 10:45	
Gate1-Bottom-T2	Corey Sheredy/Marissa Swiderski	9C28056-18	Water	03/27/19 10:50	
Gate2-Top-T2	Corey Sheredy/Marissa Swiderski	9C28056-19	Water	03/27/19 11:00	
Gate2-Bottom-T2	Corey Sheredy/Marissa Swiderski	9C28056-20	Water	03/27/19 11:05	
Basin1-Top-T2	Corey Sheredy/Marissa Swiderski	9C28056-21	Water	03/27/19 10:45	
Basin1-Bottom-T2	Corey Sheredy/Marissa Swiderski	9C28056-22	Water	03/27/19 10:50	
Basin2-Top-T2	Corey Sheredy/Marissa Swiderski	9C28056-23	Water	03/27/19 11:00	
Basin2-Bottom-T2	Corey Sheredy/Marissa Swiderski	9C28056-24	Water	03/27/19 11:05	
Gate1-Top-T2-REP	Corey Sheredy/Marissa Swiderski	9C28056-25	Water	03/27/19 10:55	
Basin1-Top-T2-REP	Corey Sheredy/Marissa Swiderski	9C28056-26	Water	03/27/19 10:55	
Gate1-Top-T3	Corey Sheredy/Marissa Swiderski	9C28056-27	Water	03/27/19 15:00	
Gate1-Bottom-T3	Corey Sheredy/Marissa Swiderski	9C28056-28	Water	03/27/19 15:05	
Gate2-Top-T3	Corey Sheredy/Marissa Swiderski	9C28056-29	Water	03/27/19 15:10	

Sample Name	Sampled By	Lab ID	Matrix	Sampled	Qualifiers
Gate2-Bottom-T3	Corey Sheredy/Marissa Swiderski	9C28056-30	Water	03/27/19 15:15	
Basin1-Top-T3	Corey Sheredy/Marissa Swiderski	9C28056-31	Water	03/27/19 15:00	
Basin1-Bottom-T3	Corey Sheredy/Marissa Swiderski	9C28056-32	Water	03/27/19 15:05	
Basin2-Top-T3	Corey Sheredy/Marissa Swiderski	9C28056-33	Water	03/27/19 15:10	
Basin2-Bottom-T3	Corey Sheredy/Marissa Swiderski	9C28056-34	Water	03/27/19 15:15	
Gate1-Top-T4	Corey Sheredy/Marissa Swiderski	9C28056-35	Water	03/27/19 15:20	
Gate1-Bottom-T4	Corey Sheredy/Marissa Swiderski	9C28056-36	Water	03/27/19 15:25	
Gate2-Top-T4	Corey Sheredy/Marissa Swiderski	9C28056-37	Water	03/27/19 15:30	
Gate2-Bottom-T4	Corey Sheredy/Marissa Swiderski	9C28056-38	Water	03/27/19 15:35	
Basin1-Top-T4	Corey Sheredy/Marissa Swiderski	9C28056-39	Water	03/27/19 15:20	
Basin1-Bottom-T4	Corey Sheredy/Marissa Swiderski	9C28056-40	Water	03/27/19 15:25	
Basin2-Top-T4	Corey Sheredy/Marissa Swiderski	9C28056-41	Water	03/27/19 15:30	
Basin2-Bottom-T4	Corey Sheredy/Marissa Swiderski	9C28056-42	Water	03/27/19 15:35	
Gate1-Top-T5	Corey Sheredy/Marissa Swiderski	9C28056-43	Water	03/27/19 17:10	
Gate1-Bottom-T5	Corey Sheredy/Marissa Swiderski	9C28056-44	Water	03/27/19 17:15	
Gate2-Top-T5	Corey Sheredy/Marissa Swiderski	9C28056-45	Water	03/27/19 17:20	
Gate2-Bottom-T5	Corey Sheredy/Marissa Swiderski	9C28056-46	Water	03/27/19 17:25	
Basin1-Top-T5	Corey Sheredy/Marissa Swiderski	9C28056-47	Water	03/27/19 17:10	
Basin1-Bottom-T5	Corey Sheredy/Marissa Swiderski	9C28056-48	Water	03/27/19 17:15	
Basin2-Top-T5	Corey Sheredy/Marissa Swiderski	9C28056-49	Water	03/27/19 17:20	
Basin2-Bottom-T5	Corey Sheredy/Marissa Swiderski	9C28056-50	Water	03/27/19 17:25	
BW-FB	Corey Sheredy/Marissa Swiderski	9C28056-51	Water	03/27/19 12:30	
Basin-Particulate	Corey Sheredy/Marissa Swiderski	9C28056-52	Solid	03/27/19 16:00	
Niskin-3-ER	Corey Sheredy/Marissa Swiderski	9C28056-53	Water	03/26/19 17:00	
Niskin-2-ER	Corey Sheredy/Marissa Swiderski	9C28056-54	Water	03/26/19 17:10	

Analyses Accreditation Summary

Analyte	CAS #	Not By NELAP	By ANAB
EPA 160.3M in Solid			
% Solids		✓	
% Solids		✓	

Sample Results

Sample: Gate1-Top-T0
9C28056-01 (Water)
Sampled: 03/27/19 8:15 by Corey Sheredy/Marissa Swiderski

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

Method: SM 2540D **Batch ID:** W9D0025 **Instr:** OVEN11 **Prepared:** 04/01/19 10:15 **Analyst:** sar

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Total Suspended Solids	**20**		5	mg/l	1	04/01/19 12:04	

Metals - Low Level by 1600 Series Methods

Method: EPA 1640 **Batch ID:** W9D0039 **Instr:** ICPMS03 **Prepared:** 04/01/19 11:39 **Analyst:** ALN

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Copper, Total	**8.0**	0.0076	0.020	ug/l	2	04/01/19 23:19	

Method: EPA 1640 **Batch ID:** W9D0064 **Instr:** ICPMS03 **Prepared:** 04/01/19 14:20 **Analyst:** ALN

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Copper, Dissolved	**6.4**	0.0076	0.020	ug/l	2	04/03/19 00:14	

Sample: Gate1-Bottom-T0
9C28056-02 (Water)
Sampled: 03/27/19 8:20 by Corey Sheredy/Marissa Swiderski

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

Method: SM 2540D **Batch ID:** W9D0025 **Instr:** OVEN11 **Prepared:** 04/01/19 10:15 **Analyst:** sar

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Total Suspended Solids	**5**		5	mg/l	1	04/01/19 12:04	

Metals - Low Level by 1600 Series Methods

Method: EPA 1640 **Batch ID:** W9D0039 **Instr:** ICPMS03 **Prepared:** 04/01/19 11:39 **Analyst:** ALN

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Copper, Total	**7.7**	0.0076	0.020	ug/l	2	04/01/19 23:33	

Method: EPA 1640 **Batch ID:** W9D0064 **Instr:** ICPMS03 **Prepared:** 04/01/19 14:20 **Analyst:** ALN

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Copper, Dissolved	**6.5**	0.0076	0.020	ug/l	2	04/03/19 00:28	

Sample: Gate2-Top-T0
9C28056-03 (Water)
Sampled: 03/27/19 8:25 by Corey Sheredy/Marissa Swiderski

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

Method: SM 2540D **Batch ID:** W9D0025 **Instr:** OVEN11 **Prepared:** 04/01/19 10:15 **Analyst:** sar

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Total Suspended Solids	**9**		5	mg/l	1	04/01/19 12:04	

Metals - Low Level by 1600 Series Methods

Method: EPA 1640 **Batch ID:** W9D0039 **Instr:** ICPMS03 **Prepared:** 04/01/19 11:39 **Analyst:** ALN

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Copper, Total	**8.0**	0.0076	0.020	ug/l	2	04/01/19 23:47	

Method: EPA 1640 **Batch ID:** W9D0064 **Instr:** ICPMS03 **Prepared:** 04/01/19 14:20 **Analyst:** ALN

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Copper, Dissolved	**7.0**	0.0076	0.020	ug/l	2	04/03/19 00:42	

Sample Results

(Continued)

Sample: Gate2-Bottom-T0
9C28056-04 (Water)
Sampled: 03/27/19 8:30 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0025 **Instr:** OVEN11 **Prepared:** 04/01/19 10:15 **Analyst:** sar							
Total Suspended Solids	**5**		5	mg/l	1	04/01/19 12:04	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D0039 **Instr:** ICPMS03 **Prepared:** 04/01/19 11:39 **Analyst:** ALN							
Copper, Total	**8.6**	0.0076	0.020	ug/l	2	04/02/19 00:00	
Method: EPA 1640 **Batch ID:** W9D0064 **Instr:** ICPMS03 **Prepared:** 04/01/19 14:20 **Analyst:** ALN							
Copper, Dissolved	**7.4**	0.0076	0.020	ug/l	2	04/03/19 00:56	

Sample: Basin1-Top-T0
9C28056-05 (Water)
Sampled: 03/27/19 8:15 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0025 **Instr:** OVEN11 **Prepared:** 04/01/19 10:15 **Analyst:** sar							
Total Suspended Solids	**3**		5	mg/l	1	04/01/19 12:04	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D0039 **Instr:** ICPMS03 **Prepared:** 04/01/19 11:39 **Analyst:** ALN							
Copper, Total	**7.2**	0.0076	0.020	ug/l	2	04/02/19 00:14	
Method: EPA 1640 **Batch ID:** W9D0064 **Instr:** ICPMS03 **Prepared:** 04/01/19 14:20 **Analyst:** ALN							
Copper, Dissolved	**6.2**	0.0076	0.020	ug/l	2	04/03/19 01:09	

Sample: Basin1-Bottom-T0
9C28056-06 (Water)
Sampled: 03/27/19 8:20 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0025 **Instr:** OVEN11 **Prepared:** 04/01/19 10:15 **Analyst:** sar							
Total Suspended Solids	**4**		5	mg/l	1	04/01/19 12:04	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D0039 **Instr:** ICPMS03 **Prepared:** 04/01/19 11:39 **Analyst:** ALN							
Copper, Total	**6.9**	0.0076	0.020	ug/l	2	04/02/19 00:28	
Method: EPA 1640 **Batch ID:** W9D0064 **Instr:** ICPMS03 **Prepared:** 04/01/19 14:20 **Analyst:** ALN							
Copper, Dissolved	**6.2**	0.0076	0.020	ug/l	2	04/03/19 01:23	

Sample Results

(Continued)

Sample: Basin2-Top-T0
9C28056-07 (Water)
Sampled: 03/27/19 8:25 by Corey Sheredy/Marissa Swiderski

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

Method: SM 2540D **Batch ID:** W9D0025 **Instr:** OVEN11 **Prepared:** 04/01/19 10:15 **Analyst:** sar

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Total Suspended Solids	**3**		5	mg/l	1	04/01/19 12:04	J

Metals - Low Level by 1600 Series Methods

Method: EPA 1640 **Batch ID:** W9D0039 **Instr:** ICPMS03 **Prepared:** 04/01/19 11:39 **Analyst:** ALN

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Copper, Total	**7.3**	0.0076	0.020	ug/l	2	04/02/19 00:42	

Method: EPA 1640 **Batch ID:** W9D0064 **Instr:** ICPMS03 **Prepared:** 04/01/19 14:20 **Analyst:** ALN

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Copper, Dissolved	**6.4**	0.0076	0.020	ug/l	2	04/03/19 01:37	

Sample: Basin2-Bottom-T0
9C28056-08 (Water)
Sampled: 03/27/19 8:30 by Corey Sheredy/Marissa Swiderski

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

Method: SM 2540D **Batch ID:** W9D0025 **Instr:** OVEN11 **Prepared:** 04/01/19 10:15 **Analyst:** sar

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Total Suspended Solids	**4**		5	mg/l	1	04/01/19 12:04	J

Metals - Low Level by 1600 Series Methods

Method: EPA 1640 **Batch ID:** W9D0039 **Instr:** ICPMS03 **Prepared:** 04/01/19 11:39 **Analyst:** ALN

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Copper, Total	**7.2**	0.0076	0.020	ug/l	2	04/02/19 00:56	

Method: EPA 1640 **Batch ID:** W9D0064 **Instr:** ICPMS03 **Prepared:** 04/01/19 14:20 **Analyst:** ALN

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Copper, Dissolved	**6.1**	0.0076	0.020	ug/l	2	04/03/19 01:51	

Sample: Gate1-Top-T1
9C28056-09 (Water)
Sampled: 03/27/19 10:20 by Corey Sheredy/Marissa Swiderski

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

Method: SM 2540D **Batch ID:** W9D0025 **Instr:** OVEN11 **Prepared:** 04/01/19 10:15 **Analyst:** sar

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Total Suspended Solids	**4**		5	mg/l	1	04/01/19 12:04	J

Metals - Low Level by 1600 Series Methods

Method: EPA 1640 **Batch ID:** W9D0039 **Instr:** ICPMS03 **Prepared:** 04/01/19 11:39 **Analyst:** ALN

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Copper, Total	**7.5**	0.0076	0.020	ug/l	2	04/02/19 01:10	

Method: EPA 1640 **Batch ID:** W9D0064 **Instr:** ICPMS03 **Prepared:** 04/01/19 14:20 **Analyst:** ALN

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Copper, Dissolved	**6.2**	0.0076	0.020	ug/l	2	04/03/19 02:05	

Sample Results

(Continued)

Sample: Gate1-Bottom-T1
9C28056-10 (Water)

Sampled: 03/27/19 10:25 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0025 **Instr:** OVEN11 **Prepared:** 04/01/19 10:15 **Analyst:** sar							
Total Suspended Solids	**9**		5	mg/l	1	04/01/19 12:04	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D0039 **Instr:** ICPMS03 **Prepared:** 04/01/19 11:39 **Analyst:** ALN							
Copper, Total	**7.7**	0.0076	0.020	ug/l	2	04/02/19 01:23	
Method: EPA 1640 **Batch ID:** W9D0064 **Instr:** ICPMS03 **Prepared:** 04/01/19 14:20 **Analyst:** ALN							
Copper, Dissolved	**6.2**	0.0076	0.020	ug/l	2	04/03/19 02:19	

Sample: Gate2-Top-T1
9C28056-11 (Water)

Sampled: 03/27/19 10:30 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0025 **Instr:** OVEN11 **Prepared:** 04/01/19 10:15 **Analyst:** sar							
Total Suspended Solids	**4**		5	mg/l	1	04/01/19 12:04	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D0039 **Instr:** ICPMS03 **Prepared:** 04/01/19 11:39 **Analyst:** ALN							
Copper, Total	**32**	0.038	0.10	ug/l	10	04/02/19 02:47	
Method: EPA 1640 **Batch ID:** W9D0064 **Instr:** ICPMS03 **Prepared:** 04/01/19 14:20 **Analyst:** ALN							
Copper, Dissolved	**11**	0.038	0.10	ug/l	10	04/03/19 03:42	

Sample: Gate2-Bottom-T1
9C28056-12 (Water)

Sampled: 03/27/19 10:35 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0025 **Instr:** OVEN11 **Prepared:** 04/01/19 10:15 **Analyst:** sar							
Total Suspended Solids	**4**		5	mg/l	1	04/01/19 12:04	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D0039 **Instr:** ICPMS03 **Prepared:** 04/01/19 11:39 **Analyst:** ALN							
Copper, Total	**23**	0.038	0.10	ug/l	10	04/02/19 03:00	
Method: EPA 1640 **Batch ID:** W9D0064 **Instr:** ICPMS03 **Prepared:** 04/01/19 14:20 **Analyst:** ALN							
Copper, Dissolved	**11**	0.038	0.10	ug/l	10	04/03/19 03:55	

Sample Results

(Continued)

Sample: Basin1-Top-T1 9C28056-13 (Water)

Sampled: 03/27/19 10:20 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0025 **Instr:** OVEN11 **Prepared:** 04/01/19 10:15 **Analyst:** sar							
Total Suspended Solids	**4**		5	mg/l	1	04/01/19 12:04	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D0039 **Instr:** ICPMS03 **Prepared:** 04/01/19 11:39 **Analyst:** ALN							
Copper, Total	**970**	1.5	4.0	ug/l	400	04/02/19 21:14	
Method: EPA 1640 **Batch ID:** W9D0064 **Instr:** ICPMS03 **Prepared:** 04/01/19 14:20 **Analyst:** ALN							
Copper, Dissolved	**240**	0.76	2.0	ug/l	200	04/03/19 04:09	

Sample: Basin1-Bottom-T1 9C28056-14 (Water)

Sampled: 03/27/19 10:25 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0025 **Instr:** OVEN11 **Prepared:** 04/01/19 10:15 **Analyst:** sar							
Total Suspended Solids	**4**		5	mg/l	1	04/01/19 12:04	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D0039 **Instr:** ICPMS03 **Prepared:** 04/01/19 11:39 **Analyst:** ALN							
Copper, Total	**870**	0.76	2.0	ug/l	200	04/02/19 03:28	
Method: EPA 1640 **Batch ID:** W9D0064 **Instr:** ICPMS03 **Prepared:** 04/01/19 14:20 **Analyst:** ALN							
Copper, Dissolved	**160**	0.76	2.0	ug/l	200	04/03/19 04:23	

Sample: Basin2-Top-T1 9C28056-15 (Water)

Sampled: 03/27/19 10:30 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0025 **Instr:** OVEN11 **Prepared:** 04/01/19 10:15 **Analyst:** sar							
Total Suspended Solids	**3**		5	mg/l	1	04/01/19 12:04	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D0039 **Instr:** ICPMS03 **Prepared:** 04/01/19 11:39 **Analyst:** ALN							
Copper, Total	**980**	0.76	2.0	ug/l	200	04/02/19 03:42	
Method: EPA 1640 **Batch ID:** W9D0064 **Instr:** ICPMS03 **Prepared:** 04/01/19 14:20 **Analyst:** ALN							
Copper, Dissolved	**190**	0.76	2.0	ug/l	200	04/03/19 04:37	

Sample Results

(Continued)

Sample: Basin2-Bottom-T1 Sampled: 03/27/19 10:35 by Corey Sheredy/Marissa Swiderski
9C28056-16 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0025 **Instr:** OVEN11 **Prepared:** 04/01/19 10:15 **Analyst:** sar							
Total Suspended Solids	**4**		5	mg/l	1	04/01/19 12:04	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D0039 **Instr:** ICPMS03 **Prepared:** 04/01/19 11:39 **Analyst:** ALN							
Copper, Total	**940**	0.76	2.0	ug/l	200	04/02/19 03:56	
Method: EPA 1640 **Batch ID:** W9D0064 **Instr:** ICPMS03 **Prepared:** 04/01/19 14:20 **Analyst:** ALN							
Copper, Dissolved	**190**	0.76	2.0	ug/l	200	04/03/19 04:51	

Sample: Gate1-Top-T2 Sampled: 03/27/19 10:45 by Corey Sheredy/Marissa Swiderski
9C28056-17 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0066 **Instr:** OVEN11 **Prepared:** 04/01/19 14:58 **Analyst:** sar							
Total Suspended Solids	**5**		5	mg/l	1	04/02/19 10:51	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D0039 **Instr:** ICPMS03 **Prepared:** 04/01/19 11:39 **Analyst:** ALN							
Copper, Total	**73**	0.076	0.20	ug/l	20	04/02/19 04:10	
Method: EPA 1640 **Batch ID:** W9D0064 **Instr:** ICPMS03 **Prepared:** 04/01/19 14:20 **Analyst:** ALN							
Copper, Dissolved	**22**	0.076	0.20	ug/l	20	04/03/19 05:05	

Sample: Gate1-Bottom-T2 Sampled: 03/27/19 10:50 by Corey Sheredy/Marissa Swiderski
9C28056-18 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0066 **Instr:** OVEN11 **Prepared:** 04/01/19 14:58 **Analyst:** sar							
Total Suspended Solids	**5**		5	mg/l	1	04/02/19 10:51	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D0039 **Instr:** ICPMS03 **Prepared:** 04/01/19 11:39 **Analyst:** ALN							
Copper, Total	**20**	0.038	0.10	ug/l	10	04/02/19 04:23	
Method: EPA 1640 **Batch ID:** W9D0064 **Instr:** ICPMS03 **Prepared:** 04/01/19 14:20 **Analyst:** ALN							
Copper, Dissolved	**9.4**	0.038	0.10	ug/l	10	04/03/19 05:18	

Sample Results

(Continued)

Sample: Gate2-Top-T2 9C28056-19 (Water)

Sampled: 03/27/19 11:00 by Corey Sheredy/Marissa Swiderski

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

Method: SM 2540D **Batch ID:** W9D0066 **Instr:** OVEN11 **Prepared:** 04/01/19 14:58 **Analyst:** sar

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Total Suspended Solids	**5**		5	mg/l	1	04/02/19 10:51	

Metals - Low Level by 1600 Series Methods

Method: EPA 1640 **Batch ID:** W9D0039 **Instr:** ICPMS03 **Prepared:** 04/01/19 11:39 **Analyst:** ALN

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Copper, Total	**13**	0.038	0.10	ug/l	10	04/02/19 04:37	

Method: EPA 1640 **Batch ID:** W9D0064 **Instr:** ICPMS03 **Prepared:** 04/01/19 14:20 **Analyst:** ALN

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Copper, Dissolved	**8.3**	0.038	0.10	ug/l	10	04/03/19 05:32	

Sample: Gate2-Bottom-T2 9C28056-20 (Water)

Sampled: 03/27/19 11:05 by Corey Sheredy/Marissa Swiderski

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

Method: SM 2540D **Batch ID:** W9D0066 **Instr:** OVEN11 **Prepared:** 04/01/19 14:58 **Analyst:** sar

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Total Suspended Solids	**19**		5	mg/l	1	04/02/19 10:51	

Metals - Low Level by 1600 Series Methods

Method: EPA 1640 **Batch ID:** W9D0039 **Instr:** ICPMS03 **Prepared:** 04/01/19 11:39 **Analyst:** ALN

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Copper, Total	**8.6**	0.0076	0.020	ug/l	2	04/02/19 04:51	

Method: EPA 1640 **Batch ID:** W9D0064 **Instr:** ICPMS03 **Prepared:** 04/01/19 14:20 **Analyst:** ALN

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Copper, Dissolved	**7.0**	0.0076	0.020	ug/l	2	04/03/19 05:46	

Sample: Basin1-Top-T2 9C28056-21 (Water)

Sampled: 03/27/19 10:45 by Corey Sheredy/Marissa Swiderski

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

Method: SM 2540D **Batch ID:** W9D0066 **Instr:** OVEN11 **Prepared:** 04/01/19 14:58 **Analyst:** sar

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Total Suspended Solids	**5**		5	mg/l	1	04/02/19 10:51	

Metals - Low Level by 1600 Series Methods

Method: EPA 1640 **Batch ID:** W9D0247 **Instr:** ICPMS03 **Prepared:** 04/03/19 12:07 **Analyst:** ALN

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Copper, Total	**710**	1.5	4.0	ug/l	400	04/04/19 22:06	

Method: EPA 1640 **Batch ID:** W9D0346 **Instr:** ICPMS03 **Prepared:** 04/04/19 14:17 **Analyst:** ALN

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Copper, Dissolved	**210**	1.5	4.0	ug/l	400	04/05/19 06:11	

Sample Results

(Continued)

Sample: Basin1-Bottom-T2 — Sampled: 03/27/19 10:50 by Corey Sheredy/Marissa Swiderski
9C28056-22 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0066 **Instr:** OVEN11 **Prepared:** 04/01/19 14:58 **Analyst:** sar							
Total Suspended Solids	**9**		5	mg/l	1	04/02/19 10:51	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D0247 **Instr:** ICPMS03 **Prepared:** 04/03/19 12:07 **Analyst:** ALN							
Copper, Total	**750**	1.5	4.0	ug/l	400	04/04/19 22:20	
Method: EPA 1640 **Batch ID:** W9D0346 **Instr:** ICPMS03 **Prepared:** 04/04/19 14:17 **Analyst:** ALN							
Copper, Dissolved	**200**	1.5	4.0	ug/l	400	04/05/19 06:25	

Sample: Basin2-Top-T2 — Sampled: 03/27/19 11:00 by Corey Sheredy/Marissa Swiderski
9C28056-23 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0066 **Instr:** OVEN11 **Prepared:** 04/01/19 14:58 **Analyst:** sar							
Total Suspended Solids	**6**		5	mg/l	1	04/02/19 10:51	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D0247 **Instr:** ICPMS03 **Prepared:** 04/03/19 12:07 **Analyst:** ALN							
Copper, Total	**670**	1.5	4.0	ug/l	400	04/04/19 22:34	
Method: EPA 1640 **Batch ID:** W9D0346 **Instr:** ICPMS03 **Prepared:** 04/04/19 14:17 **Analyst:** ALN							
Copper, Dissolved	**200**	1.5	4.0	ug/l	400	04/05/19 06:38	

Sample: Basin2-Bottom-T2 — Sampled: 03/27/19 11:05 by Corey Sheredy/Marissa Swiderski
9C28056-24 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0066 **Instr:** OVEN11 **Prepared:** 04/01/19 14:58 **Analyst:** sar							
Total Suspended Solids	**7**		5	mg/l	1	04/02/19 10:51	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D0247 **Instr:** ICPMS03 **Prepared:** 04/03/19 12:07 **Analyst:** ALN							
Copper, Total	**750**	1.5	4.0	ug/l	400	04/04/19 22:48	
Method: EPA 1640 **Batch ID:** W9D0346 **Instr:** ICPMS03 **Prepared:** 04/04/19 14:17 **Analyst:** ALN							
Copper, Dissolved	**220**	1.5	4.0	ug/l	400	04/05/19 06:52	

Sample Results

(Continued)

Sample: Gate1-Top-T2-REP
9C28056-25 (Water)
Sampled: 03/27/19 10:55 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0066 **Instr:** OVEN11 **Prepared:** 04/01/19 14:58 **Analyst:** sar							
Total Suspended Solids	**11**		5	mg/l	1	04/02/19 10:51	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D0247 **Instr:** ICPMS03 **Prepared:** 04/03/19 12:07 **Analyst:** ALN							
Copper, Total	**20**	0.038	0.10	ug/l	10	04/04/19 23:02	
Method: EPA 1640 **Batch ID:** W9D0346 **Instr:** ICPMS03 **Prepared:** 04/04/19 14:17 **Analyst:** ALN							
Copper, Dissolved	**11**	0.038	0.10	ug/l	10	04/05/19 07:06	

Sample: Basin1-Top-T2-REP
9C28056-26 (Water)
Sampled: 03/27/19 10:55 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0066 **Instr:** OVEN11 **Prepared:** 04/01/19 14:58 **Analyst:** sar							
Total Suspended Solids	**5**		5	mg/l	1	04/02/19 10:51	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D0247 **Instr:** ICPMS03 **Prepared:** 04/03/19 12:07 **Analyst:** ALN							
Copper, Total	**810**	1.5	4.0	ug/l	400	04/04/19 23:16	
Method: EPA 1640 **Batch ID:** W9D0346 **Instr:** ICPMS03 **Prepared:** 04/04/19 14:17 **Analyst:** ALN							
Copper, Dissolved	**220**	1.5	4.0	ug/l	400	04/05/19 07:20	

Sample: Gate1-Top-T3
9C28056-27 (Water)
Sampled: 03/27/19 15:00 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0066 **Instr:** OVEN11 **Prepared:** 04/01/19 14:58 **Analyst:** sar							
Total Suspended Solids	**5**		5	mg/l	1	04/02/19 10:51	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D0247 **Instr:** ICPMS03 **Prepared:** 04/03/19 12:07 **Analyst:** ALN							
Copper, Total	**12**	0.038	0.10	ug/l	10	04/04/19 23:29	
Method: EPA 1640 **Batch ID:** W9D0346 **Instr:** ICPMS03 **Prepared:** 04/04/19 14:17 **Analyst:** ALN							
Copper, Dissolved	**8.1**	0.038	0.10	ug/l	10	04/05/19 07:34	

Sample Results

(Continued)

Sample: Gate1-Bottom-T3 — Sampled: 03/27/19 15:05 by Corey Sheredy/Marissa Swiderski
9C28056-28 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0066 **Instr:** OVEN11 **Prepared:** 04/01/19 14:58 **Analyst:** sar							
Total Suspended Solids	**6**		5	mg/l	1	04/02/19 10:51	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D0247 **Instr:** ICPMS03 **Prepared:** 04/03/19 12:07 **Analyst:** ALN							
Copper, Total	**8.2**	0.019	0.050	ug/l	5	04/04/19 23:43	
Method: EPA 1640 **Batch ID:** W9D0346 **Instr:** ICPMS03 **Prepared:** 04/04/19 14:17 **Analyst:** ALN							
Copper, Dissolved	**5.9**	0.019	0.050	ug/l	5	04/05/19 07:48	

Sample: Gate2-Top-T3 — Sampled: 03/27/19 15:10 by Corey Sheredy/Marissa Swiderski
9C28056-29 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0066 **Instr:** OVEN11 **Prepared:** 04/01/19 14:58 **Analyst:** sar							
Total Suspended Solids	**3**		5	mg/l	1	04/02/19 10:51	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D0247 **Instr:** ICPMS03 **Prepared:** 04/03/19 12:07 **Analyst:** ALN							
Copper, Total	**80**	0.19	0.50	ug/l	1	04/04/19 23:57	
Method: EPA 1640 **Batch ID:** W9D0346 **Instr:** ICPMS03 **Prepared:** 04/04/19 14:17 **Analyst:** ALN							
Copper, Dissolved	**28**	0.19	0.50	ug/l	1	04/05/19 08:01	

Sample: Gate2-Bottom-T3 — Sampled: 03/27/19 15:15 by Corey Sheredy/Marissa Swiderski
9C28056-30 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0066 **Instr:** OVEN11 **Prepared:** 04/01/19 14:58 **Analyst:** sar							
Total Suspended Solids	**6**		5	mg/l	1	04/02/19 10:51	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D0247 **Instr:** ICPMS03 **Prepared:** 04/03/19 12:07 **Analyst:** ALN							
Copper, Total	**110**	0.19	0.50	ug/l	1	04/05/19 00:11	
Method: EPA 1640 **Batch ID:** W9D0346 **Instr:** ICPMS03 **Prepared:** 04/04/19 14:17 **Analyst:** ALN							
Copper, Dissolved	**59**	0.19	0.50	ug/l	1	04/05/19 08:15	

Sample Results

(Continued)

Sample: Basin1-Top-T3 — Sampled: 03/27/19 15:00 by Corey Sheredy/Marissa Swiderski
9C28056-31 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0066 **Instr:** OVEN11 **Prepared:** 04/01/19 14:58 **Analyst:** sar							
Total Suspended Solids	**4**		5	mg/l	1	04/02/19 10:51	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D0247 **Instr:** ICPMS03 **Prepared:** 04/03/19 12:07 **Analyst:** ALN							
Copper, Total	**1400**	1.5	4.0	ug/l	400	04/05/19 01:20	
Method: EPA 1640 **Batch ID:** W9D0346 **Instr:** ICPMS03 **Prepared:** 04/04/19 14:17 **Analyst:** ALN							
Copper, Dissolved	**360**	1.5	4.0	ug/l	400	04/05/19 09:25	

Sample: Basin1-Bottom-T3 — Sampled: 03/27/19 15:05 by Corey Sheredy/Marissa Swiderski
9C28056-32 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0066 **Instr:** OVEN11 **Prepared:** 04/01/19 14:58 **Analyst:** sar							
Total Suspended Solids	**13**		5	mg/l	1	04/02/19 10:51	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D0247 **Instr:** ICPMS03 **Prepared:** 04/03/19 12:07 **Analyst:** ALN							
Copper, Total	**770**	1.5	4.0	ug/l	400	04/05/19 01:34	
Method: EPA 1640 **Batch ID:** W9D0346 **Instr:** ICPMS03 **Prepared:** 04/04/19 14:17 **Analyst:** ALN							
Copper, Dissolved	**370**	1.5	4.0	ug/l	400	04/05/19 09:38	

Sample: Basin2-Top-T3 — Sampled: 03/27/19 15:10 by Corey Sheredy/Marissa Swiderski
9C28056-33 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0066 **Instr:** OVEN11 **Prepared:** 04/01/19 14:58 **Analyst:** sar							
Total Suspended Solids	**5**		5	mg/l	1	04/02/19 10:51	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D0247 **Instr:** ICPMS03 **Prepared:** 04/03/19 12:07 **Analyst:** ALN							
Copper, Total	**580**	1.5	4.0	ug/l	400	04/05/19 01:48	
Method: EPA 1640 **Batch ID:** W9D0346 **Instr:** ICPMS03 **Prepared:** 04/04/19 14:17 **Analyst:** ALN							
Copper, Dissolved	**270**	1.5	4.0	ug/l	400	04/05/19 09:52	

Sample Results

(Continued)

Sample: Basin2-Bottom-T3
9C28056-34 (Water)

Sampled: 03/27/19 15:15 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0121 **Instr:** OVEN11 **Prepared:** 04/02/19 11:08 **Analyst:** sar							
Total Suspended Solids	**6**		5	mg/l	1	04/02/19 12:25	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D0247 **Instr:** ICPMS03 **Prepared:** 04/03/19 12:07 **Analyst:** ALN							
Copper, Total	**780**	1.5	4.0	ug/l	400	04/05/19 02:02	
Method: EPA 1640 **Batch ID:** W9D0346 **Instr:** ICPMS03 **Prepared:** 04/04/19 14:17 **Analyst:** ALN							
Copper, Dissolved	**340**	1.5	4.0	ug/l	400	04/05/19 10:06	

Sample: Gate1-Top-T4
9C28056-35 (Water)

Sampled: 03/27/19 15:20 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0121 **Instr:** OVEN11 **Prepared:** 04/02/19 11:08 **Analyst:** sar							
Total Suspended Solids	**10**		5	mg/l	1	04/02/19 12:25	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D0247 **Instr:** ICPMS03 **Prepared:** 04/03/19 12:07 **Analyst:** ALN							
Copper, Total	**78**	0.19	0.50	ug/l	50	04/05/19 02:16	
Method: EPA 1640 **Batch ID:** W9D0346 **Instr:** ICPMS03 **Prepared:** 04/04/19 14:17 **Analyst:** ALN							
Copper, Dissolved	**41**	0.19	0.50	ug/l	50	04/05/19 10:20	

Sample: Gate1-Bottom-T4
9C28056-36 (Water)

Sampled: 03/27/19 15:25 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0121 **Instr:** OVEN11 **Prepared:** 04/02/19 11:08 **Analyst:** sar							
Total Suspended Solids	**5**		5	mg/l	1	04/02/19 12:25	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D0247 **Instr:** ICPMS03 **Prepared:** 04/03/19 12:07 **Analyst:** ALN							
Copper, Total	**43**	0.076	0.20	ug/l	20	04/05/19 02:29	
Method: EPA 1640 **Batch ID:** W9D0346 **Instr:** ICPMS03 **Prepared:** 04/04/19 14:17 **Analyst:** ALN							
Copper, Dissolved	**42**	0.076	0.20	ug/l	20	04/05/19 10:34	

Sample Results

(Continued)

Sample: Gate2-Top-T4 | Sampled: 03/27/19 15:30 by Corey Sheredy/Marissa Swiderski
9C28056-37 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0121 **Instr:** OVEN11 **Prepared:** 04/02/19 11:08 **Analyst:** sar							
Total Suspended Solids	**5**		5	mg/l	1	04/02/19 12:25	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D0247 **Instr:** ICPMS03 **Prepared:** 04/03/19 12:07 **Analyst:** ALN							
Copper, Total	**8.2**	0.019	0.050	ug/l	5	04/05/19 02:43	
Method: EPA 1640 **Batch ID:** W9D0346 **Instr:** ICPMS03 **Prepared:** 04/04/19 14:17 **Analyst:** ALN							
Copper, Dissolved	**6.5**	0.019	0.050	ug/l	5	04/05/19 10:48	

Sample: Gate2-Bottom-T4 | Sampled: 03/27/19 15:35 by Corey Sheredy/Marissa Swiderski
9C28056-38 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0121 **Instr:** OVEN11 **Prepared:** 04/02/19 11:08 **Analyst:** sar							
Total Suspended Solids	**11**		5	mg/l	1	04/02/19 12:25	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D0247 **Instr:** ICPMS03 **Prepared:** 04/03/19 12:07 **Analyst:** ALN							
Copper, Total	**50**	0.076	0.20	ug/l	20	04/05/19 02:57	
Method: EPA 1640 **Batch ID:** W9D0442 **Instr:** ICPMS03 **Prepared:** 04/07/19 11:27 **Analyst:** ALN							
Copper, Dissolved	**28**	0.076	0.20	ug/l	20	04/10/19 21:03	

Sample: Basin1-Top-T4 | Sampled: 03/27/19 15:20 by Corey Sheredy/Marissa Swiderski
9C28056-39 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0121 **Instr:** OVEN11 **Prepared:** 04/02/19 11:08 **Analyst:** sar							
Total Suspended Solids	**8**		5	mg/l	1	04/02/19 12:25	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D0247 **Instr:** ICPMS03 **Prepared:** 04/03/19 12:07 **Analyst:** ALN							
Copper, Total	**620**	1.5	4.0	ug/l	400	04/05/19 03:11	
Method: EPA 1640 **Batch ID:** W9D0346 **Instr:** ICPMS03 **Prepared:** 04/04/19 14:17 **Analyst:** ALN							
Copper, Dissolved	**330**	1.5	4.0	ug/l	400	04/05/19 11:15	

Sample Results

(Continued)

Sample: Basin1-Bottom-T4
9C28056-40 (Water)
Sampled: 03/27/19 15:25 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0121 **Instr:** OVEN11 **Prepared:** 04/02/19 11:08 **Analyst:** sar							
Total Suspended Solids	**5**		5	mg/l	1	04/02/19 12:25	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D0247 **Instr:** ICPMS03 **Prepared:** 04/03/19 12:07 **Analyst:** ALN							
Copper, Total	**670**	1.5	4.0	ug/l	400	04/05/19 03:25	
Method: EPA 1640 **Batch ID:** W9D0346 **Instr:** ICPMS03 **Prepared:** 04/04/19 14:17 **Analyst:** ALN							
Copper, Dissolved	**350**	1.5	4.0	ug/l	400	04/05/19 11:29	

Sample: Basin2-Top-T4
9C28056-41 (Water)
Sampled: 03/27/19 15:30 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0121 **Instr:** OVEN11 **Prepared:** 04/02/19 11:08 **Analyst:** sar							
Total Suspended Solids	**5**		5	mg/l	1	04/02/19 12:25	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D0442 **Instr:** ICPMS03 **Prepared:** 04/07/19 11:27 **Analyst:** ALN							
Copper, Total	**540**	0.76	2.0	ug/l	200	04/10/19 21:17	
Method: EPA 1640 **Batch ID:** W9D0557 **Instr:** ICPMS03 **Prepared:** 04/09/19 10:52 **Analyst:** ALN							
Copper, Dissolved	**250**	0.76	2.0	ug/l	200	04/11/19 03:59	

Sample: Basin2-Bottom-T4
9C28056-42 (Water)
Sampled: 03/27/19 15:35 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0121 **Instr:** OVEN11 **Prepared:** 04/02/19 11:08 **Analyst:** sar							
Total Suspended Solids	**7**		5	mg/l	1	04/02/19 12:25	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D0442 **Instr:** ICPMS03 **Prepared:** 04/07/19 11:27 **Analyst:** ALN							
Copper, Total	**740**	1.5	4.0	ug/l	400	04/10/19 21:31	
Method: EPA 1640 **Batch ID:** W9D0557 **Instr:** ICPMS03 **Prepared:** 04/09/19 10:52 **Analyst:** ALN							
Copper, Dissolved	**330**	1.5	4.0	ug/l	400	04/11/19 04:13	

Sample Results

(Continued)

Sample: Gate1-Top-T5 9C28056-43 (Water)
Sampled: 03/27/19 17:10 by Corey Sheredy/Marissa Swiderski

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

Method: SM 2540D **Batch ID:** W9D0121 **Instr:** OVEN11 **Prepared:** 04/02/19 11:08 **Analyst:** sar

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Total Suspended Solids	**8**		5	mg/l	1	04/02/19 12:25	

Metals - Low Level by 1600 Series Methods

Method: EPA 1640 **Batch ID:** W9D0442 **Instr:** ICPMS03 **Prepared:** 04/07/19 11:27 **Analyst:** ALN

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Copper, Total	**160**	0.38	1.0	ug/l	100	04/10/19 21:45	

Method: EPA 1640 **Batch ID:** W9D0557 **Instr:** ICPMS03 **Prepared:** 04/09/19 10:52 **Analyst:** ALN

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Copper, Dissolved	**93**	0.38	1.0	ug/l	100	04/11/19 04:26	

Sample: Gate1-Bottom-T5 9C28056-44 (Water)
Sampled: 03/27/19 17:15 by Corey Sheredy/Marissa Swiderski

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

Method: SM 2540D **Batch ID:** W9D0121 **Instr:** OVEN11 **Prepared:** 04/02/19 11:08 **Analyst:** sar

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Total Suspended Solids	**5**		5	mg/l	1	04/02/19 12:25	

Metals - Low Level by 1600 Series Methods

Method: EPA 1640 **Batch ID:** W9D0442 **Instr:** ICPMS03 **Prepared:** 04/07/19 11:27 **Analyst:** ALN

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Copper, Total	**22**	0.038	0.10	ug/l	10	04/10/19 21:59	

Method: EPA 1640 **Batch ID:** W9D0557 **Instr:** ICPMS03 **Prepared:** 04/09/19 10:52 **Analyst:** ALN

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Copper, Dissolved	**11**	0.038	0.10	ug/l	10	04/11/19 04:40	

Sample: Gate2-Top-T5 9C28056-45 (Water)
Sampled: 03/27/19 17:20 by Corey Sheredy/Marissa Swiderski

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

Method: SM 2540D **Batch ID:** W9D0121 **Instr:** OVEN11 **Prepared:** 04/02/19 11:08 **Analyst:** sar

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Total Suspended Solids	**6**		5	mg/l	1	04/02/19 12:25	

Metals - Low Level by 1600 Series Methods

Method: EPA 1640 **Batch ID:** W9D0442 **Instr:** ICPMS03 **Prepared:** 04/07/19 11:27 **Analyst:** ALN

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Copper, Total	**6.7**	0.0076	0.020	ug/l	2	04/11/19 01:26	

Method: EPA 1640 **Batch ID:** W9D0557 **Instr:** ICPMS03 **Prepared:** 04/09/19 10:52 **Analyst:** ALN

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Copper, Dissolved	**5.5**	0.0076	0.020	ug/l	2	04/11/19 04:54	

Sample Results

(Continued)

Sample: Gate2-Bottom-T5 Sampled: 03/27/19 17:25 by Corey Sheredy/Marissa Swiderski
9C28056-46 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0121 **Instr:** OVEN11 **Prepared:** 04/02/19 11:08 **Analyst:** sar							
Total Suspended Solids	**7**		5	mg/l	1	04/02/19 12:25	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D0442 **Instr:** ICPMS03 **Prepared:** 04/07/19 11:27 **Analyst:** ALN							
Copper, Total	**53**	0.076	0.20	ug/l	20	04/10/19 22:26	
Method: EPA 1640 **Batch ID:** W9D0557 **Instr:** ICPMS03 **Prepared:** 04/09/19 10:52 **Analyst:** ALN							
Copper, Dissolved	**33**	0.076	0.20	ug/l	20	04/11/19 05:08	

Sample: Basin1-Top-T5 Sampled: 03/27/19 17:10 by Corey Sheredy/Marissa Swiderski
9C28056-47 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0121 **Instr:** OVEN11 **Prepared:** 04/02/19 11:08 **Analyst:** sar							
Total Suspended Solids	**19**		5	mg/l	1	04/02/19 12:25	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D0442 **Instr:** ICPMS03 **Prepared:** 04/07/19 11:27 **Analyst:** ALN							
Copper, Total	**500**	0.76	2.0	ug/l	200	04/10/19 22:40	
Method: EPA 1640 **Batch ID:** W9D0557 **Instr:** ICPMS03 **Prepared:** 04/09/19 10:52 **Analyst:** ALN							
Copper, Dissolved	**290**	0.76	2.0	ug/l	200	04/11/19 05:22	

Sample: Basin1-Bottom-T5 Sampled: 03/27/19 17:15 by Corey Sheredy/Marissa Swiderski
9C28056-48 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0121 **Instr:** OVEN11 **Prepared:** 04/02/19 11:08 **Analyst:** sar							
Total Suspended Solids	**10**		5	mg/l	1	04/02/19 12:25	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D0442 **Instr:** ICPMS03 **Prepared:** 04/07/19 11:27 **Analyst:** ALN							
Copper, Total	**690**	0.76	2.0	ug/l	200	04/10/19 22:54	
Method: EPA 1640 **Batch ID:** W9D0557 **Instr:** ICPMS03 **Prepared:** 04/09/19 10:52 **Analyst:** ALN							
Copper, Dissolved	**310**	0.76	2.0	ug/l	200	04/11/19 05:36	

Sample Results

(Continued)

Sample: Basin2-Top-T5
9C28056-49 (Water)
Sampled: 03/27/19 17:20 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0121 **Instr:** OVEN11 **Prepared:** 04/02/19 11:08 **Analyst:** sar							
Total Suspended Solids	**8**		5	mg/l	1	04/02/19 12:25	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D0442 **Instr:** ICPMS03 **Prepared:** 04/07/19 11:27 **Analyst:** ALN							
Copper, Total	**440**	0.76	2.0	ug/l	200	04/10/19 23:08	
Method: EPA 1640 **Batch ID:** W9D0557 **Instr:** ICPMS03 **Prepared:** 04/09/19 10:52 **Analyst:** ALN							
Copper, Dissolved	**260**	0.76	2.0	ug/l	200	04/11/19 05:49	

Sample: Basin2-Bottom-T5
9C28056-50 (Water)
Sampled: 03/27/19 17:25 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0121 **Instr:** OVEN11 **Prepared:** 04/02/19 11:08 **Analyst:** sar							
Total Suspended Solids	**5**		5	mg/l	1	04/02/19 12:25	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D0442 **Instr:** ICPMS03 **Prepared:** 04/07/19 11:27 **Analyst:** ALN							
Copper, Total	**410**	0.76	2.0	ug/l	200	04/11/19 01:13	
Method: EPA 1640 **Batch ID:** W9D0557 **Instr:** ICPMS03 **Prepared:** 04/09/19 10:52 **Analyst:** ALN							
Copper, Dissolved	**240**	0.76	2.0	ug/l	200	04/11/19 06:03	

Sample: BW-FB
9C28056-51 (Water)
Sampled: 03/27/19 12:30 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0066 **Instr:** OVEN11 **Prepared:** 04/01/19 14:58 **Analyst:** sar							
Total Suspended Solids	**1**		5	mg/l	1	04/02/19 10:51	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D0441 **Instr:** ICPMS03 **Prepared:** 04/05/19 18:04 **Analyst:** ALN							
Copper, Dissolved	**0.018**	0.0038	0.010	ug/l	1	04/11/19 22:45	
Method: EPA 1640 **Batch ID:** W9D0442 **Instr:** ICPMS03 **Prepared:** 04/07/19 11:27 **Analyst:** ALN							
Copper, Total	**0.016**	0.0038	0.010	ug/l	1	04/11/19 00:31	

Sample Results

(Continued)

Sample: Basin-Particulate
9C28056-52 (Solid)

Sampled: 03/27/19 16:00 by Corey Sheredy/Marissa Swiderski

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

Method: EPA 160.3M **Batch ID:** W9D0340 **Instr:** _ANALYST **Prepared:** 04/04/19 12:35 **Analyst:** kvm

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
% Solids	**19.8**		0.100	% by Weight	1	04/05/19 14:59	

Metals (Non-Aqueous) by EPA 6000/7000 Series Methods

Method: EPA 6020 **Batch ID:** W9C1595 **Instr:** ICPMS02 **Prepared:** 03/29/19 09:42 **Analyst:** jea

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Copper, Total	**180**	0.29	0.50	mg/kg	1	04/01/19 14:49	

Sample: Niskin-3-ER
9C28056-53 (Water)

Sampled: 03/26/19 17:00 by Corey Sheredy/Marissa Swiderski

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

Method: SM 2540D **Batch ID:** W9D0025 **Instr:** OVEN11 **Prepared:** 04/01/19 10:15 **Analyst:** sar

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Total Suspended Solids	ND		5	mg/l	1	04/01/19 12:04	

Metals - Low Level by 1600 Series Methods

Method: EPA 1640 **Batch ID:** W9D0441 **Instr:** ICPMS03 **Prepared:** 04/05/19 18:04 **Analyst:** ALN

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Copper, Dissolved	**0.17**	0.0038	0.010	ug/l	1	04/11/19 22:59	

Method: EPA 1640 **Batch ID:** W9D0442 **Instr:** ICPMS03 **Prepared:** 04/07/19 11:27 **Analyst:** ALN

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Copper, Total	**0.080**	0.0038	0.010	ug/l	1	04/11/19 00:45	

Sample: Niskin-2-ER
9C28056-54 (Water)

Sampled: 03/26/19 17:10 by Corey Sheredy/Marissa Swiderski

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

Method: SM 2540D **Batch ID:** W9D0025 **Instr:** OVEN11 **Prepared:** 04/01/19 10:15 **Analyst:** sar

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Total Suspended Solids	**1**		5	mg/l	1	04/01/19 12:04	J

Metals - Low Level by 1600 Series Methods

Method: EPA 1640 **Batch ID:** W9D0441 **Instr:** ICPMS03 **Prepared:** 04/05/19 18:04 **Analyst:** ALN

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Copper, Dissolved	**0.062**	0.0038	0.010	ug/l	1	04/11/19 23:13	

Method: EPA 1640 **Batch ID:** W9D0442 **Instr:** ICPMS03 **Prepared:** 04/07/19 11:27 **Analyst:** ALN

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Copper, Total	**0.046**	0.0038	0.010	ug/l	1	04/11/19 00:59	

Quality Control Results

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W9D0025 - SM 2540D											
Blank (W9D0025-BLK1)					**Prepared & Analyzed: 04/01/19**						
Total Suspended Solids	ND		5	mg/l							
LCS (W9D0025-BS1)					**Prepared & Analyzed: 04/01/19**						
Total Suspended Solids	54.0		5	mg/l	52.5		103	90-110			
Duplicate (W9D0025-DUP1)	**Source: 9C27081-01**				**Prepared & Analyzed: 04/01/19**						
Total Suspended Solids	1.00		5	mg/l		1.00			0	20	J
Duplicate (W9D0025-DUP2)	**Source: 9C28056-01**				**Prepared & Analyzed: 04/01/19**						
Total Suspended Solids	18.0		5	mg/l		20.0			11	20	
Batch: W9D0066 - SM 2540D											
Blank (W9D0066-BLK1)					**Prepared: 04/01/19 Analyzed: 04/02/19**						
Total Suspended Solids	ND		5	mg/l							
LCS (W9D0066-BS1)					**Prepared: 04/01/19 Analyzed: 04/02/19**						
Total Suspended Solids	53.0		5	mg/l	49.9		106	90-110			
Duplicate (W9D0066-DUP1)	**Source: 9C28056-33**				**Prepared: 04/01/19 Analyzed: 04/02/19**						
Total Suspended Solids	5.00		5	mg/l		5.00			0	20	
Duplicate (W9D0066-DUP2)	**Source: 9C28056-51**				**Prepared: 04/01/19 Analyzed: 04/02/19**						
Total Suspended Solids	1.00		5	mg/l		1.00			0	20	J
Batch: W9D0121 - SM 2540D											
Blank (W9D0121-BLK1)					**Prepared & Analyzed: 04/02/19**						
Total Suspended Solids	ND		5	mg/l							
LCS (W9D0121-BS1)					**Prepared & Analyzed: 04/02/19**						
Total Suspended Solids	56.0		5	mg/l	52.6		106	90-110			
Duplicate (W9D0121-DUP1)	**Source: 9C29080-02**				**Prepared & Analyzed: 04/02/19**						
Total Suspended Solids	3.00		5	mg/l		3.00			0	20	J
Duplicate (W9D0121-DUP2)	**Source: 9C29080-03**				**Prepared & Analyzed: 04/02/19**						
Total Suspended Solids	4.00		5	mg/l		4.00			0	20	J
Batch: W9D0340 - EPA 160.3M											
Duplicate (W9D0340-DUP1)	**Source: 9C28056-52**				**Prepared: 04/04/19 Analyzed: 04/05/19**						
% Solids	20.2		0.100	% by Weight		19.8			2	20	

Quality Control Results

(Continued)

Metals - Low Level by 1600 Series Methods

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W9D0039 - EPA 1640											
Blank (W9D0039-BLK1)					**Prepared & Analyzed: 04/01/19**						
Copper, Total	ND	0.0038	0.010	ug/l							
Blank (W9D0039-BLK2)					**Prepared: 04/01/19 Analyzed: 04/02/19**						
Copper, Total	ND	0.0038	0.010	ug/l							
LCS (W9D0039-BS1)					**Prepared & Analyzed: 04/01/19**						
Copper, Total	1.94	0.0038	0.010	ug/l	2.00		97	73-122			
LCS (W9D0039-BS2)					**Prepared: 04/01/19 Analyzed: 04/02/19**						
Copper, Total	1.87	0.0038	0.010	ug/l	2.00		94	73-122			
Matrix Spike (W9D0039-MS1)	**Source: 9C28056-02**				**Prepared & Analyzed: 04/01/19**						
Copper, Total	9.36	0.0076	0.020	ug/l	2.00	7.65	85	60-138			
Matrix Spike (W9D0039-MS2)	**Source: 9C28056-03**				**Prepared & Analyzed: 04/01/19**						
Copper, Total	10.4	0.0076	0.020	ug/l	2.00	7.98	121	60-138			
Matrix Spike (W9D0039-MS3)	**Source: 9C28056-02**				**Prepared: 04/01/19 Analyzed: 04/02/19**						
Copper, Total	9.09	0.0076	0.020	ug/l	2.00	7.65	72	60-138			
Matrix Spike Dup (W9D0039-MSD1)	**Source: 9C28056-02**				**Prepared & Analyzed: 04/01/19**						
Copper, Total	9.13	0.0076	0.020	ug/l	2.00	7.65	74	60-138	3	30	
Matrix Spike Dup (W9D0039-MSD2)	**Source: 9C28056-03**				**Prepared & Analyzed: 04/01/19**						
Copper, Total	10.2	0.0076	0.020	ug/l	2.00	7.98	109	60-138	2	30	
Matrix Spike Dup (W9D0039-MSD3)	**Source: 9C28056-02**				**Prepared: 04/01/19 Analyzed: 04/02/19**						
Copper, Total	9.02	0.0076	0.020	ug/l	2.00	7.65	68	60-138	0.9	30	
Batch: W9D0064 - EPA 1640											
Blank (W9D0064-BLK1)					**Prepared: 04/01/19 Analyzed: 04/02/19**						
Copper, Dissolved	ND	0.0038	0.010	ug/l							
LCS (W9D0064-BS1)					**Prepared: 04/01/19 Analyzed: 04/02/19**						
Copper, Dissolved	1.92	0.0038	0.010	ug/l	2.00		96	70-130			
Matrix Spike (W9D0064-MS1)	**Source: 9C28056-02**				**Prepared: 04/01/19 Analyzed: 04/02/19**						
Copper, Dissolved	10.4	0.0076	0.020	ug/l	4.00	6.54	98	70-130			
Matrix Spike (W9D0064-MS2)	**Source: 9C28056-03**				**Prepared: 04/01/19 Analyzed: 04/02/19**						
Copper, Dissolved	10.9	0.0076	0.020	ug/l	4.00	7.02	97	70-130			
Matrix Spike Dup (W9D0064-MSD1)	**Source: 9C28056-02**				**Prepared: 04/01/19 Analyzed: 04/02/19**						
Copper, Dissolved	10.3	0.0076	0.020	ug/l	4.00	6.54	94	70-130	1	30	
Matrix Spike Dup (W9D0064-MSD2)	**Source: 9C28056-03**				**Prepared: 04/01/19 Analyzed: 04/02/19**						
Copper, Dissolved	10.8	0.0076	0.020	ug/l	4.00	7.02	94	70-130	1	30	
Batch: W9D0247 - EPA 1640											
Blank (W9D0247-BLK1)					**Prepared: 04/03/19 Analyzed: 04/04/19**						
Copper, Total	ND	0.0038	0.010	ug/l							
LCS (W9D0247-BS1)					**Prepared: 04/03/19 Analyzed: 04/04/19**						
Copper, Total	2.00	0.0038	0.010	ug/l	2.00		100	73-122			

Quality Control Results

(Continued)

Metals - Low Level by 1600 Series Methods (Continued)

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W9D0247 - EPA 1640 (Continued)											
Matrix Spike (W9D0247-MS1)	**Source: 9C28056-29**				**Prepared: 04/03/19**	**Analyzed: 04/04/19**					
Copper, Total	75.9	0.19	0.50	ug/l	100	79.7	NR	60-138			MS-02
Matrix Spike (W9D0247-MS2)	**Source: 9C28056-30**				**Prepared: 04/03/19**	**Analyzed: 04/04/19**					
Copper, Total	115	0.19	0.50	ug/l	100	115	0.6	60-138			MS-02
Matrix Spike Dup (W9D0247-MSD1)	**Source: 9C28056-29**				**Prepared: 04/03/19**	**Analyzed: 04/04/19**					
Copper, Total	74.8	0.19	0.50	ug/l	100	79.7	NR	60-138	1	30	MS-02
Matrix Spike Dup (W9D0247-MSD2)	**Source: 9C28056-30**				**Prepared: 04/03/19**	**Analyzed: 04/04/19**					
Copper, Total	115	0.19	0.50	ug/l	100	115	0.4	60-138	0.2	30	MS-02
Batch: W9D0346 - EPA 1640											
Blank (W9D0346-BLK1)					**Prepared: 04/04/19**	**Analyzed: 04/05/19**					
Copper, Dissolved	ND	0.0038	0.010	ug/l							
LCS (W9D0346-BS1)					**Prepared: 04/04/19**	**Analyzed: 04/05/19**					
Copper, Dissolved	2.05	0.0038	0.010	ug/l	2.00		103	70-130			
Matrix Spike (W9D0346-MS1)	**Source: 9C28056-29**				**Prepared: 04/04/19**	**Analyzed: 04/05/19**					
Copper, Dissolved	129	0.19	0.50	ug/l	100	27.6	102	70-130			
Matrix Spike (W9D0346-MS2)	**Source: 9C28056-30**				**Prepared: 04/04/19**	**Analyzed: 04/05/19**					
Copper, Dissolved	157	0.19	0.50	ug/l	100	59.2	98	70-130			
Matrix Spike Dup (W9D0346-MSD1)	**Source: 9C28056-29**				**Prepared: 04/04/19**	**Analyzed: 04/05/19**					
Copper, Dissolved	124	0.19	0.50	ug/l	100	27.6	97	70-130	4	30	
Matrix Spike Dup (W9D0346-MSD2)	**Source: 9C28056-30**				**Prepared: 04/04/19**	**Analyzed: 04/05/19**					
Copper, Dissolved	156	0.19	0.50	ug/l	100	59.2	97	70-130	0.8	30	
Batch: W9D0441 - EPA 1640											
Blank (W9D0441-BLK1)					**Prepared: 04/05/19**	**Analyzed: 04/11/19**					
Copper, Dissolved	0.00538	0.0038	0.010	ug/l							J
Blank (W9D0441-BLK2)					**Prepared: 04/05/19**	**Analyzed: 04/17/19**					
Copper, Dissolved	ND	0.0038	0.010	ug/l							
LCS (W9D0441-BS1)					**Prepared: 04/05/19**	**Analyzed: 04/11/19**					
Copper, Dissolved	1.95	0.0038	0.010	ug/l	2.00		97	70-130			
LCS (W9D0441-BS2)					**Prepared: 04/05/19**	**Analyzed: 04/17/19**					
Copper, Dissolved	2.07	0.0038	0.010	ug/l	2.00		103	70-130			
Matrix Spike (W9D0441-MS1)	**Source: 9C28056-51**				**Prepared: 04/05/19**	**Analyzed: 04/11/19**					
Copper, Dissolved	1.94	0.0038	0.010	ug/l	2.00	0.0181	96	70-130			
Matrix Spike (W9D0441-MS2)	**Source: 9C28056-53**				**Prepared: 04/05/19**	**Analyzed: 04/11/19**					
Copper, Dissolved	2.31	0.0038	0.010	ug/l	2.00	0.168	107	70-130			
Matrix Spike (W9D0441-MS3)	**Source: 9C28056-51**				**Prepared: 04/05/19**	**Analyzed: 04/17/19**					
Copper, Dissolved	2.04	0.0038	0.010	ug/l	2.00	0.0181	101	70-130			
Matrix Spike Dup (W9D0441-MSD1)	**Source: 9C28056-51**				**Prepared: 04/05/19**	**Analyzed: 04/11/19**					
Copper, Dissolved	2.01	0.0038	0.010	ug/l	2.00	0.0181	99	70-130	3	30	

Quality Control Results

(Continued)

Metals - Low Level by 1600 Series Methods (Continued)

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W9D0441 - EPA 1640 (Continued)											
Matrix Spike Dup (W9D0441-MSD2)	**Source: 9C28056-53**				**Prepared: 04/05/19**	**Analyzed: 04/11/19**					
Copper, Dissolved	2.17	0.0038	0.010	ug/l	2.00	0.168	100	70-130	6	30	
Matrix Spike Dup (W9D0441-MSD3)	**Source: 9C28056-51**				**Prepared: 04/05/19**	**Analyzed: 04/17/19**					
Copper, Dissolved	2.11	0.0038	0.010	ug/l	2.00	0.0181	105	70-130	4	30	
Batch: W9D0442 - EPA 1640											
Blank (W9D0442-BLK1)					**Prepared: 04/07/19**	**Analyzed: 04/10/19**					
Copper, Total	ND	0.0038	0.010	ug/l							
LCS (W9D0442-BS1)					**Prepared: 04/07/19**	**Analyzed: 04/10/19**					
Copper, Total	2.04	0.0038	0.010	ug/l	2.00		102	73-122			
Matrix Spike (W9D0442-MS1)	**Source: 9C28056-44**				**Prepared: 04/07/19**	**Analyzed: 04/10/19**					
Copper, Total	24.2	0.038	0.10	ug/l	2.00	21.8	121	60-138			
Matrix Spike (W9D0442-MS2)	**Source: 9C28056-45**				**Prepared: 04/07/19**	**Analyzed: 04/10/19**					
Copper, Total	7.88	0.0038	0.010	ug/l	2.00	6.70	59	60-138			MS-02
Matrix Spike Dup (W9D0442-MSD1)	**Source: 9C28056-44**				**Prepared: 04/07/19**	**Analyzed: 04/10/19**					
Copper, Total	23.0	0.038	0.10	ug/l	2.00	21.8	60	60-138	5	30	
Matrix Spike Dup (W9D0442-MSD2)	**Source: 9C28056-45**				**Prepared: 04/07/19**	**Analyzed: 04/10/19**					
Copper, Total	7.84	0.0038	0.010	ug/l	2.00	6.70	57	60-138	0.6	30	MS-02
Batch: W9D0557 - EPA 1640											
Blank (W9D0557-BLK1)					**Prepared: 04/09/19**	**Analyzed: 04/11/19**					
Copper, Dissolved	ND	0.0038	0.010	ug/l							
LCS (W9D0557-BS1)					**Prepared: 04/09/19**	**Analyzed: 04/11/19**					
Copper, Dissolved	2.17	0.0038	0.010	ug/l	2.00		108	70-130			
Matrix Spike (W9D0557-MS1)	**Source: 9C28056-45**				**Prepared: 04/09/19**	**Analyzed: 04/11/19**					
Copper, Dissolved	9.70	0.0076	0.020	ug/l	4.00	5.52	104	70-130			
Matrix Spike Dup (W9D0557-MSD1)	**Source: 9C28056-45**				**Prepared: 04/09/19**	**Analyzed: 04/11/19**					
Copper, Dissolved	9.79	0.0076	0.020	ug/l	4.00	5.52	107	70-130	0.9	30	

Quality Control Results

(Continued)

Metals (Non-Aqueous) by EPA 6000/7000 Series Methods

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W9C1595 - EPA 6020											
Blank (W9C1595-BLK1)				**Prepared: 03/29/19**	**Analyzed: 04/01/19**						
Copper, Total	ND	0.29	0.50	mg/kg							
LCS (W9C1595-BS1)				**Prepared: 03/29/19**	**Analyzed: 04/01/19**						
Copper, Total	51.7	0.29	0.50	mg/kg	50.0		103	80-120			
Matrix Spike (W9C1595-MS1)	**Source: 9C28056-52**			**Prepared: 03/29/19**	**Analyzed: 04/01/19**						
Copper, Total	256	0.29	0.50	mg/kg	50.1	182	149	75-125			MS-02
Matrix Spike Dup (W9C1595-MSD1)	**Source: 9C28056-52**			**Prepared: 03/29/19**	**Analyzed: 04/01/19**						
Copper, Total	267	0.29	0.50	mg/kg	49.8	182	171	75-125	4	20	MS-02

Notes and Definitions

Item	Definition
J	Estimated conc. detected <MRL and >MDL.
MS-02	The RPD and/or percent recovery for this QC spike sample cannot be accurately calculated due to the high concentration of analyte inherent in the sample.
ND	NOT DETECTED at or above the Method Reporting Limit (MRL). If Method Detection Limit (MDL) is reported, then ND means not detected at or above the MDL.
Dil	Dilution
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
% Rec	Percent Recovery
Source	Sample that was matrix spiked or duplicated.
MDL	Method Detection Limit
MRL	The minimum levels, concentrations, or quantities of a target variable (e.g., target analyte) that can be reported with a specified degree of confidence. The MRL is also known as Limit of Quantitation (LOQ) and Detection Limit for Reporting (DLR)
MDA	Minimum Detectable Activity
NR	Not Reportable
TIC	Tentatively Identified Compound (TIC) using mass spectrometry. The reported concentration is relative concentration based on the nearest internal standard. If the library search produces no matches at, or above 85%, the compound is reported as unknown.

Any remaining sample(s) will be disposed of one month from the final report date unless other arrangements are made in advance.
An Absence of Total Coliform meets the drinking water standards as established by the California State Water Resources Control Board (SWRCB)
All results are expressed on wet weight basis unless otherwise specified.
All samples collected by Weck Laboratories have been sampled in accordance to laboratory SOP Number MIS 002.

WECK LABORATORIES, INC.

Certificate of Analysis

FINAL REPORT

Work Orders: 9C29080

Project: Boatwash Pilot Study

Attn: Barry Snyder

Client: Wood - San Diego 2
9210 Sky Park Court, Suite 200
San Diego, CA 92123

Report Date: 4/22/2019

Received Date: 3/29/2019

Turnaround Time: Normal

Phones: (858) 300-4320

Fax: (858) 300-4301

P.O. #:

Billing Code:

EPA-UCMR #CA00211 • Guam-EPA #17-008R • HW-DOH # • ISO 17025 #L2457.01 • LACSD #10143 • NELAP-CA #04229CA • NELAP-OR #4047 • NJ-DEP #CA015 • NV-DEP #NAC 445A • SCAQMD #93LA1006

This is a complete final report. The information in this report applies to the samples analyzed in accordance with the chain-of-custody document. Weck Laboratories certifies that the test results meet all requirements of TNI unless noted by qualifiers or written in the Case Narrative. This analytical report must be reproduced in its entirety.

Dear Barry Snyder,

Enclosed are the results of analyses for samples received 3/29/19 with the Chain-of-Custody document. The samples were received in good condition, at 5.9 °C and on ice. All analyses met the method criteria except as noted in the case narrative or in the report with data qualifiers.

Reviewed by:

Chris Samatmanakit
Project Manager

Certificate of Analysis

FINAL REPORT

Wood - San Diego 2
9210 Sky Park Court, Suite 200
San Diego, CA 92123

Project Number: Boatwash Pilot Study

Project Manager: Barry Snyder

Reported:
04/22/2019 10:48

Sample Summary

Sample Name	Sampled By	Lab ID	Matrix	Sampled	Qualifiers
Gate1-Top-P1	Corey Sheredy/Marissa Swiderski	9C29080-01	Sea Water	03/28/19 12:40	
Gate1-Bottom-P1	Corey Sheredy/Marissa Swiderski	9C29080-02	Sea Water	03/28/19 12:45	
Gate2-Top-P1	Corey Sheredy/Marissa Swiderski	9C29080-03	Sea Water	03/28/19 12:50	
Gate2-Bottom-P1	Corey Sheredy/Marissa Swiderski	9C29080-04	Sea Water	03/28/19 12:55	
Basin1-Top-P1	Corey Sheredy/Marissa Swiderski	9C29080-05	Sea Water	03/28/19 13:00	
Basin1-Bottom-P1	Corey Sheredy/Marissa Swiderski	9C29080-06	Sea Water	03/28/19 13:05	
Basin2-Top-P1	Corey Sheredy/Marissa Swiderski	9C29080-07	Sea Water	03/28/19 13:10	
Basin2-Bottom-P1	Corey Sheredy/Marissa Swiderski	9C29080-08	Sea Water	03/28/19 13:15	

Wood - San Diego 2
9210 Sky Park Court, Suite 200
San Diego, CA 92123

Project Number: Boatwash Pilot Study

Project Manager: Barry Snyder

Reported:
04/22/2019 10:48

Sample Results

Sample: Gate1-Top-P1 Sampled: 03/28/19 12:40 by Corey Sheredy/Marissa Swiderski
9C29080-01 (Sea Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0121 **Instr:** OVEN11 **Prepared:** 04/02/19 11:08 **Analyst:** sar							
Total Suspended Solids	**8**		5	mg/l	1	04/02/19 12:25	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D0568 **Instr:** ICPMS03 **Prepared:** 04/09/19 11:09 **Analyst:** ALN							
Copper, Total	**17**	0.019	0.050	ug/l	5	04/13/19 12:16	
Method: EPA 1640 **Batch ID:** W9D0569 **Instr:** ICPMS03 **Prepared:** 04/09/19 11:12 **Analyst:** ALN							
Copper, Dissolved	**18**	0.019	0.050	ug/l	5	04/13/19 08:06	

Sample: Gate1-Bottom-P1 Sampled: 03/28/19 12:45 by Corey Sheredy/Marissa Swiderski
9C29080-02 (Sea Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0121 **Instr:** OVEN11 **Prepared:** 04/02/19 11:08 **Analyst:** sar							
Total Suspended Solids	**3**		5	mg/l	1	04/02/19 12:25	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D0568 **Instr:** ICPMS03 **Prepared:** 04/09/19 11:09 **Analyst:** ALN							
Copper, Total	**10**	0.019	0.050	ug/l	5	04/13/19 12:29	
Method: EPA 1640 **Batch ID:** W9D0569 **Instr:** ICPMS03 **Prepared:** 04/09/19 11:12 **Analyst:** ALN							
Copper, Dissolved	**9.4**	0.019	0.050	ug/l	5	04/13/19 08:20	

Sample: Gate2-Top-P1 Sampled: 03/28/19 12:50 by Corey Sheredy/Marissa Swiderski
9C29080-03 (Sea Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0121 **Instr:** OVEN11 **Prepared:** 04/02/19 11:08 **Analyst:** sar							
Total Suspended Solids	**4**		5	mg/l	1	04/02/19 12:25	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D0568 **Instr:** ICPMS03 **Prepared:** 04/09/19 11:09 **Analyst:** ALN							
Copper, Total	**18**	0.019	0.050	ug/l	5	04/13/19 12:43	
Method: EPA 1640 **Batch ID:** W9D0569 **Instr:** ICPMS03 **Prepared:** 04/09/19 11:12 **Analyst:** ALN							
Copper, Dissolved	**16**	0.019	0.050	ug/l	5	04/13/19 08:34	

Sample Results

(Continued)

Sample: Gate2-Bottom-P1
9C29080-04 (Sea Water)
Sampled: 03/28/19 12:55 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0139 **Instr:** OVEN11 **Prepared:** 04/02/19 13:29 **Analyst:** sar							
Total Suspended Solids	**10**		5	mg/l	1	04/02/19 15:48	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D0568 **Instr:** ICPMS03 **Prepared:** 04/09/19 11:09 **Analyst:** ALN							
Copper, Total	**14**	0.019	0.050	ug/l	5	04/13/19 12:57	
Method: EPA 1640 **Batch ID:** W9D0569 **Instr:** ICPMS03 **Prepared:** 04/09/19 11:12 **Analyst:** ALN							
Copper, Dissolved	**14**	0.019	0.050	ug/l	5	04/13/19 08:48	

Sample: Basin1-Top-P1
9C29080-05 (Sea Water)
Sampled: 03/28/19 13:00 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0139 **Instr:** OVEN11 **Prepared:** 04/02/19 13:29 **Analyst:** sar							
Total Suspended Solids	**11**		5	mg/l	1	04/02/19 15:48	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D0568 **Instr:** ICPMS03 **Prepared:** 04/09/19 11:09 **Analyst:** ALN							
Copper, Total	**180**	0.19	0.50	ug/l	50	04/13/19 13:11	
Method: EPA 1640 **Batch ID:** W9D0569 **Instr:** ICPMS03 **Prepared:** 04/09/19 11:12 **Analyst:** ALN							
Copper, Dissolved	**170**	0.19	0.50	ug/l	50	04/13/19 09:02	

Sample: Basin1-Bottom-P1
9C29080-06 (Sea Water)
Sampled: 03/28/19 13:05 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0139 **Instr:** OVEN11 **Prepared:** 04/02/19 13:29 **Analyst:** sar							
Total Suspended Solids	**6**		5	mg/l	1	04/02/19 15:48	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D0568 **Instr:** ICPMS03 **Prepared:** 04/09/19 11:09 **Analyst:** ALN							
Copper, Total	**180**	0.19	0.50	ug/l	50	04/13/19 13:25	
Method: EPA 1640 **Batch ID:** W9D0569 **Instr:** ICPMS03 **Prepared:** 04/09/19 11:12 **Analyst:** ALN							
Copper, Dissolved	**180**	0.19	0.50	ug/l	50	04/13/19 09:15	

Sample Results

(Continued)

Sample: Basin2-Top-P1
9C29080-07 (Sea Water)
Sampled: 03/28/19 13:10 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0139 **Instr:** OVEN11 **Prepared:** 04/02/19 13:29 **Analyst:** sar							
Total Suspended Solids	**5**		5	mg/l	1	04/02/19 15:48	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D0568 **Instr:** ICPMS03 **Prepared:** 04/09/19 11:09 **Analyst:** ALN							
Copper, Total	**160**	0.19	0.50	ug/l	50	04/13/19 13:39	
Method: EPA 1640 **Batch ID:** W9D0569 **Instr:** ICPMS03 **Prepared:** 04/09/19 11:12 **Analyst:** ALN							
Copper, Dissolved	**160**	0.19	0.50	ug/l	50	04/13/19 09:29	

Sample: Basin2-Bottom-P1
9C29080-08 (Sea Water)
Sampled: 03/28/19 13:15 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0139 **Instr:** OVEN11 **Prepared:** 04/02/19 13:29 **Analyst:** sar							
Total Suspended Solids	**5**		5	mg/l	1	04/02/19 15:48	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D0568 **Instr:** ICPMS03 **Prepared:** 04/09/19 11:09 **Analyst:** ALN							
Copper, Total	**180**	0.19	0.50	ug/l	50	04/13/19 13:52	
Method: EPA 1640 **Batch ID:** W9D0569 **Instr:** ICPMS03 **Prepared:** 04/09/19 11:12 **Analyst:** ALN							
Copper, Dissolved	**160**	0.19	0.50	ug/l	50	04/13/19 09:43	

Quality Control Results

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W9D0121 - SM 2540D											
Blank (W9D0121-BLK1)					**Prepared & Analyzed: 04/02/19**						
Total Suspended Solids	ND		5	mg/l							
LCS (W9D0121-BS1)					**Prepared & Analyzed: 04/02/19**						
Total Suspended Solids	56.0		5	mg/l	52.6		106	90-110			
Duplicate (W9D0121-DUP1)	**Source: 9C29080-02**				**Prepared & Analyzed: 04/02/19**						
Total Suspended Solids	3.00		5	mg/l		3.00			0	20	J
Duplicate (W9D0121-DUP2)	**Source: 9C29080-03**				**Prepared & Analyzed: 04/02/19**						
Total Suspended Solids	4.00		5	mg/l		4.00			0	20	J
Batch: W9D0139 - SM 2540D											
Blank (W9D0139-BLK1)					**Prepared & Analyzed: 04/02/19**						
Total Suspended Solids	1.00		5	mg/l							J
LCS (W9D0139-BS1)					**Prepared & Analyzed: 04/02/19**						
Total Suspended Solids	66.0		5	mg/l	61.8		107	90-110			
Duplicate (W9D0139-DUP1)	**Source: 9C29080-08**				**Prepared & Analyzed: 04/02/19**						
Total Suspended Solids	5.00		5	mg/l		5.00			0	20	
Duplicate (W9D0139-DUP2)	**Source: 9C29081-01**				**Prepared & Analyzed: 04/02/19**						
Total Suspended Solids	7.00		5	mg/l		7.00			0	20	

Quality Control Results

(Continued)

Metals - Low Level by 1600 Series Methods

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W9D0568 - EPA 1640											
Blank (W9D0568-BLK1)					**Prepared: 04/09/19**	**Analyzed: 04/13/19**					
Copper, Total	ND	0.0038	0.010	ug/l							
LCS (W9D0568-BS1)					**Prepared: 04/09/19**	**Analyzed: 04/13/19**					
Copper, Total	1.97	0.0038	0.010	ug/l	2.00		98	73-122			
Matrix Spike (W9D0568-MS1)	**Source: 9C29080-01**				**Prepared: 04/09/19**	**Analyzed: 04/13/19**					
Copper, Total	19.9	0.019	0.050	ug/l	2.00	17.0	144	60-138			MS-02
Matrix Spike Dup (W9D0568-MSD1)	**Source: 9C29080-01**				**Prepared: 04/09/19**	**Analyzed: 04/13/19**					
Copper, Total	20.0	0.019	0.050	ug/l	2.00	17.0	148	60-138	0.4	30	MS-02
Batch: W9D0569 - EPA 1640											
Blank (W9D0569-BLK1)					**Prepared: 04/09/19**	**Analyzed: 04/13/19**					
Copper, Dissolved	ND	0.0038	0.010	ug/l							
LCS (W9D0569-BS1)					**Prepared: 04/09/19**	**Analyzed: 04/13/19**					
Copper, Dissolved	1.97	0.0038	0.010	ug/l	2.00		98	70-130			
Matrix Spike (W9D0569-MS1)	**Source: 9C29080-01**				**Prepared: 04/09/19**	**Analyzed: 04/13/19**					
Copper, Dissolved	28.7	0.019	0.050	ug/l	10.0	17.8	108	70-130			
Matrix Spike Dup (W9D0569-MSD1)	**Source: 9C29080-01**				**Prepared: 04/09/19**	**Analyzed: 04/13/19**					
Copper, Dissolved	29.0	0.019	0.050	ug/l	10.0	17.8	112	70-130	1	30	

Notes and Definitions

Item	Definition
J	Estimated conc. detected <MRL and >MDL.
MS-02	The RPD and/or percent recovery for this QC spike sample cannot be accurately calculated due to the high concentration of analyte inherent in the sample.
ND	NOT DETECTED at or above the Method Reporting Limit (MRL). If Method Detection Limit (MDL) is reported, then ND means not detected at or above the MDL.
Dil	Dilution
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
% Rec	Percent Recovery
Source	Sample that was matrix spiked or duplicated.
MDL	Method Detection Limit
MRL	The minimum levels, concentrations, or quantities of a target variable (e.g., target analyte) that can be reported with a specified degree of confidence. The MRL is also known as Limit of Quantitation (LOQ) and Detection Limit for Reporting (DLR)
MDA	Minimum Detectable Activity
NR	Not Reportable
TIC	Tentatively Identified Compound (TIC) using mass spectrometry. The reported concentration is relative concentration based on the nearest internal standard. If the library search produces no matches at, or above 85%, the compound is reported as unknown.

Any remaining sample(s) will be disposed of one month from the final report date unless other arrangements are made in advance.
An Absence of Total Coliform meets the drinking water standards as established by the California State Water Resources Control Board (SWRCB)
All results are expressed on wet weight basis unless otherwise specified.
All samples collected by Weck Laboratories have been sampled in accordance to laboratory SOP Number MIS 002.

WECK LABORATORIES, INC.

Certificate of Analysis

FINAL REPORT

Work Orders: 9C29081

Project: Boatwash Pilot Study

Attn: Barry Snyder

Client: Wood - San Diego 2
9210 Sky Park Court, Suite 200
San Diego, CA 92123

Report Date: 4/22/2019

Received Date: 3/29/2019

Turnaround Time: Normal

Phones: (858) 300-4320

Fax: (858) 300-4301

P.O. #:

Billing Code:

EPA-UCMR #CA00211 • Guam-EPA #17-008R • HW-DOH # • ISO 17025 #L2457.01 • LACSD #10143 • NELAP-CA #04229CA • NELAP-OR #4047 • NJ-DEP #CA015 • NV-DEP #NAC 445A • SCAQMD #93LA1006

This is a complete final report. The information in this report applies to the samples analyzed in accordance with the chain-of-custody document. Weck Laboratories certifies that the test results meet all requirements of TNI unless noted by qualifiers or written in the Case Narrative. This analytical report must be reproduced in its entirety.

Dear Barry Snyder,

Enclosed are the results of analyses for samples received 3/29/19 with the Chain-of-Custody document. The samples were received in good condition, at 5.6 °C and on ice. All analyses met the method criteria except as noted in the case narrative or in the report with data qualifiers.

Reviewed by:

Chris Samatmanakit
Project Manager

Certificate of Analysis

FINAL REPORT

Wood - San Diego 2
9210 Sky Park Court, Suite 200
San Diego, CA 92123

Project Number: Boatwash Pilot Study

Project Manager: Barry Snyder

Reported:
04/22/2019 10:51

Sample Summary

Sample Name	Sampled By	Lab ID	Matrix	Sampled	Qualifiers
Gate1-Top-P2	Corey Sheredy/Marissa Swiderski	9C29081-01	Sea Water	03/29/19 10:45	
Gate1-Bottom-P2	Corey Sheredy/Marissa Swiderski	9C29081-02	Sea Water	03/29/19 10:50	
Gate2-Top-P2	Corey Sheredy/Marissa Swiderski	9C29081-03	Sea Water	03/29/19 10:55	
Gate2-Bottom-P2	Corey Sheredy/Marissa Swiderski	9C29081-04	Sea Water	03/29/19 11:00	
Basin1-Top-P2	Corey Sheredy/Marissa Swiderski	9C29081-05	Sea Water	03/29/19 11:05	
Basin1-Bottom-P2	Corey Sheredy/Marissa Swiderski	9C29081-06	Sea Water	03/29/19 11:10	
Basin2-Top-P2	Corey Sheredy/Marissa Swiderski	9C29081-07	Sea Water	03/29/19 11:15	
Basin2-Bottom-P2	Corey Sheredy/Marissa Swiderski	9C29081-08	Sea Water	03/29/19 11:20	

Sample Results

Sample: Gate1-Top-P2
9C29081-01 (Sea Water)

Sampled: 03/29/19 10:45 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0139 **Instr:** OVEN11 **Prepared:** 04/02/19 13:29 **Analyst:** sar							
Total Suspended Solids	**7**		5	mg/l	1	04/02/19 15:48	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D0561 **Instr:** ICPMS03 **Prepared:** 04/09/19 10:59 **Analyst:** ALN							
Copper, Total	**24**	0.019	0.050	ug/l	5	04/12/19 06:22	
Method: EPA 1640 **Batch ID:** W9D0562 **Instr:** ICPMS03 **Prepared:** 04/09/19 11:00 **Analyst:** ALN							
Copper, Dissolved	**20**	0.019	0.050	ug/l	5	04/12/19 23:48	

Sample: Gate1-Bottom-P2
9C29081-02 (Sea Water)

Sampled: 03/29/19 10:50 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0169 **Instr:** OVEN11 **Prepared:** 04/02/19 16:01 **Analyst:** sar							
Total Suspended Solids	**6**		5	mg/l	1	04/03/19 10:12	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D0561 **Instr:** ICPMS03 **Prepared:** 04/09/19 10:59 **Analyst:** ALN							
Copper, Total	**12**	0.019	0.050	ug/l	5	04/12/19 06:36	
Method: EPA 1640 **Batch ID:** W9D0562 **Instr:** ICPMS03 **Prepared:** 04/09/19 11:00 **Analyst:** ALN							
Copper, Dissolved	**11**	0.019	0.050	ug/l	5	04/13/19 00:02	

Sample: Gate2-Top-P2
9C29081-03 (Sea Water)

Sampled: 03/29/19 10:55 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0169 **Instr:** OVEN11 **Prepared:** 04/02/19 16:01 **Analyst:** sar							
Total Suspended Solids	**5**		5	mg/l	1	04/03/19 10:12	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D0561 **Instr:** ICPMS03 **Prepared:** 04/09/19 10:59 **Analyst:** ALN							
Copper, Total	**11**	0.019	0.050	ug/l	5	04/12/19 06:50	
Method: EPA 1640 **Batch ID:** W9D0562 **Instr:** ICPMS03 **Prepared:** 04/09/19 11:00 **Analyst:** ALN							
Copper, Dissolved	**8.9**	0.019	0.050	ug/l	5	04/13/19 00:15	

Sample Results

(Continued)

Sample: Gate2-Bottom-P2
9C29081-04 (Sea Water)

Sampled: 03/29/19 11:00 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0169 **Instr:** OVEN11 **Prepared:** 04/02/19 16:01 **Analyst:** sar							
Total Suspended Solids	**3**		5	mg/l	1	04/03/19 10:12	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D0441 **Instr:** ICPMS03 **Prepared:** 04/05/19 18:04 **Analyst:** ALN							
Copper, Dissolved	**9.8**	0.019	0.050	ug/l	5	04/17/19 03:37	
Method: EPA 1640 **Batch ID:** W9D0561 **Instr:** ICPMS03 **Prepared:** 04/09/19 10:59 **Analyst:** ALN							
Copper, Total	**10**	0.019	0.050	ug/l	5	04/12/19 07:03	

Sample: Basin1-Top-P2
9C29081-05 (Sea Water)

Sampled: 03/29/19 11:05 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0169 **Instr:** OVEN11 **Prepared:** 04/02/19 16:01 **Analyst:** sar							
Total Suspended Solids	**4**		5	mg/l	1	04/03/19 10:12	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D0561 **Instr:** ICPMS03 **Prepared:** 04/09/19 10:59 **Analyst:** ALN							
Copper, Total	**86**	0.076	0.20	ug/l	20	04/12/19 07:17	
Method: EPA 1640 **Batch ID:** W9D0562 **Instr:** ICPMS03 **Prepared:** 04/09/19 11:00 **Analyst:** ALN							
Copper, Dissolved	**70**	0.076	0.20	ug/l	20	04/13/19 00:43	

Sample: Basin1-Bottom-P2
9C29081-06 (Sea Water)

Sampled: 03/29/19 11:10 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0169 **Instr:** OVEN11 **Prepared:** 04/02/19 16:01 **Analyst:** sar							
Total Suspended Solids	**3**		5	mg/l	1	04/03/19 10:12	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D0561 **Instr:** ICPMS03 **Prepared:** 04/09/19 10:59 **Analyst:** ALN							
Copper, Total	**92**	0.076	0.20	ug/l	20	04/12/19 07:31	
Method: EPA 1640 **Batch ID:** W9D0562 **Instr:** ICPMS03 **Prepared:** 04/09/19 11:00 **Analyst:** ALN							
Copper, Dissolved	**77**	0.076	0.20	ug/l	20	04/13/19 00:57	

Sample Results

(Continued)

Sample: Basin2-Top-P2
9C29081-07 (Sea Water)
Sampled: 03/29/19 11:15 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0169 **Instr:** OVEN11 **Prepared:** 04/02/19 16:01 **Analyst:** sar							
Total Suspended Solids	**4**		5	mg/l	1	04/03/19 10:12	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D0561 **Instr:** ICPMS03 **Prepared:** 04/09/19 10:59 **Analyst:** ALN							
Copper, Total	**70**	0.076	0.20	ug/l	20	04/12/19 07:45	
Method: EPA 1640 **Batch ID:** W9D0562 **Instr:** ICPMS03 **Prepared:** 04/09/19 11:00 **Analyst:** ALN							
Copper, Dissolved	**61**	0.076	0.20	ug/l	20	04/13/19 01:11	

Sample: Basin2-Bottom-P2
9C29081-08 (Sea Water)
Sampled: 03/29/19 11:20 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0169 **Instr:** OVEN11 **Prepared:** 04/02/19 16:01 **Analyst:** sar							
Total Suspended Solids	**4**		5	mg/l	1	04/03/19 10:12	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D0561 **Instr:** ICPMS03 **Prepared:** 04/09/19 10:59 **Analyst:** ALN							
Copper, Total	**78**	0.076	0.20	ug/l	20	04/12/19 07:59	
Method: EPA 1640 **Batch ID:** W9D0562 **Instr:** ICPMS03 **Prepared:** 04/09/19 11:00 **Analyst:** ALN							
Copper, Dissolved	**70**	0.076	0.20	ug/l	20	04/13/19 01:25	

Certificate of Analysis

FINAL REPORT

Wood - San Diego 2
9210 Sky Park Court, Suite 200
San Diego, CA 92123

Project Number: Boatwash Pilot Study

Project Manager: Barry Snyder

Reported: 04/22/2019 10:51

Quality Control Results

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W9D0139 - SM 2540D											
Blank (W9D0139-BLK1)					**Prepared & Analyzed: 04/02/19**						
Total Suspended Solids	1.00		5	mg/l							J
LCS (W9D0139-BS1)					**Prepared & Analyzed: 04/02/19**						
Total Suspended Solids	66.0		5	mg/l	61.8		107	90-110			
Duplicate (W9D0139-DUP1)	**Source: 9C29080-08**				**Prepared & Analyzed: 04/02/19**						
Total Suspended Solids	5.00		5	mg/l		5.00			0	20	
Duplicate (W9D0139-DUP2)	**Source: 9C29081-01**				**Prepared & Analyzed: 04/02/19**						
Total Suspended Solids	7.00		5	mg/l		7.00			0	20	
Batch: W9D0169 - SM 2540D											
Blank (W9D0169-BLK1)					**Prepared: 04/02/19 Analyzed: 04/03/19**						
Total Suspended Solids	ND		5	mg/l							
LCS (W9D0169-BS1)					**Prepared: 04/02/19 Analyzed: 04/03/19**						
Total Suspended Solids	57.0		5	mg/l	54.5		105	90-110			
Duplicate (W9D0169-DUP1)	**Source: 9C29079-01**				**Prepared: 04/02/19 Analyzed: 04/03/19**						
Total Suspended Solids	6.00		5	mg/l		6.00			0	20	
Duplicate (W9D0169-DUP2)	**Source: 9D02006-01**				**Prepared: 04/02/19 Analyzed: 04/03/19**						
Total Suspended Solids	1.00		5	mg/l		1.00			0	20	J

Quality Control Results

(Continued)

Metals - Low Level by 1600 Series Methods

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W9D0441 - EPA 1640											
Blank (W9D0441-BLK1)					**Prepared: 04/05/19**	**Analyzed: 04/11/19**					
Copper, Dissolved	0.00538	0.0038	0.010	ug/l							J
Blank (W9D0441-BLK2)					**Prepared: 04/05/19**	**Analyzed: 04/17/19**					
Copper, Dissolved	ND	0.0038	0.010	ug/l							
LCS (W9D0441-BS1)					**Prepared: 04/05/19**	**Analyzed: 04/11/19**					
Copper, Dissolved	1.95	0.0038	0.010	ug/l	2.00		97	70-130			
LCS (W9D0441-BS2)					**Prepared: 04/05/19**	**Analyzed: 04/17/19**					
Copper, Dissolved	2.07	0.0038	0.010	ug/l	2.00		103	70-130			
Matrix Spike (W9D0441-MS1)	**Source: 9C28056-51**				**Prepared: 04/05/19**	**Analyzed: 04/11/19**					
Copper, Dissolved	1.94	0.0038	0.010	ug/l	2.00	0.0181	96	70-130			
Matrix Spike (W9D0441-MS2)	**Source: 9C28056-53**				**Prepared: 04/05/19**	**Analyzed: 04/11/19**					
Copper, Dissolved	2.31	0.0038	0.010	ug/l	2.00	0.168	107	70-130			
Matrix Spike (W9D0441-MS3)	**Source: 9C28056-51**				**Prepared: 04/05/19**	**Analyzed: 04/17/19**					
Copper, Dissolved	2.04	0.0038	0.010	ug/l	2.00	0.0181	101	70-130			
Matrix Spike Dup (W9D0441-MSD1)	**Source: 9C28056-51**				**Prepared: 04/05/19**	**Analyzed: 04/11/19**					
Copper, Dissolved	2.01	0.0038	0.010	ug/l	2.00	0.0181	99	70-130	3	30	
Matrix Spike Dup (W9D0441-MSD2)	**Source: 9C28056-53**				**Prepared: 04/05/19**	**Analyzed: 04/11/19**					
Copper, Dissolved	2.17	0.0038	0.010	ug/l	2.00	0.168	100	70-130	6	30	
Matrix Spike Dup (W9D0441-MSD3)	**Source: 9C28056-51**				**Prepared: 04/05/19**	**Analyzed: 04/17/19**					
Copper, Dissolved	2.11	0.0038	0.010	ug/l	2.00	0.0181	105	70-130	4	30	
Batch: W9D0561 - EPA 1640											
Blank (W9D0561-BLK1)					**Prepared: 04/09/19**	**Analyzed: 04/12/19**					
Copper, Total	0.00927	0.0038	0.010	ug/l							J
LCS (W9D0561-BS1)					**Prepared: 04/09/19**	**Analyzed: 04/12/19**					
Copper, Total	2.18	0.0038	0.010	ug/l	2.00		109	73-122			
Matrix Spike (W9D0561-MS1)	**Source: 9C29081-01**				**Prepared: 04/09/19**	**Analyzed: 04/12/19**					
Copper, Total	25.3	0.019	0.050	ug/l	2.00	23.7	78	60-138			
Matrix Spike Dup (W9D0561-MSD1)	**Source: 9C29081-01**				**Prepared: 04/09/19**	**Analyzed: 04/12/19**					
Copper, Total	25.6	0.019	0.050	ug/l	2.00	23.7	92	60-138	1	30	
Batch: W9D0562 - EPA 1640											
Blank (W9D0562-BLK1)					**Prepared: 04/09/19**	**Analyzed: 04/12/19**					
Copper, Dissolved	ND	0.0038	0.010	ug/l							
LCS (W9D0562-BS1)					**Prepared: 04/09/19**	**Analyzed: 04/12/19**					
Copper, Dissolved	1.91	0.0038	0.010	ug/l	2.00		96	70-130			
Matrix Spike (W9D0562-MS1)	**Source: 9C29081-01**				**Prepared: 04/09/19**	**Analyzed: 04/12/19**					
Copper, Dissolved	29.1	0.019	0.050	ug/l	10.0	19.7	94	70-130			
Matrix Spike Dup (W9D0562-MSD1)	**Source: 9C29081-01**				**Prepared: 04/09/19**	**Analyzed: 04/12/19**					
Copper, Dissolved	31.1	0.019	0.050	ug/l	10.0	19.7	114	70-130	7	30	

Notes and Definitions

Item	Definition
J	Estimated conc. detected <MRL and >MDL.
ND	NOT DETECTED at or above the Method Reporting Limit (MRL). If Method Detection Limit (MDL) is reported, then ND means not detected at or above the MDL.
Dil	Dilution
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
% Rec	Percent Recovery
Source	Sample that was matrix spiked or duplicated.
MDL	Method Detection Limit
MRL	The minimum levels, concentrations, or quantities of a target variable (e.g., target analyte) that can be reported with a specified degree of confidence. The MRL is also known as Limit of Quantitation (LOQ) and Detection Limit for Reporting (DLR)
MDA	Minimum Detectable Activity
NR	Not Reportable
TIC	Tentatively Identified Compound (TIC) using mass spectrometry. The reported concentration is relative concentration based on the nearest internal standard. If the library search produces no matches at, or above 85%, the compound is reported as unknown.

Any remaining sample(s) will be disposed of one month from the final report date unless other arrangements are made in advance.
An Absence of Total Coliform meets the drinking water standards as established by the California State Water Resources Control Board (SWRCB)
All results are expressed on wet weight basis unless otherwise specified.
All samples collected by Weck Laboratories have been sampled in accordance to laboratory SOP Number MIS 002.

WECK LABORATORIES, INC.

Certificate of Analysis

FINAL REPORT

Work Orders: 9D01107

Project: Boatwash Pilot Study

Attn: Barry Snyder

Client: Wood - San Diego 2
9210 Sky Park Court, Suite 200
San Diego, CA 92123

Report Date: 4/22/2019

Received Date: 4/1/2019

Turnaround Time: Normal

Phones: (858) 300-4320

Fax: (858) 300-4301

P.O. #:

Billing Code:

EPA-UCMR #CA00211 • Guam-EPA #17-008R • HW-DOH # • ISO 17025 #L2457.01 • LACSD #10143 • NELAP-CA #04229CA • NELAP-OR #4047 • NJ-DEP #CA015 • NV-DEP #NAC 445A • SCAQMD #93LA1006

This is a complete final report. The information in this report applies to the samples analyzed in accordance with the chain-of-custody document. Weck Laboratories certifies that the test results meet all requirements of TNI unless noted by qualifiers or written in the Case Narrative. This analytical report must be reproduced in its entirety.

Dear Barry Snyder,

Enclosed are the results of analyses for samples received 4/01/19 with the Chain-of-Custody document. The samples were received in good condition, at 2.9 °C and on ice. All analyses met the method criteria except as noted in the case narrative or in the report with data qualifiers.

Reviewed by:

Chris Samatmanakit
Project Manager

WECK LABORATORIES, INC.

Certificate of Analysis

FINAL REPORT

Wood - San Diego 2
9210 Sky Park Court, Suite 200
San Diego, CA 92123

Project Number: Boatwash Pilot Study

Project Manager: Barry Snyder

Reported:
04/22/2019 10:53

Sample Summary

Sample Name	Sampled By	Lab ID	Matrix	Sampled	Qualifiers
Gate1-Top-P3	Corey Sheredy/Marissa Swiderski	9D01107-01	Sea Water	03/30/19 08:50	
Gate1-Bottom-P3	Corey Sheredy/Marissa Swiderski	9D01107-02	Sea Water	03/30/19 08:55	
Gate2-Top-P3	Corey Sheredy/Marissa Swiderski	9D01107-03	Sea Water	03/30/19 09:00	
Gate2-Bottom-P3	Corey Sheredy/Marissa Swiderski	9D01107-04	Sea Water	03/30/19 09:05	
Basin1-Top-P3	Corey Sheredy/Marissa Swiderski	9D01107-05	Sea Water	03/30/19 09:10	
Basin1-Bottom-P3	Corey Sheredy/Marissa Swiderski	9D01107-06	Sea Water	03/30/19 09:15	
Basin2-Top-P3	Corey Sheredy/Marissa Swiderski	9D01107-07	Sea Water	03/30/19 09:20	
Basin2-Bottom-P3	Corey Sheredy/Marissa Swiderski	9D01107-08	Sea Water	03/30/19 09:25	

Wood - San Diego 2
9210 Sky Park Court, Suite 200
San Diego, CA 92123

Project Number: Boatwash Pilot Study

Project Manager: Barry Snyder

Reported:
04/22/2019 10:53

Sample Results

Sample: Gate1-Top-P3
9D01107-01 (Sea Water)
Sampled: 03/30/19 8:50 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0169 **Instr:** OVEN11 **Prepared:** 04/02/19 16:01 **Analyst:** sar							
Total Suspended Solids	**3**		5	mg/l	1	04/03/19 10:12	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D0565 **Instr:** ICPMS03 **Prepared:** 04/09/19 11:07 **Analyst:** ALN							
Copper, Total	**19**	0.019	0.050	ug/l	5	04/12/19 10:31	
Method: EPA 1640 **Batch ID:** W9D0566 **Instr:** ICPMS03 **Prepared:** 04/09/19 11:08 **Analyst:** ALN							
Copper, Dissolved	**16**	0.019	0.050	ug/l	5	04/13/19 03:57	

Sample: Gate1-Bottom-P3
9D01107-02 (Sea Water)
Sampled: 03/30/19 8:55 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0169 **Instr:** OVEN11 **Prepared:** 04/02/19 16:01 **Analyst:** sar							
Total Suspended Solids	**6**		5	mg/l	1	04/03/19 10:12	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D0565 **Instr:** ICPMS03 **Prepared:** 04/09/19 11:07 **Analyst:** ALN							
Copper, Total	**16**	0.019	0.050	ug/l	5	04/12/19 10:45	
Method: EPA 1640 **Batch ID:** W9D0566 **Instr:** ICPMS03 **Prepared:** 04/09/19 11:08 **Analyst:** ALN							
Copper, Dissolved	**14**	0.019	0.050	ug/l	5	04/13/19 04:11	

Sample: Gate2-Top-P3
9D01107-03 (Sea Water)
Sampled: 03/30/19 9:00 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0169 **Instr:** OVEN11 **Prepared:** 04/02/19 16:01 **Analyst:** sar							
Total Suspended Solids	**8**		5	mg/l	1	04/03/19 10:12	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D0565 **Instr:** ICPMS03 **Prepared:** 04/09/19 11:07 **Analyst:** ALN							
Copper, Total	**12**	0.019	0.050	ug/l	5	04/12/19 10:59	
Method: EPA 1640 **Batch ID:** W9D0566 **Instr:** ICPMS03 **Prepared:** 04/09/19 11:08 **Analyst:** ALN							
Copper, Dissolved	**10**	0.019	0.050	ug/l	5	04/13/19 04:25	

Sample Results

(Continued)

Sample: Gate2-Bottom-P3
9D01107-04 (Sea Water)
Sampled: 03/30/19 9:05 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0169 **Instr:** OVEN11 **Prepared:** 04/02/19 16:01 **Analyst:** sar							
Total Suspended Solids	**3**		5	mg/l	1	04/03/19 10:12	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D0565 **Instr:** ICPMS03 **Prepared:** 04/09/19 11:07 **Analyst:** ALN							
Copper, Total	**11**	0.019	0.050	ug/l	5	04/12/19 11:13	
Method: EPA 1640 **Batch ID:** W9D0566 **Instr:** ICPMS03 **Prepared:** 04/09/19 11:08 **Analyst:** ALN							
Copper, Dissolved	**9.0**	0.019	0.050	ug/l	5	04/13/19 04:39	

Sample: Basin1-Top-P3
9D01107-05 (Sea Water)
Sampled: 03/30/19 9:10 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0169 **Instr:** OVEN11 **Prepared:** 04/02/19 16:01 **Analyst:** sar							
Total Suspended Solids	**4**		5	mg/l	1	04/03/19 10:12	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D0565 **Instr:** ICPMS03 **Prepared:** 04/09/19 11:07 **Analyst:** aln							
Copper, Total	**52**	0.076	0.20	ug/l	20	04/12/19 12:22	
Method: EPA 1640 **Batch ID:** W9D0566 **Instr:** ICPMS03 **Prepared:** 04/09/19 11:08 **Analyst:** aln							
Copper, Dissolved	**47**	0.038	0.10	ug/l	10	04/13/19 04:52	

Sample: Basin1-Bottom-P3
9D01107-06 (Sea Water)
Sampled: 03/30/19 9:15 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0169 **Instr:** OVEN11 **Prepared:** 04/02/19 16:01 **Analyst:** sar							
Total Suspended Solids	**5**		5	mg/l	1	04/03/19 10:12	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D0565 **Instr:** ICPMS03 **Prepared:** 04/09/19 11:07 **Analyst:** ALN							
Copper, Total	**56**	0.076	0.20	ug/l	20	04/12/19 11:40	
Method: EPA 1640 **Batch ID:** W9D0566 **Instr:** ICPMS03 **Prepared:** 04/09/19 11:08 **Analyst:** ALN							
Copper, Dissolved	**50**	0.076	0.20	ug/l	20	04/13/19 05:06	

Sample Results

(Continued)

Sample: Basin2-Top-P3
9D01107-07 (Sea Water)

Sampled: 03/30/19 9:20 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0169 **Instr:** OVEN11 **Prepared:** 04/02/19 16:01 **Analyst:** sar							
Total Suspended Solids	**6**		5	mg/l	1	04/03/19 10:12	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D0565 **Instr:** ICPMS03 **Prepared:** 04/09/19 11:07 **Analyst:** ALN							
Copper, Total	**44**	0.038	0.10	ug/l	10	04/12/19 11:54	
Method: EPA 1640 **Batch ID:** W9D0566 **Instr:** ICPMS03 **Prepared:** 04/09/19 11:08 **Analyst:** ALN							
Copper, Dissolved	**41**	0.038	0.10	ug/l	10	04/13/19 05:20	

Sample: Basin2-Bottom-P3
9D01107-08 (Sea Water)

Sampled: 03/30/19 9:25 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0169 **Instr:** OVEN11 **Prepared:** 04/02/19 16:01 **Analyst:** sar							
Total Suspended Solids	**4**		5	mg/l	1	04/03/19 10:12	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D0565 **Instr:** ICPMS03 **Prepared:** 04/09/19 11:07 **Analyst:** ALN							
Copper, Total	**50**	0.076	0.20	ug/l	20	04/12/19 12:08	
Method: EPA 1640 **Batch ID:** W9D0566 **Instr:** ICPMS03 **Prepared:** 04/09/19 11:08 **Analyst:** ALN							
Copper, Dissolved	**44**	0.076	0.20	ug/l	20	04/13/19 05:34	

Quality Control Results

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W9D0169 - SM 2540D											
Blank (W9D0169-BLK1)					**Prepared: 04/02/19 Analyzed: 04/03/19**						
Total Suspended Solids	ND		5	mg/l							
LCS (W9D0169-BS1)					**Prepared: 04/02/19 Analyzed: 04/03/19**						
Total Suspended Solids	57.0		5	mg/l	54.5		105	90-110			
Duplicate (W9D0169-DUP1)	**Source: 9C29079-01**				**Prepared: 04/02/19 Analyzed: 04/03/19**						
Total Suspended Solids	6.00		5	mg/l		6.00			0	20	
Duplicate (W9D0169-DUP2)	**Source: 9D02006-01**				**Prepared: 04/02/19 Analyzed: 04/03/19**						
Total Suspended Solids	1.00		5	mg/l		1.00			0	20	J

Quality Control Results

Metals - Low Level by 1600 Series Methods

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W9D0565 - EPA 1640											
Blank (W9D0565-BLK1)					**Prepared: 04/09/19 Analyzed: 04/12/19**						
Copper, Total	0.0110	0.0038	0.010	ug/l							B-06
LCS (W9D0565-BS1)					**Prepared: 04/09/19 Analyzed: 04/12/19**						
Copper, Total	2.14	0.0038	0.010	ug/l	2.00		107	73-122			
Matrix Spike (W9D0565-MS1)	**Source: 9D01107-01**				**Prepared: 04/09/19 Analyzed: 04/12/19**						
Copper, Total	21.1	0.019	0.050	ug/l	2.00	18.9	108	60-138			
Matrix Spike Dup (W9D0565-MSD1)	**Source: 9D01107-01**				**Prepared: 04/09/19 Analyzed: 04/12/19**						
Copper, Total	21.9	0.019	0.050	ug/l	2.00	18.9	148	60-138	4	30	MS-02
Batch: W9D0566 - EPA 1640											
Blank (W9D0566-BLK1)					**Prepared: 04/09/19 Analyzed: 04/13/19**						
Copper, Dissolved	ND	0.0038	0.010	ug/l							
LCS (W9D0566-BS1)					**Prepared: 04/09/19 Analyzed: 04/13/19**						
Copper, Dissolved	2.00	0.0038	0.010	ug/l	2.00		100	70-130			
Matrix Spike (W9D0566-MS1)	**Source: 9D01107-01**				**Prepared: 04/09/19 Analyzed: 04/13/19**						
Copper, Dissolved	25.5	0.019	0.050	ug/l	10.0	16.3	92	70-130			
Matrix Spike Dup (W9D0566-MSD1)	**Source: 9D01107-01**				**Prepared: 04/09/19 Analyzed: 04/13/19**						
Copper, Dissolved	25.5	0.019	0.050	ug/l	10.0	16.3	92	70-130	0.03	30	

Wood - San Diego 2
9210 Sky Park Court, Suite 200
San Diego, CA 92123

Project Number: Boatwash Pilot Study

Project Manager: Barry Snyder

Reported:
04/22/2019 10:53

Notes and Definitions

Item	Definition
B-06	This analyte was found in the method blank, which was possibly contaminated during sample preparation. The batch was accepted since this analyte was either not detected or more than 10 times of the blank value for all the samples in the batch.
J	Estimated conc. detected <MRL and >MDL.
MS-02	The RPD and/or percent recovery for this QC spike sample cannot be accurately calculated due to the high concentration of analyte inherent in the sample.
ND	NOT DETECTED at or above the Method Reporting Limit (MRL). If Method Detection Limit (MDL) is reported, then ND means not detected at or above the MDL.
Dil	Dilution
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
% Rec	Percent Recovery
Source	Sample that was matrix spiked or duplicated.
MDL	Method Detection Limit
MRL	The minimum levels, concentrations, or quantities of a target variable (e.g., target analyte) that can be reported with a specified degree of confidence. The MRL is also known as Limit of Quantitation (LOQ) and Detection Limit for Reporting (DLR)
MDA	Minimum Detectable Activity
NR	Not Reportable
TIC	Tentatively Identified Compound (TIC) using mass spectrometry. The reported concentration is relative concentration based on the nearest internal standard. If the library search produces no matches at, or above 85%, the compound is reported as unknown.

Any remaining sample(s) will be disposed of one month from the final report date unless other arrangements are made in advance.
An Absence of Total Coliform meets the drinking water standards as established by the California State Water Resources Control Board (SWRCB)
All results are expressed on wet weight basis unless otherwise specified.
All samples collected by Weck Laboratories have been sampled in accordance to laboratory SOP Number MIS 002.

WECK LABORATORIES, INC.

Certificate of Analysis

FINAL REPORT

Work Orders: 9D04045

Project: Boatwash Pilot Study

Attn: Barry Snyder

Client: Wood - San Diego 2
9210 Sky Park Court, Suite 200
San Diego, CA 92123

Report Date: 4/23/2019
Received Date: 4/4/2019
Turnaround Time: Normal
Phones: (858) 300-4320
Fax: (858) 300-4301
P.O. #:
Billing Code:

EPA-UCMR #CA00211 • Guam-EPA #17-008R • HW-DOH # • ISO 17025 #L2457.01 • LACSD #10143 • NELAP-CA #04229CA • NELAP-OR #4047 • NJ-DEP #CA015 • NV-DEP #NAC 445A • SCAQMD #93LA1006

This is a complete final report. The information in this report applies to the samples analyzed in accordance with the chain-of-custody document. Weck Laboratories certifies that the test results meet all requirements of TNI unless noted by qualifiers or written in the Case Narrative. This analytical report must be reproduced in its entirety.

Dear Barry Snyder,

Enclosed are the results of analyses for samples received 4/04/19 with the Chain-of-Custody document. The samples were received in good condition, at 4.9 °C and on ice. All analyses met the method criteria except as noted in the case narrative or in the report with data qualifiers.

Reviewed by:

Chris Samatmanakit
Project Manager

WECK LABORATORIES, INC.

Certificate of Analysis

FINAL REPORT

Wood - San Diego 2
9210 Sky Park Court, Suite 200
San Diego, CA 92123

Project Number: Boatwash Pilot Study

Project Manager: Barry Snyder

Reported:
04/23/2019 17:29

Sample Summary

Sample Name	Sampled By	Lab ID	Matrix	Sampled	Qualifiers
Gate1-Top-P7	Corey Sheredy/Marissa Swiderski	9D04045-01	Water	04/03/19 10:15	
Gate1-Bottom-P7	Corey Sheredy/Marissa Swiderski	9D04045-02	Water	04/03/19 10:20	
Gate2-Top-P7	Corey Sheredy/Marissa Swiderski	9D04045-03	Water	04/03/19 10:25	
Gate2-Bottom-P7	Corey Sheredy/Marissa Swiderski	9D04045-04	Water	04/03/19 10:30	
Basin1-Top-P7	Corey Sheredy/Marissa Swiderski	9D04045-05	Water	04/03/19 10:35	
Basin1-Bottom-P7	Corey Sheredy/Marissa Swiderski	9D04045-06	Water	04/03/19 10:40	
Basin2-Top-P7	Corey Sheredy/Marissa Swiderski	9D04045-07	Water	04/03/19 10:45	
Basin2-Bottom-P7	Corey Sheredy/Marissa Swiderski	9D04045-08	Water	04/03/19 10:50	

Sample Results

Sample: Gate1-Top-P7 Sampled: 04/03/19 10:15 by Corey Sheredy/Marissa Swiderski
9D04045-01 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0436 **Instr:** OVEN11 **Prepared:** 04/05/19 16:41 **Analyst:** sar							
Total Suspended Solids	**7**		5	mg/l	1	04/08/19 18:00	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D0570 **Instr:** ICPMS03 **Prepared:** 04/09/19 11:13 **Analyst:** ALN							
Copper, Total	**12**	0.019	0.050	ug/l	5	04/18/19 03:45	
Method: EPA 1640 **Batch ID:** W9D0571 **Instr:** ICPMS03 **Prepared:** 04/09/19 11:14 **Analyst:** ALN							
Copper, Dissolved	**11**	0.019	0.050	ug/l	5	04/18/19 23:45	

Sample: Gate1-Bottom-P7 Sampled: 04/03/19 10:20 by Corey Sheredy/Marissa Swiderski
9D04045-02 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0436 **Instr:** OVEN11 **Prepared:** 04/05/19 16:41 **Analyst:** sar							
Total Suspended Solids	**4**		5	mg/l	1	04/08/19 18:00	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D0570 **Instr:** ICPMS03 **Prepared:** 04/09/19 11:13 **Analyst:** ALN							
Copper, Total	**10**	0.019	0.050	ug/l	5	04/18/19 03:59	
Method: EPA 1640 **Batch ID:** W9D0571 **Instr:** ICPMS03 **Prepared:** 04/09/19 11:14 **Analyst:** ALN							
Copper, Dissolved	**9.1**	0.019	0.050	ug/l	5	04/18/19 23:59	

Sample: Gate2-Top-P7 Sampled: 04/03/19 10:25 by Corey Sheredy/Marissa Swiderski
9D04045-03 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0436 **Instr:** OVEN11 **Prepared:** 04/05/19 16:41 **Analyst:** sar							
Total Suspended Solids	**6**		5	mg/l	1	04/08/19 18:00	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D0570 **Instr:** ICPMS03 **Prepared:** 04/09/19 11:13 **Analyst:** ALN							
Copper, Total	**11**	0.019	0.050	ug/l	5	04/18/19 04:13	
Method: EPA 1640 **Batch ID:** W9D0571 **Instr:** ICPMS03 **Prepared:** 04/09/19 11:14 **Analyst:** ALN							
Copper, Dissolved	**9.6**	0.019	0.050	ug/l	5	04/19/19 00:13	

Sample Results

(Continued)

Sample: Gate2-Bottom-P7
9D04045-04 (Water)

Sampled: 04/03/19 10:30 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0436 **Instr:** OVEN11 **Prepared:** 04/05/19 16:41 **Analyst:** sar							
Total Suspended Solids	**8**		5	mg/l	1	04/08/19 18:00	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D0570 **Instr:** ICPMS03 **Prepared:** 04/09/19 11:13 **Analyst:** ALN							
Copper, Total	**9.8**	0.019	0.050	ug/l	5	04/18/19 04:27	
Method: EPA 1640 **Batch ID:** W9D0571 **Instr:** ICPMS03 **Prepared:** 04/09/19 11:14 **Analyst:** ALN							
Copper, Dissolved	**8.4**	0.019	0.050	ug/l	5	04/19/19 00:26	

Sample: Basin1-Top-P7
9D04045-05 (Water)

Sampled: 04/03/19 10:35 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0436 **Instr:** OVEN11 **Prepared:** 04/05/19 16:41 **Analyst:** sar							
Total Suspended Solids	**8**		5	mg/l	1	04/08/19 18:00	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D0570 **Instr:** ICPMS03 **Prepared:** 04/09/19 11:13 **Analyst:** ALN							
Copper, Total	**13**	0.019	0.050	ug/l	5	04/18/19 04:41	
Method: EPA 1640 **Batch ID:** W9D0571 **Instr:** ICPMS03 **Prepared:** 04/09/19 11:14 **Analyst:** ALN							
Copper, Dissolved	**12**	0.019	0.050	ug/l	5	04/19/19 00:40	

Sample: Basin1-Bottom-P7
9D04045-06 (Water)

Sampled: 04/03/19 10:40 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0436 **Instr:** OVEN11 **Prepared:** 04/05/19 16:41 **Analyst:** sar							
Total Suspended Solids	**3**		5	mg/l	1	04/08/19 18:00	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D0570 **Instr:** ICPMS03 **Prepared:** 04/09/19 11:13 **Analyst:** ALN							
Copper, Total	**14**	0.019	0.050	ug/l	5	04/18/19 04:54	
Method: EPA 1640 **Batch ID:** W9D0571 **Instr:** ICPMS03 **Prepared:** 04/09/19 11:14 **Analyst:** ALN							
Copper, Dissolved	**12**	0.019	0.050	ug/l	5	04/19/19 00:54	

Sample Results

(Continued)

Sample: Basin2-Top-P7
9D04045-07 (Water)

Sampled: 04/03/19 10:45 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0436 **Instr:** OVEN11 **Prepared:** 04/05/19 16:41 **Analyst:** sar							
Total Suspended Solids	**2**		5	mg/l	1	04/08/19 18:00	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D0570 **Instr:** ICPMS03 **Prepared:** 04/09/19 11:13 **Analyst:** ALN							
Copper, Total	**12**	0.019	0.050	ug/l	5	04/18/19 05:08	
Method: EPA 1640 **Batch ID:** W9D0571 **Instr:** ICPMS03 **Prepared:** 04/09/19 11:14 **Analyst:** ALN							
Copper, Dissolved	**12**	0.019	0.050	ug/l	5	04/19/19 01:08	

Sample: Basin2-Bottom-P7
9D04045-08 (Water)

Sampled: 04/03/19 10:50 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0436 **Instr:** OVEN11 **Prepared:** 04/05/19 16:41 **Analyst:** sar							
Total Suspended Solids	**4**		5	mg/l	1	04/08/19 18:00	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D0570 **Instr:** ICPMS03 **Prepared:** 04/09/19 11:13 **Analyst:** ALN							
Copper, Total	**13**	0.019	0.050	ug/l	5	04/18/19 05:22	
Method: EPA 1640 **Batch ID:** W9D0571 **Instr:** ICPMS03 **Prepared:** 04/09/19 11:14 **Analyst:** ALN							
Copper, Dissolved	**12**	0.019	0.050	ug/l	5	04/19/19 01:22	

Quality Control Results

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W9D0436 - SM 2540D											
Blank (W9D0436-BLK1)					**Prepared: 04/05/19**	**Analyzed: 04/08/19**					
Total Suspended Solids	ND		5	mg/l							
LCS (W9D0436-BS1)					**Prepared: 04/05/19**	**Analyzed: 04/08/19**					
Total Suspended Solids	70.0		5	mg/l	64.7		108	90-110			
Duplicate (W9D0436-DUP1)	**Source: 9D04045-08**				**Prepared: 04/05/19**	**Analyzed: 04/08/19**					
Total Suspended Solids	4.00		5	mg/l		4.00			0	20	J
Duplicate (W9D0436-DUP2)	**Source: 9D04053-01**				**Prepared: 04/05/19**	**Analyzed: 04/08/19**					
Total Suspended Solids	ND		5	mg/l		ND				20	

Quality Control Results

Metals - Low Level by 1600 Series Methods

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W9D0570 - EPA 1640											
Blank (W9D0570-BLK1)					**Prepared: 04/09/19**	**Analyzed: 04/18/19**					
Copper, Total	ND	0.0038	0.010	ug/l							
LCS (W9D0570-BS1)					**Prepared: 04/09/19**	**Analyzed: 04/18/19**					
Copper, Total	2.23	0.0038	0.010	ug/l	2.00		111	73-122			
Matrix Spike (W9D0570-MS1)	**Source: 9D04045-01**				**Prepared: 04/09/19**	**Analyzed: 04/18/19**					
Copper, Total	13.7	0.019	0.050	ug/l	2.00	12.0	84	60-138			
Matrix Spike Dup (W9D0570-MSD1)	**Source: 9D04045-01**				**Prepared: 04/09/19**	**Analyzed: 04/18/19**					
Copper, Total	14.1	0.019	0.050	ug/l	2.00	12.0	103	60-138	3	30	
Batch: W9D0571 - EPA 1640											
Blank (W9D0571-BLK1)					**Prepared: 04/09/19**	**Analyzed: 04/18/19**					
Copper, Dissolved	ND	0.0038	0.010	ug/l							
LCS (W9D0571-BS1)					**Prepared: 04/09/19**	**Analyzed: 04/18/19**					
Copper, Dissolved	2.03	0.0038	0.010	ug/l	2.00		101	70-130			
Matrix Spike (W9D0571-MS1)	**Source: 9D04045-01**				**Prepared: 04/09/19**	**Analyzed: 04/18/19**					
Copper, Dissolved	19.8	0.019	0.050	ug/l	10.0	10.8	90	70-130			
Matrix Spike Dup (W9D0571-MSD1)	**Source: 9D04045-01**				**Prepared: 04/09/19**	**Analyzed: 04/18/19**					
Copper, Dissolved	20.0	0.019	0.050	ug/l	10.0	10.8	92	70-130	1	30	

Notes and Definitions

Item	Definition
J	Estimated conc. detected <MRL and >MDL.
ND	NOT DETECTED at or above the Method Reporting Limit (MRL). If Method Detection Limit (MDL) is reported, then ND means not detected at or above the MDL.
Dil	Dilution
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
% Rec	Percent Recovery
Source	Sample that was matrix spiked or duplicated.
MDL	Method Detection Limit
MRL	The minimum levels, concentrations, or quantities of a target variable (e.g., target analyte) that can be reported with a specified degree of confidence. The MRL is also known as Limit of Quantitation (LOQ) and Detection Limit for Reporting (DLR)
MDA	Minimum Detectable Activity
NR	Not Reportable
TIC	Tentatively Identified Compound (TIC) using mass spectrometry. The reported concentration is relative concentration based on the nearest internal standard. If the library search produces no matches at, or above 85%, the compound is reported as unknown.

Any remaining sample(s) will be disposed of one month from the final report date unless other arrangements are made in advance.
An Absence of Total Coliform meets the drinking water standards as established by the California State Water Resources Control Board (SWRCB)
All results are expressed on wet weight basis unless otherwise specified.
All samples collected by Weck Laboratories have been sampled in accordance to laboratory SOP Number MIS 002.

WECK LABORATORIES, INC.

Certificate of Analysis

FINAL REPORT

Work Orders:	9D11045	**Report Date:**	4/29/2019
		Received Date:	4/11/2019
Project:	Boatwash Pilot Study	**Turnaround Time:**	Normal
		Phones:	(858) 300-4320
		Fax:	(858) 300-4301
		P.O. #:	
Attn:	Barry Snyder	**Billing Code:**	
Client:	Wood - San Diego 2 9210 Sky Park Court, Suite 200 San Diego, CA 92123		

EPA-UCMR #CA00211 • HW-DOH # • ISO 17025 #L2457.01 • LACSD #10143 • NELAP-CA #04229CA • NELAP-OR #4047 • NJ-DEP #CA015 • NV-DEP #NAC 445A • SCAQMD #93LA1006

This is a complete final report. The information in this report applies to the samples analyzed in accordance with the chain-of-custody document. Weck Laboratories certifies that the test results meet all requirements of TNI unless noted by qualifiers or written in the Case Narrative. This analytical report must be reproduced in its entirety.

Dear Barry Snyder,

Enclosed are the results of analyses for samples received 4/ 11/19 with the Chain-of-Custody document. The samples were received in good condition, at 4.7 °C and on ice. All analyses met the method criteria except as noted in the case narrative or in the report with data qualifiers.

Reviewed by:

Chris Samatmanakit
Project Manager

Certificate of Analysis

FINAL REPORT

Wood - San Diego 2
9210 Sky Park Court, Suite 200
San Diego, CA 92123

Project Number: Boatwash Pilot Study

Project Manager: Barry Snyder

Reported:
04/29/2019 17:30

Sample Summary

Sample Name	Sampled By	Lab ID	Matrix	Sampled	Qualifiers
Gate1-Top-P14	Corey Sheredy/Marissa Swiderski	9D11045-01	Water	04/10/19 15:50	
Gate1-Bottom-P14	Corey Sheredy/Marissa Swiderski	9D11045-02	Water	04/10/19 15:55	
Gate2-Top-P14	Corey Sheredy/Marissa Swiderski	9D11045-03	Water	04/10/19 16:00	
Gate2-Bottom-P14	Corey Sheredy/Marissa Swiderski	9D11045-04	Water	04/10/19 16:05	
Basin1-Top-P14	Corey Sheredy/Marissa Swiderski	9D11045-05	Water	04/10/19 16:10	
Basin1-Bottom-P14	Corey Sheredy/Marissa Swiderski	9D11045-06	Water	04/10/19 16:15	
Basin2-Top-P14	Corey Sheredy/Marissa Swiderski	9D11045-07	Water	04/10/19 16:20	
Basin2-Bottom-P14	Corey Sheredy/Marissa Swiderski	9D11045-08	Water	04/10/19 16:25	

Sample Results

Sample: Gate1-Top-P14 — Sampled: 04/10/19 15:50 by Corey Sheredy/Marissa Swiderski
9D11045-01 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0931 **Instr:** OVEN11 **Prepared:** 04/15/19 14:51 **Analyst:** sar							
Total Suspended Solids	**4**		5	mg/l	1	04/16/19 10:14	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D1189 **Instr:** ICPMS03 **Prepared:** 04/18/19 13:02 **Analyst:** ALN							
Copper, Total	**8.0**	0.015	0.040	ug/l	4	04/25/19 01:52	
Method: EPA 1640 **Batch ID:** W9D1190 **Instr:** ICPMS03 **Prepared:** 04/18/19 13:03 **Analyst:** ALN							
Copper, Dissolved	**7.9**	0.015	0.040	ug/l	4	04/25/19 06:15	

Sample: Gate1-Bottom-P14 — Sampled: 04/10/19 15:55 by Corey Sheredy/Marissa Swiderski
9D11045-02 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0931 **Instr:** OVEN11 **Prepared:** 04/15/19 14:51 **Analyst:** sar							
Total Suspended Solids	**3**		5	mg/l	1	04/16/19 10:14	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D1189 **Instr:** ICPMS03 **Prepared:** 04/18/19 13:02 **Analyst:** ALN							
Copper, Total	**7.4**	0.015	0.040	ug/l	4	04/25/19 02:06	
Method: EPA 1640 **Batch ID:** W9D1190 **Instr:** ICPMS03 **Prepared:** 04/18/19 13:03 **Analyst:** ALN							
Copper, Dissolved	**7.2**	0.015	0.040	ug/l	4	04/25/19 06:29	

Sample: Gate2-Top-P14 — Sampled: 04/10/19 16:00 by Corey Sheredy/Marissa Swiderski
9D11045-03 (Water)

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0931 **Instr:** OVEN11 **Prepared:** 04/15/19 14:51 **Analyst:** sar							
Total Suspended Solids	**15**		5	mg/l	1	04/16/19 10:14	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D1189 **Instr:** ICPMS03 **Prepared:** 04/18/19 13:02 **Analyst:** ALN							
Copper, Total	**7.8**	0.015	0.040	ug/l	4	04/25/19 02:19	
Method: EPA 1640 **Batch ID:** W9D1190 **Instr:** ICPMS03 **Prepared:** 04/18/19 13:03 **Analyst:** ALN							
Copper, Dissolved	**7.6**	0.015	0.040	ug/l	4	04/25/19 06:43	

Sample Results

(Continued)

Sample: Gate2-Bottom-P14
9D11045-04 (Water)
Sampled: 04/10/19 16:05 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0931 **Instr:** OVEN11 **Prepared:** 04/15/19 14:51 **Analyst:** sar							
Total Suspended Solids	**4**		5	mg/l	1	04/16/19 10:14	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D1189 **Instr:** ICPMS03 **Prepared:** 04/18/19 13:02 **Analyst:** ALN							
Copper, Total	**6.6**	0.015	0.040	ug/l	4	04/25/19 02:33	
Method: EPA 1640 **Batch ID:** W9D1190 **Instr:** ICPMS03 **Prepared:** 04/18/19 13:03 **Analyst:** ALN							
Copper, Dissolved	**6.0**	0.015	0.040	ug/l	4	04/25/19 06:56	

Sample: Basin1-Top-P14
9D11045-05 (Water)
Sampled: 04/10/19 16:10 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0931 **Instr:** OVEN11 **Prepared:** 04/15/19 14:51 **Analyst:** sar							
Total Suspended Solids	**13**		5	mg/l	1	04/16/19 10:14	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D1189 **Instr:** ICPMS03 **Prepared:** 04/18/19 13:02 **Analyst:** ALN							
Copper, Total	**7.8**	0.015	0.040	ug/l	4	04/25/19 02:47	
Method: EPA 1640 **Batch ID:** W9D1190 **Instr:** ICPMS03 **Prepared:** 04/18/19 13:03 **Analyst:** ALN							
Copper, Dissolved	**7.7**	0.015	0.040	ug/l	4	04/25/19 07:10	

Sample: Basin1-Bottom-P14
9D11045-06 (Water)
Sampled: 04/10/19 16:15 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0931 **Instr:** OVEN11 **Prepared:** 04/15/19 14:51 **Analyst:** sar							
Total Suspended Solids	**5**		5	mg/l	1	04/16/19 10:14	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D1189 **Instr:** ICPMS03 **Prepared:** 04/18/19 13:02 **Analyst:** ALN							
Copper, Total	**8.2**	0.015	0.040	ug/l	4	04/25/19 03:01	
Method: EPA 1640 **Batch ID:** W9D1190 **Instr:** ICPMS03 **Prepared:** 04/18/19 13:03 **Analyst:** ALN							
Copper, Dissolved	**7.8**	0.015	0.040	ug/l	4	04/25/19 07:24	

Sample Results

(Continued)

Sample: Basin2-Top-P14
9D11045-07 (Water)

Sampled: 04/10/19 16:20 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0931 **Instr:** OVEN11 **Prepared:** 04/15/19 14:51 **Analyst:** sar							
Total Suspended Solids	**4**		5	mg/l	1	04/16/19 10:14	J
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D1189 **Instr:** ICPMS03 **Prepared:** 04/18/19 13:02 **Analyst:** ALN							
Copper, Total	**7.9**	0.015	0.040	ug/l	4	04/25/19 03:15	
Method: EPA 1640 **Batch ID:** W9D1190 **Instr:** ICPMS03 **Prepared:** 04/18/19 13:03 **Analyst:** ALN							
Copper, Dissolved	**7.9**	0.015	0.040	ug/l	4	04/25/19 07:38	

Sample: Basin2-Bottom-P14
9D11045-08 (Water)

Sampled: 04/10/19 16:25 by Corey Sheredy/Marissa Swiderski

Analyte	Result	MDL	MRL	Units	Dil	Analyzed	Qualifier
Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods							
Method: SM 2540D **Batch ID:** W9D0931 **Instr:** OVEN11 **Prepared:** 04/15/19 14:51 **Analyst:** sar							
Total Suspended Solids	**8**		5	mg/l	1	04/16/19 10:14	
Metals - Low Level by 1600 Series Methods							
Method: EPA 1640 **Batch ID:** W9D1189 **Instr:** ICPMS03 **Prepared:** 04/18/19 13:02 **Analyst:** ALN							
Copper, Total	**7.7**	0.015	0.040	ug/l	4	04/25/19 03:29	
Method: EPA 1640 **Batch ID:** W9D1190 **Instr:** ICPMS03 **Prepared:** 04/18/19 13:03 **Analyst:** ALN							
Copper, Dissolved	**8.0**	0.015	0.040	ug/l	4	04/25/19 07:52	

Quality Control Results

Conventional Chemistry/Physical Parameters by APHA/EPA/ASTM Methods

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W9D0931 - SM 2540D											
Blank (W9D0931-BLK1)					**Prepared: 04/15/19**	**Analyzed: 04/16/19**					
Total Suspended Solids	ND		5	mg/l							
LCS (W9D0931-BS1)					**Prepared: 04/15/19**	**Analyzed: 04/16/19**					
Total Suspended Solids	60.0		5	mg/l	54.7		110	90-110			
Duplicate (W9D0931-DUP1)	**Source: 9D11045-08**				**Prepared: 04/15/19**	**Analyzed: 04/16/19**					
Total Suspended Solids	9.00		5	mg/l		8.00			12	20	
Duplicate (W9D0931-DUP2)	**Source: 9D11079-01**				**Prepared: 04/15/19**	**Analyzed: 04/16/19**					
Total Suspended Solids	18.0		5	mg/l		18.0			0	20	

Quality Control Results

Metals - Low Level by 1600 Series Methods

Analyte	Result	MDL	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Batch: W9D1189 - EPA 1640											
Blank (W9D1189-BLK1)					**Prepared: 04/18/19**	**Analyzed: 04/25/19**					
Copper, Total	ND	0.0038	0.010	ug/l							
LCS (W9D1189-BS1)					**Prepared: 04/18/19**	**Analyzed: 04/25/19**					
Copper, Total	2.08	0.0038	0.010	ug/l	2.00		104	73-122			
Matrix Spike (W9D1189-MS1)	**Source: 9D11045-01**				**Prepared: 04/18/19**	**Analyzed: 04/25/19**					
Copper, Total	10.0	0.015	0.040	ug/l	2.00	8.00	101	60-138			
Matrix Spike Dup (W9D1189-MSD1)	**Source: 9D11045-01**				**Prepared: 04/18/19**	**Analyzed: 04/25/19**					
Copper, Total	10.1	0.015	0.040	ug/l	2.00	8.00	106	60-138	0.9	30	
Batch: W9D1190 - EPA 1640											
Blank (W9D1190-BLK1)					**Prepared: 04/18/19**	**Analyzed: 04/25/19**					
Copper, Dissolved	ND	0.0038	0.010	ug/l							
LCS (W9D1190-BS1)					**Prepared: 04/18/19**	**Analyzed: 04/25/19**					
Copper, Dissolved	2.15	0.0038	0.010	ug/l	2.00		108	70-130			
Matrix Spike (W9D1190-MS1)	**Source: 9D11045-01**				**Prepared: 04/18/19**	**Analyzed: 04/25/19**					
Copper, Dissolved	16.2	0.015	0.040	ug/l	8.00	7.89	104	70-130			
Matrix Spike Dup (W9D1190-MSD1)	**Source: 9D11045-01**				**Prepared: 04/18/19**	**Analyzed: 04/25/19**					
Copper, Dissolved	16.0	0.015	0.040	ug/l	8.00	7.89	101	70-130	1	30	

Notes and Definitions

Item	Definition
J	Estimated conc. detected <MRL and >MDL.
ND	NOT DETECTED at or above the Method Reporting Limit (MRL). If Method Detection Limit (MDL) is reported, then ND means not detected at or above the MDL.
Dil	Dilution
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
% Rec	Percent Recovery
Source	Sample that was matrix spiked or duplicated.
MDL	Method Detection Limit
MRL	The minimum levels, concentrations, or quantities of a target variable (e.g., target analyte) that can be reported with a specified degree of confidence. The MRL is also known as Limit of Quantitation (LOQ) and Detection Limit for Reporting (DLR)
MDA	Minimum Detectable Activity
NR	Not Reportable
TIC	Tentatively Identified Compound (TIC) using mass spectrometry. The reported concentration is relative concentration based on the nearest internal standard. If the library search produces no matches at, or above 85%, the compound is reported as unknown.

Any remaining sample(s) will be disposed of one month from the final report date unless other arrangements are made in advance.
An Absence of Total Coliform meets the drinking water standards as established by the California State Water Resources Control Board (SWRCB)
All results are expressed on wet weight basis unless otherwise specified.
All samples collected by Weck Laboratories have been sampled in accordance to laboratory SOP Number MIS 002.

EVENT 3 (BOATWASH CLEANING)
TOXICITY LAB REPORTS

Results of Chronic Toxicity Tests for Shelter Island Yacht Basin Boatwash Pilot Study – March Testing

Sample Collections: March 27, 2019
Project Number: 1715100615

Submitted to:

Wood Environment & Infrastructure Solutions, Inc.
9210 Sky Park Court, Ste. 200
San Diego, CA 92123

Testing Performed by:

wood.

Wood Environment & Infrastructure Solutions, Inc.
Aquatic Toxicology Laboratory
4905 Morena Blvd., Suite 1304
San Diego, California 92117

The Wood aquatic toxicity laboratory is certified by the State of California Department of Health Services – Environmental Lab Accreditation Program (ELAP) under Certificate Number 3010. All test results were obtained following EPA Protocol guidelines and internal QA Program requirements. The data and test results have been reviewed and verified by the following laboratory representative:

Verified by: Steve Carlson **Date:** 5/8/19.

MATERIALS & METHODS

Sample Information

Client:	Wood Environment & Infrastructure Solutions, Inc.
Project:	Shelter Island Yacht Basin – Boatwash Pilot Study
Monitoring Period:	March 2019
Sample IDs:	Gate1-T0, Gate2-T0, Basin1-T0, Basin2-T0, and Gate1-T4, Gate2-T4, Basin1-T4, Basin2-T4
Sample Collection Date, Time:	3/27/19, 08:15 – 08:25 and 15:20 – 15:30
Sample Receipt Date, Time:	3/27/19, 19:00
Sample Collection Method:	Grab samples

Table 1. Water Quality Measured Upon Sample Receipt

Sample ID	Temp. (℃)	pH (units)	Dissolved Oxygen (mg/L)	Salinity (ppt)	Alkalinity (mg/L)	Total Chlorine (mg/L)
Gate1-T0	7.0	7.85	8.2	34.0	111	0.02
Gate2-T0	7.0	7.89	8.0	33.5	112	0.04
Basin1-T0	7.0	7.91	8.3	33.7	119	<0.02
Basin2-T0	7.0	7.92	8.1	33.9	116	<0.02
Gate1-T4	6.2	7.89	8.1	33.8	130	0.02
Gate2-T4	6.2	7.90	8.2	33.8	114	<0.02
Basin1-T4	6.2	7.94	9.1	34.0	121	<0.02
Basin2-T4	6.2	7.91	9.0	34.0	120	<0.02

Note: samples were received the same day as collected. Water quality measurements were taken and then the samples were placed in cold storage until testing.

Chronic Mussel Development Test Specifications

Test Period:	3/28/19, 15:00 – 3/30/19, 16:05
Test Organism:	*Mytilus galloprovincialis* (bivalve - mussel)
Test Organism Source:	Field-collected – Mission Bay (San Diego, CA)
Test Organism Age at start:	Fertilized embryos (<4 hours old)
Test Procedure:	48-hour embryo-larval development
Test Endpoint (statistical analysis):	48-hour Combined Proportion Normal (ASTM)
Test Concentrations:	25, 50, and 100% sample; plus Lab Control
Control/Dilution Water:	Natural seawater collected from the inlet at Scripps Institution of Oceanography (20-µm filtered)
Test Recordings:	Development in the 100% concentration was recorded first. If an adverse effect was observed, development in the 25% and 50% was also recorded.
Protocols Used:	EPA, 1995 West Coast Manual (EPA/600/R-95/136); and ASTM, 1998 (E 724-98).
EPA Test Acceptability Criteria:	Control must have ≥50% survival; ≥90% proportion normal; and the minimum significant difference (MSD) must be < 25%.
Statistical Analysis Software:	CETIS™ v.1.9.3.0

RESULTS

After test completion, the results of the 100% concentration were recorded first on a microscope. If the percent effect or difference from the control was greater than 10%, then the 25 and 50% concentrations were also recorded. The 100% samples of Gate1-T0, Gate2-T0, Basin1-T0, and Basin2-T0, all produced 3.0% or less effect compared to the control. Therefore, the 25 and 50% concentrations were not measured. These four samples resulted in no significant effects using the standard method of analyses. To confirm there were no significant biological effects with the samples, test results were also evaluated using the EPA Test of Significant Toxicity (TST) approach. This approach to analysis applies a modified t-Test that accounts for the statistical power of the test and the magnitude of the biological effect in determining the presence of toxicity. The instream waste concentration (IWC) for this analysis is the 100 percent sample. The IWC was compared to the Lab Control for statistical analysis. All four of the "T0" samples resulted in a Pass for the TST analysis. Therefore, no biologically significant effects were observed, and the samples are considered non-toxic.

The other four samples (Gate1-T4, Gate2-T4, Basin1-T4, and Basin2-T4) all resulted in a 100% effect (0% normal development in the mussels) at the 100% concentration. Therefore, the four "T4" samples Failed the TST analysis and are considered toxic. The 25 and 50% concentrations were also measured for these four samples. These two concentrations also mostly resulted in a 100% effect. Only Gate2-T4 resulted in a partial effect, producing a median effect concentration (EC_{50}) of 44% effluent. A summary of the test results for the four "T0" samples is provided in Table 2, and the four "T4" samples is provided in Table 3. The full statistical analyses and raw bench sheets are provided in Appendix A. Sample receipt information and the chain of custody form are included in Appendix B and C, respectively.

Table 2. Summary of Results for "T0" Samples – Combined Proportion Normal (%)

Sample Concentration (%)	Gate1-T0	Gate2-T0	Basin1-T0	Basin2-T0
Lab Control	96.4	96.4	93.6	93.6
25	NR	NR	NR	NR
50	NR	NR	NR	NR
100	96.2	96.4	90.9	96.7
NOEC =	100	100	100	100
EC_{50} =	> 100	> 100	> 100	> 100
Percent Effect = (in 100% sample)	0.2	0.0	3.0	-3.3
TST (Pass/Fail) =	Pass	Pass	Pass	Pass

NR = Not Recorded; these concentrations were not read due to < 10% effect in the 100% concentration.

NOEC = the highest Concentration tested that results in No Observed Effect (using standard analysis).

EC_{50} = the median effect concentration expected to cause an adverse effect to 50% of the organisms.

Percent Effect = the percent difference in 100% compared to the control. A negative value indicates a positive effect.

TST = Test of Significant Toxicity (a new approach to statistical analysis). A "Pass" indicates the percent effect is not biologically significant and the sample is considered non-toxic.

Table 3. Summary of Results for "T4" Samples – Combined Proportion Normal (%)

Sample Concentration (%)	Gate1-T4	Gate2-T4	Basin1-T4	Basin2-T4
Lab Control	97.0	97.0	96.2	96.2
25	3.0 *	91.1 *	0.0 *	0.0 *
50	0.0 *	36.0 *	0.0 *	0.0 *
100	0.0 *	0.0 *	0.0 *	0.0 *
NOEC =	< 25	< 25	< 25	< 25
EC_{50} =	< 25	44.2	< 25	< 25
Percent Effect = (in 100% sample)	100	100	100	100
TST (Pass/Fail) =	**Fail**	**Fail**	**Fail**	**Fail**

* An asterisk indicates a statistically significant difference compared to the control (using standard analysis).

NR = Not Recorded; these concentrations were not read due to < 10% effect in the 100% concentration.

NOEC = the highest Concentration tested that results in No Observed Effect (using standard analysis).

EC_{50} = the median effect concentration expected to cause an adverse effect to 50% of the organisms.

Percent Effect = the percent difference in 100% compared to the control. A negative value indicates a positive effect.

TST = Test of Significant Toxicity (a new approach to statistical analysis). A "Pass" indicates the percent effect is not biologically significant and the sample is considered non-toxic. A "Fail" is considered toxic.

QUALITY ASSURANCE

Samples were collected on 3/27/2019 and delivered to the testing laboratory later the same evening. A temperature was immediately recorded, and then the samples were placed in cold storage until test initiation. Water quality measurements were recorded the following morning, prior to test initiation. All tests were initiated within the appropriate 36-hour holding time. The lab controls for each set of samples met the minimum test acceptability criteria (TAC) for both Percent Survival and Proportion Normal. Test results were deemed valid for reporting.

The concurrent reference toxicant test also had a lab control that met all TAC. The median effect concentration (EC_{50}), however, was slightly below two standard deviations of the historical control chart mean for the laboratory. This may indicate this batch of organisms may have been more sensitive to copper than historically observed with this test species. The reference toxicant test results are summarized in Table 4 and presented in full in Appendix D.

Table 4. Summary of Copper Reference Toxicant Test Results

Test Concentration (µg/L copper)	Combined Proportion Normal (%)	Statistical Results (in µg/L copper)
Lab Control	94.9	NOEC = 2.5 EC_{50} = 6.57 [1] Historical EC_{50} ±2SD = 7.44 – 16.2 range
2.5	94.1	
5.0	84.6 *	
10	0.0 *	
20	0.0 *	
40	0.0 *	

* An asterisk indicates a statistically significant difference compared to the control.

NOEC = the highest concentration tested that results in No Observed Effect.

EC_{50} = the median effect concentration expected to cause an adverse effect to 50% of the test organisms. [1] This result was more than 2 standard deviations below the historical mean (indicating more sensitivity than typical).

Historical EC_{50} = the mean EC_{50} for previous testing by the lab, plus or minus two standard deviations.

REFERENCES

ASTM. 1998. Standard Guide for Conducting Static Acute Toxicity Tests Starting with Embryos of Four Species of Saltwater Bivalve Molluscs. ASTM E 724-98.

Tidepool Scientific Software, 2001-2015. CETIS: Comprehensive Environmental Toxicity Information System software, version 1.9.3.0.

USEPA (U.S. Environmental Protection Agency). 1995. Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine and Estuarine Organisms (EPA/600/R-95/136). The USEPA, Office of Research and Development, Washington, DC.

USEPA (U.S. Environmental Protection Agency). 2010. Test of Significant Toxicity Implementation Document (EPA/833/R-10/003). The USEPA, Office of Wastewater Management, Washington, DC.

APPENDIX A

Statistical Analysis & Raw Data

Gate1-T0 and Gate2-T0

CETIS Summary Report

Report Date:	01 May-19 13:39 (p 1 of 2)
Test Code:	19-03-005 | 20-0087-1739

Bivalve Larval Survival and Development Test — **Wood Environment & Infrastructure Solutions**

Batch ID:	16-5839-7852	**Test Type:**	Development-Survival	**Analyst:**	
Start Date:	28 Mar-19 15:00	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Natural Seawater
Ending Date:	30 Mar-19 16:05	**Species:**	Mytilis galloprovincialis	**Brine:**	Not Applicable
Duration:	49h	**Source:**	Field Collected	**Age:**	

Sample ID:	12-2577-0966	**Code:**	19-W0015	**Client:**	Wood Environment and Infastructure
Sample Date:	27 Mar-19 08:15	**Material:**	Seawater	**Project:**	Boat Wash Study
Receipt Date:	27 Mar-19 19:00	**Source:**	Shelter Island Yacht Basin		
Sample Age:	31h	**Station:**	Gate1-T0		

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
21-0077-2558	Combined Proportion Norma	TST-Welch's t Test	<1.0E-37	100% passed combined proportion normal
10-9869-7860	Proportion Normal	Equal Variance t Two-Sample Test	0.2807	100% passed proportion normal
10-4238-4072	Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	100% passed survival rate

Test Acceptability

				TAC Limits			
Analysis ID	**Endpoint**	**Attribute**	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
10-9869-7860	Proportion Normal	Control Resp	0.9655	0.9	>>	Yes	Passes Criteria
10-4238-4072	Survival Rate	Control Resp	0.9984	0.5	>>	Yes	Passes Criteria

Combined Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9640	0.9559	0.9721	0.9547	0.9704	0.0029	0.0065	0.67%	0.00%
100		5	0.9624	0.9512	0.9735	0.9502	0.9728	0.0040	0.0090	0.93%	0.17%

Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9655	0.9574	0.9736	0.9547	0.9704	0.0029	0.0065	0.68%	0.00%
100		5	0.9624	0.9512	0.9735	0.9502	0.9728	0.0040	0.0090	0.93%	0.33%

Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9984	0.9941	1.0000	0.9922	1.0000	0.0016	0.0035	0.35%	0.00%
100		5	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-0.16%

Combined Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9611	0.9639	0.9698	0.9547	0.9704
25						
50						
100		0.9728	0.9593	0.9502	0.9600	0.9695

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9686	0.9639	0.9698	0.9547	0.9704
25						
50						
100		0.9728	0.9593	0.9502	0.9600	0.9695

Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9922	1.0000	1.0000	1.0000	1.0000
25						
50						
100		1.0000	1.0000	1.0000	1.0000	1.0000

Analyst: SC QA: JW 5/8/19

CETIS Summary Report

Report Date: 01 May-19 13:39 (p 2 of 2)
Test Code: 19-03-005 | 20-0087-1739

Bivalve Larval Survival and Development Test | **Wood Environment & Infrastructure Solutions**

Combined Proportion Normal Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	247/257	294/305	289/298	253/265	295/304
25						
50						
100		286/294	283/295	248/261	264/275	254/262

Proportion Normal Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	247/255	294/305	289/298	253/265	295/304
25						
50						
100		286/294	283/295	248/261	264/275	254/262

Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	255/257	257/257	257/257	257/257	257/257
25						
50						
100		257/257	257/257	257/257	257/257	257/257

Analyst: SC QA: JW 5/8/19

CETIS Analytical Report

Report Date: 09 May-19 09:59 (p 1 of 1)
Test Code: 19-03-005 | 20-0087-1739

Bivalve Larval Survival and Development Test			Wood Environment & Infrastructure Solutions

Analysis ID:	19-2065-9137	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	09 May-19 9:58	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	100% passed combined proportion normal	0.97%

Equal Variance t Two-Sample Test

Control	vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		100	0.2931	1.86	0.024	8	CDF	0.3885	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.689E-05	3.689E-05	1	0.08588	0.7769	Non-Significant Effect
Error	0.0034367	0.0004296	8			
Total	0.0034736		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.87	23.15	0.5594	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9425	0.7411	0.5814	Normal Distribution

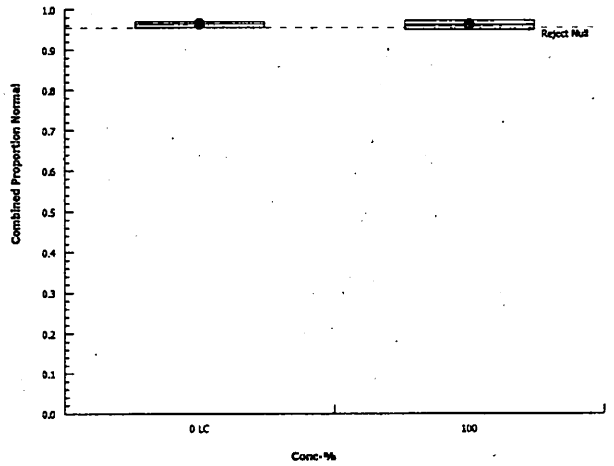
Combined Proportion Normal Summary

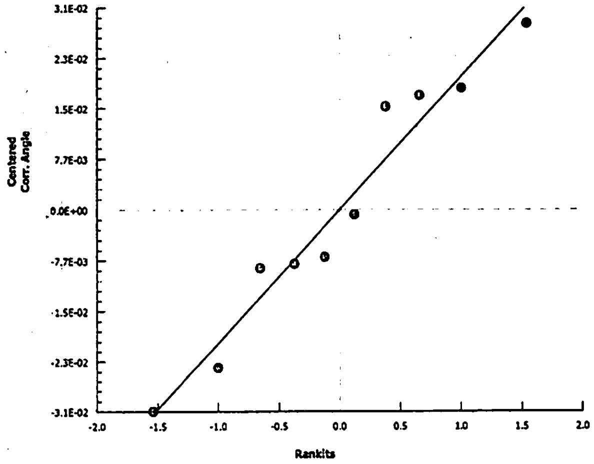
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9640	0.9559	0.9721	0.9639	0.9547	0.9704	0.0029	0.67%	0.00%
100		5	0.9624	0.9512	0.9735	0.9600	0.9502	0.9728	0.0040	0.93%	0.17%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.38	1.359	1.402	1.38	1.356	1.398	0.007739	1.25%	0.00%
100		5	1.377	1.347	1.406	1.369	1.346	1.405	0.01058	1.72%	0.28%

Graphics





Analyst: JW QA: RC 5/8/19

CETIS Analytical Report

TST

Report Date:	01 May-19 13:38 (p 1 of 1)
Test Code:	19-03-005 | 20-0087-1739

Bivalve Larval Survival and Development Test — **Wood Environment & Infrastructure Solutions**

Analysis ID:	21-0077-2558	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	01 May-19 13:38	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Data Transform	Alt Hyp	TST_b	Comparison Result
Angular (Corrected)	C*b < T	0.75	100% passed combined proportion normal

TST-Welch's t Test

Control	vs	Control II	Test Stat	Critical	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		100*	28.28	1.943	6	CDF	<1.0E-37	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.689E-05	3.689E-05	1	0.08588	0.7769	Non-Significant Effect
Error	0.0034367	0.0004296	8			
Total	0.0034736		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.87	23.15	0.5594	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9425	0.7411	0.5814	Normal Distribution

Combined Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9640	0.9559	0.9721	0.9639	0.9547	0.9704	0.0029	0.67%	0.00%
100		5	0.9624	0.9512	0.9735	0.9600	0.9502	0.9728	0.0040	0.93%	0.17%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.38	1.359	1.402	1.38	1.356	1.398	0.007739	1.25%	0.00%
100		5	1.377	1.347	1.406	1.369	1.346	1.405	0.01058	1.72%	0.28%

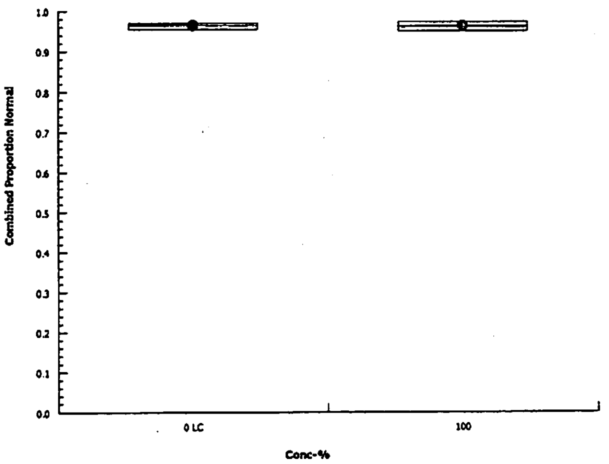
Combined Proportion Normal Detail

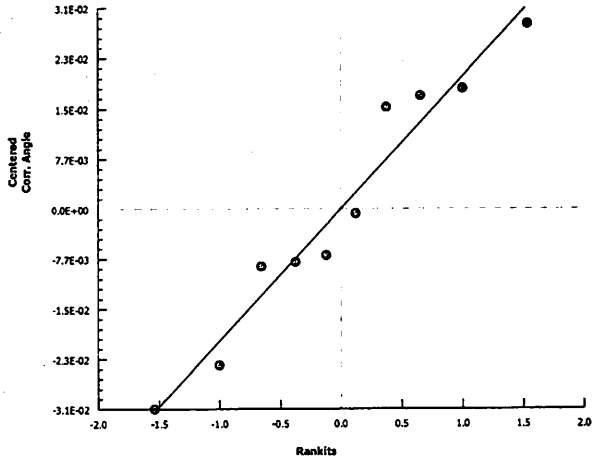
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9611	0.9639	0.9698	0.9547	0.9704
100		0.9728	0.9593	0.9502	0.9600	0.9695

Angular (Corrected) Transformed Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	1.372	1.38	1.396	1.356	1.398
100		1.405	1.368	1.346	1.369	1.395

Graphics





Analyst: SC QA: JWS 5/8/19

CETIS Summary Report

Report Date: 01 May-19 13:47 (p 1 of 2)
Test Code: 19-03-006 | 08-4608-4064

Bivalve Larval Survival and Development Test — **Wood Environment & Infrastructure Solutions**

Batch ID:	17-2587-3830	**Test Type:**	Development-Survival	**Analyst:**	
Start Date:	28 Mar-19 15:00	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Natural Seawater
Ending Date:	30 Mar-19 16:05	**Species:**	Mytilis galloprovincialis	**Brine:**	Not Applicable
Duration:	49h	**Source:**	Field Collected	**Age:**	

Sample ID:	08-4433-0503	**Code:**	19-W0016	**Client:**	Wood Environment and Infastructure
Sample Date:	27 Mar-19 08:25	**Material:**	Seawater	**Project:**	Boat Wash Study
Receipt Date:	27 Mar-19 19:00	**Source:**	Shelter Island Yacht Basin		
Sample Age:	31h	**Station:**	Gate2-T0		

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
06-9647-1883	Combined Proportion Norma	TST-Welch's t Test	5.3E-05	100% passed combined proportion normal
10-4724-7066	Proportion Normal	Equal Variance t Two-Sample Test	0.7648	100% passed proportion normal
01-0543-6008	Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	100% passed survival rate

Test Acceptability

				TAC Limits			
Analysis ID	**Endpoint**	**Attribute**	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
10-4724-7066	Proportion Normal	Control Resp	0.9655	0.9	>>	Yes	Passes Criteria
01-0543-6008	Survival Rate	Control Resp	0.9984	0.5	>>	Yes	Passes Criteria

Combined Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9640	0.9559	0.9721	0.9547	0.9704	0.0029	0.0065	0.67%	0.00%
100		5	0.9641	0.9415	0.9868	0.9377	0.9850	0.0082	0.0182	1.89%	-0.02%

Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9655	0.9574	0.9736	0.9547	0.9704	0.0029	0.0065	0.68%	0.00%
100		5	0.9694	0.9556	0.9832	0.9549	0.9850	0.0050	0.0111	1.15%	-0.40%

Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9984	0.9941	1.0000	0.9922	1.0000	0.0016	0.0035	0.35%	0.00%
100		5	0.9946	0.9794	1.0000	0.9728	1.0000	0.0054	0.0122	1.22%	0.39%

Combined Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9611	0.9639	0.9698	0.9547	0.9704
25						
50						
100		0.9729	0.9377	0.9701	0.9850	0.9549

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9686	0.9639	0.9698	0.9547	0.9704
25						
50						
100		0.9729	0.9640	0.9701	0.9850	0.9549

Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9922	1.0000	1.0000	1.0000	1.0000
25						
50						
100		1.0000	0.9728	1.0000	1.0000	1.0000

Analyst: SL QA: JW 5/8/19

Bivalve Larval Survival and Development Test **Wood Environment & Infrastructure Solutions**

Combined Proportion Normal Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	247/257	294/305	289/298	253/265	295/304
25						
50						
100		251/258	241/257	260/268	263/267	254/266

Proportion Normal Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	247/255	294/305	289/298	253/265	295/304
25						
50						
100		251/258	241/250	260/268	263/267	254/266

Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	255/257	257/257	257/257	257/257	257/257
25						
50						
100		257/257	250/257	257/257	257/257	257/257

Analyst: QA: JW 5/8/19

CETIS Analytical Report

Report Date: 09 May-19 10:07 (p 1 of 1)
Test Code: 19-03-006 | 08-4608-4064

Bivalve Larval Survival and Development Test — **Wood Environment & Infrastructure Solutions**

Analysis ID: 08-2176-8625
Analyzed: 09 May-19 10:06
Endpoint: Combined Proportion Normal
Analysis: Parametric-Two Sample
CETIS Version: CETISv1.9.3
Official Results: Yes

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	100% passed combined proportion normal	1.83%

Equal Variance t Two-Sample Test

Control	vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		100	-0.2021	1.86	0.044	8	CDF	0.5776	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5.586E-05	5.586E-05	1	0.04084	0.8449	Non-Significant Effect
Error	0.0109421	0.0013678	8			
Total	0.010998		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	8.136	23.15	0.0666	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9619	0.7411	0.8077	Normal Distribution

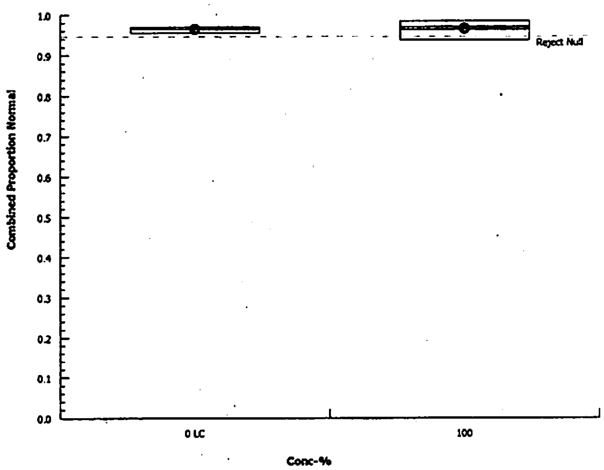
Combined Proportion Normal Summary

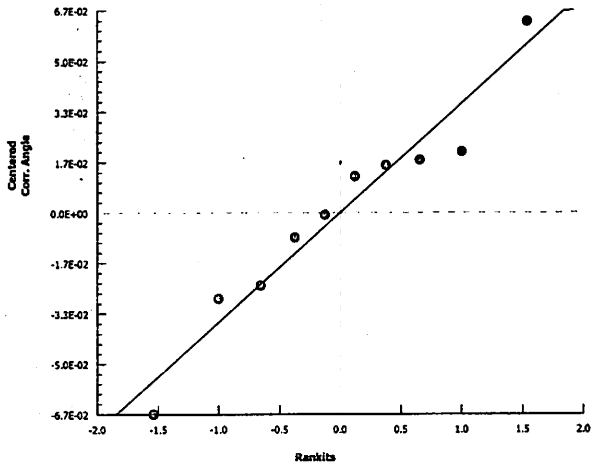
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9640	0.9559	0.9721	0.9639	0.9547	0.9704	0.0029	0.67%	0.00%
100		5	0.9641	0.9415	0.9868	0.9701	0.9377	0.9850	0.0082	1.89%	-0.02%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.38	1.359	1.402	1.38	1.356	1.398	0.007739	1.25%	0.00%
100		5	1.385	1.324	1.446	1.397	1.319	1.448	0.02207	3.56%	-0.34%

Graphics





Analyst: JW QA: SC 5/8/19

CETIS Analytical Report

TST

Report Date: 01 May-19 13:48 (p 1 of 1)
Test Code: 19-03-006 | 08-4608-4064

Bivalve Larval Survival and Development Test — **Wood Environment & Infrastructure Solutions**

Analysis ID:	06-9647-1883	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	01 May-19 13:47	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Data Transform	Alt Hyp	TST_b	Comparison Result
Angular (Corrected)	C*b < T	0.75	100% passed combined proportion normal

TST-Welch's t Test

Control	vs	Control II	Test Stat	Critical	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		100*	15.33	2.132	4	CDF	5.3E-05	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5.586E-05	5.586E-05	1	0.04084	0.8449	Non-Significant Effect
Error	0.0109421	0.0013678	8			
Total	0.010998		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	8.136	23.15	0.0666	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9619	0.7411	0.8077	Normal Distribution

Combined Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9640	0.9559	0.9721	0.9639	0.9547	0.9704	0.0029	0.67%	0.00%
100		5	0.9641	0.9415	0.9868	0.9701	0.9377	0.9850	0.0082	1.89%	-0.02%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.38	1.359	1.402	1.38	1.356	1.398	0.007739	1.25%	0.00%
100		5	1.385	1.324	1.446	1.397	1.319	1.448	0.02207	3.56%	-0.34%

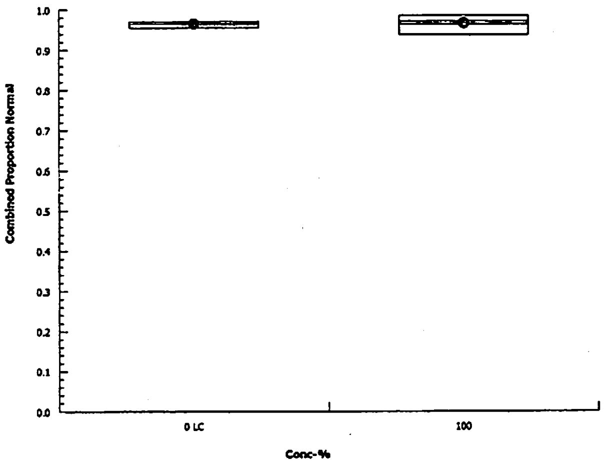
Combined Proportion Normal Detail

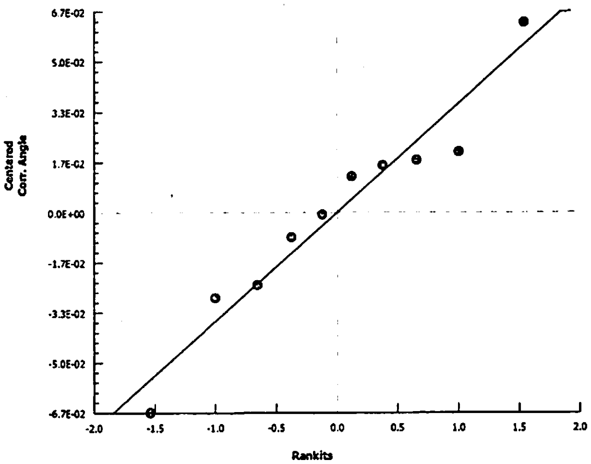
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9611	0.9639	0.9698	0.9547	0.9704
100		0.9729	0.9377	0.9701	0.9850	0.9549

Angular (Corrected) Transformed Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	1.372	1.38	1.396	1.356	1.398
100		1.405	1.319	1.397	1.448	1.357

Graphics





Analyst: SC QA: sw 5/8/19

Embryo-Larval Development Test
Scoring Worksheet

Client: Wood Environment & Infrastructure
Project ID: SIYB Gate 1; Gate 2 T0
Test No.: 19-03-005, 006

Test Species: *M. galloprovincialis*
Start Date: 3/28/2019 1500
End Date: 3/30/2019 1605

Random #	# Counted	# Normal	Tech Initials	Notes
1				
2				
3	275	264	AG	
4				
5	261	248		
6				
7				
8	266	254		
9	250	241		
10	262	254		
11				
12				
13	268	260		
14	298	289		
15				
16	294	286		
17				
18	305	294		
19				
20	255	247		
21	265	253		
22	295	283		
23				
24	304	295		
25				
26	258	251		
27				
28				
29				
30				
31	267	263		
32				
33				
34				
35				

QC Check: AG 4/4/19
Final Review: 4/29/19

Wood Environment & Infrastructure Solutions
SIYB Gate 1; Gate 2 T0
Random Numbers
3/28/19

SAMPLE ID	Rand#
Lab Control 1	20 247/255 AG 4/4/19
	18 294/305
	14 289/298
	21 253/265
	24 295/304
Gate ~~1~~ 2 (25%)	29
	19
	32
	34
	30
Gate ~~1~~ 2 (50%)	23
	28
	1
	12
	35
Gate ~~1~~ 2 (100%)	26 251/258
	9 241/250
	13 260/268
	31 263/267
	8 254/266
Gate ~~2~~ 1 (25%)	33
	4
	11
	25
	17
Gate ~~2~~ 1 (50%)	7
	2
	15
	6
	27
Gate ~~2~~ 1 (100%)	16 286/294
	22 283/295
	5 248/261
	3 264/275
	10 254/262

QC Check - Mussel: AG

Water Quality for Bivalve Development

Client: Wood Environment & Infrastructure Solutions
Project ID: SIYB - Gate 1 T0 + Gate 2 T0
Test No. 19-03-005 and 19-03-006

Test Species: *M. galloprovincialis*
Start Date/Time: 3/28/2019 1500
End Date/Time: 3/30/2019 1605

Test Conc. (%)		Water Quality Measurements		
	Parameter	**0hr**	**24hr**	**48hr**
Lab Control	Temp. (°C)	15.3	15.4	15.0
	Salinity (ppt)	34.1	34.1	34.1
	pH (units)	7.83	7.74	7.82
	DO (mg/L)	7.8	8.0	8.1
Gate 1 (25%)	Temp. (°C)	14.9	15.0	14.6
	Salinity (ppt)	34.0	34.0	34.2
	pH (units)	7.82	7.75	7.81
	DO (mg/L)	8.1	8.2	8.2
Gate 1 (50%)	Temp. (°C)	14.9	14.9	14.5
	Salinity (ppt)	34.1	34.1	34.3
	pH (units)	7.83	7.76	7.82
	DO (mg/L)	8.2	8.3	8.2
Gate 1 (100%) T0	Temp. (°C)	14.9	14.9	14.5
	Salinity (ppt)	34.0	34.0	34.1
	pH (units)	7.86	7.77	7.82
	DO (mg/L)	8.3	8.3	8.2
Gate 2 (25%)	Temp. (°C)	15.0	14.9	14.5
	Salinity (ppt)	33.9	34.0	34.1
	pH (units)	7.85	7.79	7.83
	DO (mg/L)	8.1	8.2	8.2
Gate 2 (50%)	Temp. (°C)	15.0	14.9	14.5
	Salinity (ppt)	34.0	34.1	34.2
	pH (units)	7.84	7.78	7.82
	DO (mg/L)	8.3	8.3	8.2
Gate 2 (100%) T0	Temp. (°C)	14.9	14.9	14.4
	Salinity (ppt)	34.0	34.0	34.2
	pH (units)	7.89	7.81	7.82
	DO (mg/L)	8.3	8.3	8.3
	Tech Initials:	AD	AG	AD

Source of Animals: Mission Bay
Date Received: 3/28/19

Comments:

QC Check: AG 4/10/19
Final Review: 4/29/19

Wood Environmental Toxicology Lab, 4905 Morena Blvd, Ste. 1304, San Diego, CA 92117

Embryo-Larval Development Test
Stock Preparation Worksheet

Test Species: *M. galloprovincialis*
Batch ID:
Test Type: Mussel Development

Test Date: 3/28/2019
Analyst: AG

Task	
Spawning Induction	1110
Spawning Begins	1150
# Males/# Females	3/3
Spawn Condition	good
Fertilization Initiated	1240
Fertilzation End/Eggs Rinsed	1305 & 1330
Embryo Counts	1358
Test Initiation	1500

Embryo Density Counts **# per 100 µL**

Stock #	**Stock Volume (mL)**	**Rep 1**	**Rep 2**	**Rep 3**	**Rep 4**	**Mean #/100 µL**	**Mean #/mL (x10)**
Stock ~~1~~ 2 AG	100	63 AG ~~240~~	49 AG ~~250~~	47 AG ~~255~~	50 AG ~~233~~	AG ~~240~~ 52	~~2400~~ 520
Stock ~~2~~ 1 AG	100	46	51	44	43	46	460
Stock 3	100	61	55	59	58	58	582
stock 1 & 3	100	53	52	55	51	53	530

Cell Division:

	% Divided
Stock ~~1~~ 2 AG	96.8%
Stock ~~2~~ 1 AG	99.8%
Stock 3	99%

Selected Stock:	1 & 3

Stock Density **Dil Factor**

Adjust selected embryo stock to 500 embryos/mL.
Dilution Factor = Stock Density/mL/500

$$\frac{Ⓐ}{500} \quad Ⓐ$$

In 10 mL sample volume add 500 µl of 500 embryo/ml stock to obtain 25 embryos/mL in test vials.

Notes: Ⓐ Dilution not required
$T0_1$ = 266/~~288~~ 268 AG $T0_2$ = 251/252 $T0_3$ = 281/283 $T0_4$ = 288/288 $T0_5$ = 287/288 x = 274.6
$T0_6$ = 252/253 $T0_7$ = 247/249 $T0_8$ = 250/250 $T0_9$ = 230/231 $T0_{10}$ = 221/222 x = ~~257.3~~ 240 AG
grandmean = 257.3

QA Review: AG 4/10/19

Final Review: 4/29/19

Basin1-T0 and Basin2-T0

CETIS Summary Report

Report Date: 01 May-19 14:00 (p 1 of 2)
Test Code: 19-03-007 | 10-5351-0011

Bivalve Larval Survival and Development Test — **Wood Environment & Infrastructure Solutions**

Batch ID:	10-7813-1601	**Test Type:**	Development-Survival	**Analyst:**	
Start Date:	28 Mar-19 15:00	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Natural Seawater
Ending Date:	30 Mar-19 16:05	**Species:**	Mytilis galloprovincialis	**Brine:**	Not Applicable
Duration:	49h	**Source:**	Field Collected	**Age:**	

Sample ID:	10-7179-0670	**Code:**	19-W0017	**Client:**	Wood Environment and Infastructure
Sample Date:	27 Mar-19 08:15	**Material:**	Seawater	**Project:**	Boat Wash Study
Receipt Date:	27 Mar-19 19:00	**Source:**	Shelter Island Yacht Basin		
Sample Age:	31h	**Station:**	Basin1-T0		

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
09-1794-8438	Combined Proportion Norma	TST-Welch's t Test	0.0016	100% passed combined proportion normal
07-4801-7310	Proportion Normal	Equal Variance t Two-Sample Test	0.5701	100% passed proportion normal
09-4261-5809	Survival Rate	Equal Variance t Two-Sample Test	0.2712	100% passed survival rate

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits Lower	Upper	Overlap	Decision
07-4801-7310	Proportion Normal	Control Resp	0.9631	0.9	>>	Yes	Passes Criteria
09-4261-5809	Survival Rate	Control Resp	0.972	0.5	>>	Yes	Passes Criteria

Combined Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9361	0.8941	0.9780	0.8872	0.9634	0.0151	0.0338	3.61%	0.00%
100		5	0.9085	0.8246	0.9924	0.7938	0.9615	0.0302	0.0676	7.44%	2.95%

Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9631	0.9472	0.9791	0.9476	0.9802	0.0057	0.0128	1.33%	0.00%
100		5	0.9650	0.9561	0.9739	0.9544	0.9713	0.0032	0.0071	0.74%	-0.19%

Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9720	0.9280	1.0000	0.9144	1.0000	0.0158	0.0354	3.64%	0.00%
100		5	0.9416	0.8507	1.0000	0.8210	1.0000	0.0327	0.0732	7.77%	3.12%

Combined Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9544	0.9144	0.8872	0.9611	0.9634
25						
50						
100		0.9222	0.9105	0.9544	0.9615	0.7938

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9544	0.9476	0.9702	0.9802	0.9634
25						
50						
100		0.9713	0.9710	0.9544	0.9615	0.9668

Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	1.0000	0.9650	0.9144	0.9805	1.0000
25						
50						
100		0.9494	0.9377	1.0000	1.0000	0.8210

Analyst: SC QA: 5/8/19

Bivalve Larval Survival and Development Test **Wood Environment & Infrastructure Solutions**

Combined Proportion Normal Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	251/263	235/257	228/257	247/257	263/273
25						
50						
100		237/257	234/257	251/263	250/260	204/257

Proportion Normal Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	251/263	235/248	228/235	247/252	263/273
25						
50						
100		237/244	234/241	251/263	250/260	204/211

Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	257/257	248/257	235/257	252/257	257/257
25						
50						
100		244/257	241/257	257/257	257/257	211/257

Analyst: SC QA: JW 5/8/19

CETIS Analytical Report

Report Date: 09 May-19 10:09 (p 1 of 1)
Test Code: 19-03-007 | 10-5351-0011

Bivalve Larval Survival and Development Test — **Wood Environment & Infrastructure Solutions**

Analysis ID:	11-4408-4490	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	09 May-19 10:08	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	100% passed combined proportion normal	6.10%

Equal Variance t Two-Sample Test

Control	vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		100	0.7873	1.86	0.106	8	CDF	0.2269	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0050474	0.0050474	1	0.6199	0.4538	Non-Significant Effect
Error	0.06514	0.0081425	8			
Total	0.0701874		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.635	23.15	0.3708	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.918	0.7411	0.3402	Normal Distribution

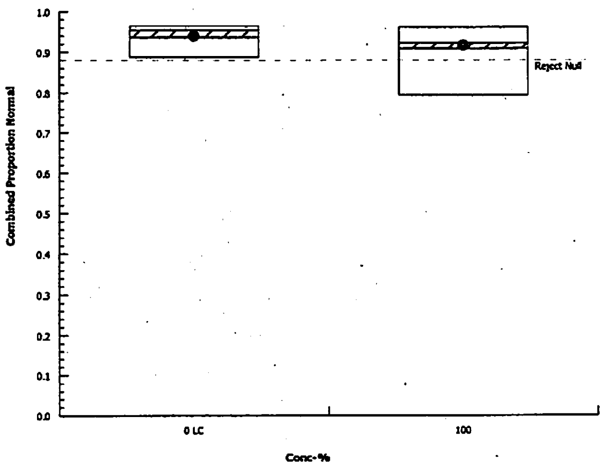
Combined Proportion Normal Summary

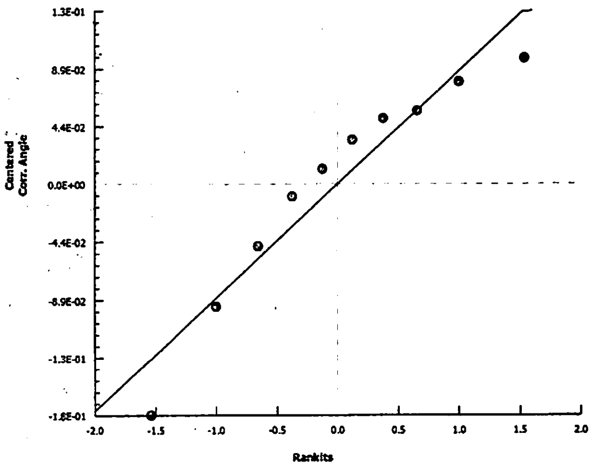
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9361	0.8941	0.9780	0.9544	0.8872	0.9634	0.0151	3.61%	0.00%
100		5	0.9085	0.8246	0.9924	0.9222	0.7938	0.9615	0.0302	7.44%	2.95%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.322	1.239	1.405	1.356	1.228	1.378	0.02993	5.06%	0.00%
100		5	1.277	1.142	1.412	1.288	1.099	1.373	0.04859	8.51%	3.40%

Graphics





Analyst: JW QA: JC 5/8/19

CETIS Analytical Report

TST

Report Date:	01 May-19 14:01 (p 1 of 1)
Test Code:	19-03-007 | 10-5351-0011

Bivalve Larval Survival and Development Test — **Wood Environment & Infrastructure Solutions**

Analysis ID:	09-1794-8438	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	01 May-19 13:59	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Data Transform	Alt Hyp	TST_b	Comparison Result
Angular (Corrected)	C*b < T	0.75	100% passed combined proportion normal

TST-Welch's t Test

Control	vs	Control II	Test Stat	Critical	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		100*	5.333	2.015	5	CDF	0.0016	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0050474	0.0050474	1	0.6199	0.4538	Non-Significant Effect
Error	0.06514	0.0081425	8			
Total	0.0701874		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.635	23.15	0.3708	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.918	0.7411	0.3402	Normal Distribution

Combined Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9361	0.8941	0.9780	0.9544	0.8872	0.9634	0.0151	3.61%	0.00%
100		5	0.9085	0.8246	0.9924	0.9222	0.7938	0.9615	0.0302	7.44%	2.95%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.322	1.239	1.405	1.356	1.228	1.378	0.02993	5.06%	0.00%
100		5	1.277	1.142	1.412	1.288	1.099	1.373	0.04859	8.51%	3.40%

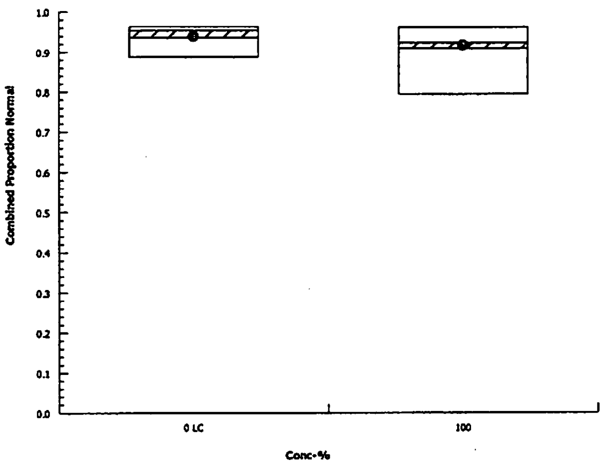
Combined Proportion Normal Detail

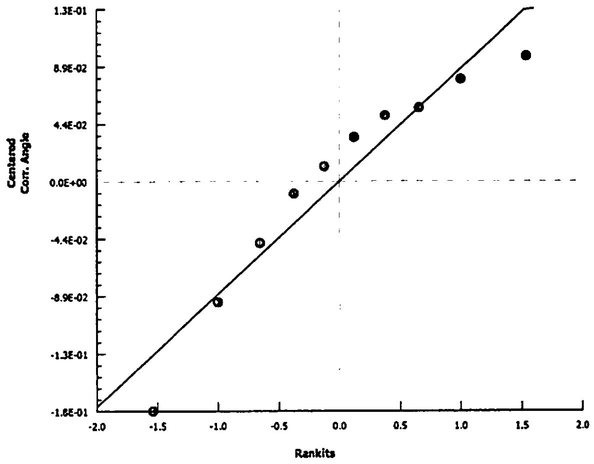
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9544	0.9144	0.8872	0.9611	0.9634
100		0.9222	0.9105	0.9544	0.9615	0.7938

Angular (Corrected) Transformed Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	1.356	1.274	1.228	1.372	1.378
100		1.288	1.267	1.356	1.373	1.099

Graphics





Analyst: SC QA: Jw 5|6|19

CETIS Summary Report

Bivalve Larval Survival and Development Test	Wood Environment & Infrastructure Solutions

Batch ID:	01-1094-9551	**Test Type:**	Development-Survival	**Analyst:**	
Start Date:	28 Mar-19 15:00	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Natural Seawater
Ending Date:	30 Mar-19 16:05	**Species:**	Mytilis galloprovincialis	**Brine:**	Not Applicable
Duration:	49h	**Source:**	Field Collected	**Age:**	

Sample ID:	09-5351-5408	**Code:**	19-W0018	**Client:**	Wood Environment and Infastructure
Sample Date:	27 Mar-19 08:25	**Material:**	Seawater	**Project:**	Boat Wash Study
Receipt Date:	27 Mar-19 19:00	**Source:**	Shelter Island Yacht Basin		
Sample Age:	31h	**Station:**	Basin2-T0		

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
02-7168-0510	Combined Proportion Norma	TST-Welch's t Test	2.5E-06	100% passed combined proportion normal
21-1157-7083	Proportion Normal	Equal Variance t Two-Sample Test	0.6859	100% passed proportion normal
04-3334-4126	Survival Rate	Unequal Variance t Two-Sample Test	0.9490	100% passed survival rate

Test Acceptability

				TAC Limits			
Analysis ID	Endpoint	Attribute	Test Stat	Lower	Upper	Overlap	Decision
21-1157-7083	Proportion Normal	Control Resp	0.9631	0.9	>>	Yes	Passes Criteria
04-3334-4126	Survival Rate	Control Resp	0.972	0.5	>>	Yes	Passes Criteria

Combined Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9361	0.8941	0.9780	0.8872	0.9634	0.0151	0.0338	3.61%	0.00%
100		5	0.9672	0.9544	0.9799	0.9550	0.9808	0.0046	0.0103	1.06%	-3.32%

Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9631	0.9472	0.9791	0.9476	0.9802	0.0057	0.0128	1.33%	0.00%
100		5	0.9672	0.9544	0.9799	0.9550	0.9808	0.0046	0.0103	1.06%	-0.42%

Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9720	0.9280	1.0000	0.9144	1.0000	0.0158	0.0354	3.64%	0.00%
100		5	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-2.88%

Combined Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9544	0.9144	0.8872	0.9611	0.9634
25						
50						
100		0.9652	0.9740	0.9550	0.9808	0.9609

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9544	0.9476	0.9702	0.9802	0.9634
25						
50						
100		0.9652	0.9740	0.9550	0.9808	0.9609

Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	1.0000	0.9650	0.9144	0.9805	1.0000
25						
50						
100		1.0000	1.0000	1.0000	1.0000	1.0000

Analyst: SC QA: JW 5/8/19

Bivalve Larval Survival and Development Test | **Wood Environment & Infrastructure Solutions**

Combined Proportion Normal Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	251/263	235/257	228/257	247/257	263/273
25						
50						
100		277/287	300/308	276/289	255/260	270/281

Proportion Normal Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	251/263	235/248	228/235	247/252	263/273
25						
50						
100		277/287	300/308	276/289	255/260	270/281

Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	257/257	248/257	235/257	252/257	257/257
25						
50						
100		257/257	257/257	257/257	257/257	257/257

Analyst: QA: Jv 5/8/19

CETIS Analytical Report

Report Date: 09 May-19 10:11 (p 1 of 1)
Test Code: 19-03-008 | 05-2049-3673

Bivalve Larval Survival and Development Test — **Wood Environment & Infrastructure Solutions**

Analysis ID:	16-2682-8384	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	09 May-19 10:11	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	100% passed combined proportion normal	3.12%

Equal Variance t Two-Sample Test

Control	vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		100	-2.101	1.86	0.061	8	CDF	0.9656	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0118518	0.0118518	1	4.414	0.0688	Non-Significant Effect
Error	0.0214827	0.0026853	8			
Total	0.0333345		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5.029	23.15	0.1468	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9376	0.7411	0.5263	Normal Distribution

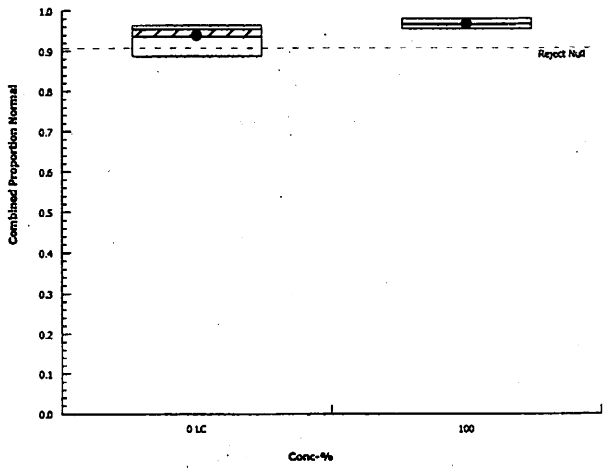
Combined Proportion Normal Summary

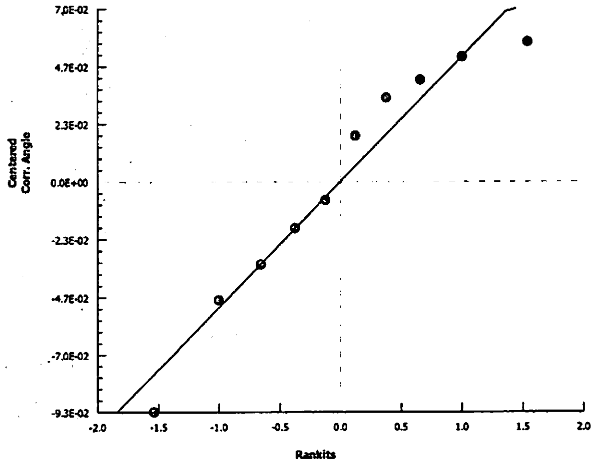
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9361	0.8941	0.9780	0.9544	0.8872	0.9634	0.0151	3.61%	0.00%
100		5	0.9672	0.9544	0.9799	0.9652	0.9550	0.9808	0.0046	1.06%	-3.32%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.322	1.239	1.405	1.356	1.228	1.378	0.02993	5.06%	0.00%
100		5	1.39	1.353	1.428	1.383	1.357	1.432	0.01335	2.15%	-5.21%

Graphics





Analyst: JCV QA: 5/8/19

CETIS Analytical Report

TST

Report Date:	01 May-19 14:08 (p 1 of 1)
Test Code:	19-03-008 | 05-2049-3673

Bivalve Larval Survival and Development Test — **Wood Environment & Infrastructure Solutions**

Analysis ID:	02-7168-0510	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	01 May-19 14:07	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Data Transform	Alt Hyp	TST_b	Comparison Result
Angular (Corrected)	C*b < T	0.75	100% passed combined proportion normal

TST-Welch's t Test

Control	vs	Control II	Test Stat	Critical	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		100*	15.29	1.943	6	CDF	2.5E-06	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0118518	0.0118518	1	4.414	0.0688	Non-Significant Effect
Error	0.0214827	0.0026853	8			
Total	0.0333345		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	5.029	23.15	0.1468	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9376	0.7411	0.5263	Normal Distribution

Combined Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9361	0.8941	0.9780	0.9544	0.8872	0.9634	0.0151	3.61%	0.00%
100		5	0.9672	0.9544	0.9799	0.9652	0.9550	0.9808	0.0046	1.06%	-3.32%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.322	1.239	1.405	1.356	1.228	1.378	0.02993	5.06%	0.00%
100		5	1.39	1.353	1.428	1.383	1.357	1.432	0.01335	2.15%	-5.21%

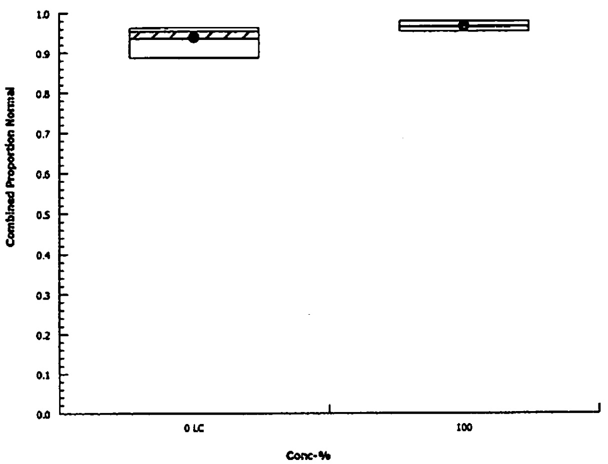
Combined Proportion Normal Detail

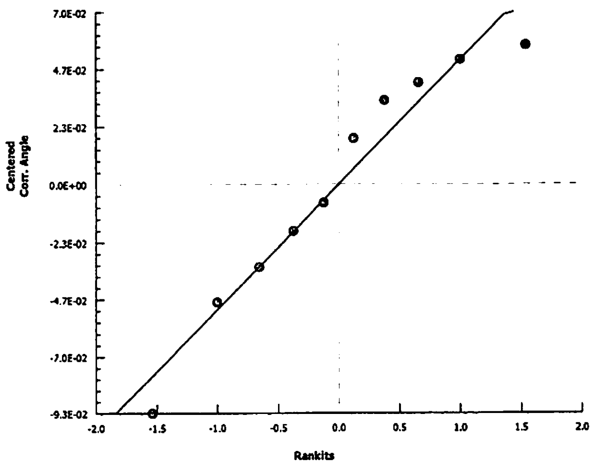
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9544	0.9144	0.8872	0.9611	0.9634
100		0.9652	0.9740	0.9550	0.9808	0.9609

Angular (Corrected) Transformed Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	1.356	1.274	1.228	1.372	1.378
100		1.383	1.409	1.357	1.432	1.372

Graphics





Analyst: SC QA: JW 5/8/19

Embryo-Larval Development Test
Scoring Worksheet

Client: Wood Environment & Infrastructure
Project ID: SIYB Basin 1-~~T4~~ Basin 2-~~T4~~0 AB
Test No.: 19-03-007, AB 008

Test Species: *M. galloprovincialis*
Start Date: 3/28/2019 1500
End Date: 3/30/2019 1605

Random #	# Counted	# Normal	Tech Initials	Notes
106	308	300	AB	
107	260	255		
108				
109				
110				
111	289	276		
112				
113				
114	273	263		
115				
116				
117				
118				
119				
120	263	251		
121				
122	241	234		
123	235	228		
124	281	270		
125				
126	248	235		
127				
128				
129				
130				
131	252	247		
132				
133	263	251		
134				
135				
136				
137	260	250		
138	289	277		
139	249	237		
140	211	204	✓	

QC Check: AB 4/4/19

Final Review: 4/29/19

Wood Environment & Infrastructure Solutions
SIYB Basin 1-~~T4~~ T0; Basin 2-~~T4~~ T0
Random Numbers
3/28/19

SAMPLE ID	Rand#	
Lab Control 4	133 251/263	AG 4/4/19
	126 235/248	
	123 228/235	
	131 241/252	
	114 263/273	
Basin 1-~~T4~~ 0 (25%)	113	
	117	
	127	
	109	
	134	
Basin 1-~~T4~~ 0 (50%)	125	
	108	
	121	
	128	
	136	
Basin 1-~~T4~~ 0 (100%)	139 237/244	AG 4/5/19
	122 234/241	
	120 251/263	
	137 250/260	
	140 204/211	
Basin 2-~~T4~~ 0 (25%)	116	
	118	
	130	
	110	
	115	
Basin 2-~~T4~~ 0 (50%)	119	
	135	
	112	
	132	
	129	
Basin 2-~~T4~~ 0 (100%)	138 277/287	AG 4/5/19
	106 300/308	
	111 276/289	
	107 255/260	
	124 270/281	

QC Check - Mussel: AG

Final QC: SC 4/29/19

Water Quality for Bivalve Development

Client: Wood Environment & Infrastructure Solutions
Project ID: SIYB - Basin 1 T0 + Basin 2 T0
Test No. 19-03-007 and 19-03-008

Test Species: *M. galloprovincialis*
Start Date/Time: 3/28/2019 1500
End Date/Time: 3/30/2019 1605

Test Conc. (%)	Water Quality Measurements			
	Parameter	0hr	24hr	48hr
Lab Control 2	Temp. (°C)	15.8	14.9	14.6
	Salinity (ppt)	34.0	33.9	34.1
	pH (units)	7.87	7.82	7.80
	DO (mg/L)	7.7	7.9	8.2
Basin 1 (25%)	Temp. (°C)	15.7	14.9	14.5
	Salinity (ppt)	34.0	34.0	34.2
	pH (units)	7.85	7.82	7.80
	DO (mg/L)	8.1	8.2	8.2
Basin 1 (50%)	Temp. (°C)	15.6	14.9	14.5
	Salinity (ppt)	34.0	34.0	34.3
	pH (units)	7.86	7.82	7.81
	DO (mg/L)	8.2	8.2	8.3
Basin 1 (100%) T0	Temp. (°C)	15.3	14.9	14.5
	Salinity (ppt)	33.9	33.9	34.2
	pH (units)	7.89	7.83	7.82
	DO (mg/L)	8.2	8.2	8.3
Basin 2 (25%)	Temp. (°C)	15.8	15.0	14.6
	Salinity (ppt)	33.8	34.0	34.2
	pH (units)	7.84	7.83	7.81
	DO (mg/L)	8.1	8.2	8.3
Basin 2 (50%)	Temp. (°C)	15.7	14.9	14.6
	Salinity (ppt)	33.9	34.5	34.3
	pH (units)	7.86	7.83	7.82
	DO (mg/L)	8.1	8.2	8.3
Basin 2 (100%) T0	Temp. (°C)	15.5	14.9	14.7
	Salinity (ppt)	33.9	34.0	34.2
	pH (units)	7.89	7.84	7.82
	DO (mg/L)	8.3	8.3	8.3
	Tech Initials:	AD	AG	AD

Source of Animals: Mission Bay
Date Received: 3/28/19
Comments:

QC Check: AG 4/10/19
Final Review: JC 4/29/19

Embryo-Larval Development Test
Stock Preparation Worksheet

Test Species: *M. galloprovincialis*
Test Date: 3/28/2019
Batch ID:
Analyst: AG
Test Type: Mussel Development

Task	
Spawning Induction	1110
Spawning Begins	1150
# Males/# Females	3/3
Spawn Condition	good
Fertilization Initiated	1240
Fertilzation End/Eggs Rinsed	1305 & 1330
Embryo Counts	1358
Test Initiation	1500

Embryo Density Counts **# per 100 µL**

Stock #	Stock Volume (mL)	Rep 1	Rep 2	Rep 3	Rep 4	Mean #/100 µL	Mean #/mL (x10)
Stock ~~1~~ AG 2	100	63 AG ~~240~~	49 AG ~~250~~	47 AG ~~255~~	50 AG ~~255~~	AG ~~240~~ 52	~~2,400~~ 520
Stock ~~2~~ AG 1	100	46	51	44	43	46	460
Stock 3	100	61	55	59	58	58	582
stock 1 & 3	100	53	52	55	51	53	530

Cell Division:

	% Divided
Stock ~~1~~ AG 2	96.8%
Stock ~~2~~ AG 1	99.8%
Stock 3	99.8%

Selected Stock:	1 & 3

Adjust selected embryo stock to 500 embryos/mL.
Dilution Factor = Stock Density/mL/500

Stock Density Ⓐ / 500

Dil Factor Ⓐ

In 10 mL sample volume add 500 µl of 500 embryo/ml stock to obtain 25 embryos/mL in test vials.

Notes: Ⓐ Dilution not required

$T0_1$ = 266/~~288~~ 268 AG $T0_2$ = 251/252 $T0_3$ = 281/283 $T0_4$ = 288/288 $T0_5$ = 287/288 x = 274.6

$T0_6$ = 252/253 $T0_7$ = 247/249 $T0_8$ = 250/250 $T0_9$ = 230/231 $T0_{10}$ = 221/222 x = ~~257.3~~ 240 AG

grandmean = 257.3

QA Review: AG 4/10/19

Final Review: 4/29/19

Gate1-T4 and Gate2-T4

CETIS Summary Report

Report Date: 01 May-19 14:52 (p 1 of 2)
Test Code: 19-03-009 | 17-2434-4072

Bivalve Larval Survival and Development Test — **Wood Environment & Infrastructure Solutions**

Batch ID:	18-4905-3235	**Test Type:**	Development-Survival	**Analyst:**	
Start Date:	28 Mar-19 15:00	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Natural Seawater
Ending Date:	30 Mar-19 16:05	**Species:**	Mytilis galloprovincialis	**Brine:**	Not Applicable
Duration:	49h	**Source:**	Field Collected	**Age:**	

Sample ID:	07-1583-5312	**Code:**	19~~W~~SW-W0019	**Client:**	Wood Environment and Infastructure
Sample Date:	27 Mar-19 15:20	**Material:**	Seawater	**Project:**	Boat Wash Study
Receipt Date:	27 Mar-19 19:00	**Source:**	Shelter Island Yacht Basin		
Sample Age:	24h	**Station:**	Gate1-T4		

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
12-4482-0999	Combined Proportion Norma	TST-Welch's t Test	1.0000	25% failed combined proportion normal
06-5842-3916	Proportion Normal	Dunnett Multiple Comparison Test	6.9E-07	25% failed proportion normal

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	NOEL	LOEL	TOEL	TU	PMSD ✓
03-8429-7205	Survival Rate	Steel Many-One Rank Sum Test	50	100	70.71	2	2.28%

Test Acceptability

				TAC Limits			
Analysis ID	Endpoint	Attribute	Test Stat	Lower	Upper	Overlap	Decision
06-5842-3916	Proportion Normal	Control Resp	0.9703	0.9	>>	Yes	Passes Criteria
03-8429-7205	Survival Rate	Control Resp	1	0.5	>>	Yes	Passes Criteria

Combined Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9703	0.9617	0.9789	0.9617	0.9779	0.0031	0.0069	0.71%	0.00%
25		5	0.0302	0.0123	0.0481	0.0156	0.0467	0.0065	0.0144	47.73%	96.88%
50		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%
100		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%

Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9703	0.9617	0.9789	0.9617	0.9779	0.0031	0.0069	0.71%	0.00%
25		5	0.0306	0.0132	0.0480	0.0172	0.0467	0.0063	0.0140	45.86%	96.85%
50		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%
100		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%

Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
25		5	0.9805	0.9265	1.0000	0.9027	1.0000	0.0195	0.0435	4.44%	1.95%
50		5	0.9782	0.9405	1.0000	0.9377	1.0000	0.0136	0.0303	3.10%	2.18%
100		5	0.0125	0.0084	0.0165	0.0078	0.0156	0.0015	0.0033	26.15%	98.75%

Analyst: SC QA: JW 5/8/19

Bivalve Larval Survival and Development Test — **Wood Environment & Infrastructure Solutions**

Combined Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9779	0.9667	0.9768	0.9617	0.9684
25		0.0467	0.0257	0.0189	0.0443	0.0156
50		0.0000	0.0000	0.0000	0.0000	0.0000
100		0.0000	0.0000	0.0000	0.0000	0.0000

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9779	0.9667	0.9768	0.9617	0.9684
25		0.0467	0.0257	0.0189	0.0443	0.0172
50		0.0000	0.0000	0.0000	0.0000	0.0000
100		0.0000	0.0000	0.0000	0.0000	0.0000

Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	1.0000	1.0000	1.0000	1.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000	0.9027
50		1.0000	0.9377	0.9533	1.0000	1.0000
100		0.0117	0.0078	0.0156	0.0117	0.0156

Combined Proportion Normal Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	265/271	290/300	295/302	251/261	276/285
25		12/257	7/272	5/265	12/271	4/257
50		0/259	0/257	0/257	0/282	0/261
100		0/257	0/257	0/257	0/257	0/257

Proportion Normal Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	265/271	290/300	295/302	251/261	276/285
25		12/257	7/272	5/265	12/271	4/232
50		0/259	0/241	0/245	0/282	0/261
100		0/3	0/2	0/4	0/3	0/4

Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	257/257	257/257	257/257	257/257	257/257
25		257/257	257/257	257/257	257/257	232/257
50		257/257	241/257	245/257	257/257	257/257
100		3/257	2/257	4/257	3/257	4/257

Analyst: SC QA: JW 5/8/19

CETIS Analytical Report

Report Date: 09 May-19 10:12 (p 1 of 1)
Test Code: 19-03-009 | 17-2434-4072

Bivalve Larval Survival and Development Test — **Wood Environment & Infrastructure Solutions**

Analysis ID:	16-1588-3093	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	09 May-19 10:12	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	25% failed combined proportion normal	1.48%

Dunnett Multiple Comparison Test

Control	vs	Control II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		25*	58.31	1.86	0.039	8	CDF	6.9E-07	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.76837	3.76837	1	3401	<1.0E-37	Significant Effect
Error	0.0088651	0.0011081	8			
Total	3.77724		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.264	23.15	0.1891	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9493	0.7411	0.6599	Normal Distribution

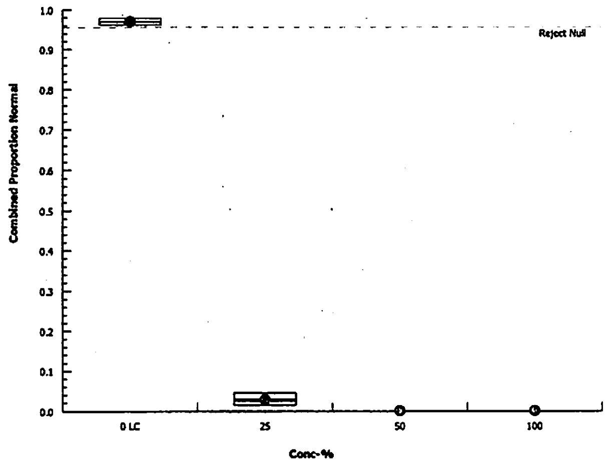
Combined Proportion Normal Summary

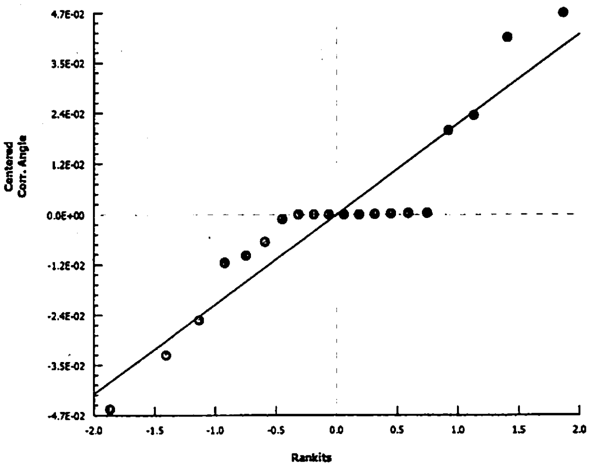
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9703	0.9617	0.9789	0.9684	0.9617	0.9779	0.0031	0.71%	0.00%
25		5	0.0302	0.0123	0.0481	0.0257	0.0156	0.0467	0.0065	47.73%	96.88%
50		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%
100		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.399	1.373	1.424	1.392	1.374	1.421	0.009177	1.47%	0.00%
25		5	0.1708	0.1182	0.2234	0.1611	0.1251	0.2178	0.01895	24.81%	87.79%
50		5	0.03084	0.03009	0.03159	0.03107	0.02978	0.03119	0.0002687	1.95%	97.79%
100		5	0.03119	0.03119	0.0312	0.03119	0.03119	0.03119	0	0.00%	97.77%

Graphics





Analyst: JVU QA: LC 5/8/19

CETIS Analytical Report

TST

Report Date: 01 May-19 14:54 (p 1 of 2)
Test Code: 19-03-009 | 17-2434-4072

Bivalve Larval Survival and Development Test — **Wood Environment & Infrastructure Solutions**

Analysis ID:	12-4482-0999	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	01 May-19 14:52	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Data Transform	Alt Hyp	TST_b	Comparison Result
Angular (Corrected)	C*b < T	0.75	25% failed combined proportion normal

TST-Welch's t Test

Control	vs	Conc-%	Test Stat	Critical	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		25	-43.56	2.015	5	CDF	1.0000	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.76837	3.76837	1	3401	<1.0E-37	Significant Effect
Error	0.0088651	0.0011081	8			
Total	3.77724		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.264	23.15	0.1891	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9493	0.7411	0.6599	Normal Distribution

Combined Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9703	0.9617	0.9789	0.9684	0.9617	0.9779	0.0031	0.71%	0.00%
25		5	0.0302	0.0123	0.0481	0.0257	0.0156	0.0467	0.0065	47.73%	96.88%
50		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%
100		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.399	1.373	1.424	1.392	1.374	1.421	0.009177	1.47%	0.00%
25		5	0.1708	0.1182	0.2234	0.1611	0.1251	0.2178	0.01895	24.81%	87.79%
50		5	0.03084	0.03009	0.03159	0.03107	0.02978	0.03119	0.0002687	1.95%	97.79%
100		5	0.03119	0.03119	0.0312	0.03119	0.03119	0.03119	0	0.00%	97.77%

Combined Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9779	0.9667	0.9768	0.9617	0.9684
25		0.0467	0.0257	0.0189	0.0443	0.0156
50		0.0000	0.0000	0.0000	0.0000	0.0000
100		0.0000	0.0000	0.0000	0.0000	0.0000

Angular (Corrected) Transformed Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	1.421	1.387	1.418	1.374	1.392
25		0.2178	0.1611	0.1378	0.212	0.1251
50		0.03107	0.03119	0.03119	0.02978	0.03095
100		0.03119	0.03119	0.03119	0.03119	0.03119

Analyst: SC QA: JW 5/8/19

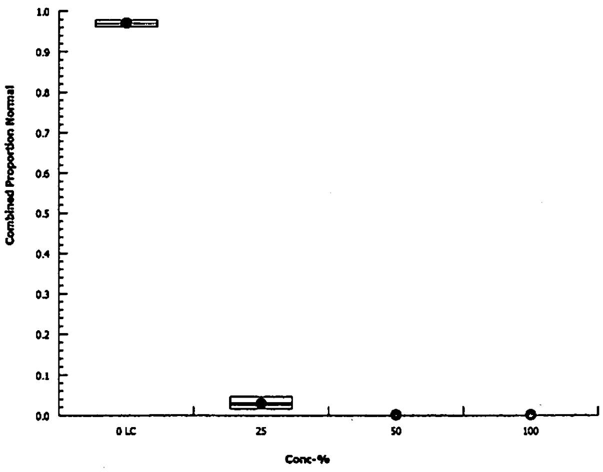
CETIS Analytical Report

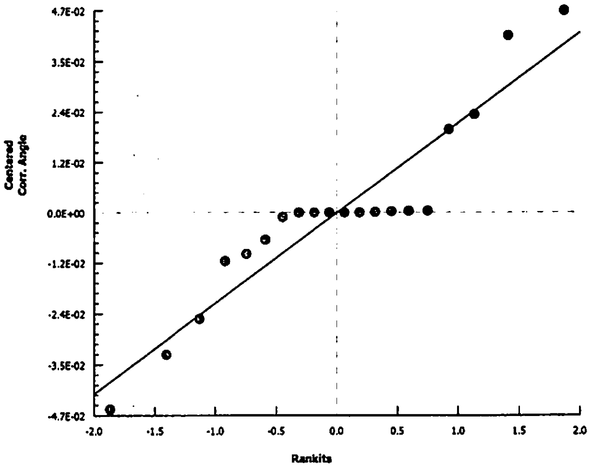
Report Date: 01 May-19 14:54 (p 2 of 2)
Test Code: 19-03-009 | 17-2434-4072

Bivalve Larval Survival and Development Test — **Wood Environment & Infrastructure Solutions**

Analysis ID:	12-4482-0999	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	01 May-19 14:52	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Graphics





Analyst: SL QA: JW 5/8/19

CETIS Summary Report

Report Date: 09 May-19 10:16 (p 1 of 2)
Test Code: 19-03-010 | 07-7538-0134

Bivalve Larval Survival and Development Test	**Wood Environment & Infrastructure Solutions**

Batch ID:	20-7814-2409	**Test Type:**	Development-Survival	**Analyst:**	
Start Date:	28 Mar-19 15:00	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Natural Seawater
Ending Date:	30 Mar-19 16:05	**Species:**	Mytilis galloprovincialis	**Brine:**	Not Applicable
Duration:	49h	**Source:**	Field Collected	**Age:**	

Sample ID:	01-1209-5736	**Code:**	19-W0020	**Client:**	Wood Environment and Infastructure
Sample Date:	27 Mar-19 15:30	**Material:**	Seawater	**Project:**	Boat Wash Study
Receipt Date:	27 Mar-19 19:00	**Source:**	Shelter Island Yacht Basin		
Sample Age:	23h	**Station:**	Gate2-T4		

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	NOEL	LOEL	TOEL	TU	PMSD ✓
00-2620-9179	Combined Proportion Norma	Dunnett Multiple Comparison Test	< 25	25	n/a	>4	4.84% ✓
03-1366-6173	Combined Proportion Norma	TST-Welch's t Test	25	50	35.36	4	n/a
00-1200-8915	Proportion Normal	Steel Many-One Rank Sum Test	< 25	25	n/a	>4	4.37% ✓
00-4761-6285	Survival Rate	Steel Many-One Rank Sum Test	100	> 100	n/a	1	3.0%

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	%	95% LCL	95% UCL	TU ✓
02-2958-6106	Combined Proportion Norma	Trimmed Spearman-Kärber	EC50	44.23	43.33	45.15	2.261

Test Acceptability

				TAC Limits			
Analysis ID	Endpoint	Attribute	Test Stat	Lower	Upper	Overlap	Decision
00-1200-8915	Proportion Normal	Control Resp	0.9703	0.9	>>	Yes	Passes Criteria
00-4761-6285	Survival Rate	Control Resp	1	0.5	>>	Yes	Passes Criteria

Combined Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9703	0.9617	0.9789	0.9617	0.9779	0.0031	0.0069	0.71%	0.00%
25		5	0.9114	0.8605	0.9623	0.8405	0.9453	0.0183	0.0410	4.50%	6.07%
50		5	0.3599	0.2147	0.5052	0.2534	0.5352	0.0523	0.1170	32.50%	62.91%
100		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%

Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9703	0.9617	0.9789	0.9617	0.9779	0.0031	0.0069	0.71%	0.00%
25		5	0.9295	0.9166	0.9425	0.9164	0.9453	0.0047	0.0104	1.12%	4.20%
50		5	0.3667	0.2166	0.5167	0.2534	0.5352	0.0540	0.1208	32.96%	62.21%
100		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%

Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
25		5	0.9805	0.9265	1.0000	0.9027	1.0000	0.0195	0.0435	4.44%	1.95%
50		5	0.9844	0.9412	1.0000	0.9222	1.0000	0.0156	0.0348	3.54%	1.56%
100		5	0.9735	0.9329	1.0000	0.9261	1.0000	0.0146	0.0327	3.36%	2.65%

Analyst: JUU QA: 5/8/19

Bivalve Larval Survival and Development Test | **Wood Environment & Infrastructure Solutions**

Combined Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9779	0.9667	0.9768	0.9617	0.9684
25		0.8405	0.9164	0.9272	0.9278	0.9453
50		0.4008	0.2552	0.3549	0.2534	0.5352
100		0.0000	0.0000	0.0000	0.0000	0.0000

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9779	0.9667	0.9768	0.9617	0.9684
25		0.9310	0.9164	0.9272	0.9278	0.9453
50		0.4346	0.2552	0.3549	0.2534	0.5352
100		0.0000	0.0000	0.0000	0.0000	0.0000

Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	1.0000	1.0000	1.0000	1.0000	1.0000
25		0.9027	1.0000	1.0000	1.0000	1.0000
50		0.9222	1.0000	1.0000	1.0000	1.0000
100		1.0000	0.9883	0.9533	0.9261	1.0000

Combined Proportion Normal Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	265/271	290/300	295/302	251/261	276/285
25		216/257	252/275	242/261	244/263	294/311
50		103/257	74/290	104/293	74/292	152/284
100		0/260	0/257	0/257	0/257	0/289

Proportion Normal Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	265/271	290/300	295/302	251/261	276/285
25		216/232	252/275	242/261	244/263	294/311
50		103/237	74/290	104/293	74/292	152/284
100		0/260	0/254	0/245	0/238	0/289

Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	257/257	257/257	257/257	257/257	257/257
25		232/257	257/257	257/257	257/257	257/257
50		237/257	257/257	257/257	257/257	257/257
100		257/257	254/257	245/257	238/257	257/257

Analyst: JW QA:

CETIS Analytical Report

Report Date: 09 May-19 10:14 (p 1 of 1)
Test Code: 19-03-010 | 07-7538-0134

Bivalve Larval Survival and Development Test				Wood Environment & Infrastructure Solutions	
Analysis ID:	00-2620-9179	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	09 May-19 10:14	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	C > T	< 25	25	n/a	>4	4.84%

Dunnett Multiple Comparison Test

Control	vs	Control II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		25*	2.431	2.108	0.108	8	CDF	0.0284	Significant Effect
		50*	14.76	2.108	0.108	8	CDF	8.8E-07	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.65273	0.826365	2	125.3	<1.0E-37	Significant Effect
Error	0.0791237	0.0065936	12			
Total	1.73185		14			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	8.37	9.21	0.0152	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.8906	0.8328	0.0684	Normal Distribution

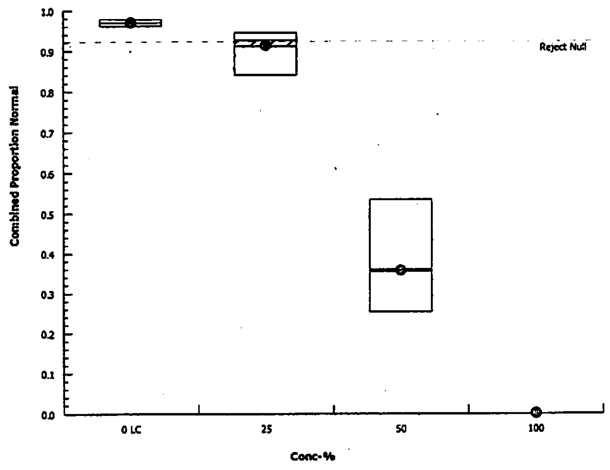
Combined Proportion Normal Summary

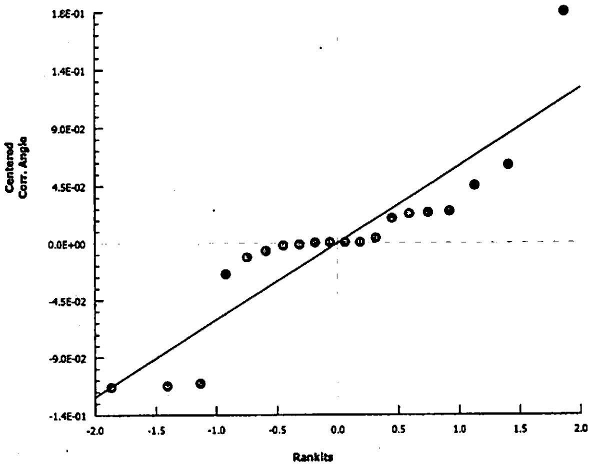
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9703	0.9617	0.9789	0.9684	0.9617	0.9779	0.0031	0.71%	0.00%
25		5	0.9114	0.8605	0.9623	0.9272	0.8405	0.9453	0.0183	4.50%	6.07%
50		5	0.3599	0.2147	0.5052	0.3549	0.2534	0.5352	0.0523	32.50%	62.91%
100		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.399	1.373	1.424	1.392	1.374	1.421	0.009177	1.47%	0.00%
25		5	1.274	1.191	1.357	1.298	1.16	1.335	0.02991	5.25%	8.93%
50		5	0.6403	0.4888	0.7918	0.6382	0.5275	0.8206	0.05457	19.06%	54.22%
100		5	0.0308	0.02984	0.03177	0.03119	0.02942	0.03119	0.0003484	2.53%	97.80%

Graphics





Analyst: JVV QA: JC 5/8/19

CETIS Analytical Report

TST

Report Date: 01 May-19 15:19 (p 1 of 2)
Test Code: 19-03-010 | 07-7538-0134

Bivalve Larval Survival and Development Test — **Wood Environment & Infrastructure Solutions**

Analysis ID:	03-1366-6173	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	01 May-19 15:15	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Data Transform	Alt Hyp	TST_b	NOEL	LOEL	TOEL	TU
Angular (Corrected)	C*b < T	0.75	25	50	35.36	4

TST-Welch's t Test

Control	vs	Control II	Test Stat	Critical	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		25*	7.325	2.132	4	CDF	9.2E-04	Non-Significant Effect
		50	-7.429	2.132	4	CDF	0.9991	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.65273	0.826365	2	125.3	<1.0E-37	Significant Effect
Error	0.0791237	0.0065936	12			
Total	1.73185		14			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	8.37	9.21	0.0152	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.8906	0.8328	0.0684	Normal Distribution

Combined Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9703	0.9617	0.9789	0.9684	0.9617	0.9779	0.0031	0.71%	0.00%
25		5	0.9114	0.8605	0.9623	0.9272	0.8405	0.9453	0.0183	4.50%	6.07%
50		5	0.3599	0.2147	0.5052	0.3549	0.2534	0.5352	0.0523	32.50%	62.91%
100		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.399	1.373	1.424	1.392	1.374	1.421	0.009177	1.47%	0.00%
25		5	1.274	1.191	1.357	1.298	1.16	1.335	0.02991	5.25%	8.93%
50		5	0.6403	0.4888	0.7918	0.6382	0.5275	0.8206	0.05457	19.06%	54.22%
100		5	0.0308	0.02984	0.03177	0.03119	0.02942	0.03119	0.0003484	2.53%	97.80%

Combined Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9779	0.9667	0.9768	0.9617	0.9684
25		0.8405	0.9164	0.9272	0.9278	0.9453
50		0.4008	0.2552	0.3549	0.2534	0.5352
100		0.0000	0.0000	0.0000	0.0000	0.0000

Angular (Corrected) Transformed Detail

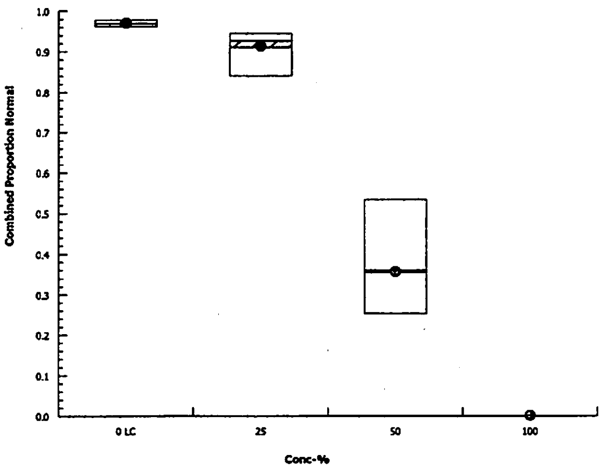
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	1.421	1.387	1.418	1.374	1.392
25		1.16	1.277	1.298	1.299	1.335
50		0.6855	0.5296	0.6382	0.5275	0.8206
100		0.03101	0.03119	0.03119	0.03119	0.02942

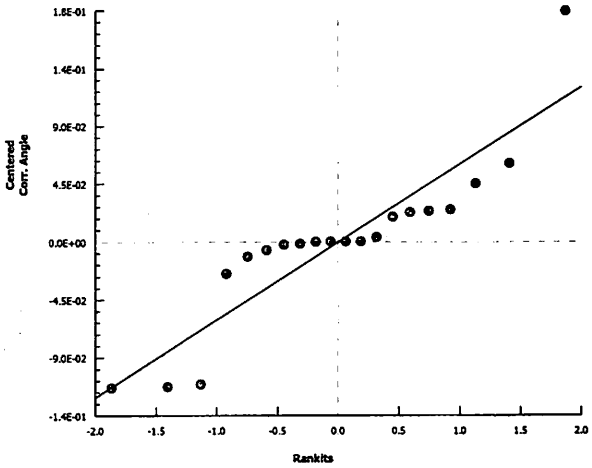
Analyst: SC QA: JW 5/8/19

Bivalve Larval Survival and Development Test			**Wood Environment & Infrastructure Solutions**

Analysis ID:	03-1366-6173	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	01 May-19 15:15	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Graphics





Analyst: SL QA: JW 5/8/19

CETIS Analytical Report

Report Date: 01 May-19 15:19 (p 1 of 1)
Test Code: 19-03-010 | 07-7538-0134

Bivalve Larval Survival and Development Test **Nood Environment & Infrastructure Solutions**

Analysis ID:	02-2958-6106	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	01 May-19 15:15	**Analysis:**	Trimmed Spearman-Kärber	**Official Results:**	Yes

Trimmed Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0.0296	5.92%	1.646	0.004457	44.23	43.33	45.15

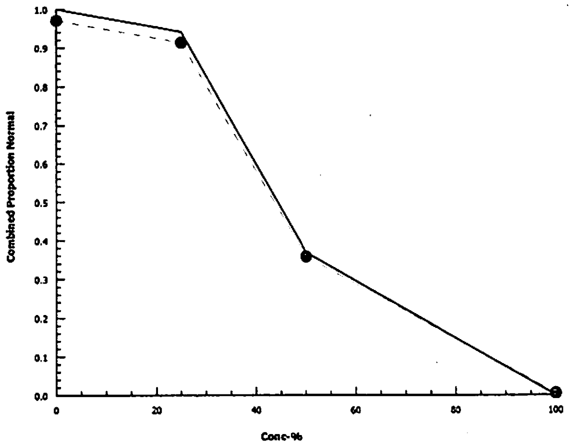
Combined Proportion Normal Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	LC	5	0.9703	0.9617	0.9779	0.0069	0.71%	0.0%	1377/1419	0.9703	0.0%
25		5	0.9114	0.8405	0.9453	0.0410	4.50%	6.07%	1248/1367	0.9114	6.07%
50		5	0.3599	0.2534	0.5352	0.1170	32.50%	62.91%	507/1416	0.3599	62.91%
100		5	0.0000	0.0000	0.0000	0.0000		100.0%	0/1320	0	100.0%

Combined Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9779	0.9667	0.9768	0.9617	0.9684
25		0.8405	0.9164	0.9272	0.9278	0.9453
50		0.4008	0.2552	0.3549	0.2534	0.5352
100		0.0000	0.0000	0.0000	0.0000	0.0000

Graphics



Analyst: SL QA: JVV 5/8/19

Embryo-Larval Development Test
Scoring Worksheet

Client: Wood Environment & Infrastructure
Project ID: SIYB Gate 1-T4; Gate 2-T4
Test No.: 19-03-009 and 19-03-010

Test Species: *M. galloprovincialis*
Start Date: 3/28/2019 1500
End Date: 3/30/2019 1605

Random #	# Counted	# Normal	Tech Initials	Notes
71	284	AG ~~188~~ 152	AG	
72	302	295		
73	2	0		
74	290	74		
75	271	AG ~~259~~ 12		
76	289	0		
77	300	290		
78	311	294		
79	272	AG ~~265~~ 7		
80	241	0		
81	292	74		
82	261	0		
83	3	0		
84	4	0		
85	271	265		
86	261	251		
87	257	AG ~~246~~ 12		
88	286	276		
89	254	0		
90	276	252		
91	263	244		
92	4	0		
93	246	0		
94	261	242		
95	232	216		
96	245	0		
97	293	104		
98	259	0		
99	238	0		
100	265 ~~258~~ AG	~~7~~ AG 5		
101	237	103		
102	260	0		
103	3	0		
104	282	0		
105	232	4		

QC Check: AG 4/10/19

Final Review: Jc 4/29/19

Wood Environment & Infrastructure Solutions
SIYB Gate 1-T4; Gate 2-T4
Random Numbers
3/28/19

SAMPLE ID	Rand#	
Lab Control 3	85 265/271 77 290/300 72 295/302 86 251/261 88 276/285	AG 4/5/19
Gate 1-T4 (25%)	87 12/257 79 7/272 100 5/265 75 12/271 105 4/232	
Gate 1-T4 (50%)	98 0/259 80 0/241 96 0/245 104 0/282 82 0/261	
Gate 1-T4 (100%)	103 0/3 73 0/2 84 0/4 83 0/3 92 0/4	AG 4/5/19
Gate 2-T4 (25%)	95 216/232 90 252/275 94 242/261 91 244/263 78 294/311	
Gate 2-T4 (50%)	101 103/237 74 74/290 97 104/293 81 74/292 71 152/284	
Gate 2-T4 (100%)	102 0/260 89 0/254 93 0/245 99 0/238 76 0/289	AG 4/5/19

QC Check - Mussel: AG

Final QC: 4/29/19

Water Quality for Bivalve Development

Client: Wood Environment & Infrastructure Solutions **Test Species:** *M. galloprovincialis*
Project ID: SIYB Gate 1-T4; Gate 2-T4 **Start Date/Time:** 3/28/2019 1500
Test No. 19-03-009 and 19-03-010 **End Date/Time:** 3/30/2019 1605

Test Conc. (%)	Water Quality Measurements			
	Parameter	0hr	24hr	48hr
Lab Control 3	Temp. (°C)	15.7	15.1	14.5
	Salinity (ppt)	33.9	34.1	34.1
	pH (units)	7.87	7.84	7.84
	DO (mg/L)	7.7	8.1	8.2
Gate 1-T4 (25%)	Temp. (°C)	15.6	15.1	14.5
	Salinity (ppt)	34.0	34.1	34.1
	pH (units)	7.87	7.84	7.83
	DO (mg/L)	8.1	8.2	8.2
Gate 1-T4 (50%)	Temp. (°C)	15.4	15.1	14.5
	Salinity (ppt)	33.9	34.1	34.1
	pH (units)	7.88	7.84	7.83
	DO (mg/L)	8.1	8.2	8.3
Gate 1-T4 (100%)	Temp. (°C)	15.1	15.1	14.5
	Salinity (ppt)	33.9	34.0	34.0
	pH (units)	7.92	7.85	7.84
	DO (mg/L)	8.4	8.4	8.2
Gate 2-T4 (25%)	Temp. (°C)	15.6	15.1	14.6
	Salinity (ppt)	33.9	33.9	34.1
	pH (units)	7.88	7.86	7.84
	DO (mg/L)	8.1	8.3	8.2
Gate 2-T4 (50%)	Temp. (°C)	15.4	15.2	14.6
	Salinity (ppt)	34.0	34.1	34.1
	pH (units)	7.89	7.85	7.84
	DO (mg/L)	8.2	8.3	8.2
Gate 2-T4 (100%)	Temp. (°C)	15.0	15.2	14.7
	Salinity (ppt)	3~~3~~4.0 AD	33.9	34.0
	pH (units)	7.92	7.86	7.85
	DO (mg/L)	8.3	AG ~~8.5~~ 8.3	8.2
	Tech Initials:	AD	AG	AD

Source of Animals: Mission Bay **Date Received:** 3/28/19

Comments:

QC Check: AG 4/10/19 **Final Review:** Jr 4/29/19

Wood Environmental Toxicology Lab, 4905 Morena Blvd, Ste. 1304, San Diego, CA 92117

Embryo-Larval Development Test
Stock Preparation Worksheet

Test Species: *M. galloprovincialis*
Batch ID:
Test Type: Mussel Development

Test Date: 3/28/2019
Analyst: AG

Task	
Spawning Induction	1110
Spawning Begins	1150
# Males/# Females	3/3
Spawn Condition	good
Fertilization Initiated	1240
Fertilzation End/Eggs Rinsed	1305 & 1330
Embryo Counts	1358
Test Initiation	1500

Embryo Density Counts **# per 100 µL**

Stock #	Stock Volume (mL)	Rep 1	Rep 2	Rep 3	Rep 4	Mean #/100 µL	Mean #/mL (x10)
Stock ~~1~~ 2 AG	100	AG ~~240~~ 63	AG ~~250~~ 49	AG ~~255~~ 47	AG ~~253~~ 50	AG ~~240~~ 52	~~2,400~~ 520
Stock ~~2~~ 1 AG	100	46	51	44	43	46	460
Stock 3	100	61	55	59	58	58	582
stock 1 & 3	100	53	52	55	51	53	530

Cell Division:

	% Divided
Stock ~~1~~ 2 AG	96.8%
Stock ~~2~~ 1 AG	99.8%
Stock 3	99%

Selected Stock:	1 & 3

Adjust selected embryo stock to 500 embryos/mL.
Dilution Factor = Stock Density/mL/500

Stock Density Ⓐ / 500

Dil Factor Ⓐ

In 10 mL sample volume add 500 µl of 500 embryo/ml stock to obtain 25 embryos/mL in test vials.

Notes: Ⓐ Dilution not required

$T0_1$ = 266/~~288~~ 268 AG $T0_2$ = 251/252 $T0_3$ = 281/283 $T0_4$ = 288/288 $T0_5$ = 287/288 x = 274.6

$T0_6$ = 252/253 $T0_7$ = 247/249 $T0_8$ = 250/250 $T0_9$ = 230/231 $T0_{10}$ = 221/222 x = ~~257.3~~ 240 AG

grandmean = 257.3

QA Review: AG 4/10/19

Final Review: 4/29/19

Basin1-T4 and Basin2-T4

CETIS Summary Report

Report Date: 09 May-19 10:20 (p 1 of 2)
Test Code: 19-03-011 | 09-5187-0671

Bivalve Larval Survival and Development Test — **Wood Environment & Infrastructure Solutions**

Batch ID:	18-6585-4814	**Test Type:**	Development-Survival	**Analyst:**	
Start Date:	28 Mar-19 15:00	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Natural Seawater
Ending Date:	30 Mar-19 16:05	**Species:**	Mytilis galloprovincialis	**Brine:**	Not Applicable
Duration:	49h	**Source:**	Field Collected	**Age:**	

Sample ID:	15-4885-6156	**Code:**	19-W0021	**Client:**	Wood Environment and Infastructure
Sample Date:	27 Mar-19 15:20	**Material:**	Seawater	**Project:**	Boat Wash Study
Receipt Date:	27 Mar-19 19:00	**Source:**	Shelter Island Yacht Basin		
Sample Age:	24h	**Station:**	Basin1-T4		

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	NOEL	LOEL	TOEL	TU	PMSD ✓
08-4201-2667	Combined Proportion Norma	Dunnett Multiple Comparison Test	< 25	25	n/a	>4	0.59% ✓
00-7054-3308	Combined Proportion Norma	TST-Welch's t Test	< 25	25	n/a	>4	n/a ✓
07-5919-0576	Survival Rate	Dunnett Multiple Comparison Test	< 25	25	n/a	>4	0.77% ✓

Test Acceptability

				TAC Limits			
Analysis ID	Endpoint	Attribute	Test Stat	Lower	Upper	Overlap	Decision
13-2653-4179	Proportion Normal	Control Resp	0.968	0.9	>>	Yes	Passes Criteria
07-5919-0576	Survival Rate	Control Resp	0.9938	0.5	>>	Yes	Passes Criteria

Combined Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9619	0.9515	0.9722	0.9524	0.9689	0.0037	0.0083	0.87%	0.00%
25		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%
50		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%
100		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%

Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9938	0.9827	1.0000	0.9805	1.0000	0.0040	0.0090	0.90%	0.00%
25		5	0.0039	0.0000	0.0087	0.0000	0.0078	0.0017	0.0039	100.00%	99.61%
50		5	0.0016	0.0000	0.0059	0.0000	0.0078	0.0016	0.0035	223.61%	99.84%
100		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%

Combined Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9533	0.9689	0.9662	0.9524	0.9686
25		0.0000	0.0000	0.0000	0.0000	0.0000
50		0.0000	0.0000	0.0000	0.0000	0.0000
100		0.0000	0.0000	0.0000	0.0000	0.0000

Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9805	0.9883	1.0000	1.0000	1.0000
25		0.0078	0.0039	0.0078	0.0000	0.0000
50		0.0000	0.0078	0.0000	0.0000	0.0000
100		0.0000	0.0000	0.0000	0.0000	0.0000

Analyst: JW QA: 5/8/19

Bivalve Larval Survival and Development Test | **Wood Environment & Infrastructure Solutions**

Combined Proportion Normal Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	245/257	249/257	286/296	260/273	278/287
25		0/257	0/257	0/257	0/257	0/257
50		0/257	0/257	0/257	0/257	0/257
100		0/257	0/257	0/257	0/257	0/257

Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	252/257	254/257	257/257	257/257	257/257
25		2/257	1/257	2/257	0/257	0/257
50		0/257	2/257	0/257	0/257	0/257
100		0/257	0/257	0/257	0/257	0/257

Analyst: JW QA:

CETIS Analytical Report

Report Date: 09 May-19 10:19 (p 1 of 1)
Test Code: 19-03-011 | 09-5187-0671

Bivalve Larval Survival and Development Test — ***N*ood Environment & Infrastructure Solutions**

Analysis ID:	08-4201-2667	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	09 May-19 10:19	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	C > T	< 25	25	n/a	>4	0.59%

Dunnett Multiple Comparison Test

Control	vs	Control II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		25*	197.9	2.227	0.015	8	CDF	7.0E-07	Significant Effect
		50*	197.9	2.227	0.015	8	CDF	7.0E-07	Significant Effect
		100*	197.9	2.227	0.015	8	CDF	7.0E-07	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	6.77372	2.25791	3	19580	<1.0E-37	Significant Effect
Error	0.0018448	0.0001153	16			
Total	6.77557		19			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	63.62	5.292	<1.0E-37	Unequal Variances
Variances	Mod Levene Equality of Variance Test	7.025	5.953	0.0056	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.6919	0.866	3.1E-05	Non-Normal Distribution

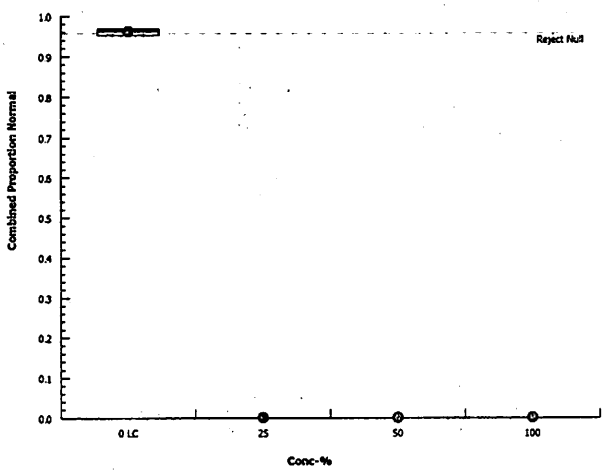
Combined Proportion Normal Summary

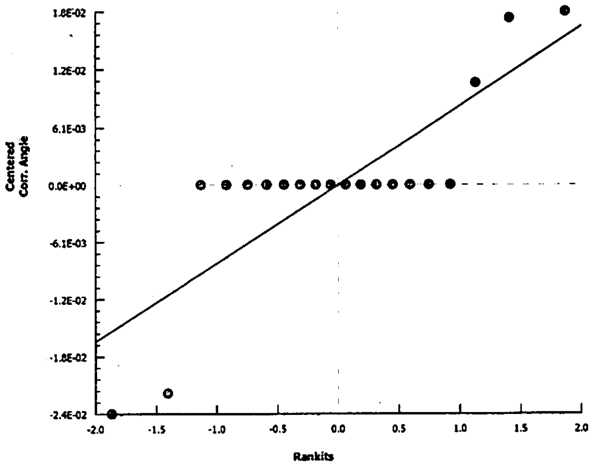
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9619	0.9515	0.9722	0.9662	0.9524	0.9689	0.0037	0.87%	0.00%
25		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%
50		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%
100		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.375	1.349	1.402	1.386	1.351	1.393	0.009604	1.56%	0.00%
25		5	0.03119	0.03119	0.0312	0.03119	0.03119	0.03119	0	0.00%	97.73%
50		5	0.03119	0.03119	0.0312	0.03119	0.03119	0.03119	0	0.00%	97.73%
100		5	0.03119	0.03119	0.0312	0.03119	0.03119	0.03119	0	0.00%	97.73%

Graphics





Analyst: JUU QA: JC 5/8/19

CETIS Analytical Report

TST

Report Date: 01 May-19 15:39 (p 1 of 2)
Test Code: 19-03-011 | 09-5187-0671

Bivalve Larval Survival and Development Test — **Wood Environment & Infrastructure Solutions**

Analysis ID: 00-7054-3308 **Endpoint:** Combined Proportion Normal **CETIS Version:** CETISv1.9.3
Analyzed: 01 May-19 15:37 **Analysis:** Parametric Bioequivalence-Two Sample **Official Results:** Yes

Data Transform	Alt Hyp	TST_b	NOEL	LOEL	TOEL	TU
Angular (Corrected)	C*b < T	0.75	< 25	25	n/a	>4

TST-Welch's t Test

Control vs	Conc-%	Test Stat	Critical	DF	P-Type	P-Value	Decision(α:5%)
Lab Control	25	-138.9	2.132	4	CDF	1.0000	Significant Effect
	50	-138.9	2.132	4	CDF	1.0000	Significant Effect
	100	-138.9	2.132	4	CDF	1.0000	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	6.77372	2.25791	3	19580	<1.0E-37	Significant Effect
Error	0.0018448	0.0001153	16			
Total	6.77557		19			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	63.62	5.292	<1.0E-37	Unequal Variances
Variances	Mod Levene Equality of Variance Test	7.025	5.953	0.0056	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.6919	0.866	3.1E-05	Non-Normal Distribution

Combined Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9619	0.9515	0.9722	0.9662	0.9524	0.9689	0.0037	0.87%	0.00%
25		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%
50		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%
100		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.375	1.349	1.402	1.386	1.351	1.393	0.009604	1.56%	0.00%
25		5	0.03119	0.03119	0.0312	0.03119	0.03119	0.03119	0	0.00%	97.73%
50		5	0.03119	0.03119	0.0312	0.03119	0.03119	0.03119	0	0.00%	97.73%
100		5	0.03119	0.03119	0.0312	0.03119	0.03119	0.03119	0	0.00%	97.73%

Combined Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9533	0.9689	0.9662	0.9524	0.9686
25		0.0000	0.0000	0.0000	0.0000	0.0000
50		0.0000	0.0000	0.0000	0.0000	0.0000
100		0.0000	0.0000	0.0000	0.0000	0.0000

Angular (Corrected) Transformed Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	1.353	1.393	1.386	1.351	1.393
25		0.03119	0.03119	0.03119	0.03119	0.03119
50		0.03119	0.03119	0.03119	0.03119	0.03119
100		0.03119	0.03119	0.03119	0.03119	0.03119

Analyst: SC QA: JW 5/8/19

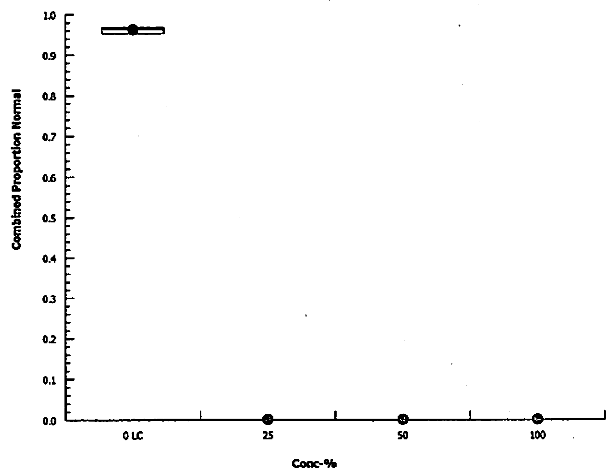
CETIS Analytical Report

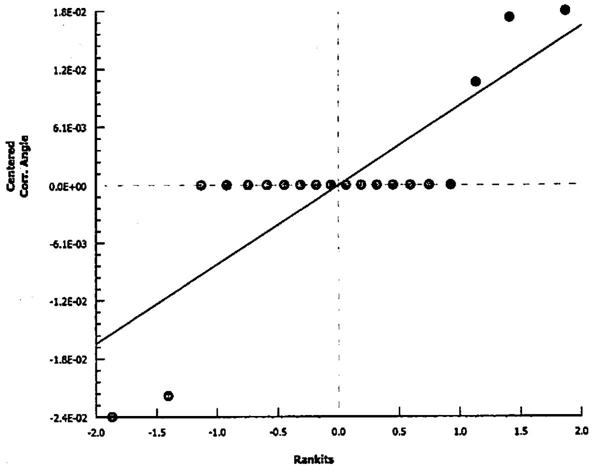
Report Date: 01 May-19 15:39 (p 2 of 2)
Test Code: 19-03-011 | 09-5187-0671

Bivalve Larval Survival and Development Test	**Wood Environment & Infrastructure Solutions**

Analysis ID:	00-7054-3308	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	01 May-19 15:37	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Graphics





Analyst: SC QA: JW 5/8/19

CETIS Summary Report

Report Date: 09 May-19 10:22 (p 1 of 2)
Test Code: 19-03-012 | 05-5762-1747

Bivalve Larval Survival and Development Test	**Wood Environment & Infrastructure Solutions**

Batch ID:	03-0659-3805	**Test Type:**	Development-Survival	**Analyst:**	
Start Date:	28 Mar-19 15:00	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Natural Seawater
Ending Date:	30 Mar-19 16:05	**Species:**	Mytilis galloprovincialis	**Brine:**	Not Applicable
Duration:	49h	**Source:**	Field Collected	**Age:**	

Sample ID:	08-3441-4277	**Code:**	19-W0022	**Client:**	Wood Environment and Infastructure
Sample Date:	27 Mar-19 15:30	**Material:**	Seawater	**Project:**	Boat Wash Study
Receipt Date:	27 Mar-19 19:00	**Source:**	Shelter Island Yacht Basin		
Sample Age:	23h	**Station:**	Basin2-T4		

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
11-1530-3573	Survival Rate	Dunnett Multiple Comparison Test	6.9E-07	25% failed survival rate

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	NOEL	LOEL	TOEL	TU	PMSD ✓
16-2267-4015	Combined Proportion Norma	Steel Many-One Rank Sum Test	< 25	25	n/a	>4	0.59% ✓
04-8235-9698	Combined Proportion Norma	TST-Welch's t Test	< 25	25	n/a	>4	n/a ✓

Test Acceptability

				TAC Limits			
Analysis ID	Endpoint	Attribute	Test Stat	Lower	Upper	Overlap	Decision
19-6488-2628	Proportion Normal	Control Resp	0.968	0.9	>>	Yes	Passes Criteria
11-1530-3573	Survival Rate	Control Resp	0.9938	0.5	>>	Yes	Passes Criteria

Combined Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9619	0.9515	0.9722	0.9524	0.9689	0.0037	0.0083	0.87%	0.00%
25		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%
50		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%
100		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%

Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9938	0.9827	1.0000	0.9805	1.0000	0.0040	0.0090	0.90%	0.00%
25		5	0.0008	0.0000	0.0029	0.0000	0.0039	0.0008	0.0017	223.61%	99.92%
50		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%
100		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%

Combined Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9533	0.9689	0.9662	0.9524	0.9686
25		0.0000	0.0000	0.0000	0.0000	0.0000
50		0.0000	0.0000	0.0000	0.0000	0.0000
100		0.0000	0.0000	0.0000	0.0000	0.0000

Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9805	0.9883	1.0000	1.0000	1.0000
25		0.0000	0.0000	0.0000	0.0000	0.0039
50		0.0000	0.0000	0.0000	0.0000	0.0000
100		0.0000	0.0000	0.0000	0.0000	0.0000

Analyst: JUU QA: JC 5/8/19

Bivalve Larval Survival and Development Test — **Wood Environment & Infrastructure Solutions**

Combined Proportion Normal Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	245/257	249/257	286/296	260/273	278/287
25		0/257	0/257	0/257	0/257	0/257
50		0/257	0/257	0/257	0/257	0/257
100		0/257	0/257	0/257	0/257	0/257

Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	252/257	254/257	257/257	257/257	257/257
25		0/257	0/257	0/257	0/257	1/257
50		0/257	0/257	0/257	0/257	0/257
100		0/257	0/257	0/257	0/257	0/257

Analyst: JUV QA: BL

CETIS Analytical Report

Report Date: 09 May-19 10:23 (p 1 of 1)
Test Code: 19-03-012 | 05-5762-1747

Bivalve Larval Survival and Development Test — **Wood Environment & Infrastructure Solutions**

Analysis ID:	16-2267-4015	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	09 May-19 10:21	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	C > T	< 25	25	n/a	>4	0.59%

Steel Many-One Rank Sum Test

Control	vs	Control II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		25*	15	17	0	8	Asymp	0.0123	Significant Effect
		50*	15	17	0	8	Asymp	0.0123	Significant Effect
		100*	15	17	0	8	Asymp	0.0123	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	6.77372	2.25791	3	19580	<1.0E-37	Significant Effect
Error	0.0018448	0.0001153	16			
Total	6.77557		19			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	63.62	5.292	<1.0E-37	Unequal Variances
Variances	Mod Levene Equality of Variance Test	7.025	5.953	0.0056	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.6919	0.866	3.1E-05	Non-Normal Distribution

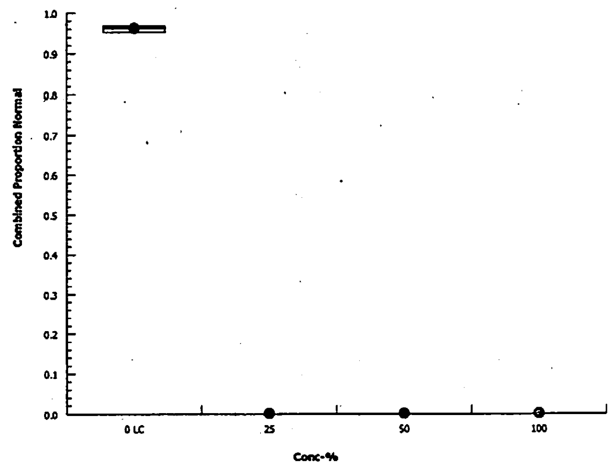
Combined Proportion Normal Summary

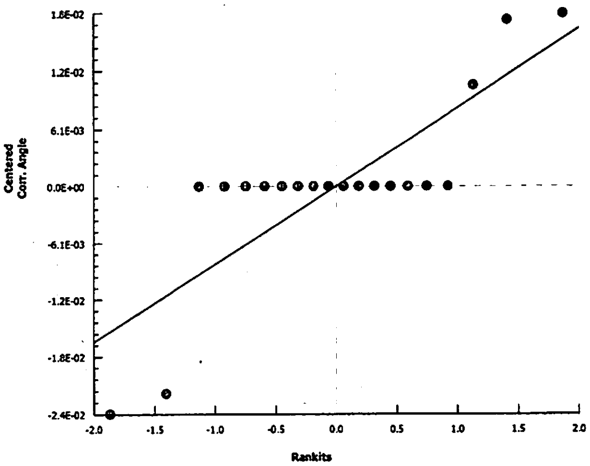
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9619	0.9515	0.9722	0.9662	0.9524	0.9689	0.0037	0.87%	0.00%
25		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%
50		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%
100		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.375	1.349	1.402	1.386	1.351	1.393	0.009604	1.56%	0.00%
25		5	0.03119	0.03119	0.0312	0.03119	0.03119	0.03119	0	0.00%	97.73%
50		5	0.03119	0.03119	0.0312	0.03119	0.03119	0.03119	0	0.00%	97.73%
100		5	0.03119	0.03119	0.0312	0.03119	0.03119	0.03119	0	0.00%	97.73%

Graphics





Analyst: JW QA:

CETIS Analytical Report

TST

Report Date: 01 May-19 15:47 (p 1 of 2)
Test Code: 19-03-012 | 05-5762-1747

Bivalve Larval Survival and Development Test — **Wood Environment & Infrastructure Solutions**

Analysis ID:	04-8235-9698	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	01 May-19 15:45	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Data Transform	Alt Hyp	TST_b	NOEL	LOEL	TOEL	TU
Angular (Corrected)	C*b < T	0.75	< 25	25	n/a	>4

TST-Welch's t Test

Control	vs	Conc-%	Test Stat	Critical	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		25	-138.9	2.132	4	CDF	1.0000	Significant Effect
		50	-138.9	2.132	4	CDF	1.0000	Significant Effect
		100	-138.9	2.132	4	CDF	1.0000	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	6.77372	2.25791	3	19580	<1.0E-37	Significant Effect
Error	0.0018448	0.0001153	16			
Total	6.77557		19			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	63.62	5.292	<1.0E-37	Unequal Variances
Variances	Mod Levene Equality of Variance Test	7.025	5.953	0.0056	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.6919	0.866	3.1E-05	Non-Normal Distribution

Combined Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9619	0.9515	0.9722	0.9662	0.9524	0.9689	0.0037	0.87%	0.00%
25		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%
50		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%
100		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.375	1.349	1.402	1.386	1.351	1.393	0.009604	1.56%	0.00%
25		5	0.03119	0.03119	0.0312	0.03119	0.03119	0.03119	0	0.00%	97.73%
50		5	0.03119	0.03119	0.0312	0.03119	0.03119	0.03119	0	0.00%	97.73%
100		5	0.03119	0.03119	0.0312	0.03119	0.03119	0.03119	0	0.00%	97.73%

Combined Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9533	0.9689	0.9662	0.9524	0.9686
25		0.0000	0.0000	0.0000	0.0000	0.0000
50		0.0000	0.0000	0.0000	0.0000	0.0000
100		0.0000	0.0000	0.0000	0.0000	0.0000

Angular (Corrected) Transformed Detail

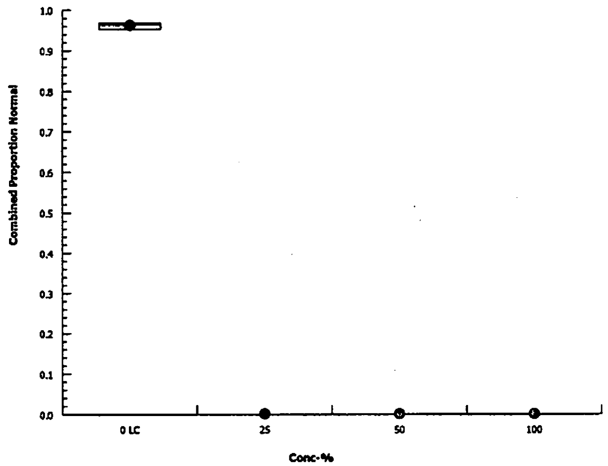
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	1.353	1.393	1.386	1.351	1.393
25		0.03119	0.03119	0.03119	0.03119	0.03119
50		0.03119	0.03119	0.03119	0.03119	0.03119
100		0.03119	0.03119	0.03119	0.03119	0.03119

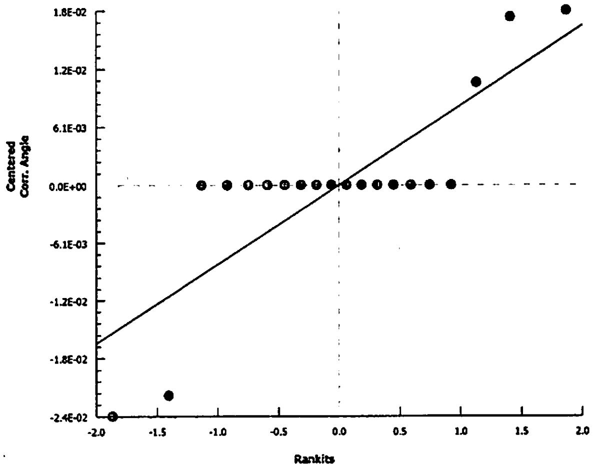
Analyst: SC QA: Jw 5/8/19

Bivalve Larval Survival and Development Test | **Wood Environment & Infrastructure Solutions**

Analysis ID:	04-8235-9698	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	01 May-19 15:45	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Graphics





Analyst: SC QA: JW 5/8/19

Embryo-Larval Development Test
Scoring Worksheet

Client: Wood Environment & Infrastructure
Project ID: SIYB Basin 1; Basin 2 T4
Test No.: 19-03-011 and 19-03-012

Test Species: *M. galloprovincialis*
Start Date: 3/28/2019 1500
End Date: 3/30/2019 1605

Random #	# Counted	# Normal	Tech Initials	Notes
36	0	0	AG	4/5/19
37	0	0		
38	0	0		
39	0	0		
40	0	0		
41	278 ↔	287 JL		
42	0	0		
43	0	0		
44	0	0		
45	254	249		
46	0	0		
47	0 ↔	2 JL		
48	0	0		
49	0 ↔	1 JL		
50	0	0		
51	0	0		
52	0	0		
53	0 ↔	2 JL		
54	286 ↔	296 JL		
55	0	0		
56	252	245		
57	0	0		
58	0	0		
59	0	0		
60	0	0		
61	260 ↔	273 JL		
62	0	0		
63	0	0		
64	0 ↔	1 JL		
65	0	0		
66	0	0		
67	0	0		
68	0	0		
69	0	0		
70	0 ↔	2 JL	✓	

QC Check: AG 4/10/19
Final Review: JL 4/29/19

Wood Environment & Infrastructure Solutions
SIYB Basin 1; Basin 2 T4
Random Numbers
3/28/19

SAMPLE ID	Rand#
Lab Control 2	56 245/252 45 249/254 54 286/296 61 260/273 41 278/287
Basin ~~1~~ 2 (25%) T4	36 0/0 58 0/0 48 0/0 63 0/0 64 0/1
Basin ~~1~~ 2 (50%) T4	65 0/0 55 0/0 38 0/0 51 0/0 42 0/0
Basin ~~1~~ 2 (100%) T4	43 0/0 37 0/0 68 0/0 60 0/0 39 0/0
Basin ~~2~~ 1 (25%) T4	70 0/2 49 0/1 47 0/2 67 0/0 66 0/0
Basin ~~2~~ 1 (50%) T4	44 0/0 53 0/2 40 0/0 46 0/0 69 0/0
Basin ~~2~~ 1 (100%) T4	50 0/0 57 0/0 52 0/0 59 0/0 62 0/0

AG 4/5/19

AG 4/5/19

AG 4/5/19

QC Check - Mussel: Ab

Final QC: Jc 4/29/19

Water Quality for Bivalve Development

Client: Wood Environment & Infrastructure Solutions
Project ID: SIYB Basin 1-T4; Basin 2-T4
Test No. 19-03-011 and 19-03-012

Test Species: *M. galloprovincialis*
Start Date/Time: 3/28/2019 1500
End Date/Time: 3/30/2019 1605

Test Conc. (%)	Water Quality Measurements			
	Parameter	**0hr**	**24hr**	**48hr**
Lab Control 4	Temp. (°C)	15.5	15.4	14.5
	Salinity (ppt)	34.0	34.0	34.2
	pH (units)	7.87	7.85	7.82
	DO (mg/L)	7.7	8.1	8.2
Basin 1 (25%) T4	Temp. (°C)	15.3	15.4	14.4
	Salinity (ppt)	33.9	34.1	34.3
	pH (units)	7.87	7.85	7.83
	DO (mg/L)	8.0	8.2	8.2
Basin 1 (50%) T4	Temp. (°C)	15.3	15.4	14.4
	Salinity (ppt)	34.1	34.1	34.3
	pH (units)	7.89	7.85	7.82
	DO (mg/L)	8.3	8.3	8.3
Basin 1 (100%) T4	Temp. (°C)	15.1	15.4	14.4
	Salinity (ppt)	33.9	34.0	34.2
	pH (units)	7.90	7.86	7.83
	DO (mg/L)	8.7	8.4	8.3
Basin 2 (25%) T4	Temp. (°C)	15.5	15.4	14.5
	Salinity (ppt)	33.9	33.9	34.2
	pH (units)	AD ~~3~~ 7.89	7.86	7.83
	DO (mg/L)	8.1	8.2	8.3
Basin 2 (50%) T4	Temp. (°C)	15.5	15.5	14.6
	Salinity (ppt)	33.9	34.0	34.3
	pH (units)	7.89	7.87	7.83
	DO (mg/L)	8.2	8.2	8.3
Basin 2 (100%) T4	Temp. (°C)	15.3	15.5	14.6
	Salinity (ppt)	33.9	34.0	34.2
	pH (units)	7.91	7.87	7.84
	DO (mg/L)	8.6	8.3	8.3
	Tech Initials:	AD	AG	AD

Source of Animals: Mission Bay

Date Received: 3/28/19

Comments:

QC Check: AG 4/10/19

Final Review: 4/29/19

Wood Environmental Toxicology Lab, 4905 Morena Blvd, Ste. 1304, San Diego, CA 92117

Embryo-Larval Development Test
Stock Preparation Worksheet

Test Species: *M. galloprovincialis*
Batch ID:
Test Type: Mussel Development

Test Date: 3/28/2019
Analyst: AG

Task	
Spawning Induction	1110
Spawning Begins	1150
# Males/# Females	3/3
Spawn Condition	good
Fertilization Initiated	1240
Fertilzation End/Eggs Rinsed	1305 & 1330
Embryo Counts	1358
Test Initiation	1500

Embryo Density Counts # per 100 µL

Stock #	Stock Volume (mL)	Rep 1	Rep 2	Rep 3	Rep 4	Mean #/100 µL	Mean #/mL (x10)
Stock ~~1~~ 2 AG	100	~~240~~ 63 AG	~~250~~ 49 AG	~~255~~ 47 AG	~~253~~ 50 AG	~~240~~ 52 AG	~~2,400~~ 520
Stock ~~2~~ 1 AG	100	46	51	44	43	46	460
Stock 3	100	61	55	59	58	58	582
stock 1 & 3	100	53	52	55	51	53	530

Cell Division:

	% Divided
Stock ~~1~~ 2 AG	96.8%
Stock ~~2~~ 1 AG	99.8%
Stock 3	99%

Selected Stock:	1 & 3

Adjust selected embryo stock to 500 embryos/mL.
Dilution Factor = Stock Density/mL/500

Stock Density Ⓐ / 500

Dil Factor Ⓐ

In 10 mL sample volume add 500 µl of 500 embryo/ml stock to obtain 25 embryos/mL in test vials.

Notes: Ⓐ Dilution not required

$T0_1$ = 266/~~288~~ 268 AG $T0_2$ = 251/252 $T0_3$ = 281/283 $T0_4$ = 288/288 $T0_5$ = 287/288 x = 274.6

$T0_6$ = 252/253 $T0_7$ = 247/249 $T0_8$ = 250/250 $T0_9$ = 230/231 $T0_{10}$ = 221/22~~2~~ x = ~~257.3~~ 240 AG

grandmean = 257.3

QA Review: AG 4/10/19

Final Review: 4/29/19

APPENDIX B

Sample Receipt Information

Sample Check-In: Effluent/Water

Wood Environmental Toxicology Lab
4905 Morena Blvd, Ste. 1304
San Diego, CA 92117

Client: Wood - SIYB
Project Name: Boat Wash Monitoring
Test ID Numbers: 19-03-005 to 19-03-014

Sample ID:	Gate1-T0	Gate2-T0	Basin1-T0	Basin2-T0	Gate1-T4	Gate2-T4	Basin1-T4	Basin2-T4
Sample Number:	19-W0015	-W0016	-W0017	-W0018	-W0019	-W0020	-W0021	-W0022
Collection Date/Time:	3/27/19 0815	0825	0815	0825	1520	1530	1520	1530 →
Receipt Date/Time:	3/27/19 1900	→						
Total Sample Volume (L):	4L	→						
Receipt Temp (°C):	7.0	7.0	7.0	7.0	6.2	6.2	6.2	6.2
Appropriate Temp (Y/N)¹:	y	→						
pH (units):	7.85	7.89	7.91	7.92	7.89	7.90	7.9~~0~~4 AD	7.91
DO (mg/L):	8.2	8.0	8.3	8.1	8.1	8.2	~~8.3~~ 9.1	9.0
Conductivity (µS/cm)²:	—	—	—	—	—	—	AD 34.0	—
Salinity (ppt):	34.0	33.5	33.7	33.9	33.8	33.8	~~33.8~~ AD	34.0
Alkalinity (mg/L):	111	112	119	116	130	114	121	120
Hardness (mg/L)²:	—	—	—	—	—	—	—	—
Total Chlorine (mg/L)³:	0.02	0.04	<0.02	<0.02	0.02	<0.02	<0.02	<0.02
Free Chlorine (mg/L)³:	—	—	—	—	—	—	—	—
Technician Initials:	AD	→						

Notes:

¹ Temperature should be 0 - 6°C if received > 24 hours past collection
² Only measured on samples with less than 3 ppt salinity
³ If total chlorine is above 0.10 mg/L, the free chlorine will be measured
⁴ Debris, odor, and color is described only if observed in the sample

Sample Descriptions⁴:
Not recorded

Test Organism: M. galloprovincialis Dilution Water: [✓ Nat-SW], Art-SW, RW, DMW, Other________ Salinity 34 ppt
Additional Control:________________ Salinity________

Initial QC: AG 4/10/19
Final Review: 4/29/19

APPENDIX C

Chain of Custody Form

wood.

Wood Aquatic Toxicology Lab
4905 Morena Blvd, Ste. 1304
San Diego, CA 92117
Phone: (858) 299-5368

Chain of Custody Form

Page 1 of 1

Client/Send Report To:

Company: Wood E & I Solutions, Inc.
Address: 9210 Sky Park Court, Suite 200
San Diego, CA 92123
Contact/PM: Corey Sheredy
Phone Number: 858-300-4316
Email Address: corey.sheredy@woodplc.com

Project Information (if needed):

Project Name: Boatwash Pilot Study
Project No.: 1715100615
PO Number:

Personal Cooler Shipped:
Return Requested: YES____ NO____.

Analysis Requested (write out or use codes below)

Sample ID	Collection Date	Collection Time	Sample Volume	Sample Type: Grab/Comp.	Sample Number (for lab use)	ms-dv							Receipt Temp (°C)
GATE1-T0	3/27/2019	0815	4L	Comp		X							7.0
GATE2-T0	3/27/2019	0825	4L	Comp		X							
BASIN1-T0	3/27/2019	0815	4L	Comp		X							
BASIN2-T0	3/27/2019	0825	4L	Comp		X							
GATE1-T4	3/27/2019	~~[illegible]~~ 1520	4L	Comp		X							6.2
GATE2-T4	3/27/2019	~~1720~~ 1530	4L	Comp		X							
BASIN1-T4	3/27/2019	~~[illegible]~~ 1520	4L	Comp		X							
BASIN2-T4	3/27/2019	1530	4L	Comp		X							

Samples Collected By:
CCS/MS/BS/CG

Additional Comments:

Samples Shipped via:
Condition Upon Receipt:

Relinquished/Shipped By:
Signature:
Print Name: Corey Sheredy
Date/Time: 3/27/19 1900

Received By:
Signature:
Print Name: Chris Stransky
Date/Time: 3/27/19 1900

Relinquished By:
Signature:
Print Name:
Date/Time:

Received By:
Signature:
Print Name:
Date/Time:

Test Codes (marine):

Mp-c: Chronic Kelp
Hr-dv: Chronic Abalone
Aa-a: Acute Topsmelt
Aa-c: Chronic Topsmelt
Mb-a: Acute Menidia/Silverside
Mb-c: Chronic Menidia/Silverside
Ab-a: Acute Mysid Shrimp
Ab-c: Chronic Mysid Shrimp
Sp-c: Chronic Urchin Fertilization
Sp-dv: Chronic Urchin Development
Mg-dv: Chronic Mussel Development
Other: Write out the test organism

Test Codes (freshwater):

Cd-a: Acute Ceriodaphnia
Cd-c: Chronic Ceriodaphnia
Pp-a: Acute Fathead Minnow
Pp-c: Chronic Fathead Minno
Sc-c: Chronic Green Algae
Ha-a: Acute Hyalella amphipod
Ha-c: Chronic Hyalella amphipod
T-22: CA Title 22 Hazardous Waste

APPENDIX D
Reference Toxicant Test

CETIS Summary Report

Report Date: 08 May-19 10:14 (p 1 of 2)
Test Code: 190328mgrd | 01-1205-3490

Bivalve Larval Survival and Development Test — **Wood Environment & Infrastructure Solutions**

Batch ID:	18-3529-2063	**Test Type:**	Development-Survival	**Analyst:**	
Start Date:	28 Mar-19 15:00	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Natural Seawater
Ending Date:	30 Mar-19 16:05	**Species:**	Mytilis galloprovincialis	**Brine:**	Not Applicable
Duration:	49h	**Source:**	Field Collected	**Age:**	

Sample ID:	18-3339-1914	**Code:**	190328mgrd	**Client:**	Internal
Sample Date:	28 Mar-19	**Material:**	Total Copper	**Project:**	
Receipt Date:	28 Mar-19	**Source:**	Reference Toxicant		
Sample Age:	15h	**Station:**			

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	NOEL	LOEL	TOEL	TU	PMSD ✓
08-5079-2147	Combined Proportion Norma	Steel Many-One Rank Sum Test	2.5	5	3.536		2.97% ✓
04-3744-6884	Proportion Normal	Steel Many-One Rank Sum Test	2.5	5	3.536		3.77% ✓
04-3609-4639	Survival Rate	Steel Many-One Rank Sum Test	20	40	28.28		1.51%

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	µg/L	95% LCL	95% UCL	TU	✓
09-9916-0601	Combined Proportion Norma	Trimmed Spearman-Kärber	EC50	6.57	6.492	6.649		

Test Acceptability

				TAC Limits			
Analysis ID	**Endpoint**	**Attribute**	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
04-3744-6884	Proportion Normal	Control Resp	0.9512	0.9	>>	Yes	Passes Criteria
04-3609-4639	Survival Rate	Control Resp	0.9977	0.5	>>	Yes	Passes Criteria
08-5079-2147	Combined Proportion Norma	PMSD	0.02968	<<	0.25	No	Passes Criteria

Combined Proportion Normal Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9489	0.9392	0.9587	0.9416	0.9613	0.0035	0.0078	0.82%	0.00%
2.5		5	0.9414	0.9291	0.9538	0.9317	0.9558	0.0044	0.0099	1.05%	0.79%
5		5	0.8464	0.7650	0.9277	0.7634	0.9139	0.0293	0.0655	7.74%	10.81%
10		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%
20		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%
40		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%

Survival Rate Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9977	0.9912	1.0000	0.9883	1.0000	0.0023	0.0052	0.52%	0.00%
2.5		5	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-0.23%
5		5	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-0.23%
10		5	0.9782	0.9230	1.0000	0.8988	1.0000	0.0199	0.0445	4.55%	1.95%
20		5	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-0.23%
40		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%

Analyst: SC QA: JW 5/8/19

Bivalve Larval Survival and Development Test — **Wood Environment & Infrastructure Solutions**

Combined Proportion Normal Detail

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9613	0.9416	0.9505	0.9429	0.9485
2.5		0.9317	0.9412	0.9558	0.9328	0.9457
5		0.9139	0.7915	0.7634	0.8926	0.8705
10		0.0000	0.0000	0.0000	0.0000	0.0000
20		0.0000	0.0000	0.0000	0.0000	0.0000
40		0.0000	0.0000	0.0000	0.0000	0.0000

Survival Rate Detail

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	1.0000	0.9883	1.0000	1.0000	1.0000
2.5		1.0000	1.0000	1.0000	1.0000	1.0000
5		1.0000	1.0000	1.0000	1.0000	1.0000
10		1.0000	0.9922	1.0000	1.0000	0.8988
20		1.0000	1.0000	1.0000	1.0000	1.0000
40		0.0000	0.0000	0.0000	0.0000	0.0000

Combined Proportion Normal Binomials

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	273/284	242/257	269/283	264/280	276/291
2.5		259/278	256/272	281/294	250/268	244/258
5		244/267	224/283	200/262	241/270	242/278
10		0/259	0/257	0/266	0/287	0/257
20		0/259	0/266	0/265	0/283	0/274
40		0/257	0/257	0/257	0/257	0/257

Survival Rate Binomials

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	257/257	254/257	257/257	257/257	257/257
2.5		257/257	257/257	257/257	257/257	257/257
5		257/257	257/257	257/257	257/257	257/257
10		257/257	255/257	257/257	257/257	231/257
20		257/257	257/257	257/257	257/257	257/257
40		0/257	0/257	0/257	0/257	0/257

Analyst: SC QA: JW 5/8/19

CETIS Analytical Report

Report Date: 01 May-19 16:06 (p 1 of 6)
Test Code: 190328mgrd | 01-1205-3490

Bivalve Larval Survival and Development Test	**Nood Environment & Infrastructure Solutions**

Analysis ID:	08-5079-2147	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	01 May-19 16:04	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	C > T	2.5	5	3.536		2.97%

Steel Many-One Rank Sum Test

Control	vs	Conc-µg/L	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		2.5	21	16	0	8	Asymp	0.2625	Non-Significant Effect
		5*	15	16	0	8	Asymp	0.0191	Significant Effect
		10*	15	16	0	8	Asymp	0.0191	Significant Effect
		20*	15	16	0	8	Asymp	0.0191	Significant Effect
		40*	15	16	0	8	Asymp	0.0191	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	11.8212	2.36425	5	1571	<1.0E-37	Significant Effect
Error	0.036128	0.0015053	24			
Total	11.8574		29			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	19.5	3.895	<1.0E-37	Unequal Variances
Variances	Mod Levene Equality of Variance Test	12.03	4.248	3.2E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.7687	0.9031	1.9E-05	Non-Normal Distribution

Combined Proportion Normal Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9489	0.9392	0.9587	0.9485	0.9416	0.9613	0.0035	0.82%	0.00%
2.5		5	0.9414	0.9291	0.9538	0.9412	0.9317	0.9558	0.0044	1.05%	0.79%
5		5	0.8464	0.7650	0.9277	0.8705	0.7634	0.9139	0.0293	7.74%	10.81%
10		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%
20		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%
40		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%

Angular (Corrected) Transformed Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.343	1.321	1.366	1.342	1.327	1.373	0.008192	1.36%	0.00%
2.5		5	1.327	1.3	1.354	1.326	1.306	1.359	0.00965	1.63%	1.22%
5		5	1.174	1.062	1.287	1.203	1.063	1.273	0.04057	7.72%	12.58%
10		5	0.03073	0.02985	0.03161	0.03107	0.02952	0.03119	0.0003179	2.31%	97.71%
20		5	0.03048	0.02983	0.03112	0.03066	0.02973	0.03107	0.0002327	1.71%	97.73%
40		5	0.03119	0.03119	0.0312	0.03119	0.03119	0.03119	0	0.00%	97.68%

Analyst: SC QA: JW 5/8/19

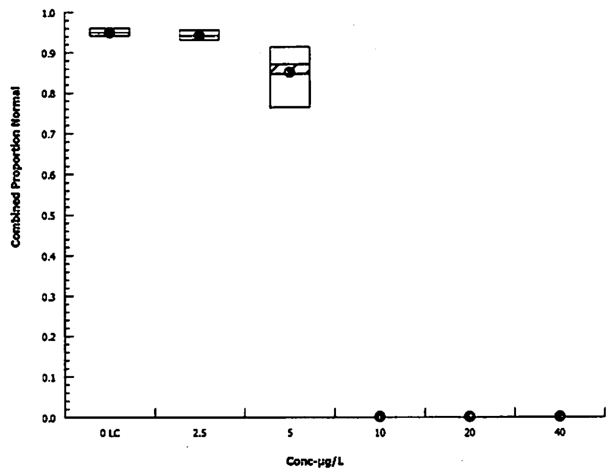
CETIS Analytical Report

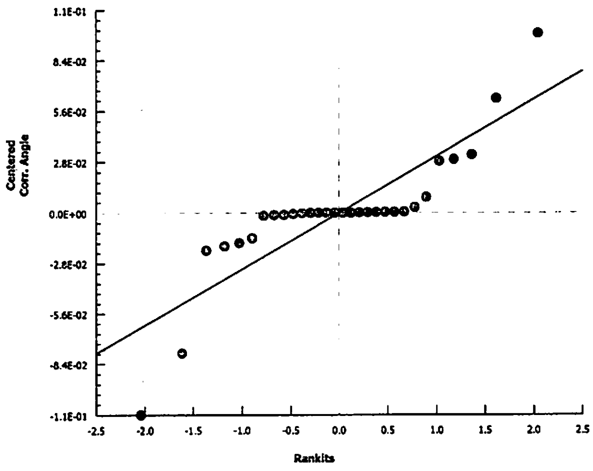
Report Date:	01 May-19 16:06 (p 2 of 6)
Test Code:	190328mgrd | 01-1205-3490

Bivalve Larval Survival and Development Test — **Wood Environment & Infrastructure Solutions**

Analysis ID:	08-5079-2147	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	01 May-19 16:04	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Graphics





Analyst: SC QA: JW 5/8/19

CETIS Analytical Report

Report Date: 01 May-19 16:06 (p 1 of 1)
Test Code: 190328mgrd | 01-1205-3490

Bivalve Larval Survival and Development Test — **Wood Environment & Infrastructure Solutions**

Analysis ID:	09-9916-0601	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	01 May-19 16:04	**Analysis:**	Trimmed Spearman-Kärber	**Official Results:**	Yes

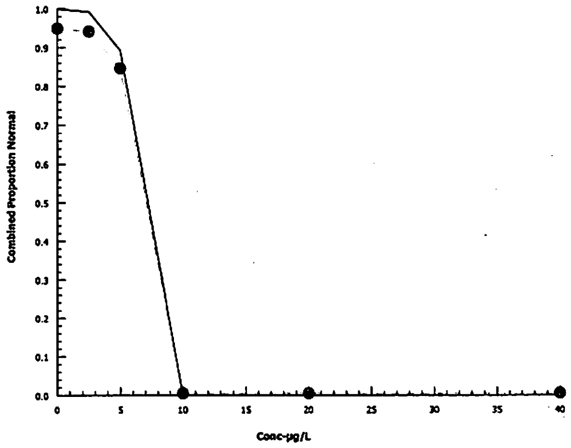
Trimmed Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0.0509	0.79%	0.8176	0.002603	6.57	6.492	6.649

Combined Proportion Normal Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-µg/L	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	LC	5	0.9489	0.9416	0.9613	0.0078	0.83%	0.0%	1324/1395	0.9489	0.0%
2.5		5	0.9414	0.9317	0.9558	0.0099	1.05%	0.79%	1290/1370	0.9414	0.79%
5		5	0.8464	0.7634	0.9139	0.0655	7.74%	10.81%	1151/1360	0.8464	10.81%
10		5	0.0000	0.0000	0.0000	0.0000		100.0%	0/1326	0	100.0%
20		5	0.0000	0.0000	0.0000	0.0000		100.0%	0/1347	0	100.0%
40		5	0.0000	0.0000	0.0000	0.0000		100.0%	0/1285	0	100.0%

Graphics



Analyst:______ QA: JW 5/8/19

CETIS Analytical Report

Report Date:	08 May-19 09:57 (p 1 of 1)
Test Code:	190328mgrd | 01-1205-3490

Bivalve Larval Survival and Development Test — **Wood Environment & Infrastructure Solutions**

Analysis ID:	04-3744-6884	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	08 May-19 9:57	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	C > T	2.5	5	3.536		3.77%

Steel Many-One Rank Sum Test

Control	vs	Conc-µg/L	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		2.5	20	18	0	8	Asymp	0.1020	Non-Significant Effect
		5*	15	18	0	8	Asymp	0.0086	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0901014	0.0450507	2	15.1	5.3E-04	Significant Effect
Error	0.0357921	0.0029827	12			
Total	0.125894		14			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	11.92	9.21	0.0026	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9458	0.8328	0.4607	Normal Distribution

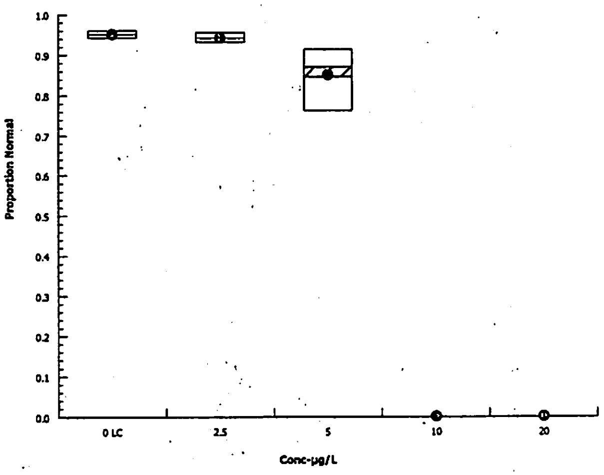
Proportion Normal Summary

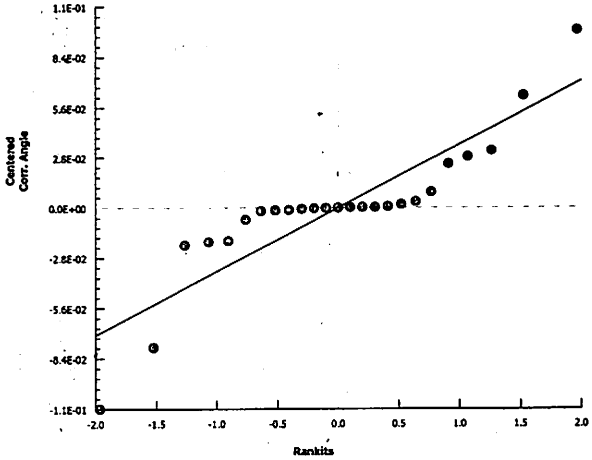
Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9512	0.9428	0.9595	0.9505	0.9429	0.9613	0.0030	0.71%	0.00%
2.5		5	0.9414	0.9291	0.9538	0.9412	0.9317	0.9558	0.0044	1.05%	1.02%
5		5	0.8464	0.7650	0.9277	0.8705	0.7634	0.9139	0.0293	7.74%	11.02%
10		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%
20		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%

Angular (Corrected) Transformed Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.348	1.329	1.368	1.347	1.329	1.373	0.007104	1.18%	0.00%
2.5		5	1.327	1.3	1.354	1.326	1.306	1.359	0.00965	1.63%	1.58%
5		5	1.174	1.062	1.287	1.203	1.063	1.273	0.04057	7.72%	12.91%
10		5	0.03109	0.02957	0.03261	0.03107	0.02952	0.0329	0.0005474	3.94%	97.69%
20		5	0.03048	0.02983	0.03112	0.03066	0.02973	0.03107	0.0002327	1.71%	97.74%

Graphics





Analyst: SC QA: Jw 5/18/19

CETIS Analytical Report

Report Date:	08 May-19 10:03 (p 1 of 2)
Test Code:	190328mgrd | 01-1205-3490

Bivalve Larval Survival and Development Test — **Wood Environment & Infrastructure Solutions**

Analysis ID:	04-3609-4639	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.3
Analyzed:	01 May-19 16:03	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	C > T	20	40	28.28		1.51%

Steel Many-One Rank Sum Test

Control	vs	Conc-µg/L	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		2.5	30	17	1	8	Asymp	0.9275	Non-Significant Effect
		5	30	17	1	8	Asymp	0.9275	Non-Significant Effect
		10	25	17	1	8	Asymp	0.5912	Non-Significant Effect
		20	30	17	1	8	Asymp	0.9275	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0183537	0.0045884	4	1.328	0.2940	Non-Significant Effect
Error	0.0691208	0.0034560	20			
Total	0.0874745		24			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	5.623	4.431	0.0034	Unequal Variances
Variances	Mod Levene Equality of Variance Test	1.372	4.893	0.2903	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.5772	0.8877	2.4E-07	Non-Normal Distribution

Survival Rate Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9977	0.9912	1.0000	1.0000	0.9883	1.0000	0.0023	0.52%	0.00%
2.5		5	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-0.23%
5		5	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-0.23%
10		5	0.9782	0.9230	1.0000	1.0000	0.8988	1.0000	0.0199	4.55%	1.95%
20		5	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-0.23%
40		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%

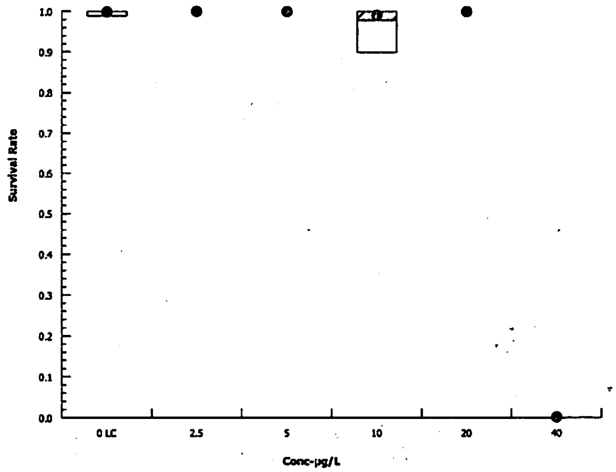
Angular (Corrected) Transformed Summary

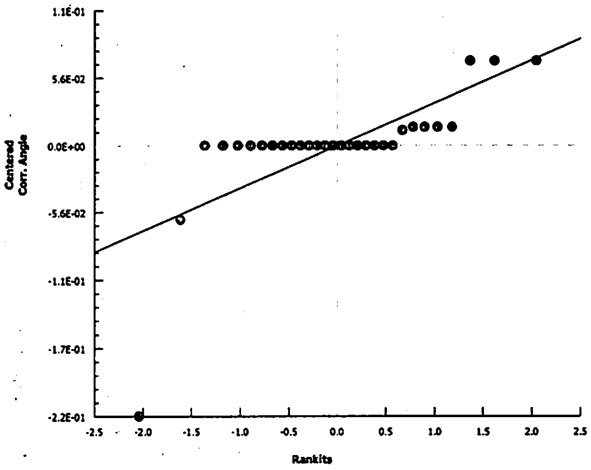
Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.524	1.481	1.567	1.54	1.463	1.54	0.01541	2.26%	0.00%
2.5		5	1.54	1.539	1.54	1.54	1.54	1.54	0	0.00%	-1.01%
5		5	1.54	1.539	1.54	1.54	1.54	1.54	0	0.00%	-1.01%
10		5	1.47	1.312	1.627	1.54	1.247	1.54	0.05673	8.63%	3.58%
20		5	1.54	1.539	1.54	1.54	1.54	1.54	0	0.00%	-1.01%
40		5	0.03119	0.03119	0.0312	0.03119	0.03119	0.03119	0	0.00%	97.95%

Analyst: SC QA: JW 5/18/19

Bivalve Larval Survival and Development Test				**Wood Environment & Infrastructure Solutions**	
Analysis ID:	04-3609-4639	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.3
Analyzed:	01 May-19 16:03	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Graphics





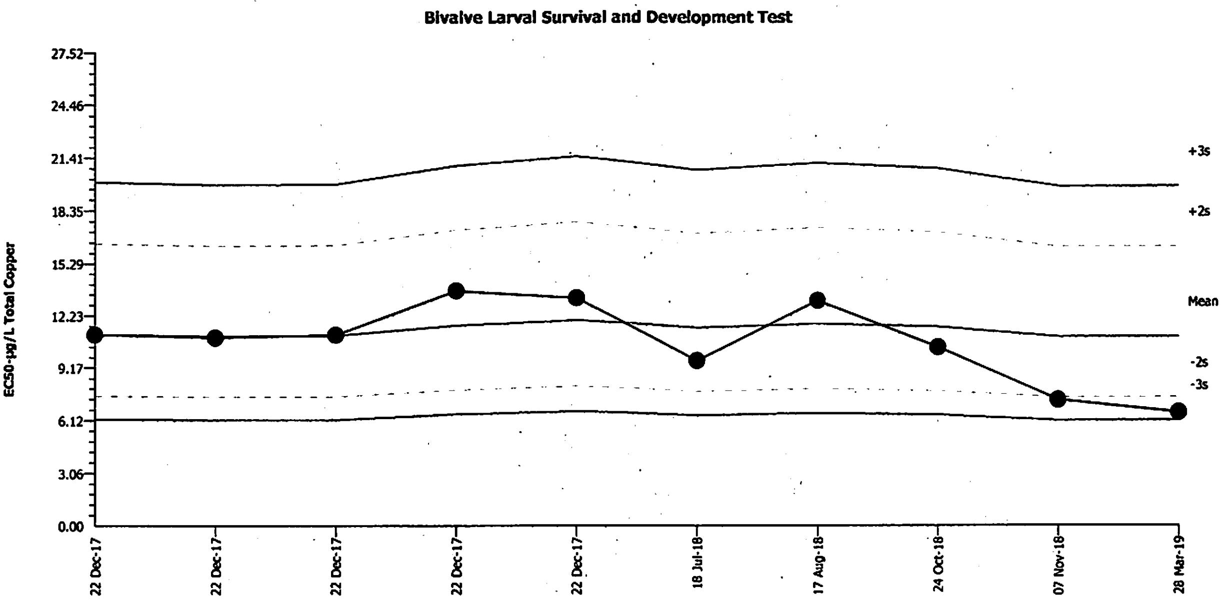
Analyst: SC QA: 2W 5/18/19

CETIS QC Plot

Report Date: 01 May-19 16:10 (1 of 1)

Bivalve Larval Survival and Development Test **Wood Environment & Infrastructure Solutions**

Test Type:	Development-Survival	**Organism:**	Mytilis galloprovincialis (Bay Mussel)	**Material:**	Total Copper
Protocol:	EPA/600/R-95/136 (1995)	**Endpoint:**	Combined Proportion Normal	**Source:**	Reference Toxicant-REF



Mean:	10.99	**Count:**	9	**-2s Warning Limit:**	7.435	**-3s Action Limit:**	6.116
Sigma:	n/a	**CV:**	19.70%	**+2s Warning Limit:**	16.24	**+3s Action Limit:**	19.74

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2017	Dec	22	15:00	11.13	0.1385	0.06412			19-1537-3013	20-7428-0259
2			22	15:00	10.95	-0.04383	-0.02046			13-8076-0092	04-7666-8867
3			22	15:00	11.1	0.1146	0.05311			18-9173-1279	00-8804-3805
4			22	15:10	13.69	2.697	1.124			05-2148-4604	14-2190-9809
5			22	15:10	13.26	2.271	0.9618			07-4924-1298	02-9536-6591
6	2018	Jul	18	12:30	9.593	-1.397	-0.696			17-4700-2672	19-1834-7581
7		Aug	17	18:15	13.11	2.117	0.902			06-6531-4070	03-3159-5721
8		Oct	24	14:25	10.37	-0.617	-0.2958			10-5049-1350	21-2167-7967
9		Nov	7	14:40	7.288	-3.702	-2.103	(-)		21-2560-8966	08-1725-7308
10	2019	Mar	28	15:00	6.57	-4.42	-2.634	(-)		01-1205-3490	09-9916-0601

Analyst: SC QA: JW 5/18/19

CETIS Test Data Worksheet

Report Date: 26 Mar-19 12:33 (p 1 of 1)
Test Code/ID: 01-1205-3490/190328mgrd

Bivalve Larval Survival and Development Test — od Environment & Infrastructure Solutions

Start Date:	28 Mar-19	**Species:**	Mytilis galloprovincialis	**Sample Code:**	190328mgrd
End Date:	30 Mar-19	**Protocol:**	EPA/600/R-95/136 (1995)	**Sample Source:**	Reference Toxicant
Sample Date:	28 Mar-19	**Material:**	Total Copper	**Sample Station:**	

Conc-µg/L	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
			141			278	242	
			142			270	241	
			143			255	0	
			144			0	0	
			145			0	0	
			146			283	0	
			147			265	0	
			148	294	~~304~~ AD	~~381~~	~~378~~	AD AD 281 = 294/281 (written clearer, lc)
			149			AD 284	273	
			150			272	256	
			151			254	242	
			152			287	0	
			153			280	264	
			154			274	0	
			155			278	259	
			156			268	250	
			157			266	0	
			158		258	~~361~~	~~348~~	AD 244
			159			266	0	
			160			267	244	
			161			291	276	
			162			259	0	
			163			0	0	
			164			0	0	
			165			259	0	
			166			231	0	
			167			0	0	
			168		283	~~379~~	~~304~~	AD 269
			169			283	224	
			170		262	~~331~~	~~268~~	AD 200

Analyst: AD QA: 4/29/19

CETIS Test Data Worksheet

Report Date: 26 Mar-19 12:33 (p 1 of 1)
Test Code/ID: 01-1205-3490/190328mgrd

Bivalve Larval Survival and Development Test od Environment & Infrastructure Solutions

Start Date:	28 Mar-19	**Species:**	Mytilis galloprovincialis	**Sample Code:**	190328mgrd
End Date:	30 Mar-19	**Protocol:**	EPA/600/R-95/136 (1995)	**Sample Source:**	Reference Toxicant
Sample Date:	28 Mar-19	**Material:**	Total Copper	**Sample Station:**	

Conc-µg/L	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
0	LC	1	149					
0	LC	2	151					
0	LC	3	168					
0	LC	4	153					
0	LC	5	161					
2.5		1	155					
2.5		2	150					
2.5		3	148					
2.5		4	156					
2.5		5	158					
5		1	160					
5		2	169					
5		3	170					
5		4	142					
5		5	141					
10		1	162					
10		2	143					
10		3	159					
10		4	152					
10		5	166					
20		1	165					
20		2	157					
20		3	147					
20		4	146					
20		5	154					
40		1	163					
40		2	167					
40		3	145					
40		4	164					
40		5	144					

QC: AO

Analyst: AG

QA: 4/29/19

Water Quality for Bivalve Development

Client: Internal
Project ID: Cu RefTox
Test No. 190328mgrd
Test Species: *M. galloprovincialis*
Start Date/Time: 3/28/2019 1506
End Date/Time: 3/30/2019 1605

copper Test Conc. (µg/L)	Water Quality Measurements			
	Parameter	**0hr**	**24hr**	**48hr**
Lab Control	Temp. (°C)	15.4	15.2	15.0
	Salinity (ppt)	33.9	34.1	34.0
	pH (units)	7.83	7.87	7.76
	DO (mg/L)	7.7	8.2	8.2
2.5	Temp. (°C)	15.5	14.9	14.8
	Salinity (ppt)	33.9	34.1	34.1
	pH (units)	7.83	7.86	7.78
	DO (mg/L)	7.9	8.2	8.3
5	Temp. (°C)	15.5	14.8	14.8
	Salinity (ppt)	33.9	34.1	34.2
	pH (units)	7.83	7.85	7.78
	DO (mg/L)	8.0	8.3	8.3
10	Temp. (°C)	15.4	14.8	14.8
	Salinity (ppt)	33.9	34.2	34.3
	pH (units)	7.84	7.86	7.48
	DO (mg/L)	8.0	8.3	8.2
20	Temp. (°C)	15.4	15.0	15.0
	Salinity (ppt)	33.8	34.2	34.3
	pH (units)	7.84	7.86	7.79
	DO (mg/L)	8.0	8.3	8.3
40	Temp. (°C)	15.5	15.0	15.0
	Salinity (ppt)	33.9	34.1	34.2
	pH (units)	7.84	7.86	7.86
	DO (mg/L)	8.0	8.2	8.3
	Temp. (°C)			
	Salinity (ppt)			
	pH (units)			
	DO (mg/L)			
	Tech Initials:	AD	AG	AD

Source of Animals: Mission Bay
Date Received: 3/28/19
Comments:

QC Check: AG 4/10/19
Final Review: SC 4/29/19

Embryo-Larval Development Test
Stock Preparation Worksheet

Test Species: *M. galloprovincialis*
Batch ID:
Test Type: Mussel Development

Test Date: 3/28/2019
Analyst: AG

Task	
Spawning Induction	1110
Spawning Begins	1150
# Males/# Females	3/3
Spawn Condition	good
Fertilization Initiated	1240
Fertilzation End/Eggs Rinsed	1305 & 1330
Embryo Counts	1358
Test Initiation	1500

Embryo Density Counts **# per 100 µL**

Stock #	**Stock Volume (mL)**	**Rep 1**	**Rep 2**	**Rep 3**	**Rep 4**	**Mean #/100 µL**	**Mean #/mL (x10)**
Stock ~~1~~ 2 AG	100	AG ~~240~~ 63	AG ~~250~~ 49	AG ~~255~~ 47	AG ~~233~~ 50	AG ~~240~~ 52	~~2,400~~ 520
Stock ~~2~~ 1 AG	100	46	51	44	43	46	460
Stock 3	100	61	55	59	58	58	582
stock 1 & 3	100	53	52	55	51	53	530

Cell Division:

	% Divided
Stock ~~1~~ 2 AG	96.8%
Stock ~~2~~ 1 AG	99.8%
Stock 3	99%

Selected Stock:	1 & 3

Adjust selected embryo stock to 500 embryos/mL.
Dilution Factor = Stock Density/mL/500

Stock Density Ⓐ / 500

Dil Factor Ⓐ

In 10 mL sample volume add 500 µl of 500 embryo/ml stock to obtain 25 embryos/mL in test vials.

Notes: Ⓐ Dilution not required

$T0_1$ = 266/~~288~~ 268 AG $T0_2$ = 251/252 $T0_3$ = 281/283 $T0_4$ = 288/288 $T0_5$ = 287/288 x = 274.6
$T0_6$ = 232/253 $T0_7$ = 247/249 $T0_8$ = 250/250 $T0_9$ = 230/231 $T0_{10}$ = 221/222 x = ~~257.3~~ 240 AG
grandmean = 257.3

QA Review: AG 4/10/19

Final Review: 4/29/19

Results of Chronic Toxicity Tests for Shelter Island Yacht Basin Boatwash Pilot Study – April Testing

Sample Collections: April 10, 2019
Project Number: 1715100615

Submitted to:

Wood Environment & Infrastructure Solutions, Inc.
9210 Sky Park Court, Ste. 200
San Diego, CA 92123

Testing Performed by:

wood.

Wood Environment & Infrastructure Solutions, Inc.
Aquatic Toxicology Laboratory
4905 Morena Blvd., Suite 1304
San Diego, California 92117

The Wood aquatic toxicity laboratory is certified by the State of California Department of Health Services – Environmental Lab Accreditation Program (ELAP) under Certificate Number 3010. All test results were obtained following EPA Protocol guidelines and internal QA Program requirements. The data and test results have been reviewed and verified by the following laboratory representative:

Verified by: Steve Carlson **Date:** 5/10/19.

MATERIALS & METHODS

Sample Information

Client:	Wood Environment & Infrastructure Solutions
Project:	Shelter Island Yacht Basin – Boatwash Monitoring
Monitoring Period:	April 2019
Sample IDs:	Gate-1, Gate-2, Basin-1, and Basin-2
Sample Collection Date, Time:	4/10/19, 15:50 – 16:20
Sample Receipt Date, Time:	4/11/19, 09:15
Sample Collection Method:	Grab samples
Water Quality Parameters:	See Table 1 (measured upon sample receipt)

Chronic Mussel Development Test Specifications

Test Period:	4/11/19, 15:05 – 4/13/19, 16:10
Test Organism:	*Mytilus galloprovincialis* (bivalve - mussel)
Test Organism Source:	Field-collected – Mission Bay (San Diego, CA)
Test Organism Age at start:	Fertilized embryos (<4 hours old)
Test Procedure:	48-hour embryo-larval development
Test Endpoint (statistical analysis):	48-hour Combined Proportion Normal (ASTM)
Test Concentrations:	25, 50, and 100% sample; plus Lab Control
Control/Dilution Water:	Natural seawater (diluted to 32ppt) from the inlet at Scripps Institution of Oceanography (20-µm filtered)
Test Recordings:	Development in the 100% concentration was recorded first. If >10% effect was observed, the development in the 25% and 50% was also recorded.
Protocols Used:	EPA 1995 West Coast Manual (EPA/600/R-95/136); and ASTM 1998 (E 724-98).
EPA Test Acceptability Criteria:	Control must have ≥50% survival; ≥90% proportion normal; and the minimum significant difference (MSD) must be <25%.
Statistical Analysis Software:	CETIS™ v.1.9.3.0

Table 1. Water Quality Measured Upon Sample Receipt

Sample ID	Temp. (℃)	pH (units)	Dissolved Oxygen (mg/L)	Salinity (ppt)	Alkalinity (mg/L)	Total Chlorine (mg/L)
Gate-1	5.0	7.78	8.5	33.9	118	<0.02
Gate-2	5.0	7.83	8.7	34.1	131	<0.02
Basin-1	5.0	7.86	8.4	34.2	117	<0.02
Basin-2	4.5	7.80	8.5	34.3	119	<0.02

RESULTS

After test completion, the results of the 100% concentration were recorded first on a microscope. If there was greater than a 10% effect observed, then the 25% and 50% concentrations were also recorded. This was not necessary, as all four samples resulted in less than a 10% effect. All four of the 100% undiluted samples resulted in no statistically significant effects using the standard statistical analysis method. A summary of the test results is provided in Table 2. The full statistical analyses and raw bench sheets are provided in Appendix A. Sample receipt information and the chain of custody form are included in Appendix B and C, respectively.

To confirm whether there were biologically significant effects with the samples, test results were also evaluated using the EPA Test of Significant Toxicity (TST) approach. This approach to analysis applies a modified t-Test that accounts for the statistical power of the test and the magnitude of the biological effect in determining the presence of toxicity. The instream waste concentration (IWC) for this analysis is the 100 percent sample. The IWC was compared to the Lab Control for statistical analysis. All four samples resulted in a "Pass" for the TST analysis. Therefore, no biologically significant effects were observed, and the samples are considered non-toxic.

Table 2. Summary of Test Results – Combined Proportion Normal (%)

Sample Concentration (%)	Gate-1	Gate-2	Basin-1	Basin-2
Lab Control	93.8	93.8	91.7	91.7
100	94.4	91.5	91.1	93.4
NOEC =	100	100	100	100
EC_{50} =	> 100	> 100	> 100	> 100
Percent Effect = (in 100% sample)	-0.7	2.4	0.6	-2.0
TST (Pass/Fail) =	Pass	Pass	Pass	Pass

NOEC = the highest Concentration tested that results in No Observed Effect (using standard analysis).

EC_{50} = the effect concentration expected to cause an adverse effect to 50% of the test organisms.

Percent Effect = the percent difference from the control. A negative value indicates a positive effect.

TST = Test of Significant Toxicity (a new approach to statistical analysis). A "Pass" indicates the percent effect is not biologically significant and the sample results are considered non-toxic.

QUALITY ASSURANCE

Samples were collected, placed on ice, and delivered to the testing lab the following morning. Samples were received in good condition, water quality measurements were recorded, and the samples were immediately prepared for testing. The testing was initiated within the appropriate 36-hour sample holding time. Two controls were tested, and both met the EPA's minimum test acceptability criteria (TAC) for Percent Survival, Proportion Normal, and the Percent Minimum Significant Difference (PMSD). Therefore, the test results were deemed valid for reporting. In addition, the samples were analyzed for the Combined Proportion Normal endpoint. According to the ASTM guidance document, the bivalve test meets acceptability criteria if the control has > 70% for the Combined Proportion Normal endpoint. Both test controls also exceeded the ASTM acceptability criteria for the combined endpoint.

The concurrent reference toxicant test also met all TAC. Therefore, the reference toxicant test was deemed valid. The median effect concentration (EC_{50}) was within two standard deviations of the historical control chart mean for the laboratory. This indicates the batch of mussels used for testing was healthy and produced or exhibited typical sensitivity to copper. The reference toxicant test results are summarized in Table 3 and presented in full in Appendix D.

Table 3. Summary of Copper Reference Toxicant Test Results

Test Concentration (µg/L copper)	Combined Proportion Normal (%)	Statistical Results (in µg/L copper)
Lab Control	91.5	NOEC = 5.0 EC_{50} = 7.2 Historical EC_{50} ±2SD = 6.4 – 17.1 range
2.5	93.9	
5.0	90.5	
10	4.7 *	
20	0.0 *	
40	0.0 *	

* An asterisk indicates a statistically significant effect compared to the control (using standard analysis).

NOEC = the highest concentration tested that results in No Observed Effect.

EC_{50} = the median effect concentration expected to cause an adverse effect to 50% of the test organisms.

Historical EC_{50} = the mean EC_{50} for previous testing by the lab, plus or minus two standard deviations.

REFERENCES

ASTM. 1998. Standard Guide for Conducting Static Acute Toxicity Tests Starting with Embryos of Four Species of Saltwater Bivalve Molluscs. ASTM E 724-98.

Tidepool Scientific Software, 2001-2015. CETIS: Comprehensive Environmental Toxicity Information System software, version 1.9.3.0.

USEPA (U.S. Environmental Protection Agency). 1995. Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine and Estuarine Organisms (EPA/600/R-95/136). The USEPA, Office of Research and Development, Washington, DC.

USEPA (U.S. Environmental Protection Agency). 2010. Test of Significant Toxicity Implementation Document (EPA/833/R-10/003). The USEPA, Office of Wastewater Management, Washington, DC.

APPENDIX A

Statistical Analysis & Raw Data

Gate-1

CETIS Summary Report

Report Date:	09 May-19 14:48 (p 1 of 2)
Test Code:	19-04-001 | 19-6184-9830

Bivalve Larval Survival and Development Test — **Wood Environment & Infrastructure Solutions**

Batch ID:	01-1132-9307	**Test Type:**	Development-Survival	**Analyst:**	
Start Date:	11 Apr-19 15:05	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Natural Seawater
Ending Date:	13 Apr-19 16:10	**Species:**	Mytilis galloprovincialis	**Brine:**	Not Applicable
Duration:	49h	**Source:**	Field Collected	**Age:**	

Sample ID:	08-8815-6664	**Code:**	19-W0024	**Client:**	Wood Environment and Infastructure
Sample Date:	10 Apr-19 15:50	**Material:**	Seawater	**Project:**	Boat Wash Study
Receipt Date:	11 Apr-19 09:15	**Source:**	Shelter Island Yacht Basin		
Sample Age:	23h	**Station:**	Gate1		

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
02-6928-9678	Combined Proportion Norma	Equal Variance t Two-Sample Test	0.6095	100% passed combined proportion normal
04-5489-8767	Combined Proportion Norma	TST-Welch's t Test	5.0E-06	100% passed combined proportion normal
07-2198-5556	Proportion Normal	Equal Variance t Two-Sample Test	0.7557	100% passed proportion normal
17-8833-4753	Survival Rate	Equal Variance t Two-Sample Test	0.4409	100% passed survival rate

Test Acceptability

				TAC Limits			
Analysis ID	**Endpoint**	**Attribute**	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
07-2198-5556	Proportion Normal	Control Resp	0.9614	0.9	>>	Yes	Passes Criteria
17-8833-4753	Survival Rate	Control Resp	0.9753	0.5	>>	Yes	Passes Criteria

Combined Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9376	0.8948	0.9804	0.8807	0.9714	0.0154	0.0345	3.68%	0.00%
100		5	0.9442	0.9196	0.9687	0.9218	0.9714	0.0088	0.0198	2.10%	-0.70%

Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9614	0.9489	0.9739	0.9504	0.9714	0.0045	0.0101	1.05%	0.00%
100		5	0.9657	0.9561	0.9752	0.9551	0.9741	0.0034	0.0077	0.79%	-0.44%

Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9753	0.9281	1.0000	0.9136	1.0000	0.0170	0.0381	3.90%	0.00%
100		5	0.9778	0.9508	1.0000	0.9547	1.0000	0.0097	0.0217	2.22%	-0.25%

Combined Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9504	0.8807	0.9714	0.9342	0.9513
25						
50						
100		0.9218	0.9551	0.9424	0.9300	0.9714

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9504	0.9640	0.9714	0.9701	0.9513
25						
50						
100		0.9614	0.9551	0.9662	0.9741	0.9714

Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	1.0000	0.9136	1.0000	0.9630	1.0000
25						
50						
100		0.9588	1.0000	0.9753	0.9547	1.0000

Analyst: SC QA: JW 5/10/19

Bivalve Larval Survival and Development Test **Wood Environment & Infrastructure Solutions**

Combined Proportion Normal Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	249/262	214/243	238/245	227/243	254/267
25						
50						
100		224/243	234/245	229/243	226/243	238/245

Proportion Normal Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	249/262	214/222	238/245	227/234	254/267
25						
50						
100		224/233	234/245	229/237	226/232	238/245

Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	243/243	222/243	243/243	234/243	243/243
25						
50						
100		233/243	243/243	237/243	232/243	243/243

Analyst: SC QA: JW 5/10/19

CETIS Analytical Report

Report Date: 09 May-19 14:48 (p 1 of 4)
Test Code: 19-04-001 | 19-6184-9830

Bivalve Larval Survival and Development Test — **Wood Environment & Infrastructure Solutions**

Analysis ID:	02-6928-9678	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	09 May-19 14:46	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	100% passed combined proportion normal	3.49%

Equal Variance t Two-Sample Test

Control	vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		100	-0.2874	1.86	0.068	8	CDF	0.6095	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0002742	0.0002742	1	0.08261	0.7811	Non-Significant Effect
Error	0.0265533	0.0033192	8			
Total	0.0268275		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.249	23.15	0.4517	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9605	0.7411	0.7919	Normal Distribution

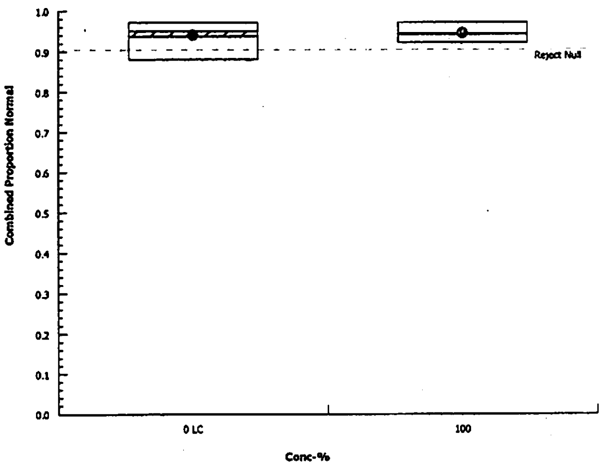
Combined Proportion Normal Summary

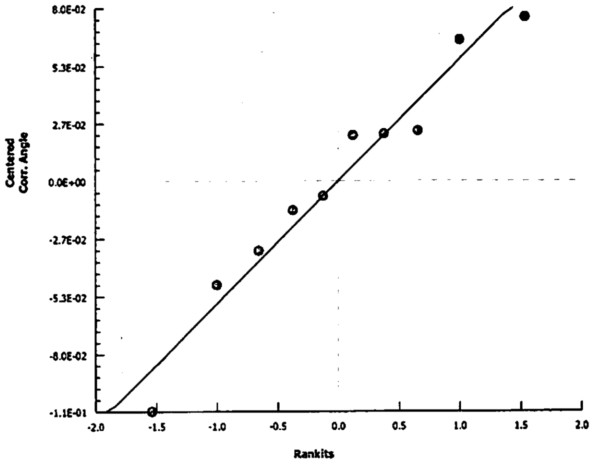
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9376	0.8948	0.9804	0.9504	0.8807	0.9714	0.0154	3.68%	0.00%
100		5	0.9442	0.9196	0.9687	0.9424	0.9218	0.9714	0.0088	2.10%	-0.70%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.325	1.241	1.409	1.346	1.218	1.401	0.03032	5.12%	0.00%
100		5	1.335	1.279	1.392	1.328	1.287	1.401	0.02021	3.38%	-0.79%

Graphics





Analyst: SC QA: JW 5/10/19

CETIS Analytical Report

TST

Report Date:	09 May-19 14:48 (p 2 of 4)
Test Code:	19-04-001 | 19-6184-9830

Bivalve Larval Survival and Development Test **Wood Environment & Infrastructure Solutions**

Analysis ID:	04-5489-8767	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	09 May-19 14:47	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Data Transform	Alt Hyp	TST_b	Comparison Result
Angular (Corrected)	C*b < T	0.75	100% passed combined proportion normal

TST-Welch's t Test

Control	vs	Control II	Test Stat	Critical	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		100*	11.23	1.895	7	CDF	5.0E-06	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0002742	0.0002742	1	0.08261	0.7811	Non-Significant Effect
Error	0.0265533	0.0033192	8			
Total	0.0268275		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.249	23.15	0.4517	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9605	0.7411	0.7919	Normal Distribution

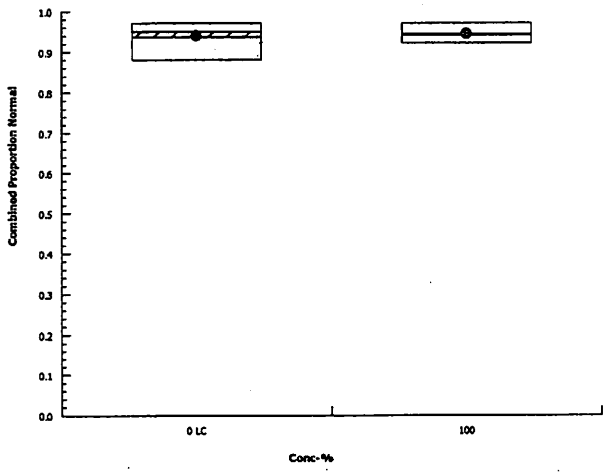
Combined Proportion Normal Summary

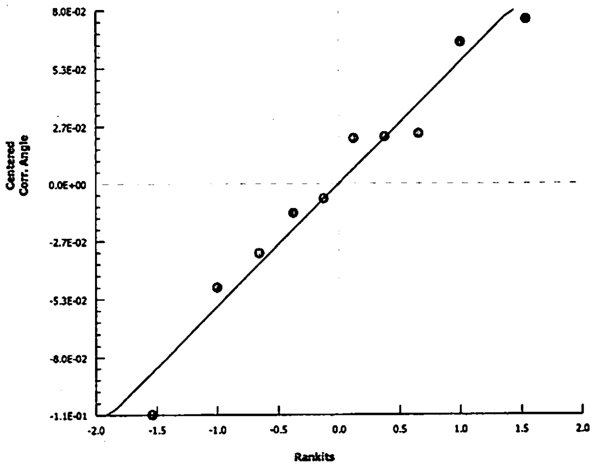
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9376	0.8948	0.9804	0.9504	0.8807	0.9714	0.0154	3.68%	0.00%
100		5	0.9442	0.9196	0.9687	0.9424	0.9218	0.9714	0.0088	2.10%	-0.70%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.325	1.241	1.409	1.346	1.218	1.401	0.03032	5.12%	0.00%
100		5	1.335	1.279	1.392	1.328	1.287	1.401	0.02021	3.38%	-0.79%

Graphics





Analyst: SC QA: JW 5/10/19

Gate-2

CETIS Summary Report

Report Date: 09 May-19 14:57 (p 1 of 2)
Test Code: 19-04-002 | 20-2115-0084

Bivalve Larval Survival and Development Test — **Wood Environment & Infrastructure Solutions**

Batch ID:	11-4172-0991	**Test Type:**	Development-Survival	**Analyst:**	
Start Date:	11 Apr-19 15:05	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Natural Seawater
Ending Date:	13 Apr-19 16:10	**Species:**	Mytilis galloprovincialis	**Brine:**	Not Applicable
Duration:	49h	**Source:**	Field Collected	**Age:**	

Sample ID:	02-4910-5886	**Code:**	19-W0025	**Client:**	Wood Environment and Infastructure
Sample Date:	10 Apr-19 16:00	**Material:**	Seawater	**Project:**	Boat Wash Study
Receipt Date:	11 Apr-19 09:15	**Source:**	Shelter Island Yacht Basin		
Sample Age:	23h	**Station:**	Gate 2		

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
15-6002-7539	Combined Proportion Norma	Equal Variance t Two-Sample Test	0.2228	100% passed combined proportion normal
07-8247-3996	Combined Proportion Norma	TST-Welch's t Test	3.4E-04	100% passed combined proportion normal
10-3974-8473	Proportion Normal	Equal Variance t Two-Sample Test	0.9536	100% passed proportion normal
12-9077-4366	Survival Rate	Equal Variance t Two-Sample Test	0.1097	100% passed survival rate

Test Acceptability

				TAC Limits			
Analysis ID	**Endpoint**	**Attribute**	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
10-3974-8473	Proportion Normal	Control Resp	0.9614	0.9	>>	Yes	Passes Criteria
12-9077-4366	Survival Rate	Control Resp	0.9753	0.5	>>	Yes	Passes Criteria

Combined Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9376	0.8948	0.9804	0.8807	0.9714	0.0154	0.0345	3.68%	0.00%
100		5	0.9153	0.8559	0.9747	0.8477	0.9717	0.0214	0.0478	5.23%	2.37%

Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9614	0.9489	0.9739	0.9504	0.9714	0.0045	0.0101	1.05%	0.00%
100		5	0.9720	0.9632	0.9808	0.9643	0.9827	0.0032	0.0071	0.73%	-1.10%

Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9753	0.9281	1.0000	0.9136	1.0000	0.0170	0.0381	3.90%	0.00%
100		5	0.9416	0.8846	0.9985	0.8765	1.0000	0.0205	0.0459	4.87%	3.46%

Combined Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9504	0.8807	0.9714	0.9342	0.9513
25						
50						
100		0.8889	0.9717	0.9342	0.9342	0.8477

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9504	0.9640	0.9714	0.9701	0.9513
25						
50						
100		0.9643	0.9717	0.9742	0.9827	0.9671

Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	1.0000	0.9136	1.0000	0.9630	1.0000
25						
50						
100		0.9218	1.0000	0.9588	0.9506	0.8765

Analyst: JC QA: JW 5/10/19

Bivalve Larval Survival and Development Test **Wood Environment & Infrastructure Solutions**

Combined Proportion Normal Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	249/262	214/243	238/245	227/243	254/267
25						
50						
100		216/243	240/247	227/243	227/243	206/243

Proportion Normal Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	249/262	214/222	238/245	227/234	254/267
25						
50						
100		216/224	240/247	227/233	227/231	206/213

Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	243/243	222/243	243/243	234/243	243/243
25						
50						
100		224/243	243/243	233/243	231/243	213/243

Analyst: SC QA: JW 5/10/19

CETIS Analytical Report

Report Date:	09 May-19 14:58 (p 1 of 2)
Test Code:	19-04-002 | 20-2115-0084

Bivalve Larval Survival and Development Test — **Wood Environment & Infrastructure Solutions**

Analysis ID:	15-6002-7539	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	09 May-19 14:56	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	100% passed combined proportion normal	5.10%

Equal Variance t Two-Sample Test

Control	vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		100	0.8024	1.86	0.093	8	CDF	0.2228	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0039861	0.0039861	1	0.6438	0.4455	Non-Significant Effect
Error	0.0495303	0.0061913	8			
Total	0.0535164		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.695	23.15	0.6219	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9359	0.7411	0.5086	Normal Distribution

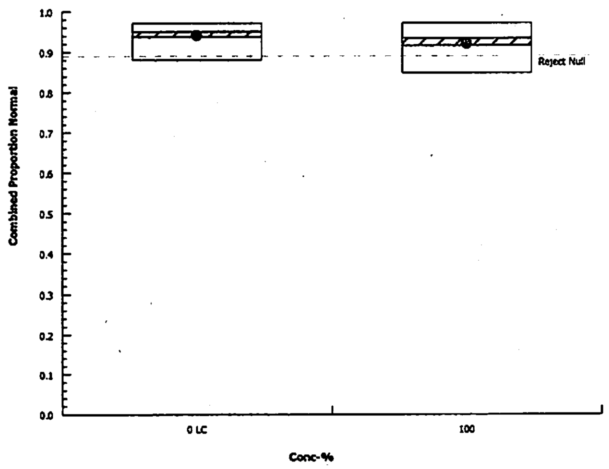
Combined Proportion Normal Summary

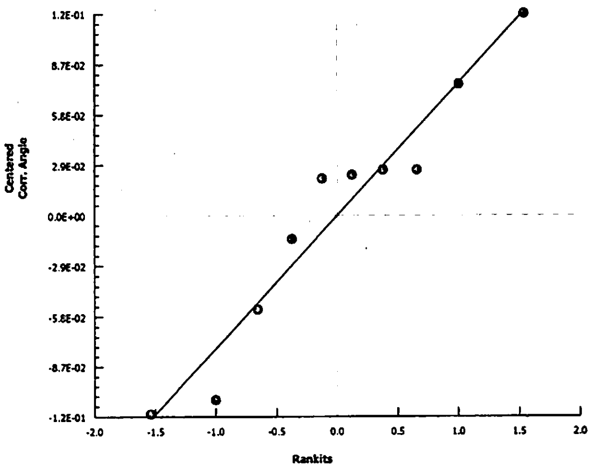
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9376	0.8948	0.9804	0.9504	0.8807	0.9714	0.0154	3.68%	0.00%
100		5	0.9153	0.8559	0.9747	0.9342	0.8477	0.9717	0.0214	5.23%	2.37%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.325	1.241	1.409	1.346	1.218	1.401	0.03032	5.12%	0.00%
100		5	1.285	1.175	1.395	1.311	1.17	1.402	0.03946	6.87%	3.01%

Graphics





Analyst: SC QA: JW 5/10/19

CETIS Analytical Report

TST

Report Date: 09 May-19 14:58 (p 2 of 2)
Test Code: 19-04-002 | 20-2115-0084

Bivalve Larval Survival and Development Test — **Nood Environment & Infrastructure Solutions**

Analysis ID:	07-8247-3996	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	09 May-19 14:57	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Data Transform	Alt Hyp	TST_b	Comparison Result
Angular (Corrected)	C*b < T	0.75	100% passed combined proportion normal

TST-Welch's t Test

Control	vs	Control II	Test Stat	Critical	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		100*	6.396	1.943	6	CDF	3.4E-04	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0039861	0.0039861	1	0.6438	0.4455	Non-Significant Effect
Error	0.0495303	0.0061913	8			
Total	0.0535164		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.695	23.15	0.6219	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9359	0.7411	0.5086	Normal Distribution

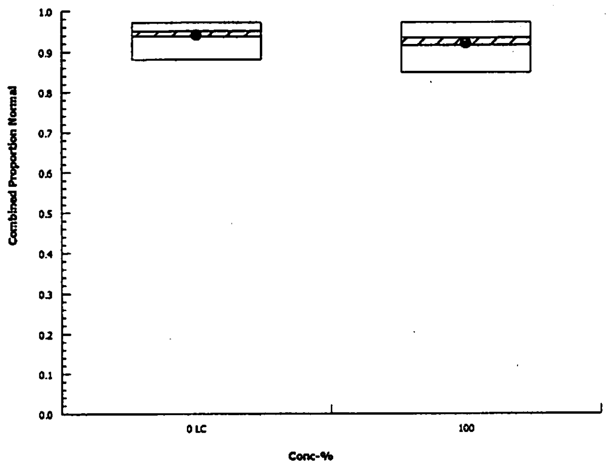
Combined Proportion Normal Summary

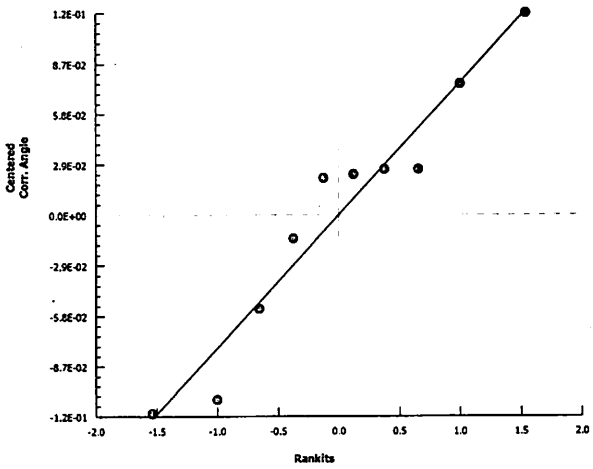
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9376	0.8948	0.9804	0.9504	0.8807	0.9714	0.0154	3.68%	0.00%
100		5	0.9153	0.8559	0.9747	0.9342	0.8477	0.9717	0.0214	5.23%	2.37%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.325	1.241	1.409	1.346	1.218	1.401	0.03032	5.12%	0.00%
100		5	1.285	1.175	1.395	1.311	1.17	1.402	0.03946	6.87%	3.01%

Graphics





Analyst: SC QA: JW 5/10/19

Embryo-Larval Development Test
Scoring Worksheet

Client: Wood Environment & Infrastructure
Project ID: SIYB Gate 1; Gate 2
Test No.: 19-04-001 & 19-04-002

Test Species: *M. galloprovincialis*
Start Date: 4/11/2019 1505
End Date: 4/13/2019 1616

Random #	# Counted	# Normal	Tech Initials	Notes
1			AB	T0 mean= 243
2				
3	231	227		
4				
5	233	227		
6				
7				
8	245	238		
9	245	234		
10	213	206		
11				
12				
13	237	229		
14	245	238		
15				
16	224	216		
17				
18	222	214		
19				
20	262	249		
21	234	227		
22	247	240		
23				
24	267	254		
25				
26	233	224		
27				
28				
29				
30				
31	232	226		
32				
33				
34				
35				

QC Check: 5/9/19

Final Review: JW 5/10/19

Wood Environment & Infrastructure Solutions
SIYB Gate 1; Gate 2
Random Numbers
4/11/19

SAMPLE ID	Rand#
Lab Control 1	20 249/262 18 214/222 14 238/245 21 227/234 24 254/267
Gate 1 (25%)	29 19 32 34 30
Gate 1 (50%)	23 28 1 12 35
Gate 1 (100%)	26 224/233 9 234/245 13 229/237 31 226/232 8 238/245
Gate 2 (25%)	33 4 11 25 17
Gate 2 (50%)	7 2 15 6 27
Gate 2 (100%)	16 216/224 22 240/247 5 227/233 3 227/231 10 206/213

QC Check - Mussel: ____

Final QC: 5/9/19

Water Quality for Bivalve Development

Client: Wood Environment & Infrastructure Solutions
Project ID: SIYB Boatwash
Test No. 19-04-001 & 19-04-002

Test Species: *M. galloprovincialis*
Start Date/Time: 4/11/2019 1505
End Date/Time: 4/13/2019 1610

Test Conc. (%)	Water Quality Measurements			
	Parameter	**0hr**	**24hr**	**48hr**
Lab Control	Temp. (°C)	15.3	15.2	15.0
	Salinity (ppt)	33.8	33.8	34.0
	pH (units)	7.90	7.90	7.91
	DO (mg/L)	7.8	7.8	8.1
Gate 1 (25%)	Temp. (°C)	15.2	14.7	15.2
	Salinity (ppt)	33.8	34.1	34.3
	pH (units)	7.92	7.91	7.90
	DO (mg/L)	7.8	8.0	8.2
Gate 1 (50%)	Temp. (°C)	14.9	14.7	15.1
	Salinity (ppt)	33.9	34.2	34.4
	pH (units)	7.93	7.90	7.90
	DO (mg/L)	7.9	8.1	8.2
Gate 1 (100%)	Temp. (°C)	14.6	14.6	15.0
	Salinity (ppt)	34.1	34.2	34.4
	pH (units)	7.93	7.89	7.90
	DO (mg/L)	8.2	8.2	8.2
Gate 2 (25%)	Temp. (°C)	15.0	14.6	14.9
	Salinity (ppt)	33.8	34.1	34.4
	pH (units)	7.93	7.92	7.90
	DO (mg/L)	8.0	8.1	8.2
Gate 2 (50%)	Temp. (°C)	14.8	14.6	15.2
	Salinity (ppt)	34.0	34.3	34.4
	pH (units)	7.94	7.91	7.89
	DO (mg/L)	8.1	8.1	8.2
Gate 2 (100%)	Temp. (°C)	14.6	14.6	15.1
	Salinity (ppt)	34.2	34.3	34.4
	pH (units)	7.93	7.91	7.90
	DO (mg/L)	8.2	8.2	8.2
	Tech Initials:	JW	AG	AD

Source of Animals: Mission Bay

Date Received: 4/11/19

Comments:

QC Check: 5/9/19

Final Review: JW 5/10/19

Wood Environmental Toxicology Lab, 4905 Morena Blvd, Ste. 1304, San Diego, CA 92117

Embryo-Larval Development Test
Stock Preparation Worksheet

Test Species: *M. galloprovincialis* **Test Date:** 4/11/2019
~~Batch~~ ID: Collected: 4/11/19 **Analyst:** AG
Test Type: 48-hr larval development

Task	
Spawning Induction	1115
Spawning Begins	1200
# Males/# Females	6/6
Spawn Condition	good
Fertilization Initiated	1235
Fertilzation End/Eggs Rinsed	~~+9~~ AG 1305/1335
Embryo Counts	1435
Test Initiation	1505

Embryo Density Counts **# per 100 µL**

Stock #	Stock Volume (mL)	Rep 1	Rep 2	Rep 3	Rep 4	Mean #/100 µL	Mean #/mL (x10)
Stock 1							
Stock 2							
Stock 3		86	93	104	111	98.5	985

Cell Division:

	% Divided
Stock 1	96.4%
Stock 2	88.9
Stock 3	99.8

Selected Stock:	3

	Stock Density	Dil Factor
Adjust selected embryo stock to 500 embryos/mL. Dilution Factor = Stock Density/mL/500	985 500	1.97

In 10 mL sample volume add 500 µl of 500 embryo/ml stock to obtain 25 embryos/mL in test vials.

Notes: QC1 = 236/245
$T0_1$ = 251/251 $T0_2$ = 249/249 $T0_3$ = 246/246 $T0_4$ = 245/246 $T0_5$ = 225/225
T0 mean = 243

QA Review: JC 5/9/19 **Final Review:** JW 5/10/19

Basin-1

CETIS Summary Report

Report Date: 09 May-19 15:05 (p 1 of 2)
Test Code: 19-04-003 | 01-0669-4451

Bivalve Larval Survival and Development Test — **Wood Environment & Infrastructure Solutions**

Batch ID:	09-1168-6514	**Test Type:**	Development-Survival	**Analyst:**	
Start Date:	11 Apr-19 15:05	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Natural Seawater
Ending Date:	13 Apr-19 16:10	**Species:**	Mytilis galloprovincialis	**Brine:**	Not Applicable
Duration:	49h	**Source:**	Field Collected	**Age:**	

Sample ID:	04-3306-1073	**Code:**	19-W0026	**Client:**	Wood Environment and Infastructure
Sample Date:	10 Apr-19 16:10	**Material:**	Seawater	**Project:**	Boat Wash Study
Receipt Date:	11 Apr-19 09:15	**Source:**	Shelter Island Yacht Basin		
Sample Age:	23h	**Station:**	Basin 1		

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
04-7468-6488	Combined Proportion Norma	Equal Variance t Two-Sample Test	0.4499	100% passed combined proportion normal
06-6418-4209	Combined Proportion Norma	TST-Welch's t Test	2.7E-04	100% passed combined proportion normal
03-5613-6302	Proportion Normal	Equal Variance t Two-Sample Test	0.6520	100% passed proportion normal
02-5697-2621	Survival Rate	Equal Variance t Two-Sample Test	0.4663	100% passed survival rate

Test Acceptability

				TAC Limits			
Analysis ID	**Endpoint**	**Attribute**	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
03-5613-6302	Proportion Normal	Control Resp	0.9607	0.9	>>	Yes	Passes Criteria
02-5697-2621	Survival Rate	Control Resp	0.9539	0.5	>>	Yes	Passes Criteria

Combined Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9165	0.8510	0.9820	0.8272	0.9570	0.0236	0.0528	5.76%	0.00%
100		5	0.9112	0.8496	0.9727	0.8724	0.9724	0.0222	0.0496	5.44%	0.58%

Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9607	0.9518	0.9696	0.9532	0.9707	0.0032	0.0072	0.75%	0.00%
100		5	0.9626	0.9535	0.9717	0.9552	0.9724	0.0033	0.0073	0.76%	-0.19%

Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9539	0.8881	1.0000	0.8642	1.0000	0.0237	0.0530	5.55%	0.00%
100		5	0.9465	0.8854	1.0000	0.9012	1.0000	0.0220	0.0492	5.20%	0.78%

Combined Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9218	0.9218	0.9570	0.8272	0.9547
25						
50						
100		0.8765	0.8724	0.9724	0.9579	0.8765

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9532	0.9655	0.9570	0.9571	0.9707
25						
50						
100		0.9552	0.9680	0.9724	0.9579	0.9595

Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9671	0.9547	1.0000	0.8642	0.9835
25						
50						
100		0.9177	0.9012	1.0000	1.0000	0.9136

Analyst: SC QA: JW 5/10/19

CETIS Summary Report

Bivalve Larval Survival and Development Test — **Wood Environment & Infrastructure Solutions**

Combined Proportion Normal Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	224/243	224/243	245/256	201/243	232/243
25						
50						
100		213/243	212/243	247/254	250/261	213/243

Proportion Normal Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	224/235	224/232	245/256	201/210	232/239
25						
50						
100		213/223	212/219	247/254	250/261	213/222

Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	235/243	232/243	243/243	210/243	239/243
25						
50						
100		223/243	219/243	243/243	243/243	222/243

Analyst: SC QA: JW 5/10/19

CETIS Analytical Report

Report Date: 09 May-19 15:09 (p 1 of 2)
Test Code: 19-04-003 | 01-0669-4451

Bivalve Larval Survival and Development Test — **Wood Environment & Infrastructure Solutions**

Analysis ID:	04-7468-6488	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	09 May-19 15:04	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	100% passed combined proportion normal	6.87%

Equal Variance t Two-Sample Test

Control	vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		100	0.1299	1.86	0.109	8	CDF	0.4499	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.000145	0.000145	1	0.01687	0.8999	Non-Significant Effect
Error	0.0687457	0.0085932	8			
Total	0.0688906		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.186	23.15	0.8729	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9399	0.7411	0.5519	Normal Distribution

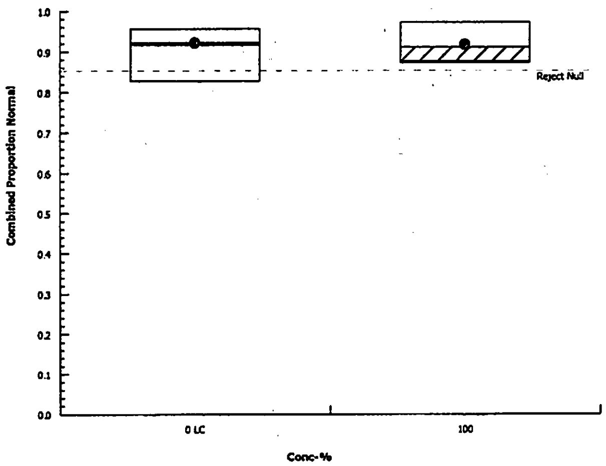
Combined Proportion Normal Summary

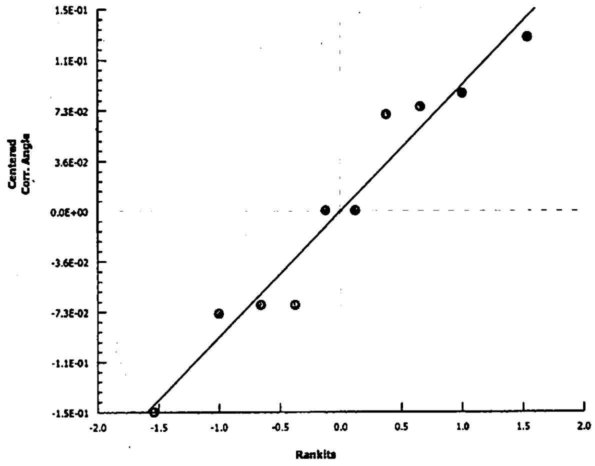
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9165	0.8510	0.9820	0.9218	0.8272	0.9570	0.0236	5.76%	0.00%
100		5	0.9112	0.8496	0.9727	0.8765	0.8724	0.9724	0.0222	5.44%	0.58%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.287	1.177	1.397	1.287	1.142	1.362	0.03966	6.89%	0.00%
100		5	1.279	1.16	1.399	1.212	1.206	1.404	0.04318	7.55%	0.59%

Graphics





Analyst: Sc QA: JW 5/10/19

TST

Bivalve Larval Survival and Development Test	**Wood Environment & Infrastructure Solutions**

Analysis ID:	06-6418-4209	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	09 May-19 15:05	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Data Transform	Alt Hyp	TST_b	Comparison Result
Angular (Corrected)	C*b < T	0.75	100% passed combined proportion normal

TST-Welch's t Test

Control	vs	Control II	Test Stat	Critical	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		100*	5.991	1.895	7	CDF	2.7E-04	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.000145	0.000145	1	0.01687	0.8999	Non-Significant Effect
Error	0.0687457	0.0085932	8			
Total	0.0688906		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.186	23.15	0.8729	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9399	0.7411	0.5519	Normal Distribution

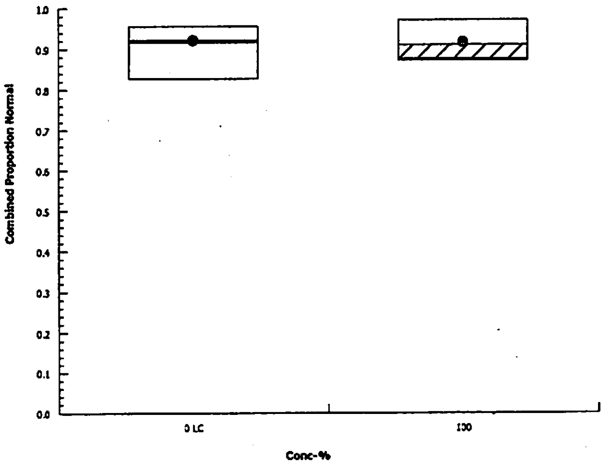
Combined Proportion Normal Summary

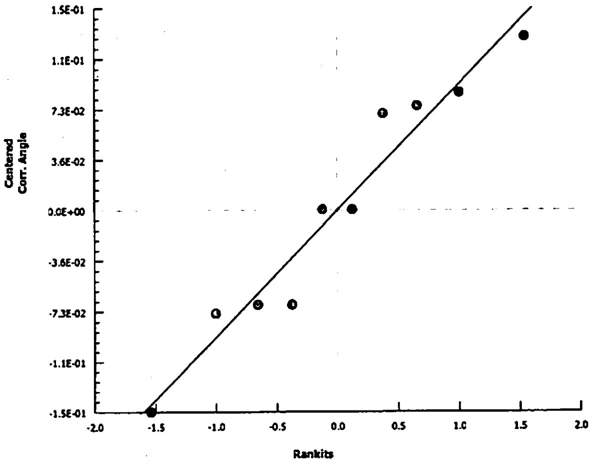
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9165	0.8510	0.9820	0.9218	0.8272	0.9570	0.0236	5.76%	0.00%
100		5	0.9112	0.8496	0.9727	0.8765	0.8724	0.9724	0.0222	5.44%	0.58%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.287	1.177	1.397	1.287	1.142	1.362	0.03966	6.89%	0.00%
100		5	1.279	1.16	1.399	1.212	1.206	1.404	0.04318	7.55%	0.59%

Graphics





Analyst: SC QA: JW 5/10/19

Basin-2

CETIS Summary Report

Report Date: 09 May-19 15:15 (p 1 of 2)
Test Code: 19-04-004 | 14-3160-4642

Bivalve Larval Survival and Development Test — **Wood Environment & Infrastructure Solutions**

Batch ID:	00-4678-1920	**Test Type:**	Development-Survival	**Analyst:**	
Start Date:	11 Apr-19 15:05	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Natural Seawater
Ending Date:	13 Apr-19 16:10	**Species:**	Mytilis galloprovincialis	**Brine:**	Not Applicable
Duration:	49h	**Source:**	Field Collected	**Age:**	

Sample ID:	21-2851-7892	**Code:**	19-W0027	**Client:**	Wood Environment and Infastructure
Sample Date:	10 Apr-19 16:20	**Material:**	Seawater	**Project:**	Boat Wash Study
Receipt Date:	11 Apr-19 09:15	**Source:**	Shelter Island Yacht Basin		
Sample Age:	23h	**Station:**	Basin 2		

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result
06-9135-9346	Combined Proportion Norma	Equal Variance t Two-Sample Test	0.7248	100% passed combined proportion normal
05-4827-8868	Combined Proportion Norma	TST-Welch's t Test	2.3E-05	100% passed combined proportion normal
16-2641-7289	Proportion Normal	Equal Variance t Two-Sample Test	0.9184	100% passed proportion normal
20-9314-6418	Survival Rate	Equal Variance t Two-Sample Test	0.6550	100% passed survival rate

Test Acceptability

				TAC Limits			
Analysis ID	Endpoint	Attribute	Test Stat	Lower	Upper	Overlap	Decision
16-2641-7289	Proportion Normal	Control Resp	0.9607	0.9	>>	Yes	Passes Criteria
20-9314-6418	Survival Rate	Control Resp	0.9539	0.5	>>	Yes	Passes Criteria

Combined Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9165	0.8510	0.9820	0.8272	0.9570	0.0236	0.0528	5.76%	0.00%
100		5	0.9344	0.8984	0.9704	0.8930	0.9643	0.0130	0.0290	3.10%	-1.95%

Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9607	0.9518	0.9696	0.9532	0.9707	0.0032	0.0072	0.75%	0.00%
100		5	0.9672	0.9599	0.9744	0.9588	0.9742	0.0026	0.0059	0.61%	-0.67%

Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9539	0.8881	1.0000	0.8642	1.0000	0.0237	0.0530	5.55%	0.00%
100		5	0.9663	0.9244	1.0000	0.9218	1.0000	0.0151	0.0337	3.49%	-1.29%

Combined Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9218	0.9218	0.9570	0.8272	0.9547
25						
50						
100		0.9588	0.9218	0.9643	0.8930	0.9342

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9532	0.9655	0.9570	0.9571	0.9707
25						
50						
100		0.9588	0.9697	0.9643	0.9688	0.9742

Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9671	0.9547	1.0000	0.8642	0.9835
25						
50						
100		1.0000	0.9506	1.0000	0.9218	0.9588

Analyst: SL QA: JW 5/10/19

Bivalve Larval Survival and Development Test **Wood Environment & Infrastructure Solutions**

Combined Proportion Normal Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	224/243	224/243	245/256	201/243	232/243
25						
50						
100		256/267	224/243	243/252	217/243	227/243

Proportion Normal Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	224/235	224/232	245/256	201/210	232/239
25						
50						
100		256/267	224/231	243/252	217/224	227/233

Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	235/243	232/243	243/243	210/243	239/243
25						
50						
100		243/243	231/243	243/243	224/243	233/243

Analyst: SC QA: JW 5/10/19

CETIS Analytical Report

Report Date: 09 May-19 15:16 (p 1 of 2)
Test Code: 19-04-004 | 14-3160-4642

Bivalve Larval Survival and Development Test				**Wood Environment & Infrastructure Solutions**	
Analysis ID:	06-9135-9346	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	09 May-19 15:15	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	100% passed combined proportion normal	5.31%

Equal Variance t Two-Sample Test

Control	vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		100	-0.6233	1.86	0.088	8	CDF	0.7248	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0021935	0.0021935	1	0.3885	0.5504	Non-Significant Effect
Error	0.045167	0.0056459	8			
Total	0.0473604		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.294	23.15	0.4412	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9015	0.7411	0.2276	Normal Distribution

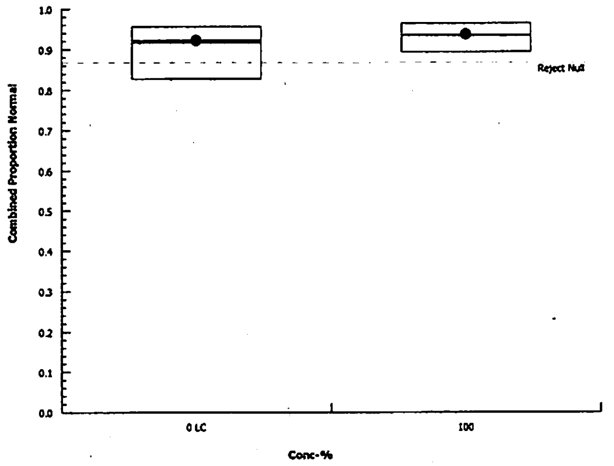
Combined Proportion Normal Summary

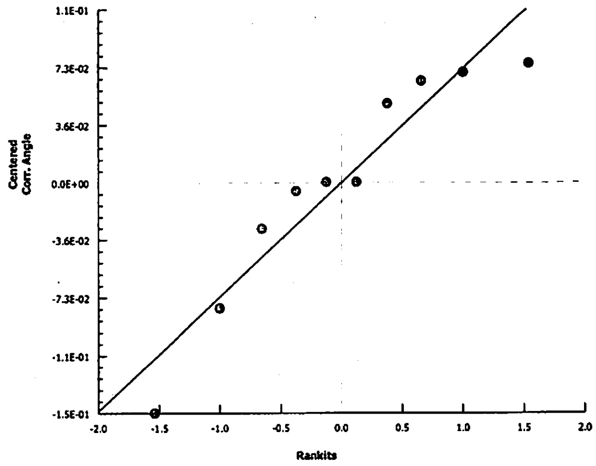
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9165	0.8510	0.9820	0.9218	0.8272	0.9570	0.0236	5.76%	0.00%
100		5	0.9344	0.8984	0.9704	0.9342	0.8930	0.9643	0.0130	3.10%	-1.95%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.287	1.177	1.397	1.287	1.142	1.362	0.03966	6.89%	0.00%
100		5	1.317	1.244	1.389	1.311	1.238	1.381	0.02619	4.45%	-2.30%

Graphics





Analyst: SC QA: JW 5/10/19

CETIS Analytical Report

TST

Report Date:	09 May-19 15:16 (p 2 of 2)
Test Code:	19-04-004 | 14-3160-4642

Bivalve Larval Survival and Development Test — **Wood Environment & Infrastructure Solutions**

Analysis ID:	05-4827-8868	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	09 May-19 15:15	**Analysis:**	Parametric Bioequivalence-Two Sample	**Official Results:**	Yes

Data Transform	Alt Hyp	TST_b	Comparison Result
Angular (Corrected)	C*b < T	0.75	100% passed combined proportion normal

TST-Welch's t Test

Control	vs	Control II	Test Stat	Critical	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		100*	8.867	1.895	7	CDF	2.3E-05	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0021935	0.0021935	1	0.3885	0.5504	Non-Significant Effect
Error	0.045167	0.0056459	8			
Total	0.0473604		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.294	23.15	0.4412	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9015	0.7411	0.2276	Normal Distribution

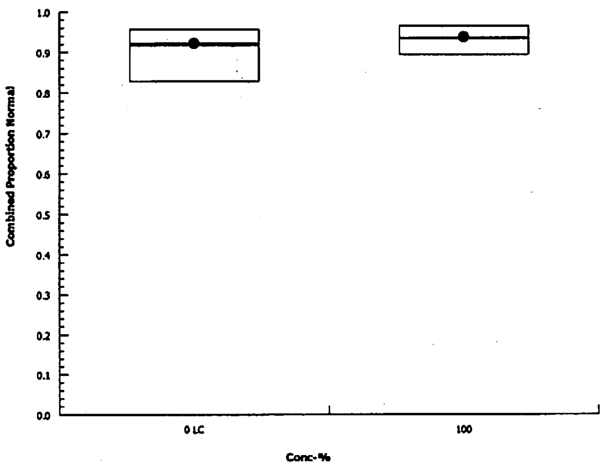
Combined Proportion Normal Summary

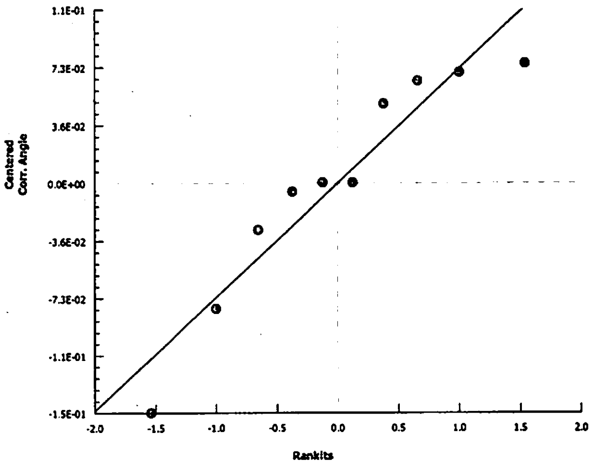
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9165	0.8510	0.9820	0.9218	0.8272	0.9570	0.0236	5.76%	0.00%
100		5	0.9344	0.8984	0.9704	0.9342	0.8930	0.9643	0.0130	3.10%	-1.95%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.287	1.177	1.397	1.287	1.142	1.362	0.03966	6.89%	0.00%
100		5	1.317	1.244	1.389	1.311	1.238	1.381	0.02619	4.45%	-2.30%

Graphics





Analyst: QA: JW 5/10/19

Embryo-Larval Development Test
Scoring Worksheet

Client: Wood Environment & Infrastructure
Project ID: SIYB Basin 1; Basin 2
Test No.: 19-04-003, -004

Test Species: *M. galloprovincialis*
Start Date: 3/28/2019 1505
End Date: 3/30/2019 1610

Random #	# Counted	# Normal	Tech Initials	Notes
36			AB	T0 Mean = 243
37	219	212		
38				
39	222	213		
40				
41	239	232		
42				
43	223	213		
44				
45	232	224		
46				
47				
48				
49				
50	267	256		
51				
52	252	243		
53				
54	256	245		
55				
56	235	224		
57	231	224		
58				
59	224	217		
60	261	250		
61	210	201		
62	233	227		
63				
64				
65				
66				
67				
68	254	247		
69				
70				

QC Check: 5/9/19

Final Review: JW 5/10/19

Wood Environment & Infrastructure Solutions
SIYB Basin 1; Basin 2
Random Numbers
4/11/19

SAMPLE ID	Rand#
Lab Control 2	56 224/235 45 224/232 54 245/256 61 201/210 41 232/239
Basin 1 (25%)	36 58 48 63 64
Basin 1 (50%)	65 55 38 51 42
Basin 1 (100%)	213/223 43 AB ~~213/225~~ ~~228/234~~ 212/219 37 247/254 68 250/261 60 213/222 39
Basin 2 (25%)	70 49 47 67 66
Basin 2 (50%)	44 53 40 46 69
Basin 2 (100%)	50 256/267 57 224/233 AB 52 243/252 59 217/224 62 227/233

QC Check - Mussel: AB

Final QC: SC 5/9/19

Water Quality for Bivalve Development

Client: Wood Environment & Infrastructure Solutions
Project ID: SIYB Boatwash
Test No. 19-04-003 & 19-04-004

Test Species: *M. galloprovincialis*
Start Date/Time: 4/11/2019 1505
End Date/Time: 4/13/2019 1610

Test Conc. (%)	Water Quality Measurements			
	Parameter	0hr	24hr	48hr
Lab Control 2	Temp. (°C)	15.6	14.5	15.2
	Salinity (ppt)	33.8	34.1	34.1
	pH (units)	7.90	7.91	7.93
	DO (mg/L)	7.7	8.1	8.1
Basin 1 (25%)	Temp. (°C)	15.5	14.6	14.9
	Salinity (ppt)	JW ~~7~~ 33.9	34.2	34.3
	pH (units)	7.93	7.91	7.90
	DO (mg/L)	7.8	8.2	8.2
Basin 1 (50%)	Temp. (°C)	15.3	14.6	14.8
	Salinity (ppt)	33.9	34.2	34.2
	pH (units)	7.94	7.91	7.90
	DO (mg/L)	7.9	8.1	8.2
Basin 1 (100%)	Temp. (°C)	15.0	14.6	14.9
	Salinity (ppt)	34.1	34.2	34.3
	pH (units)	7.94	7.91	7.89
	DO (mg/L)	8.0	8.1	8.2
Basin 2 (25%)	Temp. (°C)	15.3	14.9	15.0
	Salinity (ppt)	33.8	34.1	34.2
	pH (units)	7.94	7.91	7.88
	DO (mg/L)	7.9	8.1	8.2
Basin 2 (50%)	Temp. (°C)	15.1	14.7	14.8
	Salinity (ppt)	34.0	34.2	34.4
	pH (units)	7.94	7.90	7.89
	DO (mg/L)	7.9	8.1	8.2
Basin 2 (100%)	Temp. (°C)	14.9	14.7	15.1
	Salinity (ppt)	34.2	34.3	34.5
	pH (units)	7.93	7.90	7.89
	DO (mg/L)	8.1	AG ~~8~~ 8.2	8.2
	Tech Initials:	JW	AG	AD

Source of Animals: Mission Bay

Date Received: 4/11/19

Comments:

QC Check: JC 5/9/19

Final Review: JW 5/10/19

Wood Environmental Toxicology Lab, 4905 Morena Blvd, Ste. 1304, San Diego, CA 92117

Embryo-Larval Development Test
Stock Preparation Worksheet

Test Species: *M. galloprovincialis*

Test Date: 4/11/2019

~~Batch~~ ID: Collected: 4/11/19

Analyst: AG

Test Type: 48-hr larval development

Task	
Spawning Induction	1115
Spawning Begins	1200
# Males/# Females	6/6
Spawn Condition	good
Fertilization Initiated	1235
Fertilzation End/Eggs Rinsed	~~14~~ AG 1305/1335
Embryo Counts	1435
Test Initiation	1505

Embryo Density Counts **# per 100 µL**

Stock #	**Stock Volume (mL)**	**Rep 1**	**Rep 2**	**Rep 3**	**Rep 4**	**Mean #/100 µL**	**Mean #/mL (x10)**
Stock 1							
Stock 2							
Stock 3		86	93	104	111	98.5	985

Cell Division:

	% Divided
Stock 1	96.4%
Stock 2	88.9
Stock 3	99.8

Selected Stock:	3

Adjust selected embryo stock to 500 embryos/mL.
Dilution Factor = Stock Density/mL/500

Stock Density $\frac{985}{500}$

Dil Factor 1.97

In 10 mL sample volume add 500 µl of 500 embryo/ml stock to obtain 25 embryos/mL in test vials.

Notes: QC1 = 236/245
T0₁ = 251/251 T0₂ = 249/249 T0₃ = 246/246 T0₄ = 245/246 T0₅ = 225/225
T0 mean = 243

QA Review: JC 5/9/19

Final Review: JW 5/10/19

APPENDIX B

Sample Receipt Information

Sample Check-In: Effluent/Water

Wood Environmental Toxicology Lab
4905 Morena Blvd, Ste. 1304
San Diego, CA 92117

Client: Wood
Project Name: SIYB Boatwash Study
Test ID Numbers: 19-04-001 to -004

Sample ID:	Gate 1	Gate 2	Basin 1	Basin 2				
Sample Number:	19-W0024	W0025	W0026	W0027				
Collection Date/Time:	4/10/19 1550	1600	1610	1620 →				
Receipt Date/Time:	4/11/19 0915	→	→	→				
Total Sample Volume (L):	42	→	→	→				
Receipt Temp (°C):	5.0 ~~10.2~~ jw	jw ~~10.0~~ 5.0	jw ~~10.1~~ 5.0	jw ~~10.0~~ 4.5				
Appropriate Temp (Y/N)[1]:	y jw	y	y	y				
pH (units):	7.78	7.83	7.86	7.80				
DO (mg/L):	8.5	8.7	8.4	8.5				
Conductivity (µS/cm)[2]:	—	—	—	—				
Salinity (ppt):	33.9	34.1	34.2	34.3				
Alkalinity (mg/L):	118	131	117	119				
Hardness (mg/L)[2]:	—	—	—	—				
Total Chlorine (mg/L)[3]:	<0.02	<0.02	<0.02	<0.02				
Free Chlorine (mg/L)[3]:	—	—	—	—				
Technician Initials:	AD	AD	AD	AD				

Notes:

[1] Temperature should be 0 - 6°C if received > 24 hours past collection
[2] Only measured on samples with less than 3 ppt salinity
[3] If total chlorine is above 0.10 mg/L, the free chlorine will be measured
[4] Debris, odor, and color is described only if observed in the sample

Sample Descriptions[4]:
All: Light yellow, clear

Test Organism: mussel **Dilution Water:** [✓ Nat-SW], Art-SW, RW, DMW, Other________ **Salinity** 34 ppt
Additional Control:________________ **Salinity**________

Initial QC: 5/9/19
Final Review: JW 5/10/19

APPENDIX C

Chain of Custody Form

wood.

Wood Aquatic Toxicology Lab
4905 Morena Blvd, Ste. 1304
San Diego, CA 92117
Phone: (858) 299-5368

Chain of Custody Form

Page 1 of 1

Client/Send Report To:

Company: Wood E & I Solutions, Inc.
Address: 9210 Sky Park Court, Suite 200
San Diego, CA 92123
Contact/PM: Corey Sheredy
Phone Number: 858-300-4316
Email Address: corey.sheredy@woodplc.com

Project Information (if needed):

Project Name: Boatwash Pilot Study
Project No.: 1715100615
PO Number:

Personal Cooler Shipped:
Return Requested: YES____ NO____.

Analysis Requested (write out or use codes below)

Sample ID	Collection Date	Collection Time	Sample Volume	Sample Type: Grab/Comp.	Sample Number (for lab use)	ms-dv							Receipt Temp (°C)
GATE1-~~T0~~ P14	4/10/2019	1550	4L	Comp		X							5.0
GATE2-~~T0~~ P14	4/10/2019	1600	4L	Comp		X							5.0
BASIN1-~~T0~~ P14	4/10/2019	1610	4L	Comp		X							5.0
BASIN2-~~T0~~ P14	4/10/2019	1620	4L	Comp		X							4.5

Samples Collected By:
CCS/MS

Additional Comments:

Samples Shipped via:
Condition Upon Receipt: Good

Relinquished/Shipped By:
Signature:
Print Name: Marisa Swiderski
Date/Time: 04/11/2019 0915

Received By:
Signature:
Print Name: Jeff Van Voorhis
Date/Time: 4/11/19 0915

Relinquished By:
Signature:
Print Name:
Date/Time:

Received By:
Signature:
Print Name:
Date/Time:

Test Codes (marine):

Mp-c: Chronic Kelp
Hr-dv: Chronic Abalone
Aa-a: Acute Topsmelt
Aa-c: Chronic Topsmelt
Mb-a: Acute Menidia/Silverside
Mb-c: Chronic Menidia/Silverside
Ab-a: Acute Mysid Shrimp
Ab-c: Chronic Mysid Shrimp
Sp-c: Chronic Urchin Fertilization
Sp-dv: Chronic Urchin Development
Mg-dv: Chronic Mussel Development
Other: Write out the test organism

Test Codes (freshwater):

Cd-a: Acute Ceriodaphnia
Cd-c: Chronic Ceriodaphnia
Pp-a: Acute Fathead Minnow
Pp-c: Chronic Fathead Minno
Sc-c: Chronic Green Algae
Ha-a: Acute Hyalella amphipod
Ha-c: Chronic Hyalella amphipod
T-22: CA Title 22 Hazardous Waste

APPENDIX D
Reference Toxicant Test

CETIS Summary Report

Report Date: 10 May-19 12:20 (p 1 of 2)
Test Code: 190411mgrd | 09-5126-5022

Bivalve Larval Survival and Development Test | **Wood Environment & Infrastructure Solutions**

Batch ID:	08-0604-3012	**Test Type:**	Development-Survival	**Analyst:**	
Start Date:	11 Apr-19 15:05	**Protocol:**	EPA/600/R-95/136 (1995)	**Diluent:**	Natural Seawater
Ending Date:	13 Apr-19 16:10	**Species:**	Mytilis galloprovincialis	**Brine:**	Not Applicable
Duration:	49h	**Source:**	Field Collected	**Age:**	

Sample ID:	19-9255-3162	**Code:**	190411mgrd	**Client:**	Internal
Sample Date:	11 Apr-19	**Material:**	Total Copper	**Project:**	
Receipt Date:	11 Apr-19	**Source:**	Reference Toxicant		
Sample Age:	15h	**Station:**			

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	NOEL	LOEL	TOEL	TU	PMSD ✓
13-5875-9998	Combined Proportion Norma	Steel Many-One Rank Sum Test	5	10	7.071		4.91%
11-5190-6798	Proportion Normal	Dunnett Multiple Comparison Test	2.5	5	3.536		1.54% ✓
11-9858-2164	Survival Rate	Dunnett Multiple Comparison Test	10	20	14.14		7.76%

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	Level	µg/L	95% LCL	95% UCL	TU	✓
11-0264-5925	Combined Proportion Norma	Spearman-Kärber	EC50	7.2	7.124	7.277		

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits Lower	TAC Limits Upper	Overlap	Decision
11-5190-6798	Proportion Normal	Control Resp	0.9629	0.9	>>	Yes	Passes Criteria
11-9858-2164	Survival Rate	Control Resp	0.9506	0.5	>>	Yes	Passes Criteria
13-5875-9998	Combined Proportion Norma	PMSD	0.04912	<<	0.25	No	Passes Criteria

Combined Proportion Normal Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9154	0.8744	0.9563	0.8765	0.9677	0.0148	0.0330	3.61%	0.00%
2.5		5	0.9393	0.8839	0.9948	0.8683	0.9717	0.0200	0.0447	4.76%	-2.62%
5		5	0.9046	0.8669	0.9422	0.8642	0.9385	0.0136	0.0304	3.36%	1.18%
10		5	0.0468	0.0255	0.0682	0.0247	0.0700	0.0077	0.0172	36.70%	94.88%
20		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%
40		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%

Survival Rate Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	LC	5	0.9506	0.9096	0.9917	0.9095	1.0000	0.0148	0.0331	3.48%	0.00%
2.5		5	0.9728	0.9193	1.0000	0.9012	1.0000	0.0193	0.0431	4.43%	-2.34%
5		5	0.9638	0.9222	1.0000	0.9136	1.0000	0.0150	0.0335	3.47%	-1.39%
10		5	0.9399	0.8965	0.9834	0.9136	1.0000	0.0157	0.0350	3.72%	1.13%
20		5	0.8626	0.8077	0.9174	0.8272	0.9300	0.0198	0.0442	5.12%	9.26%
40		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%

Analyst: SC QA: JW 5/10/19

Bivalve Larval Survival and Development Test **Wood Environment & Infrastructure Solutions**

Combined Proportion Normal Detail

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	0.9677	0.9053	0.8765	0.9136	0.9136
2.5		0.9717	0.9672	0.9218	0.9677	0.8683
5		0.8889	0.8642	0.9385	0.9300	0.9012
10		0.0535	0.0700	0.0366	0.0494	0.0247
20		0.0000	0.0000	0.0000	0.0000	0.0000
40		0.0000	0.0000	0.0000	0.0000	0.0000

Survival Rate Detail

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	1.0000	0.9465	0.9095	0.9383	0.9588
2.5		1.0000	1.0000	0.9630	1.0000	0.9012
5		0.9547	0.9136	1.0000	0.9877	0.9630
10		0.9300	0.9383	1.0000	0.9136	0.9177
20		0.8395	0.8313	0.9300	0.8848	0.8272
40		0.0000	0.0000	0.0000	0.0000	0.0000

Combined Proportion Normal Binomials

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	240/248	220/243	213/243	222/243	222/243
2.5		240/247	236/244	224/243	240/248	211/243
5		216/243	210/243	244/260	226/243	219/243
10		13/243	17/243	9/246	12/243	6/243
20		0/243	0/243	0/243	0/243	0/243
40		0/243	0/243	0/243	0/243	0/243

Survival Rate Binomials

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	LC	243/243	230/243	221/243	228/243	233/243
2.5		243/243	243/243	234/243	243/243	219/243
5		232/243	222/243	243/243	240/243	234/243
10		226/243	228/243	243/243	222/243	223/243
20		204/243	202/243	226/243	215/243	201/243
40		0/243	0/243	0/243	0/243	0/243

Analyst: SC QA: JW 5/10/19

CETIS Analytical Report

Report Date: 10 May-19 11:14 (p 1 of 6)
Test Code: 190411mgrd | 09-5126-5022

Bivalve Larval Survival and Development Test — **Wood Environment & Infrastructure Solutions**

Analysis ID:	13-5875-9998	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	10 May-19 11:12	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	C > T	5	10	7.071		4.91%

Steel Many-One Rank Sum Test

Control	vs	Conc-µg/L	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		2.5	32.5	16	1	8	Asymp	0.9870	Non-Significant Effect
		5	25	16	0	8	Asymp	0.6353	Non-Significant Effect
		10*	15	16	0	8	Asymp	0.0191	Significant Effect
		20*	15	16	0	8	Asymp	0.0191	Significant Effect
		40*	15	16	0	8	Asymp	0.0191	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	10.8957	2.17915	5	789.9	<1.0E-37	Significant Effect
Error	0.0662121	0.0027588	24			
Total	10.962		29			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	273.4	15.09	1.9E-07	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9382	0.9031	0.0814	Normal Distribution

Combined Proportion Normal Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9154	0.8744	0.9563	0.9136	0.8765	0.9677	0.0148	3.61%	0.00%
2.5		5	0.9393	0.8839	0.9948	0.9672	0.8683	0.9717	0.0200	4.76%	-2.62%
5		5	0.9046	0.8669	0.9422	0.9012	0.8642	0.9385	0.0136	3.36%	1.18%
10		5	0.0468	0.0255	0.0682	0.0494	0.0247	0.0700	0.0077	36.70%	94.88%
20		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%
40		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%

Angular (Corrected) Transformed Summary

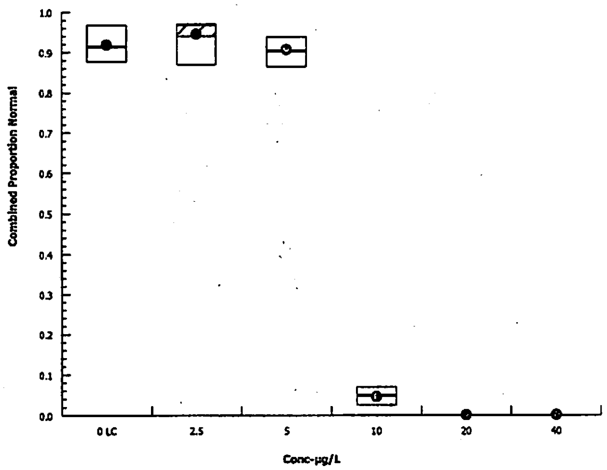
Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.281	1.199	1.363	1.272	1.212	1.39	0.02949	5.15%	0.00%
2.5		5	1.333	1.224	1.443	1.389	1.199	1.402	0.03938	6.60%	-4.10%
5		5	1.26	1.195	1.324	1.251	1.193	1.32	0.02327	4.13%	1.66%
10		5	0.2151	0.1632	0.2669	0.2241	0.1578	0.2677	0.01868	19.42%	83.21%
20		5	0.03208	0.03208	0.03208	0.03208	0.03208	0.03208	0	0.00%	97.50%
40		5	0.03208	0.03208	0.03208	0.03208	0.03208	0.03208	0	0.00%	97.50%

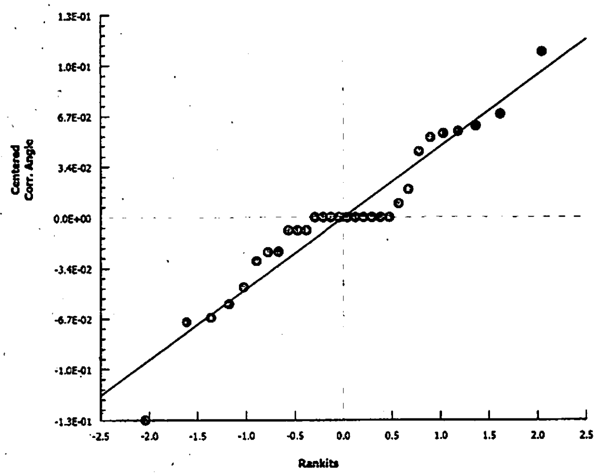
Analyst: SC QA: JW 5/10/19

Bivalve Larval Survival and Development Test	**Wood Environment & Infrastructure Solutions**

Analysis ID:	13-5875-9998	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	10 May-19 11:12	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Graphics





Analyst: SC QA: JWS 5/10/19

CETIS Analytical Report

Report Date: 10 May-19 12:19 (p 1 of 1)
Test Code: 190411mgrd | 09-5126-5022

Bivalve Larval Survival and Development Test — **Wood Environment & Infrastructure Solutions**

Analysis ID:	11-5190-6798	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	10 May-19 12:19	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	C > T	2.5	5	3.536		1.54%

Dunnett Multiple Comparison Test

Control	vs	Conc-µg/L	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		2.5	-0.3798	2.227	0.037	8	CDF	0.8645	Non-Significant Effect
		5*	3.439	2.227	0.037	8	CDF	0.0045	Significant Effect
		10*	69.27	2.227	0.037	8	CDF	7.0E-07	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4.87594	1.62531	3	2335	<1.0E-37	Significant Effect
Error	0.0111388	0.0006962	16			
Total	4.88708		19			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	7.554	11.34	0.0562	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9772	0.866	0.8935	Normal Distribution

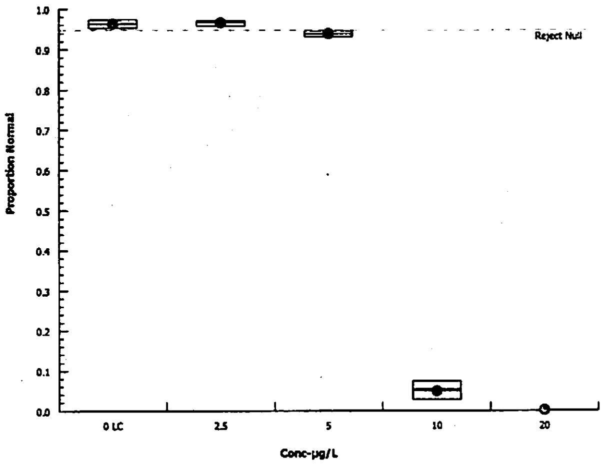
Proportion Normal Summary

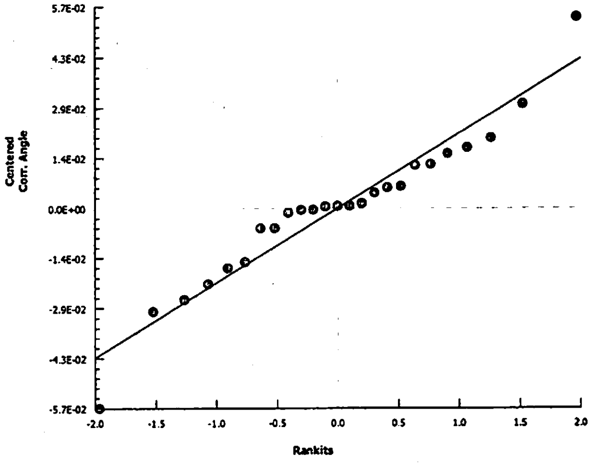
Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9629	0.9525	0.9734	0.9638	0.9528	0.9737	0.0038	0.87%	0.00%
2.5		5	0.9655	0.9587	0.9722	0.9672	0.9573	0.9717	0.0024	0.56%	-0.27%
5		5	0.9386	0.9316	0.9456	0.9385	0.9310	0.9459	0.0025	0.60%	2.52%
10		5	0.0499	0.0268	0.0731	0.0541	0.0269	0.0746	0.0083	37.33%	94.82%
20		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%

Angular (Corrected) Transformed Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.378	1.35	1.406	1.379	1.352	1.408	0.01007	1.63%	0.00%
2.5		5	1.384	1.366	1.403	1.389	1.363	1.402	0.006563	1.06%	-0.46%
5		5	1.321	1.306	1.335	1.32	1.305	1.336	0.005272	0.89%	4.16%
10		5	0.2221	0.1677	0.2766	0.2346	0.1648	0.2766	0.01961	19.74%	83.88%
20		5	0.03457	0.0335	0.03564	0.03501	0.03327	0.03527	0.0003867	2.50%	97.49%

Graphics





Analyst: SC QA: JW 5/10/19

CETIS Analytical Report

Report Date: 10 May-19 12:17 (p 1 of 1)
Test Code: 190411mgrd | 09-5126-5022

Bivalve Larval Survival and Development Test — **Wood Environment & Infrastructure Solutions**

Analysis ID:	11-9858-2164	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.3
Analyzed:	10 May-19 12:16	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	C > T	10	20	14.14		7.76%

Dunnett Multiple Comparison Test

Control	vs	Conc-µg/L	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		2.5	-1.253	2.305	0.153	8	CDF	0.9878	Non-Significant Effect
		5	-0.531	2.305	0.153	8	CDF	0.9269	Non-Significant Effect
		10	0.3419	2.305	0.153	8	CDF	0.6719	Non-Significant Effect
		20*	2.561	2.305	0.153	8	CDF	0.0301	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.183153	0.0457882	4	4.139	0.0133	Significant Effect
Error	0.221257	0.0110629	20			
Total	0.40441		24			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	1.441	13.28	0.8371	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.953	0.8877	0.2922	Normal Distribution

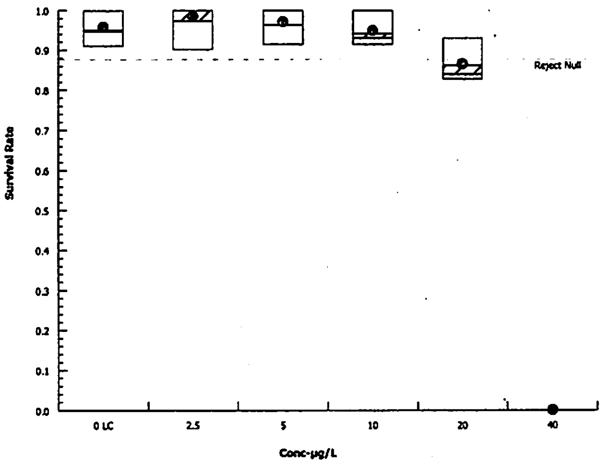
Survival Rate Summary

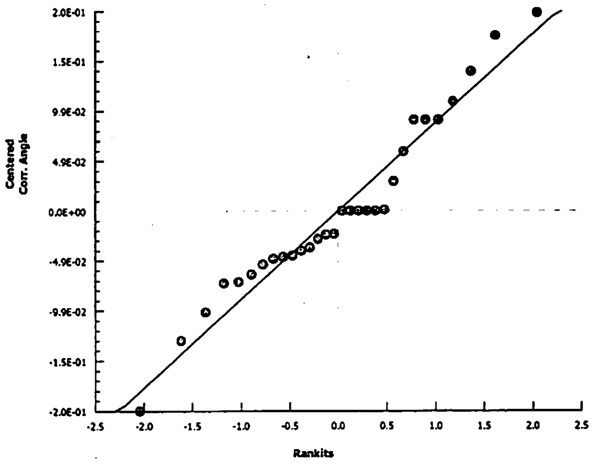
Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	0.9506	0.9096	0.9917	0.9465	0.9095	1.0000	0.0148	3.48%	0.00%
2.5		5	0.9728	0.9193	1.0000	1.0000	0.9012	1.0000	0.0193	4.43%	-2.34%
5		5	0.9638	0.9222	1.0000	0.9630	0.9136	1.0000	0.0150	3.47%	-1.39%
10		5	0.9399	0.8965	0.9834	0.9300	0.9136	1.0000	0.0157	3.72%	1.13%
20		5	0.8626	0.8077	0.9174	0.8395	0.8272	0.9300	0.0198	5.12%	9.26%
40		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%

Angular (Corrected) Transformed Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	LC	5	1.366	1.237	1.494	1.337	1.265	1.539	0.04635	7.59%	0.00%
2.5		5	1.449	1.286	1.611	1.539	1.251	1.539	0.05851	9.03%	-6.11%
5		5	1.401	1.274	1.527	1.377	1.272	1.539	0.04554	7.27%	-2.59%
10		5	1.343	1.205	1.481	1.303	1.272	1.539	0.0497	8.28%	1.67%
20		5	1.195	1.11	1.281	1.159	1.142	1.303	0.03077	5.76%	12.48%
40		5	0.03208	0.03208	0.03208	0.03208	0.03208	0.03208	0	0.00%	97.65%

Graphics





Analyst: SC QA: JW 5/10/19

CETIS Analytical Report

Report Date: 10 May-19 11:14 (p 1 of 1)
Test Code: 190411mgrd | 09-5126-5022

Bivalve Larval Survival and Development Test — **Wood Environment & Infrastructure Solutions**

Analysis ID:	11-0264-5925	**Endpoint:**	Combined Proportion Normal	**CETIS Version:**	CETISv1.9.3
Analyzed:	10 May-19 11:12	**Analysis:**	Untrimmed Spearman-Kärber	**Official Results:**	Yes

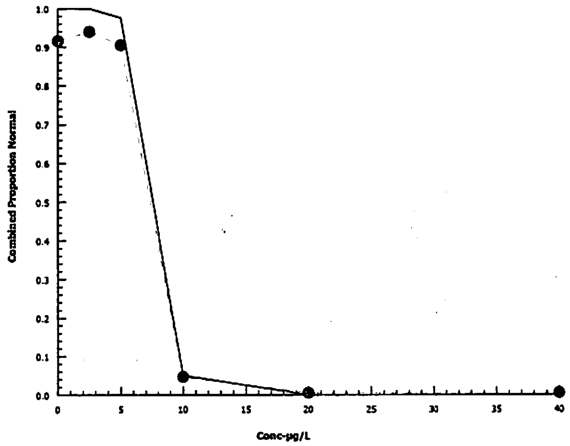
Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0.08443	0.00%	0.8574	0.002304	7.2	7.124	7.277

Combined Proportion Normal Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-µg/L	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	LC	5	0.9154	0.8765	0.9677	0.0330	3.61%	0.0%	1117/1220	0.9274	0.0%
2.5		5	0.9393	0.8683	0.9717	0.0447	4.76%	-2.62%	1151/1225	0.9274	0.0%
5		5	0.9046	0.8642	0.9385	0.0304	3.36%	1.18%	1115/1232	0.9046	2.46%
10		5	0.0468	0.0247	0.0700	0.0172	36.70%	94.88%	57/1218	0.04682	94.95%
20		5	0.0000	0.0000	0.0000	0.0000		100.0%	0/1215	0	100.0%
40		5	0.0000	0.0000	0.0000	0.0000		100.0%	0/1215	0	100.0%

Graphics



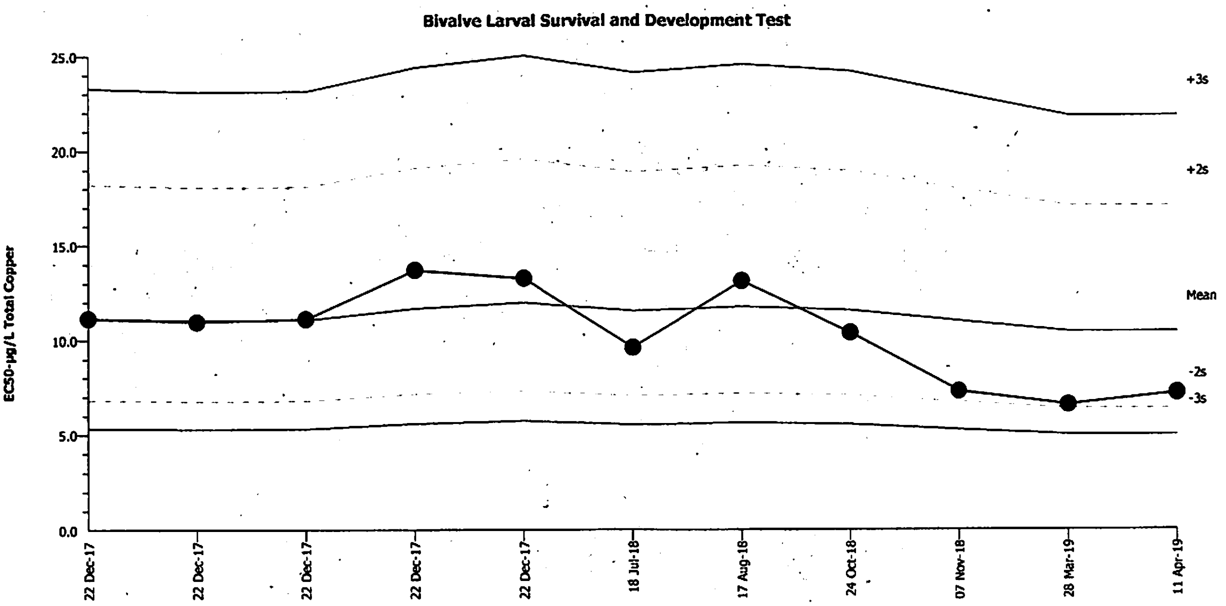
Analyst: SC QA: JW 5/10/19

CETIS QC Plot

Report Date: 10 May-19 11:18 (1 of 1)

Bivalve Larval Survival and Development Test | **Wood Environment & Infrastructure Solutions**

Test Type:	Development-Survival	**Organism:**	Mytilis galloprovincialis (Bay Mussel)	**Material:**	Total Copper
Protocol:	EPA/600/R-95/136 (1995)	**Endpoint:**	Combined Proportion Normal	**Source:**	Reference Toxicant-REF



Mean:	10.43	**Count:**	10	**-2s Warning Limit:**	6.385	**-3s Action Limit:**	4.994
Sigma:	n/a	**CV:**	24.90%	**+2s Warning Limit:**	17.06	**+3s Action Limit:**	21.81

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2017	Dec	22	15:00	11.13	0.6954	0.2626			19-1537-3013	20-7428-0259
2			22	15:00	10.95	0.5131	0.1954			13-8076-0092	04-7666-8867
3			22	15:00	11.1	0.6715	0.2539			18-9173-1279	00-8804-3805
4			22	15:10	13.69	3.254	1.105			05-2148-4604	14-2190-9809
5			22	15:10	13.26	2.828	0.9761			07-4924-1298	02-9536-6591
6	2018	Jul	18	12:30	9.593	-0.8399	-0.3416			17-4700-2672	19-1834-7581
7		Aug	17	18:15	13.11	2.674	0.9286			06-6531-4070	03-3159-5721
8		Oct	24	14:25	10.37	-0.0601	-0.02351			10-5049-1350	21-2167-7967
9		Nov	7	14:40	7.288	-3.145	-1.46			21-2560-8966	08-1725-7308
10	2019	Mar	28	15:00	6.57	-3.863	-1.882			01-1205-3490	09-9916-0601
11		Apr	11	15:05	7.2	-3.233	-1.509			09-5126-5022	11-0264-5925

Analyst: SC QA: JW 5/10/19

CETIS Test Data Worksheet

Report Date: 09 Apr-19 16:25 (p 1 of 1)
Test Code/ID: 09-5126-5022/190411mgrd

Bivalve Larval Survival and Development Test od Environment & Infrastructure Solutions

Start Date: 11 Apr-19
End Date: 13 Apr-19
Sample Date: 11 Apr-19
Species: Mytilis galloprovincialis
Protocol: EPA/600/R-95/136 (1995)
Material: Total Copper
Sample Code: 190411mgrd
Sample Source: Reference Toxicant
Sample Station:

Conc-µg/L	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
			71			246	9	
			72			248	240	
			73			0	0	
			74			215	0	
			75			221	213	
			76			240	226	
			77			0	0	
			78			204	0	
			79			232	216	
			80			247	240	
			81			0	0	
			82			223	6	
			83			260	244	
			84			226	0	
			85			234	219	
			86			222	210	
			87			228	222	
			88			230	220	
			89			233	222	
			90			222	12	
			91			201	0	
			92			248	240	
			93			226	13	
			94			0	0	
			95			202	0	
			96			0	0	
			97			228	17	
			98			234	224	
			99			219	211	
			100			244	236	

Analyst: QA: 5/10/19

CETIS Test Data Worksheet

Report Date: 09 Apr-19 16:25 (p 1 of 1)
Test Code/ID: 09-5126-5022/190411mgrd

Bivalve Larval Survival and Development Test od Environment & Infrastructure Solutions

Start Date:	11 Apr-19	**Species:**	Mytilis galloprovincialis	**Sample Code:**	190411mgrd
End Date:	13 Apr-19	**Protocol:**	EPA/600/R-95/136 (1995)	**Sample Source:**	Reference Toxicant
Sample Date:	11 Apr-19	**Material:**	Total Copper	**Sample Station:**	

Conc-µg/L	Code	Rep	Pos	Initial Density	Final Density	# Counted	# Normal	Notes
0	LC	1	92					
0	LC	2	88					
0	LC	3	75					
0	LC	4	87					
0	LC	5	89					
2.5		1	80					
2.5		2	100					
2.5		3	98					
2.5		4	72					
2.5		5	99					
5		1	79					
5		2	86					
5		3	83					
5		4	76					
5		5	85					
10		1	93					
10		2	97					
10		3	71					
10		4	90					
10		5	82					
20		1	78					
20		2	95					
20		3	84					
20		4	74					
20		5	91					
40		1	96					
40		2	94					
40		3	77					
40		4	73					
40		5	81					

QC: AG

Analyst: AG QA: 5/9/19

Water Quality for Bivalve Development

Client: Internal

Project ID: Cu RefTox

Test No. 190411mgrd

Test Species: *M. galloprovincialis*

Start Date/Time: 4/11/2019 1505

End Date/Time: 4/13/2019 1610

Test Conc. (µg/L)	**Water Quality Measurements**			
	Parameter	**0hr**	**24hr**	**48hr**
Lab Control	Temp. (°C)	JW ~~33~~ 15.9	15.1	14.6
	Salinity (ppt)	33.6	33.7	33.9
	pH (units)	7.90	7.91	7.89
	DO (mg/L)	7.7	8.1	8.2
2.5	Temp. (°C)	15.4	15.0	14.5
	Salinity (ppt)	33.6	33.9	34.2
	pH (units)	7.91	7.91	7.91
	DO (mg/L)	7.8	8.1	8.2
5	Temp. (°C)	15.4	14.8	14.3
	Salinity (ppt)	33.7	34.0	34.3
	pH (units)	7.93	7.93	7.91
	DO (mg/L)	7.9	8.1	8.2
10	Temp. (°C)	15.2	15.1	14.5
	Salinity (ppt)	33.7	34.0	34.4
	pH (units)	7.94	7.92	7.91
	DO (mg/L)	7.9	8.1	8.2
20	Temp. (°C)	15.2	14.8	14.4
	Salinity (ppt)	JW ~~34.8~~ 33.8	34.0	34.4
	pH (units)	7.95	7.92	7.91
	DO (mg/L)	7.9	8.1	8.2
40	Temp. (°C)	15.3	14.9	14.7
	Salinity (ppt)	JW ~~34~~ 33.8	33.9	34.3
	pH (units)	7.96	7.93	7.91
	DO (mg/L)	7.9	8.1	8.2
	Tech Initials:	JW	AB	AD

Source of Animals: Mission Bay

Date Received: 4/11/19

Comments:

QC Check: SC 5/9/19

Final Review: JW 5/10/19

Embryo-Larval Development Test
Stock Preparation Worksheet

Test Species: *M. galloprovincialis*

Test Date: 4/11/2019

~~Batch~~ ID: Collected: 4/11/19

Analyst: AG

Test Type: 48-hr larval development

Task	
Spawning Induction	1115
Spawning Begins	1200
# Males/# Females	6/6
Spawn Condition	good
Fertilization Initiated	1235
Fertilzation End/Eggs Rinsed	~~[illegible]~~ AG 1305/1335
Embryo Counts	1435
Test Initiation	1505

Embryo Density Counts **# per 100 µL**

Stock #	**Stock Volume (mL)**	**Rep 1**	**Rep 2**	**Rep 3**	**Rep 4**	**Mean #/100 µL**	**Mean #/mL (x10)**
Stock 1							
Stock 2							
Stock 3		86	93	104	111	98.5	985

Cell Division:

	% Divided
Stock 1	96.4%
Stock 2	88.9
Stock 3	99.8

Selected Stock:	3

Adjust selected embryo stock to 500 embryos/mL.
Dilution Factor = Stock Density/mL/500

Stock Density 985 / 500

Dil Factor 1.97

In 10 mL sample volume add 500 µl of 500 embryo/ml stock to obtain 25 embryos/mL in test vials.

Notes: QC1 = 236/245

$T0_1$ = 251/231 $T0_2$ = 249/249 $T0_3$ = 246/246 $T0_4$ = 245/246 $T0_5$ = 225/225

T0 Mean = 243

QA Review: JC 5/9/19

Final Review: JW 5/10/19

APPENDIX E
TABULATED RESULTS AND FIELD DATA SHEETS

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PHYSICAL WATER QUALITY MEASUREMENTS
TABULATED RESULTS

Table E-1A. Physical Water Quality Measurements for Event 1 (Boatwash Cleaning) and Follow-Up

Station	Sample Time	Timing Description	pH	Salinity (ppt)	Temperature (°C)	Turbidity (NTU)	Secchi Depth (m)
Basin 1	T0	Baseline	8.54	33.4	22.9	0.88	3.2
	T1	Pre-Release of Boat #1	8.45	33.4	22.8	3.00	NR
	T2	Post-Release of Boat #1	8.48	33.3	22.8	1.88	NR
	T3	Pre-Release of Boat #8	8.44	33.2	23.1	2.37	NR
	T4	Post-Release of Boat #8	8.51	33.3	23.2	2.21	1.1
	P30	30 Days after Cleaning Event	7.82	33.7	23.8	1.03	3.2
Basin 2	T0	Baseline	8.49	33.4	22.9	1.66	NR
	T1	Pre-Release of Boat #1	8.43	33.2	22.8	1.28	NR
	T2	Post-Release of Boat #1	8.50	33.3	22.8	1.84	NR
	T3	Pre-Release of Boat #8	8.46	33.2	23.1	2.02	NR
	T4	Post-Release of Boat #8	8.47	33.2	23.2	1.87	NR
	P30	30 Days after Cleaning Event	7.81	33.7	24.0	0.73	NR
Gate 1	T0	Baseline	8.29	33.6	22.9	1.41	NR
	T1	Pre-Release of Boat #1	8.40	33.7	22.9	1.49	NR
	T2	Post-Release of Boat #1	8.36	33.6	22.9	1.57	NR
	T3	Pre-Release of Boat #8	8.54	33.6	23.6	1.60	NR
	T4	Post-Release of Boat #8	8.33	33.6	23.5	1.21	NR
	P30	30 Days after Cleaning Event	7.79	33.7	23.8	1.67	NR
Gate 2	T0	Baseline	8.34	33.4	22.8	1.61	NR
	T1	Pre-Release of Boat #1	8.35	33.5	22.8	1.43	NR
	T2	Post-Release of Boat #1	8.30	33.7	22.8	1.18	NR
	T3	Pre-Release of Boat #8	8.30	33.6	23.7	1.04	NR
	T4	Post-Release of Boat #8	8.30	33.6	23.6	1.35	NR
	P30	30 Days after Cleaning Event	7.83	33.7	23.8	1.72	NR

Notes: °C = degrees Celsius; m = meter(s); NR = not recorded; NTU = Nephelometric Turbidity Units; ppt = parts per thousand

Table E-1B. Physical Water Quality Measurements for Event 2 (Diver Cleaning) and Follow-Up

Station	Sample Time	Timing Description	pH	Salinity (ppt)	Temperature (°C)	Turbidity (NTU)	Secchi Depth (m)
Basin 1	T0	Baseline	7.94	32.5	19.5	0.84	3.2
	T1	Pre-Release of Boat #1	7.96	33.5	19.5	0.91	NR
	T2	Post-Release of Boat #1	7.98	33.5	19.5	1.21	NR
	T3	Pre-Release of Boat #7	8.00	33.5	19.8	0.75	NR
	T4	Post-Release of Boat #7	8.03	33.6	19.8	1.09	2.6
	T5	2 Hours after Cleaning Event	8.04	33.5	19.8	NR	2.6
	P1	1 Day after Cleaning Event	7.95	33.2	19.7	0.74	3.2
	P2	2 Days after Cleaning Event	7.98	33.6	19.7	0.65	3.2
	P3	3 Days after Cleaning Event	7.99	33.5	19.8	0.94	3.2
	P7	1 Week after Cleaning Event	8.02	33.6	19.5	0.76	3.2
	P14	2 Weeks after Cleaning Event	8.03	34.2	19.7	0.96	3.2
Basin 2	T0	Baseline	7.97	33.4	19.5	1.03	NR
	T1	Pre-Release of Boat #1	7.98	33.5	19.5	1.15	NR
	T2	Post-Release of Boat #1	7.99	33.5	19.5	0.93	NR
	T3	Pre-Release of Boat #7	8.03	33.5	19.9	1.05	NR
	T4	Post-Release of Boat #7	8.26	33.6	19.8	NR	NR
	T5	2 Hours after Cleaning Event	8.04	33.5	19.8	NR	NR
	P1	1 Day after Cleaning Event	7.94	33.4	19.7	0.77	NR
	P2	2 Days after Cleaning Event	7.99	33.6	19.7	0.74	NR
	P3	3 Days after Cleaning Event	8.01	33.7	19.8	0.66	NR
	P7	1 Week after Cleaning Event	8.03	33.8	19.5	0.75	NR
	P14	2 Weeks after Cleaning Event	8.03	34.0	19.9	0.99	NR
Gate 1	T0	Baseline	7.94	33.3	19.5	1.27	3.2
	T1	Pre-Release of Boat #1	7.99	33.9	19.6	1.54	NR
	T2	Post-Release of Boat #1	8.01	33.9	19.5	1.04	NR
	T3	Pre-Release of Boat #7	8.11	33.9	20.1	NR	NR
	T4	Post-Release of Boat #7	8.11	33.9	20.0	NR	2.6
	T5	2 Hours after Cleaning Event	8.07	33.9	19.8	NR	2.5
	P1	1 Day after Cleaning Event	7.95	33.4	19.7	0.66	2.9
	P2	2 Days after Cleaning Event	7.90	32.9	19.7	0.78	2.8
	P3	3 Days after Cleaning Event	8.00	33.5	19.9	1.36	3.5
	P7	1 Week after Cleaning Event	8.03	33.2	19.4	1.18	2.7
	P14	2 Weeks after Cleaning Event	8.02	32.5	19.7	1.41	3.1
Gate 2	T0	Baseline	7.98	33.8	19.3	1.13	NR
	T1	Pre-Release of Boat #1	8.01	33.8	19.5	1.09	NR
	T2	Post-Release of Boat #1	8.00	33.9	19.6	1.01	NR
	T3	Pre-Release of Boat #7	8.11	33.9	20.1	NR	NR
	T4	Post-Release of Boat #7	8.13	33.9	19.9	NR	NR
	T5	2 Hours after Cleaning Event	8.00	33.9	19.8	NR	NR
	P1	1 Day after Cleaning Event	7.95	33.3	19.7	0.75	NR
	P2	2 Days after Cleaning Event	7.93	33.6	19.7	0.88	NR
	P3	3 Days after Cleaning Event	8.00	33.6	20.0	0.81	NR
	P7	1 Week after Cleaning Event	8.05	33.6	19.4	1.31	NR
	P14	2 Weeks after Cleaning Event	8.04	33.5	19.8	1.81	NR

Notes: °C = degrees Celsius; m = meter(s); NR = not recorded; NTU = Nephelometric Turbidity Units; ppt = parts per thousand

Table E-1C. Physical Water Quality Measurements for Event 3 (Boatwash Cleaning) and Follow-Up

Station	Sample Time	Timing Description	pH	Salinity (ppt)	Temperature (°C)	Turbidity (NTU)	Secchi Depth (m)
Basin 1	T0	Baseline	7.90	33.2	17.0	3.26	3.2
	T1	Pre-Release of Boat #1	7.95	33.7	17.1	1.81	NR
	T2	Post-Release of Boat #1	7.95	33.8	17.1	1.61	NR
	T3	Pre-Release of Boat #5	8.00	33.7	17.4	2.98	2.1
	T4	Post-Release of Boat #5	8.00	33.7	17.5	2.51	2.3
	T5	2 Hours after Cleaning Event	8.00	33.8	17.6	3.16	NR
	P1	1 Day after Cleaning Event	8.00	33.4	17.8	1.32	NR
	P2	2 Days after Cleaning Event	8.01	33.4	17.3	1.00	3.2
	P3	3 Days after Cleaning Event	7.95	33.5	17.0	1.08	3.2
	P7	1 Week after Cleaning Event	8.04	33.5	16.8	0.95	3.2
	P14	2 Weeks after Cleaning Event	8.00	33.8	18.3	0.70	3.2
Basin 2	T0	Baseline	7.94	33.5	17.0	1.23	NR
	T1	Pre-Release of Boat #1	7.96	33.7	17.2	1.72	NR
	T2	Post-Release of Boat #1	7.96	33.8	17.2	2.48	NR
	T3	Pre-Release of Boat #5	8.00	33.8	17.5	2.85	NR
	T4	Post-Release of Boat #5	8.00	33.8	17.5	2.67	NR
	T5	2 Hours after Cleaning Event	8.00	33.8	17.5	2.94	NR
	P1	1 Day after Cleaning Event	8.02	33.4	17.7	1.21	NR
	P2	2 Days after Cleaning Event	8.03	33.5	17.4	1.05	NR
	P3	3 Days after Cleaning Event	7.96	33.5	17.0	2.80	NR
	P7	1 Week after Cleaning Event	8.05	33.5	16.8	0.64	NR
	P14	2 Weeks after Cleaning Event	8.00	33.8	18.2	0.70	NR
Gate 1	T0	Baseline	7.86	33.1	17.0	1.43	4.1
	T1	Pre-Release of Boat #1	8.05	33.2	17.4	1.85	NR
	T2	Post-Release of Boat #1	8.04	33.3	17.3	1.56	NR
	T3	Pre-Release of Boat #5	8.09	33.1	17.5	1.52	3.2
	T4	Post-Release of Boat #5	8.09	33.3	17.5	1.46	3.4
	T5	2 Hours after Cleaning Event	8.09	33.3	17.6	1.35	NR
	P1	1 Day after Cleaning Event	7.98	33.2	17.7	1.26	NR
	P2	2 Days after Cleaning Event	8.02	33.5	17.7	0.88	4.0
	P3	3 Days after Cleaning Event	7.92	33.4	17.0	1.40	3.9
	P7	1 Week after Cleaning Event	8.01	32.8	17.0	0.80	3.3
	P14	2 Weeks after Cleaning Event	7.99	33.4	18.2	1.10	NR
Gate 2	T0	Baseline	7.94	33.2	16.9	1.41	NR
	T1	Pre-Release of Boat #1	8.05	33.3	17.3	1.95	NR
	T2	Post-Release of Boat #1	8.02	33.3	17.4	1.41	NR
	T3	Pre-Release of Boat #5	8.08	33.3	17.3	1.69	NR
	T4	Post-Release of Boat #5	8.07	33.3	17.5	1.48	NR
	T5	2 Hours after Cleaning Event	8.11	33.3	17.4	1.95	NR
	P1	1 Day after Cleaning Event	8.01	33.4	17.7	1.12	NR
	P2	2 Days after Cleaning Event	8.05	33.5	17.7	0.87	NR
	P3	3 Days after Cleaning Event	7.96	33.4	16.9	1.43	NR
	P7	1 Week after Cleaning Event	8.04	33.5	16.8	1.25	NR
	P14	2 Weeks after Cleaning Event	8.00	33.6	18.4	1.00	NR

Notes: °C = degrees Celsius; m = meter(s); NR = not recorded; NTU = Nephelometric Turbidity Units; ppt = parts per thousand

WATER CHEMISTRY TABULATED RESULTS

Table E-2A. Water Chemistry Results for Event 1 (Boatwash Cleaning) and Follow-Up

Station	Sample Time	Timing Description	Depth	Dissolved Copper (µg/L)	Total Copper (µg/L)	TSS (mg/L)
Basin 1	T0	Baseline	Top	5.4	5.4	4
			Bottom	5.3	5.4	1
	T1	Pre-Release of Boat #1	Top	430	3000	8
			Bottom	330	2100	6
	T2	Post-Release of Boat #1	Top	340	1600	10
			Bottom	360	1600	9
	T3	Pre-Release of Boat #8	Top	170	3100	7
			Bottom	170	2900	7
	T4	Post-Release of Boat #8	Top	810	2200	8
			Bottom	850	2300	24
	P30	30 Days after Cleaning Event	Top	10	10	7
			Bottom	11	11	6
Basin 2	T0	Baseline	Top	5.4	5.6	4
			Bottom	5.8	5.7	3
	T1	Pre-Release of Boat #1	Top	230	1300	14
			Bottom	270	1600	9
	T2	Post-Release of Boat #1	Top	350	1400	6
			Bottom	350	1400	6
	T3	Pre-Release of Boat #8	Top	160	2500	9
			Bottom	860	2300	8
	T4	Post-Release of Boat #8	Top	770	1800	7
			Bottom	880	2100	8
	P30	30 Days after Cleaning Event	Top	9.7	10	9
			Bottom	9.9	10	10

Notes: µg/L = microgram(s)per liter; mg/L = milligram(s) per liter; TSS = total suspended solids

Table E-2A. Water Chemistry Results for Event 1 (Boatwash Cleaning) and Follow-Up (cont.)

Station	Sample Time	Timing Description	Depth	Dissolved Copper (µg/L)	Total Copper (µg/L)	TSS (mg/L)
Gate 1	T0	Baseline	Top	6.2	7.0	8
			Bottom	6.9	8.2	10
	T1	Pre-Release of Boat #1	Top	4.8	5.8	7
			Bottom	15	46	7
	T2	Post-Release of Boat #1	Top	21	78	7
			Bottom	20	71	7
	T3	Pre-Release of Boat #8	Top	130	390	6
			Bottom	88	200	6
	T4	Post-Release of Boat #8	Top	170	400	13
			Bottom	51	61	13
	P30	30 Days after Cleaning Event	Top	4.7	5.1	10
			Bottom	4.7	5.6	13
Gate 2	T0	Baseline	Top	8.3	8.3	7
			Bottom	6.5	6.4	8
	T1	Pre-Release of Boat #1	Top	10	32	8
			Bottom	7.0	9.3	7
	T2	Post-Release of Boat #1	Top	40	130	7
			Bottom	18	32	5
	T3	Pre-Release of Boat #8	Top	12	19	7
			Bottom	12	13	7
	T4	Post-Release of Boat #8	Top	12	19	6
			Bottom	18	33	6
	P30	30 Days after Cleaning Event	Top	4.2	5.0	17
			Bottom	5.7	7.0	26

Notes: µg/L = microgram(s)per liter; mg/L = milligram(s) per liter; TSS = total suspended solids

Table E-2B. Water Chemistry Results for Event 2 (Diver Cleaning) and Follow-Up

Station	Sample Time	Timing Description	Depth	Dissolved Copper (µg/L)	Total Copper (µg/L)	TSS (mg/L)
Basin 1	T0	Baseline	Top	7.1	7.5	4
			Bottom	6.9	7.5	5
	T1	Pre-Release of Boat #1	Top	18	35	4
			Bottom	16	28	4
	T2	Post-Release of Boat #1	Top	16	28	6
			Bottom	15	24	5
	T3	Pre-Release of Boat #7	Top	46	120	4
			Bottom	51	100	4
	T4	Post-Release of Boat #7	Top	52	95	4
			Bottom	44	84	11
	T5	2 Hours after Cleaning Event	Top	46	91	6
			Bottom	45	87	5
	P1	1 Day after Cleaning Event	Top	23	27	2
			Bottom	25	26	2
	P2	2 Days after Cleaning Event	Top	9.7	9.1	4
			Bottom	9.5	9.9	4
	P3	3 Days after Cleaning Event	Top	7.9	8.5	3
			Bottom	8.4	8.5	2
	P7	7 Days after Cleaning Event	Top	5.5	6.0	4
			Bottom	5.5	6.0	3
	P14	14 Days after Cleaning Event	Top	5.0	5.3	4
			Bottom	5.2	5.8	3
Basin 2	T0	Baseline	Top	7.0	7.1	3
			Bottom	6.9	7.5	5
	T1	Pre-Release of Boat #1	Top	18	33	4
			Bottom	17	29	4
	T2	Post-Release of Boat #1	Top	16	27	6
			Bottom	16	25	5
	T3	Pre-Release of Boat #7	Top	43	87	7
			Bottom	44	91	4
	T4	Post-Release of Boat #7	Top	47	87	5
			Bottom	48	98	7
	T5	2 Hours after Cleaning Event	Top	42	74	7
			Bottom	46	84	9
	P1	1 Day after Cleaning Event	Top	22	23	4
			Bottom	19	21	4
	P2	2 Days after Cleaning Event	Top	8.9	9.2	4
			Bottom	9.2	9.6	3
	P3	3 Days after Cleaning Event	Top	8.4	8.5	2
			Bottom	8.2	8.5	3
	P7	7 Days after Cleaning Event	Top	5.2	5.8	3
			Bottom	5.4	6.0	5
	P14	14 Days after Cleaning Event	Top	5.2	6.2	2
			Bottom	5.6	5.9	4

Notes: µg/L = microgram(s)per liter; mg/L = milligram(s) per liter; TSS = total suspended solids

Table E-2B. Water Chemistry Results for Event 2 (Diver Cleaning) and Follow-Up (cont.)

Station	Sample Time	Timing Description	Depth	Dissolved Copper (µg/L)	Total Copper (µg/L)	TSS (mg/L)
Gate 1	T0	Baseline	Top	5.5	7.7	5
			Bottom	6.5	7.9	4
	T1	Pre-Release of Boat #1	Top	7.4	11	5
			Bottom	6.1	7.0	3
	T2	Post-Release of Boat #1	Top	4.6	5.9	6
			Bottom	7.1	8.3	5
	T3	Pre-Release of Boat #7	Top	7.9	8.8	12
			Bottom	7.3	8.5	4
	T4	Post-Release of Boat #7	Top	8.4	12	4
			Bottom	7.2	8.7	4
	T5	2 Hours after Cleaning Event	Top	9.1	11	6
			Bottom	9.7	13	5
	P1	1 Day after Cleaning Event	Top	7.2	8.8	3
			Bottom	6.6	7.2	4
	P2	2 Days after Cleaning Event	Top	6.1	6.8	6
			Bottom	5.9	6.3	4
	P3	3 Days after Cleaning Event	Top	7.3	8.4	4
			Bottom	6.3	6.6	4
	P7	7 Days after Cleaning Event	Top	4.8	5.9	4
			Bottom	5.3	6.0	7
	P14	14 Days after Cleaning Event	Top	7.4	7.9	9
			Bottom	7.5	8.5	6
Gate 2	T0	Baseline	Top	4.1	5.2	5
			Bottom	6.3	7.4	9
	T1	Pre-Release of Boat #1	Top	6.1	7.0	6
			Bottom	6.7	7.9	5
	T2	Post-Release of Boat #1	Top	6.0	6.9	8
			Bottom	6.6	8.1	6
	T3	Pre-Release of Boat #7	Top	7.8	9.1	3
			Bottom	7.6	8.6	5
	T4	Post-Release of Boat #7	Top	7.3	9.8	5
			Bottom	7.7	9.5	5
	T5	2 Hours after Cleaning Event	Top	8.2	10.0	5
			Bottom	9.3	11.0	6
	P1	1 Day after Cleaning Event	Top	6.1	6.8	5
			Bottom	5.9	6.7	2
	P2	2 Days after Cleaning Event	Top	5.7	6.5	6
			Bottom	6.5	6.9	5
	P3	3 Days after Cleaning Event	Top	7.6	9.4	7
			Bottom	6.4	7.2	4
	P7	7 Days after Cleaning Event	Top	5.2	8.5	17
			Bottom	4.3	6.3	7
	P14	14 Days after Cleaning Event	Top	7.3	8.7	10
			Bottom	7.4	8.3	6

Notes: µg/L = microgram(s)per liter; mg/L = milligram(s) per liter; TSS = total suspended solids

Table E-2C. Water Chemistry Results for Event 3 (Boatwash Cleaning) and Follow-Up

Station	Sample Time	Timing Description	Depth	Dissolved Copper (µg/L)	Total Copper (µg/L)	TSS (mg/L)
Basin 1	T0	Baseline	Top	6.2	7.2	3
			Bottom	6.2	6.9	4
	T1	Pre-Release of Boat #1	Top	240	970	4
			Bottom	160	870	4
	T2	Post-Release of Boat #1	Top	210	710	5
			Bottom	200	750	9
	T3	Pre-Release of Boat #5	Top	360	1400	4
			Bottom	370	770	13
	T4	Post-Release of Boat #5	Top	330	620	8
			Bottom	350	670	5
	T5	2 Hours after Cleaning Event	Top	290	500	19
			Bottom	310	690	10
	P1	1 Day after Cleaning Event	Top	170	180	11
			Bottom	180	180	6
	P2	2 Days after Cleaning Event	Top	70	86	4
			Bottom	77	92	3
	P3	3 Days after Cleaning Event	Top	47	52	4
			Bottom	50	56	5
	P7	7 Days after Cleaning Event	Top	12	13	8
			Bottom	12	14	3
	P14	14 Days after Cleaning Event	Top	7.7	7.8	13
			Bottom	7.8	8.2	5
Basin 2	T0	Baseline	Top	6.4	7.3	3
			Bottom	6.1	7.2	4
	T1	Pre-Release of Boat #1	Top	190	980	3
			Bottom	190	940	4
	T2	Post-Release of Boat #1	Top	200	670	6
			Bottom	220	750	7
	T3	Pre-Release of Boat #5	Top	270	580	5
			Bottom	340	780	6
	T4	Post-Release of Boat #5	Top	250	540	5
			Bottom	330	740	7
	T5	2 Hours after Cleaning Event	Top	260	440	8
			Bottom	240	410	5
	P1	1 Day after Cleaning Event	Top	160	160	5
			Bottom	160	180	5
	P2	2 Days after Cleaning Event	Top	61	70	4
			Bottom	70	78	4
	P3	3 Days after Cleaning Event	Top	41	44	6
			Bottom	44	50	4
	P7	7 Days after Cleaning Event	Top	12	12	2
			Bottom	12	13	4
	P14	14 Days after Cleaning Event	Top	7.9	7.9	5
			Bottom	8.0	7.7	5

Notes: µg/L = microgram(s)per liter; mg/L = milligram(s) per liter; TSS = total suspended solids

Table E-2C. Water Chemistry Results for Event 3 (Boatwash Cleaning) and Follow-Up (cont.)

Station	Sample Time	Timing Description	Depth	Dissolved Copper (µg/L)	Total Copper (µg/L)	TSS (mg/L)
Gate 1	T0	Baseline	Top	6.4	8.0	20
			Bottom	6.5	7.7	5
	T1	Pre-Release of Boat #1	Top	6.2	7.5	4
			Bottom	6.2	7.7	9
	T2	Post-Release of Boat #1	Top	22	73	5
			Bottom	9.4	20	5
	T3	Pre-Release of Boat #5	Top	8.1	12	5
			Bottom	5.9	8.2	6
	T4	Post-Release of Boat #5	Top	41	78	10
			Bottom	42	43	5
	T5	2 Hours after Cleaning Event	Top	93	160	8
			Bottom	11	22	5
	P1	1 Day after Cleaning Event	Top	18	17	8
			Bottom	9.4	10	3
	P2	2 Days after Cleaning Event	Top	20	24	7
			Bottom	11	12	6
	P3	3 Days after Cleaning Event	Top	16	19	3
			Bottom	14	16	6
	P7	7 Days after Cleaning Event	Top	11	12	7
			Bottom	9.1	10	4
	P14	14 Days after Cleaning Event	Top	7.9	8.0	4
			Bottom	7.2	7.4	3
Gate 2	T0	Baseline	Top	7.0	8.0	9
			Bottom	7.4	8.6	5
	T1	Pre-Release of Boat #1	Top	11	32	4
			Bottom	11	23	4
	T2	Post-Release of Boat #1	Top	8.3	13	5
			Bottom	7.0	8.6	19
	T3	Pre-Release of Boat #5	Top	28	80	3
			Bottom	59	110	6
	T4	Post-Release of Boat #5	Top	6.5	8.2	5
			Bottom	28	50	11
	T5	2 Hours after Cleaning Event	Top	5.5	6.7	6
			Bottom	33	53	7
	P1	1 Day after Cleaning Event	Top	16	18	4
			Bottom	14	14	10
	P2	2 Days after Cleaning Event	Top	8.9	11	5
			Bottom	9.8	10	3
	P3	3 Days after Cleaning Event	Top	10	12	8
			Bottom	9.0	11	3
	P7	7 Days after Cleaning Event	Top	9.6	11	6
			Bottom	8.4	9.8	8
	P14	14 Days after Cleaning Event	Top	7.6	7.8	15
			Bottom	6.0	6.6	4

Notes: µg/L = microgram(s)per liter; mg/L = milligram(s) per liter; TSS = total suspended solids

TOXICITY TABULATED RESULTS

Table E-3A. Toxicity Results for Event 1 (Boatwash Cleaning) and Follow-Up

Station	Sample Time	Timing Description	Combined Proportion Normal (%)	
			100% Sample Concentration	Lab Control
Basin 1	T0	Baseline	90.0	89.1
	T4	Post-Release of Boat #8	0.0*	86.7
	P30	30 Days after Cleaning Event	86.1	91.9
Basin 2	T0	Baseline	91.2	89.1
	T4	Post-Release of Boat #8	0.0*	86.7
	P30	30 Days after Cleaning Event	90.2	91.9
Gate 1	T0	Baseline	75.2	83.6
	T4	Post-Release of Boat #8	0.0*	86.4
	P30	30 Days after Cleaning Event	90.8	92.5
Gate 2	T0	Baseline	82.1	83.6
	T4	Post-Release of Boat #8	3.5*	86.4
	P30	30 Days after Cleaning Event	91.6	92.5

Notes: * An asterisk indicates a statistically significant difference compared to the control; % = percent

Table E-3B. Toxicity Results for Event 2 (Diver Cleaning) and Follow-Up

Station	Sample Time	Timing Description	Combined Proportion Normal (%)	
			100% Sample Concentration	Lab Control
Basin 1	T0	Baseline	79.1	81.6
	T4	Post-Release of Boat #7	0.0*	84.9
	P14	14 Days after Cleaning Event	92.9	89.8
Basin 2	T0	Baseline	82.5	81.6
	T4	Post-Release of Boat #7	0.0*	84.9
	P14	14 Days after Cleaning Event	91.4	89.8
Gate 1	T0	Baseline	77.0*	83.5
	T4	Post-Release of Boat #7	83.0	85.7
	P14	14 Days after Cleaning Event	86.1	89.3
Gate 2	T0	Baseline	78.5*	83.5
	T4	Post-Release of Boat #7	82.4	85.7
	P14	14 Days after Cleaning Event	89.3	89.3

Notes: * An asterisk indicates a statistically significant difference compared to the control; % = percent

Table E-3C. Toxicity Results for Event 3 (Boatwash Cleaning) and Follow-Up

Station	Sample Time	Timing Description	Combined Proportion Normal (%)	
			100% Sample Concentration	Lab Control
Basin 1	T0	Baseline	90.9	93.6
	T4	Post-Release of Boat #5	0.0*	96.2
	P14	14 Days after Cleaning Event	91.1	91.7
Basin 2	T0	Baseline	96.7	93.6
	T4	Post-Release of Boat #5	0.0*	96.2
	P14	14 Days after Cleaning Event	93.4	91.7
Gate 1	T0	Baseline	96.2	96.4
	T4	Post-Release of Boat #5	0.0*	97.0
	P14	14 Days after Cleaning Event	94.4	93.8
Gate 2	T0	Baseline	96.4	96.4
	T4	Post-Release of Boat #5	0.0*	97.0
	P14	14 Days after Cleaning Event	91.5	93.8

Notes: * An asterisk indicates a statistically significant difference compared to the control; % = percent

EVENT 1 (BOATWASH CLEANING)
FIELD DATA SHEETS

BASIN 1

PORT OF SAN DIEGO
BOATWASH MONITORING
EVENT 1 - JULY 2018

FIELD WATER QUALITY DATA SHEET

Date: 07/17/2018

Surface Station Identification: BWB1-E1-T Sample depth: 1.0 m Time of Collection: 0905

Description: Boatwash basin pre-cleaning event, surface sample

Bottom Station Identification: BWB1-E1-B Sample depth: 2.2 m Time of Collection: 0910

Description: Boatwash basin pre-cleaning event, bottom sample

Tide: + 0.71 ft ↑

Weather conditions: breezy, overcast

Sea state & current direction: Basin conditions are calm.

Surface Water (1m) Physical Parameters	**pH**	**Salinity (ppt)**	**Temperature (°C)**	**Turbidity (NTU)**
Measurement:	8.54	33.41	22.89	0.88

Notes:
Niskin #1 , visibility to bottom of boatwash (3.3m)

FIELD WATER QUALITY DATA SHEET

Date: 07/17/2018

Surface Station Identification: BWB1-E2-T Sample depth: 1.0 m Time of Collection: 1100

Description: Boatwash basin post-cleaning, pre-vessel release, surface sample (1st boat of day)

Bottom Station Identification: BWB1-E2-B Sample depth: 2.2 m Time of Collection: 1105

Description: Boatwash basin pre-cleaning event, bottom sample (1st boat of day)

Tide: + 2.78 ft ↑

Weather conditions: sunny, windy

Sea state & current direction: calm BW basin conditions

Surface Water (1m) Physical Parameters	pH	Salinity (ppt)	Temperature (°C)	Turbidity (NTU)
Measurement:	8.45	33.37	22.83	3.00

Notes:

Boatwash started 1040
ended 1058

organic debris in basin

PORT OF SAN DIEGO
BOATWASH MONITORING
EVENT 1 - JULY 2018

FIELD WATER QUALITY DATA SHEET

Date: 07/17/2018

Surface Station Identification: BWB1-E3-T Sample depth: 1.0 m Time of Collection: 1130

Description: Boatwash basin post-vessel release, surface sample (1st boat of day)

Bottom Station Identification: BWB1-E3-B Sample depth: 2.2 m Time of Collection: 1138

Description: Boatwash basin post-vessel release, bottom sample (1st boat of day)

Tide: + 3.2 ft ↑

Weather conditions: Partly Cloudy; breezy

Sea state & current direction: Calm BW basin conditions

Surface Water (1m) Physical Parameters	**pH**	**Salinity (ppt)**	**Temperature (°C)**	**Turbidity (NTU)**
Measurement:	8.48	33.25	22.81	1.88

Notes:

Gate Came up at 1136

PORT OF SAN DIEGO
BOATWASH MONITORING
EVENT 1 - JULY 2018

FIELD WATER QUALITY DATA SHEET

Date: 07/17/2018

Surface Station Identification: BWB1-E3-T-REP Sample depth: 1.0 m Time of Collection: 1145

Description: Replicate sample

Bottom Station Identification: NA Sample depth: NA Time of Collection: NA

Description: NA

Tide: +3.2 ft ↑

Weather conditions: partly cloudy; breezy

Sea state & current direction: calm BW basin conditions

Surface Water (1m) Physical Parameters	pH	Salinity (ppt)	Temperature (°C)	Turbidity (NTU)
Measurement:	8.49	33.26	22.80	1.60

Notes:

PORT OF SAN DIEGO
BOATWASH MONITORING
EVENT 1 - JULY 2018

FIELD WATER QUALITY DATA SHEET

Date: 07/17/2018

Surface Station Identification: BWB1-E4-T Sample depth: 1.0 m Time of Collection: 1632

Description: Boatwash basin post-cleaning, pre-vessel release, surface sample (last boat of day)

Bottom Station Identification: BWB1-E4-B Sample depth: 2.2 m Time of Collection: 1638

Description: Boatwash basin post-cleaning, pre-vessel release, bottom sample (last boat of day)

Tide: +4 ft ↓

Weather conditions: Partly cloudy

Sea state & current direction: calm BW basin conditions

Surface Water (1m) Physical Parameters	pH	Salinity (ppt)	Temperature (°C)	Turbidity (NTU)
Measurement:	8.44	33.20	23.09	2.37

Notes:

Last cleaning started 1620

FIELD BLANK TAKEN AT 1500 (ID BW-FB)

PORT OF SAN DIEGO
BOATWASH MONITORING
EVENT 1 - JULY 2018

FIELD WATER QUALITY DATA SHEET

Date: 07/17/2018

Surface Station Identification: BWB1-E5-T Sample depth: 1.0 m Time of Collection: 1704

Description: Boatwash basin post-vessel release, surface sample (last boat of day)

Bottom Station Identification: BWB1-E5-B Sample depth: 2.2 m Time of Collection: 1712

Description: Boatwash basin post-vessel release, bottom sample (last boat of day)

Tide: +3.53^{ft}↓

Weather conditions: partly cloudy

Sea state & current direction: calm BW basin conditions

Surface Water (1m) Physical Parameters	**pH**	**Salinity (ppt)**	**Temperature (°C)**	**Turbidity (NTU)**
Measurement:	8.51	33.33	23.16	2.21

Notes:

Boatwash gate opened @ 1503

BASIN 2

PORT OF SAN DIEGO
BOATWASH MONITORING
EVENT 1 - JULY 2018

FIELD WATER QUALITY DATA SHEET

Date: 07/17/2018

Surface Station Identification: BWB2-E1-T Sample depth: 1.0 m Time of Collection: 0935

Description: Boatwash basin pre-cleaning event, surface sample

Bottom Station Identification: BWB2-E1-B Sample depth: 2.2 m Time of Collection: 0945 → ~~labeled as 0935 on bottles~~

Description: Boatwash basin pre-cleaning event, bottom sample

Tide: +1.09 ft ↑

Weather conditions: windy, over cast

Sea state & current direction: Boatwash is calm water.

Surface Water (1m) Physical Parameters	pH	Salinity (ppt)	Temperature (°C)	Turbidity (NTU)
Measurement:	8.49	33.40	22.87	1.66

Notes:

FIELD WATER QUALITY DATA SHEET

Date: 07/17/2018

Surface Station Identification: BWB2-E2-T Sample depth: 1.0 m Time of Collection: 1112

Description: Boatwash basin post-cleaning, pre-vessel release, surface sample (1st boat of day)

Bottom Station Identification: BWB2-E2-B Sample depth: 2.2 m Time of Collection: 1118

Description: Boatwash basin pre-cleaning event, bottom sample (1st boat of day)

Tide: +3.03ft↑

Weather conditions: windy, overcast

Sea state & current direction: calm in boatwash basin

Surface Water (1m) Physical Parameters	pH	Salinity (ppt)	Temperature (°C)	Turbidity (NTU)
Measurement:	8.43	33.24	22.78	1.28

Notes:

PORT OF SAN DIEGO
BOATWASH MONITORING
EVENT 1 - JULY 2018

FIELD WATER QUALITY DATA SHEET

Date: 07/17/2018

Surface Station Identification: BWB2-E3-T Sample depth: 1.0 m Time of Collection: ~~1159~~ 1152 -MS/MSP

Description: Boatwash basin post-vessel release, surface sample (1st boat of day)

Bottom Station Identification: BWB2-E3-B Sample depth: 2.2 m Time of Collection: ~~[illegible]~~ 1159

Description: Boatwash basin post-vessel release, bottom sample (1st boat of day)

Tide: +3.95ft ↑

Weather conditions: windy + overcast

Sea state & current direction: calm in BW basin

Surface Water (1m) Physical Parameters	pH	Salinity (ppt)	Temperature (°C)	Turbidity (NTU)
Measurement:	8.50	33.25	22.82	1.84

Notes:

PORT OF SAN DIEGO
BOATWASH MONITORING
EVENT 1 - JULY 2018

FIELD WATER QUALITY DATA SHEET

Date: 07/17/2018

Surface Station Identification: BWB2-E3-T-REP Sample depth: 1.0 m Time of Collection: 1210

Description: Replicate sample

Bottom Station Identification: NA Sample depth: NA Time of Collection: NA

Description: NA

Tide: +3.95ft ↑

Weather conditions: windy, partly cloudy

Sea state & current direction: calm in BW basin

Surface Water (1m) Physical Parameters	**pH**	**Salinity (ppt)**	**Temperature (°C)**	**Turbidity (NTU)**
Measurement:	8.50	33.25	22.82	1.88

Notes:

PORT OF SAN DIEGO
BOATWASH MONITORING
EVENT 1 - JULY 2018

FIELD WATER QUALITY DATA SHEET

Date: 07/17/2018

Surface Station Identification: BWB2-E4-T   Sample depth: 1.0 m   Time of Collection: 1646

Description: Boatwash basin post-cleaning, pre-vessel release, surface sample (last boat of day)

Bottom Station Identification: BWB2-E4-B   Sample depth: 2.2 m   Time of Collection: 1652

Description: Boatwash basin post-cleaning, pre-vessel release, bottom sample (last boat of day)

Tide: +3.78 ft ↓

Weather conditions: partly cloudy

Sea state & current direction: Calm in BW basin

Surface Water (1m) Physical Parameters	pH	Salinity (ppt)	Temperature (°C)	Turbidity (NTU)
Measurement:	8.46	33.22	23.06	2.02

Notes:

PORT OF SAN DIEGO
BOATWASH MONITORING
EVENT 1 - JULY 2018

FIELD WATER QUALITY DATA SHEET

Date: 07/17/2018

Surface Station Identification: BWB2-E5-T Sample depth: 1.0 m Time of Collection: 1723

Description: Boatwash basin post-vessel release, surface sample (last boat of day)

Bottom Station Identification: BWB2-E5-B Sample depth: 2.2 m Time of Collection: 1730

Description: Boatwash basin post-vessel release, bottom sample (last boat of day)

Tide: +3.32 ft ↓

Weather conditions: partly cloudy

Sea state & current direction: calm in BW basin

Surface Water (1m) Physical Parameters	pH	Salinity (ppt)	Temperature (°C)	Turbidity (NTU)
Measurement:	8.47	33.22	23.19	1.87

Notes:

Secchi depth = 1.1 m
vacuuming began at 1752
sample collected in Teflon bag ~4 L of volume
decanted 07/18 ~ 2.5 L of volume

GATE 1

PORT OF SAN DIEGO
BOATWASH MONITORING
EVENT 1 - JULY 2018

FIELD WATER QUALITY DATA SHEET

Date: 07/17/2018

Surface Station Identification: BWG1-E1-T Sample depth: 1.0 m Time of Collection: 0910

Description: Gate pre-cleaning event, surface sample

Bottom Station Identification: BWG1-E1-B Sample depth: 2.2 m Time of Collection: 0920

Description: Gate pre-cleaning event, bottom sample

Tide: +0.71 feet ↑

Weather conditions: light wind from W

Sea state & current direction: small ripples;

Surface Water (1m) Physical Parameters	pH	Salinity (ppt)	Temperature (°C)	Turbidity (NTU)
Measurement:	8.29	33.6	22.9	1.41

Notes: Breeze increased during sampling
slight drizzle periodically

Niskin #2

PORT OF SAN DIEGO
BOATWASH MONITORING
EVENT 1 - JULY 2018

FIELD WATER QUALITY DATA SHEET

Date: 07/17/2018

Surface Station Identification: BWG1-E2-T Sample depth: 1.0 m Time of Collection: 1160

Description: Gate post-cleaning, pre-vessel release, surface sample (1st boat of day)

Bottom Station Identification: BWG1-E2-B Sample depth: 2.2 m Time of Collection: 1105

Description: Gate pre-cleaning event, bottom sample (1st boat of day)

Tide: +2.78ft ↑

Weather conditions: windy N/NW

Sea state & current direction: Sm. ripples

Surface Water (1m) Physical Parameters	**pH**	**Salinity (ppt)**	**Temperature (°C)**	**Turbidity (NTU)**
Measurement:	8.4	33.7	22.9	1.49

Notes:

PORT OF SAN DIEGO
BOATWASH MONITORING
EVENT 1 - JULY 2018

FIELD WATER QUALITY DATA SHEET

Date: 07/17/2018

Surface Station Identification: BWG1-E3-T Sample depth: 1.0 m Time of Collection: 1130

Description: Gate post-vessel release, surface sample (1st boat of day)

Bottom Station Identification: BWG1-E3-B Sample depth: 2.2 m Time of Collection: 1140

Description: Gate post-vessel release, bottom sample (1st boat of day)

Tide: +3.2ft ↑

Weather conditions: windy N/NW

Sea state & current direction: sm. ripples

Surface Water (1m) Physical Parameters	**pH**	**Salinity (ppt)**	**Temperature (°C)**	**Turbidity (NTU)**
Measurement:	8.36	33.6	22.9	1.57

Notes:

PORT OF SAN DIEGO
BOATWASH MONITORING
EVENT 1 - JULY 2018

FIELD WATER QUALITY DATA SHEET

Date: 07/17/2018

Surface Station Identification: BWG1-E3-T-REP Sample depth: 1.0 m Time of Collection: 1150

Description: Replicate sample

Bottom Station Identification: NA Sample depth: NA Time of Collection: NA

Description: NA

Tide: +3.2ft ↑

Weather conditions: N/NW wind

Sea state & current direction: ptly sunny

Surface Water (1m) Physical Parameters	**pH**	**Salinity (ppt)**	**Temperature (°C)**	**Turbidity (NTU)**
Measurement:	8.36	33.6	22.9	1.77

Notes:

PORT OF SAN DIEGO
BOATWASH MONITORING
EVENT 1 - JULY 2018

FIELD WATER QUALITY DATA SHEET

Date: 07/17/2018

Surface Station Identification: BWG1-E4-T Sample depth: 1.0 m Time of Collection: 1630

Description: Gate post-cleaning, pre-vessel release, surface sample (last boat of day)

Bottom Station Identification: BWG1-E4-B Sample depth: 2.2 m Time of Collection: 1635

Description: Gate post-cleaning, pre-vessel release, bottom sample (last boat of day)

Tide: +4 ft ↓

Weather conditions: Windy N/NW; partly cloudy

Sea state & current direction: small ripples

Surface Water (1m) Physical Parameters	**pH**	**Salinity (ppt)**	**Temperature (°C)**	**Turbidity (NTU)**
Measurement:	8.54	33.6	23.6	1.60

Notes:

FIELD WATER QUALITY DATA SHEET

Date: 07/17/2018

Surface Station Identification: BWG1-E5-T Sample depth: 1.0 m Time of Collection: 1710

Description: Gate post-vessel release, surface sample (last boat of day)

Bottom Station Identification: BWG1-E5-B Sample depth: 2.2 m Time of Collection: 1715

Description: Gate post-vessel release, bottom sample (last boat of day)

Tide: +3.41 ft ↓

Weather conditions: windy, N/NW

Sea state & current direction: small ripples

Surface Water (1m) Physical Parameters	pH	Salinity (ppt)	Temperature (°C)	Turbidity (NTU)
Measurement:	8.33	33.6	23.5	1.21

Notes:

GATE 2

PORT OF SAN DIEGO
BOATWASH MONITORING
EVENT 1 - JULY 2018

FIELD WATER QUALITY DATA SHEET

Date: 07/17/2018

Surface Station Identification: BWG2-E1-T Sample depth: 1.0 m Time of Collection: 0935

Description: Gate ~~post-vessel release,~~ pre-cleaning surface sample (~~1st boat of day~~) kg

Bottom Station Identification: BWG2-E1-B Sample depth: 2.2 m Time of Collection: 0945

Description: Gate ~~post-vessel release,~~ pre-cleaning bottom sample (~~1st boat of day~~) kg

Tide: 1.09 ft ↑

Weather conditions: breeze from N/NW

Sea state & current direction: sm. ripples.

Surface Water (1m) Physical Parameters	pH	Salinity (ppt)	Temperature (°C)	Turbidity (NTU)
Measurement:	8.34	33.4	22.8	1.61

Notes:

PORT OF SAN DIEGO
BOATWASH MONITORING
EVENT 1 - JULY 2018

FIELD WATER QUALITY DATA SHEET

Date: 07/17/2018

Surface Station Identification: BWG2-E2-T Sample depth: 1.0 m Time of Collection: 1115

Description: vessel release kg
Gate pre-~~cleaning event~~, surface sample (1st boat of day)

Bottom Station Identification: BWG2-E1-B Sample depth: 2.2 m Time of Collection: 1120

Description: vessel release kg
Gate pre-~~cleaning event~~, bottom sample (1st boat of day)

Tide: +3.03 ft ↑

Weather conditions: windy N NW

Sea state & current direction: sm. currents

Surface Water (1m) Physical Parameters	pH	Salinity (ppt)	Temperature (°C)	Turbidity (NTU)
Measurement:	8.35	33.5	22.8	1.43

Notes:

PORT OF SAN DIEGO
BOATWASH MONITORING
EVENT 1 - JULY 2018

FIELD WATER QUALITY DATA SHEET

Date: 07/17/2018

Surface Station Identification: BWG2-E3-T Sample depth: 1.0 m Time of Collection: 1200

Description: Gate post-~~cleaning~~ vessel release kg, ~~pre vessel release~~, surface sample (1st boat of day)

Bottom Station Identification: BWG2-E3-B kg Sample depth: 2.2 m Time of Collection:

Description: Gate ~~pre-cleaning event~~ post-vessel release kg, bottom sample (1st boat of day) 1205

Tide: +3.95ft↑

Weather conditions: ptly sunny windy N/NW

Sea state & current direction: SM. Ripples

Surface Water (1m) Physical Parameters	pH	Salinity (ppt)	Temperature (°C)	Turbidity (NTU)
Measurement:	8.3	33.7	22.8	1.18

Notes:

FIELD WATER QUALITY DATA SHEET

Date: 07/17/2018

Surface Station Identification: BWG2-E3-T-REP Sample depth: 1.0 m Time of Collection: 1210

Description: Replicate sample

Bottom Station Identification: NA Sample depth: NA Time of Collection: NA

Description: NA

Tide: +3.95ft ↑

Weather conditions: ptly sunny Wind N/NW

Sea state & current direction: SM. ripples

Surface Water (1m) Physical Parameters	pH	Salinity (ppt)	Temperature (°C)	Turbidity (NTU)
Measurement:	8.3	33.7	22.8	1.44

Notes:

PORT OF SAN DIEGO
BOATWASH MONITORING
EVENT 1 - JULY 2018

FIELD WATER QUALITY DATA SHEET

Date: 07/17/2018

Surface Station Identification: BWG2-E4-T Sample depth: 1.0 m Time of Collection: 1645

Description: Gate post-cleaning, pre-vessel release, surface sample (last boat of day)

Bottom Station Identification: BWG2-E4-B Sample depth: 2.2 m Time of Collection: 1650

Description: Gate post-cleaning, pre-vessel release, bottom sample (last boat of day)

Tide: +3.78 ft ↓

Weather conditions: Windy, N/NW; partly cloudy

Sea state & current direction: SM. Ripples

Surface Water (1m) Physical Parameters	**pH**	**Salinity (ppt)**	**Temperature (°C)**	**Turbidity (NTU)**
Measurement:	8.3	33.6	23.7	1.04

Notes:

FIELD WATER QUALITY DATA SHEET

Date: 07/17/2018

Surface Station Identification: BWG2-E5-T Sample depth: 1.0 m Time of Collection: 1725

Description: Gate post-vessel release, surface sample (last boat of day)

Bottom Station Identification: BWG2-E5-B Sample depth: 2.2 m Time of Collection: 1735

Description: Gate post-vessel release, bottom sample (last boat of day)

Tide: + 3.32ft ↓

Weather conditions: windy; N/NW

Sea state & current direction: Small ripples

Surface Water (1m) Physical Parameters	pH	Salinity (ppt)	Temperature (°C)	Turbidity (NTU)
Measurement:	8.3	33.6	23.6	1.35

Notes:

PORT OF SAN DIEGO
BOATWASH MONITORING
EVENT 2 - AUGUST 2018

FIELD WATER QUALITY DATA SHEET

Date: 08/16/2018

Surface Station Identification: Niskin-1-ER
Sample depth: N/A
Time of Collection: 09:20

Description: Equipment rinsate

Bottom Station Identification: N/A
Sample depth: N/A
Time of Collection: N/A

Description: N/A

Tide: N/A

Weather conditions: cloudy, calm wind: 0-2 mph

Sea state & current direction: calm

Surface Water (1m) Physical Parameters	**pH**	**Salinity (ppt)**	**Temperature (°C)**	**Turbidity (NTU)**
Measurement:	N/A	N/A	N/A	N/A

Notes:

PORT OF SAN DIEGO
BOATWASH MONITORING
EVENT 2 - AUGUST 2018

FIELD WATER QUALITY DATA SHEET

Date: 08/16/2018

Surface Station Identification: E1-Gate-1-Top
Sample depth: 1.0 m
Time of Collection: 0945

Description: Boatwash gate station 1, no cleaning event, surface sample

Bottom Station Identification: E1-Gate-1-Bottom
Sample depth: 2.2 m
Time of Collection: 0950

Description: Boatwash gate station 1, no cleaning event, bottom sample

Tide: + 2.62 ↑

Weather conditions: overcast and humid, calm conditions

Sea state & current direction: calm water, current flowing NW

Surface Water (1m) Physical Parameters	**pH**	**Salinity (ppt)**	**Temperature (°C)**	**Turbidity (NTU)**	SP COND
Measurement:	7.79	33.69	23.8	1.67	51273

Notes:

PORT OF SAN DIEGO
BOATWASH MONITORING
EVENT 2 - AUGUST 2018

FIELD WATER QUALITY DATA SHEET

Date: 08/16/2018

Surface Station Identification: E1-Gate-2-Top Sample depth: 1.0 m Time of Collection: 0955

Description: Boatwash gate station 2, no cleaning event, surface sample

Bottom Station Identification: E1-Gate-2-Bottom Sample depth: 2.2 m Time of Collection: 1000

Description: Boatwash gate station 2, no cleaning event, bottom sample

Tide: +2.74 ft ↑

Weather conditions: over cast and humid, calm conditions

Sea state & current direction: calm water, current flowing NW

Surface Water (1m) Physical Parameters	pH	Salinity (ppt)	Temperature (°C)	Turbidity (NTU)	SP. COND
Measurement:	7.83	33.74	23.8	1.72	51372

Notes:

PORT OF SAN DIEGO
BOATWASH MONITORING
EVENT 2 - AUGUST 2018

FIELD WATER QUALITY DATA SHEET

Date: 08/16/2018

Surface Station Identification: E1-Basin-1-Top* Sample depth: 1.0 m Time of Collection: 1050

Description: Boatwash basin station 1, no cleaning event, surface sample

Bottom Station Identification: E1-Basin-1-Bottom Sample depth: 2.2 m Time of Collection: 1100

Description: Boatwash basin station 1, no cleaning event, bottom sample

Tide: + 3.51 ft ↑

Weather conditions: warm, humid, + overcast

Sea state & current direction: calm in basin

Surface Water (1m) Physical Parameters	pH	Salinity (ppt)	Temperature (°C)	Turbidity (NTU)	SP COND
Measurement:	7.82	33.70	23.8	1.03	51279

Notes:

*Extra volume taken for MS/MSD at top station.

- can see to bottom of basin
- 1045 → sanding at other side of transient dock.

PORT OF SAN DIEGO
BOATWASH MONITORING
EVENT 2 - AUGUST 2018

FIELD WATER QUALITY DATA SHEET

Date: 08/16/2018

Surface Station Identification: E1-Basin-1-Top-REP Sample depth: 1.0 m Time of Collection: 1055

Description: Boatwash basin station 1, no cleaning event, surface replicate sample

Bottom Station Identification: N/A Sample depth: N/A Time of Collection: N/A

Description: N/A

Tide: + 3.61 ft ↑

Weather conditions: warm, humid, and over cast

Sea state & current direction: calm in BW basin

Surface Water (1m) Physical Parameters	pH	Salinity (ppt)	Temperature (°C)	Turbidity (NTU)	SP cnd
Measurement:	7.81	33.69	24.0	0.73	51289

Notes:

Date: 08/16/2018

PORT OF SAN DIEGO
BOATWASH MONITORING
EVENT 2 - AUGUST 2018

DATE: 8/16/2015

FIELD WATER QUALITY DATA SHEET

Surface Station Identification: E1-Basin-2-Top   Sample depth: 1.0 m   Time of Collection: 1110

Description: Boatwash basin station 2, no cleaning event, surface sample

Bottom Station Identification: E1-Basin-2-Bottom   Sample depth: 2.2 m   Time of Collection: 1115

Description: Boatwash basin station 2, no cleaning event, bottom sample

Tide: +3.83↑

Weather conditions: warm + sunny, calm, 1-2 mph winds

Sea state & current direction: calm in basn.

Surface Water (1m) Physical Parameters	**pH**	**Salinity (ppt)**	**Temperature (°C)**	**Turbidity (NTU)**	Sp. Cond
Measurement:	781	33.68	23.9	1.07	51259

Notes:

FIELD WATER QUALITY DATA SHEET

Date: 08/16/2018

Surface Station Identification: Field Blank
Sample depth: N/A
Time of Collection: 1150

Description: Field Blank

Bottom Station Identification: N/A
Sample depth: N/A
Time of Collection: N/A

Description: N/A

Tide: N/A

Weather conditions: warm, sunny, calm

Sea state & current direction: N/A

Surface Water (1m) Physical Parameters	pH	Salinity (ppt)	Temperature (°C)	Turbidity (NTU)
Measurement:	N/A	N/A	N/A	N/A

Notes:

Collection Event: **Event 1 (No boatwashing activity)** **Date/Time:** 8/16/2018

Mark each box with Y, N, or NA

Field Procedures

1. Upon arriving at the sampling location, the following site observations are being recorded:

Tide recorded	Y
Weather conditions recorded	Y
Times of samples recorded	Y
General site observations recorded	Y

2. Sampling procedures:

Field staff wearing fresh, powder free nitrile gloves	Y
Sampling depths delineated on sampling instrument with a clear marking	Y
Sampling depth recorded	Y
SWAMP protocols utilized to avoid sample contamination (i.e., clean hands/dirty hands technique)	Y
Samples bottles and containers are the correct type in accordance with QAPP	Y
Sample bottles correctly labeled and match the station identification	Y
Sample bottles correctly labeled with date and time	Y
Bottles filled in the following order: metals, TSS, toxicity	Y
Staff avoided contaminating samples at all times	Y
pH, salinity, temperature, and turbidity readings taken?	Y
Equipment rinsate blank and field blank have been collected (if applicable)	Y
Site replicate (i.e., duplicate) collected (if applicable)	Y

3. PPE properly removed and disposed of upon station completion ________

4. Data Recording:

Field notes have been recorded for this site before moving to the next	Y
Water samples properly logged on COC form	Y

5. Sample Storage:

Water samples properly stored on ice in a cooler	Y
Water samples grouped in separate plastic bag	Y

Additional Notes:

Signature of QA/QC Personnel:

Date/Time 8/16/2018

Print Name/Company: Corey Sheredy

EVENT 2 (DIVER CLEANING)
FIELD DATA SHEETS

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
DIVER CLEANING
OCTOBER 23, 2018

FIELD WATER QUALITY DATA SHEET

Date: 10/23/2018

Surface Station Identification: GATE 1-Top-T0 Sample depth: 1.0 m Time of Collection: 0700

Description: Gate pre-cleaning event, surface sample

Bottom Station Identification: GATE 1-Bottom - T0 Sample depth: 2.2 m Time of Collection: 0705

Description: Gate pre-cleaning event, bottom sample

Tide: +5.17 ft ↑

Weather conditions: calm, overcast

Sea state & current direction: calm

Surface Water (1m) Physical Parameters	pH	Salinity (ppt)	Temperature (°C)	Turbidity (NTU)
Measurement:	7.94	31.26	19.5	1.27

SPC
47916

Notes: Niskin #1 used for all Gate collections.
Niskin-1-ER taken on 10/22/2018 at 1900.

Secchi depth: 3.2 m

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
DIVER CLEANING
OCTOBER 23, 2018

FIELD WATER QUALITY DATA SHEET

Date: 10/23/2018

Surface Station Identification: GATE 2-Top-T0 Sample depth: 1.0 m Time of Collection: ~~0710~~ 0725

Description: Gate pre-cleaning event, surface sample

Bottom Station Identification: GATE 2-Bottom - T0 Sample depth: 2.2 m Time of Collection: ~~0715~~ 0730

Description: Gate pre-cleaning event, bottom sample

Tide: +5.58 ft ↑

Weather conditions: overcast, calm

Sea state & current direction: calm

Surface Water (1m) Physical Parameters	pH	Salinity (ppt)	Temperature (°C)	Turbidity (NTU)
Measurement:	7.98	33.80	19.3	1.13

SPC
51332

Notes:

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
DIVER CLEANING
OCTOBER 23, 2018

FIELD WATER QUALITY DATA SHEET

Date: 10/23/2018

Surface Station Identification: BASIN 1-Top-T0 Sample depth: 1.0 m Time of Collection: 0700

Description: Basin pre-cleaning event, surface sample

Bottom Station Identification: BASIN 1-Bottom -T0 Sample depth: 2.2 m Time of Collection: 0705

Description: Basin pre-cleaning event, bottom sample

Tide: +5.17ft ↑

Weather conditions: overcast, slight breeze

Sea state & current direction: calm

Surface Water (1m) Physical Parameters	pH	Salinity (ppt)	Temperature (°C)	Turbidity (NTU)	SPC
Measurement:	7.94	32.54	19.5	0.84	NR

Notes: Niskin #3 used for all Basin collections. Niskin-2-ER (Equip Rinsate) taken on 10/22 at 1920.

Secchi depth: can see basin bottom.

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
DIVER CLEANING
OCTOBER 23, 2018

FIELD WATER QUALITY DATA SHEET

Date: 10/23/2018

Surface Station Identification: BASIN 2-Top-T0 Sample depth: 1.0 m Time of Collection: 0710

Description: Basin pre-cleaning event, surface sample

Bottom Station Identification: BASIN 2-Bottom-T0 Sample depth: 2.2 m Time of Collection: 0715

Description: Basin pre-cleaning event, bottom sample

Tide: + 5.44 ft T

Weather conditions: overcast, light breeze

Sea state & current direction: calm

Surface Water (1m) Physical Parameters	**pH**	**Salinity (ppt)**	**Temperature (°C)**	**Turbidity (NTU)**
Measurement:	7.97	33.42	19.5	1.03

SPC
NR

Notes:

Secchi depth:

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
DIVER CLEANING
OCTOBER 23, 2018

FIELD WATER QUALITY DATA SHEET

Date: 10/23/2018

Surface Station Identification: GATE 1-Top -T1 Sample depth: 1.0 m Time of Collection: 0930

Description: Gate post-cleaning, pre-vessel release, surface sample (1st boat of day)

Bottom Station Identification: GATE 1-Bottom - T1 Sample depth: 2.2 m Time of Collection: 0935

Description: Gate post-cleaning, pre-vessel release, bottom sample (1st boat of day)

Tide: + 6.31 ft ↓

Weather conditions: Over cast, windy, water moving out of basin

Sea state & current direction: calm

Surface Water (1m) Physical Parameters	pH	Salinity (ppt)	Temperature (°C)	Turbidity (NTU)
Measurement:	8.01	33.81	19.5	1.09

Notes:

First cleaning starts: 0910
ended: 0935

* actual sample collected at 0935

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
DIVER CLEANING
OCTOBER 23, 2018

FIELD WATER QUALITY DATA SHEET

Date: 10/23/2018

Surface Station Identification: GATE 2-Top -T1 Sample depth: 1.0 m Time of Collection: 0945

Description: Gate post-cleaning, pre-vessel release, surface sample (1st boat of day)

Bottom Station Identification: GATE 2-Bottom - T1 Sample depth: 2.2 m Time of Collection: 0950

Description: Gate post-cleaning, pre-vessel release, bottom sample (1st boat of day)

Tide: +6.15 ft ↓

Weather conditions: partly cloudy + breezy

Sea state & current direction: calm

Surface Water (1m) Physical Parameters	**pH**	**Salinity (ppt)**	**Temperature (°C)**	**Turbidity (NTU)**
Measurement:	799	33.85	19.6	1.54

Notes:

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
DIVER CLEANING
OCTOBER 23, 2018

FIELD WATER QUALITY DATA SHEET

Date: 10/23/2018

Surface Station Identification: BASIN 1-Top -T1 Sample depth: 1.0 m Time of Collection: 0930

Description: Basin post-cleaning, pre-vessel release, surface sample (1st boat of day)

Bottom Station Identification: BASIN 1-Bottom -T1 Sample depth: 2.2 m Time of Collection: 0935

Description: Basin post-cleaning, pre-vessel release, bottom sample (1st boat of day)

Tide: +6.31ft ↓

Weather conditions: overcast, slightly windy

Sea state & current direction: mostly calm, pushing out of the basin

Surface Water (1m) Physical Parameters	**pH**	**Salinity (ppt)**	**Temperature (°C)**	**Turbidity (NTU)**
Measurement:	7.96	33.45	19.5	0.91

SPC 50929

Notes:

First clean start: 0910
end:

* Hull cleaner at South end of transient dock @0910

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
DIVER CLEANING
OCTOBER 23, 2018

FIELD WATER QUALITY DATA SHEET

Date: 10/23/2018

Surface Station Identification: BASIN 2-Top -T1 Sample depth: 1.0 m Time of Collection: 0945

Description: Basin post-cleaning, pre-vessel release, surface sample (1st boat of day)

Bottom Station Identification: BASIN 2-Bottom -T1 Sample depth: 2.2 m Time of Collection: 0950

Description: Basin post-cleaning, pre-vessel release, surface sample (1st boat of day)

Tide: +6.15 ft ↓

Weather conditions: partly cloudy, slight breeze

Sea state & current direction: calm

Surface Water (1m) Physical Parameters	**pH**	**Salinity (ppt)**	**Temperature (°C)**	**Turbidity (NTU)**
Measurement:	7.98	33.50	19.5	1.15

SPC
50946

Notes:

FIELD WATER QUALITY DATA SHEET

Date: 10/23/2018

Surface Station Identification: GATE 1-Top -T2 Sample depth: 1.0 m Time of Collection: 1010

Description: Gate post-vessel release, surface sample (1st boat of day)

Bottom Station Identification: GATE 1-Bottom - T2 Sample depth: 2.2 m Time of Collection: 1015

Description: Gate post-vessel release, bottom sample (1st boat of day)

Tide: +5.86ft ↓

Weather conditions: Sunny + warm

Sea state & current direction: Calm, no ripples or swell

Surface Water (1m) Physical Parameters	pH	Salinity (ppt)	Temperature (°C)	Turbidity (NTU)
Measurement:	8.01	33.86	19.5	1.04

Notes:

vessel released at 1010

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
DIVER CLEANING
OCTOBER 23, 2018

FIELD WATER QUALITY DATA SHEET

Date: 10/23/2018

Surface Station Identification: GATE 1-Top -T2-REP Sample depth: 1.0 m Time of Collection: 1020

Description: Replicate sample

Bottom Station Identification: NA Sample depth: NA Time of Collection: NA

Description: NA

Tide: +5.81 ft ↓

Weather conditions: sunny +warm

Sea state & current direction: calm

Surface Water (1m) Physical Parameters	pH	Salinity (ppt)	Temperature (°C)	Turbidity (NTU)
Measurement:	8.01	33.89	19.5	1.12

Notes:

FIELD WATER QUALITY DATA SHEET

Date: 10/23/2018

Surface Station Identification: GATE 2-Top -T2 Sample depth: 1.0 m Time of Collection: 1030

Description: Gate post-vessel release, surface sample (1st boat of day)

Bottom Station Identification: GATE 2-Bottom - T2 Sample depth: 2.2 m Time of Collection: 1035

Description: Gate post-vessel release, bottom sample (1st boat of day)

Tide: +5.58 ft ↓

Weather conditions: sunny + warm

Sea state & current direction: calm

Surface Water (1m) Physical Parameters	pH	Salinity (ppt)	Temperature (°C)	Turbidity (NTU)
Measurement:	8.00	33.85	19.6	1.01

Notes:

wind picked up at 1040!

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
DIVER CLEANING
OCTOBER 23, 2018

FIELD WATER QUALITY DATA SHEET

Date: 10/23/2018

Surface Station Identification: BASIN 1-Top -T2 Sample depth: 1.0 m Time of Collection: 1010

Description: Basin post-vessel release, surface sample (1st boat of day)

Bottom Station Identification: BASIN 1-Bottom -T2 Sample depth: 2.2 m Time of Collection: 1015

Description: Basin post-vessel release, bottom sample (1st boat of day)

✓

Tide: + 5.86ft↓

Weather conditions: mostly sunny

Sea state & current direction: calm

Surface Water (1m) Physical Parameters	**pH**	**Salinity (ppt)**	**Temperature (°C)**	**Turbidity (NTU)**	SpC
Measurement:	7.98	33.52	19.5	1.21	50959

Notes:

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
DIVER CLEANING
OCTOBER 23, 2018

FIELD WATER QUALITY DATA SHEET

Date: 10/23/2018

Surface Station Identification: BASIN 1-Top -T2-REP Sample depth: 1.0 m Time of Collection: 1020

Description: Replicate sample

Bottom Station Identification: NA Sample depth: NA Time of Collection: NA

Description: NA

Tide: +5.81 ft ↓

Weather conditions: mostly sunny

Sea state & current direction: calm

Surface Water (1m) Physical Parameters	**pH**	**Salinity (ppt)**	**Temperature (°C)**	**Turbidity (NTU)**	SPC.
Measurement:	7.97	33.49	19.5	0.84	50950

Notes:

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
DIVER CLEANING
OCTOBER 23, 2018

FIELD WATER QUALITY DATA SHEET

Date: 10/23/2018

Surface Station Identification: BASIN 2-Top -T2 Sample depth: 1.0 m Time of Collection: 1025

Description: Basin post-vessel release, surface sample (1st boat of day)

Bottom Station Identification: BASIN 2-Bottom -T2 Sample depth: 2.2 m Time of Collection: 1030

Description: Basin post-vessel release, bottom sample (1st boat of day)

Tide: +5.71 ft ↓

Weather conditions: mostly sunny

Sea state & current direction: calm

Surface Water (1m) Physical Parameters	pH	Salinity (ppt)	(°C)	Turbidity (NTU)	SPC
Measurement:	7.99	33.49	19.5	0.93	50942

Notes:

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
DIVER CLEANING
OCTOBER 23, 2018

FIELD WATER QUALITY DATA SHEET

Date: 10/23/2018

Surface Station Identification: GATE 1-Top -T3 Sample depth: 1.0 m Time of Collection: 1515

Description: Gate post-cleaning, pre-vessel release, surface sample (last boat of day)

Bottom Station Identification: GATE 1-Bottom-T3 Sample depth: 2.2 m Time of Collection: 1520

Description: Gate post-cleaning, pre-vessel release, bottom sample (last boat of day)

Tide: 0.73ft ↑

Weather conditions: overcast + windy

Sea state & current direction: small ripples, otherwise calm

Surface Water (1m) Physical Parameters	pH	Salinity (ppt)	Temperature (°C)	Turbidity (NTU)
Measurement:	8.11	33.87	20.1	NR

Notes:

Field Blank collected 10/23 at 1330

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
DIVER CLEANING
OCTOBER 23, 2018

FIELD WATER QUALITY DATA SHEET

Date: 10/23/2018

Surface Station Identification: GATE 2-Top -T3 Sample depth: 1.0 m Time of Collection: 1530

Description: Gate post-cleaning, pre-vessel release, surface sample (last boat of day)

Bottom Station Identification: GATE 2-Bottom-T3 Sample depth: 2.2 m Time of Collection: 1535

Description: Gate post-cleaning, pre-vessel release, bottom sample (last boat of day)

Tide: +0.79 ft ↑

Weather conditions: overcast + windy

Sea state & current direction: small ripples, otherwise calm

Surface Water (1m) Physical Parameters	pH	Salinity (ppt)	Temperature (°C)	Turbidity (NTU)
Measurement:	8.11	33.88	20.1	NR

Notes:

Last cleaning complete at 1505 (samples taken starting at 1505 but labeled w 1515, etc...

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
DIVER CLEANING
OCTOBER 23, 2018

FIELD WATER QUALITY DATA SHEET

Date: 10/23/2018

Surface Station Identification: BASIN 1-Top -T3 Sample depth: 1.0 m Time of Collection: 1515

Description: Basin post-cleaning, pre-vessel release, surface sample (last boat of day)

Bottom Station Identification: BASIN 1-Bottom-T3 Sample depth: 2.2 m Time of Collection: 1520

Description: Basin post-cleaning, pre-vessel release, bottom sample (last boat of day)

Tide: +0.73 ft ↑

Weather conditions: overcast, breezy

Sea state & current direction: calm

Surface Water (1m) Physical Parameters	**pH**	**Salinity (ppt)**	**Temperature (°C)**	**Turbidity (NTU)**	SpC
Measurement:	8.00	33.53	19.8	0.75	50977

Notes:

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
DIVER CLEANING
OCTOBER 23, 2018

FIELD WATER QUALITY DATA SHEET

Date: 10/23/2018

Surface Station Identification: BASIN 2-Top -T3 Sample depth: 1.0 m Time of Collection: 1525

Description: Basin post-cleaning, pre-vessel release, surface sample (last boat of day)

Bottom Station Identification: BASIN 2-Bottom-T3 Sample depth: 2.2 m Time of Collection: 1530

Description: Basin post-cleaning, pre-vessel release, bottom sample (last boat of day)

Tide: + 0.77 ft T

Weather conditions: overcast, breezy

Sea state & current direction: calm

Surface Water (1m) Physical Parameters	**pH**	**Salinity (ppt)**	**Temperature (°C)**	**Turbidity (NTU)**	Spc
Measurement:	8.03	33.54	19.9	1.05	51000

Notes:

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
DIVER CLEANING
OCTOBER 23, 2018

FIELD WATER QUALITY DATA SHEET

Date: 10/23/2018

Surface Station Identification: GATE 1-Top -T4 Sample depth: 1.0 m Time of Collection: 15 ~~13~~40

Description: Gate post-vessel release, surface sample (last boat of day)

Bottom Station Identification: GATE 1-Bottom-T4 Sample depth: 2.2 m Time of Collection: 15 ~~13~~45

Description: Gate post-vessel release, bottom sample (last boat of day)

Tide: + 0.79 ft ↑

Weather conditions: overcast + windy

Sea state & current direction: ripples

Surface Water (1m) Physical Parameters	pH	Salinity (ppt)	Temperature (°C)	Turbidity (NTU)
Measurement:	8.11	33.86	20.0	NR

Notes:

Boat released at 1540

Secchi depth: 2.6 m

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
DIVER CLEANING
OCTOBER 23, 2018

FIELD WATER QUALITY DATA SHEET

Date: 10/23/2018

Surface Station Identification: GATE 2-Top -T4 Sample depth: 1.0 m Time of Collection: 15 ~~13~~50

Description: Gate post-vessel release, surface sample (last boat of day)

Bottom Station Identification: GATE 2-Bottom-T4 Sample depth: 2.2 m Time of Collection: 15 ~~13~~55

Description: Gate post-vessel release, bottom sample (last boat of day)

Tide: +0.81ft ↑

Weather conditions: overcast + windy

Sea state & current direction: some small ripples, headed out of mouth

Surface Water (1m) Physical Parameters	pH	Salinity (ppt)	Temperature (°C)	Turbidity (NTU)
Measurement:	8.13	33.94	19.9	NR ~~19.9~~

Notes:

COMPOSITE SAMPLE TAKEN @ : 1640

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
DIVER CLEANING
OCTOBER 23, 2018

FIELD WATER QUALITY DATA SHEET

Date: 10/23/2018

Surface Station Identification: BASIN 1-Top -T4 Sample depth: 1.0 m Time of Collection: 1540

Description: Basin post-vessel release, surface sample (last boat of day)

Bottom Station Identification: BASIN 1-Bottom-T4 Sample depth: 2.2 m Time of Collection: 1545

Description: Basin post-vessel release, bottom sample (last boat of day)

Tide: +0.79ft↑

Weather conditions: overcast, breezy.

Sea state & current direction: calm

Surface Water (1m) Physical Parameters	pH	Salinity (ppt)	Temperature (°C)	Turbidity (NTU)
Measurement:	8.03	33.55	19.8	1.09

SPC
51007

Notes:

Secchi depth: 2.6 m

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
DIVER CLEANING
OCTOBER 23, 2018

FIELD WATER QUALITY DATA SHEET

Date: 10/23/2018

Surface Station Identification: BASIN 2-Top -T4 Sample depth: 1.0 m Time of Collection: 1550

Description: Basin post-vessel release, surface sample (last boat of day)

Bottom Station Identification: BASIN 2-Bottom-T4 Sample depth: 2.2 m Time of Collection: 1555

Description: Basin post-vessel release, bottom sample (last boat of day)

Tide: +0.81 ft T

Weather conditions: overcast, breezy

Sea state & current direction: calm

Surface Water (1m) Physical Parameters	pH	Salinity (ppt)	Temperature (°C)	Turbidity (NTU)	SPC
Measurement:	8.26	33.59	19.8	NR	51077

Notes:

SEDIMENT COMPOSITE COLLECTED AT 1640
(SEE BACK OF DATASHEET FOR TRASECTS)
APPROX VOLUME:

~~Secchi depth:~~ ?

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
DIVER CLEANING
OCTOBER 23, 2018

FIELD WATER QUALITY DATA SHEET

Date: 10/23/2018

Surface Station Identification: GATE 1-Top –T5 Sample depth: 1.0 m Time of Collection: 1740

Description: 2 hours post-cleaning event samples (T0-T4); surface sample

Bottom Station Identification: GATE 1-Bottom –T5 Sample depth: 2.2 m Time of Collection: 1745

Description: 2 hours post-cleaning event samples (T0-T4); bottom sample

Tide: +2.61 ft ↑

Weather conditions: overcast, slightly breezy

Sea state & current direction: calm, no current noticable

Surface Water (1m) Physical Parameters	pH	Salinity (ppt)	Temperature (°C)	Turbidity (NTU)
Measurement:	8.07	33.90	19.8	See Secchi depth

Notes:

Secchi depth: 2.8 m

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
DIVER CLEANING
OCTOBER 23, 2018

FIELD WATER QUALITY DATA SHEET

Date: 10/23/2018

Surface Station Identification: GATE 2-Top –T5 Sample depth: 1.0 m Time of Collection: 1755

Description: 2 hours post-cleaning event samples (T0-T4); surface sample

Bottom Station Identification: GATE 2-Bottom –T5 Sample depth: 2.2 Time of Collection: 1800

Description: 2 hours post-cleaning event samples (T0-T4); bottom sample

Tide: + 2.82 ft ↑

Weather conditions: Same as Gate 1

Sea state & current direction: Same as Gate 1

Surface Water (1m) Physical Parameters	pH	Salinity (ppt)	Temperature (°C)	Turbidity (NTU)
Measurement:	8.06	33.90	19.8	see secchi depth

Notes:

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
DIVER CLEANING
OCTOBER 23, 2018

FIELD WATER QUALITY DATA SHEET

Date: 10/23/2018

Surface Station Identification: BASIN 1-Top-T5 Sample depth: 1.0 m Time of Collection: 1740

Description: 2 hours post-cleaning event samples (T0-T4); surface sample

Bottom Station Identification: BASIN 1-Bottom –T5 Sample depth: 2.2 m Time of Collection: 1745

Description: 2hours post-cleaning event samples (T0-T4); bottom sample

Tide: +2.61ft ↑

Weather conditions: overcast, slight breeze

Sea state & current direction: calm

Surface Water (1m) Physical Parameters	pH	Salinity (ppt)	Temperature (°C)	Turbidity (NTU)	SPC
Measurement:	8.04	33.53	19.8	see secchi depth	50988

Notes:

Secchi depth: 2.6m

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
DIVER CLEANING
OCTOBER 23, 2018

FIELD WATER QUALITY DATA SHEET

Date: 10/23/2018

Surface Station Identification: BASIN 2-Top –T5 Sample depth: 1.0 m Time of Collection: 1750

Description: 2 hours post-cleaning event samples (T0-T4); surface sample

Bottom Station Identification: BASIN 2-Bottom –T5 Sample depth: 2.2 m Time of Collection: 1755

Description: 2 hours post-cleaning event samples (T0-T4); bottom sample

Tide: +2.82 ft ↑

Weather conditions: overcast, slight breeze

Sea state & current direction: calm

Surface Water (1m) Physical Parameters	**pH**	**Salinity (ppt)**	**Temperature (°C)**	**Turbidity (NTU)**
Measurement:	8.04	33.54	19.8	see secchi depth

Spc

51000

Notes:

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
DIVER CLEANING FOLLOW-UP
OCTOBER 24, 2018

FIELD WATER QUALITY DATA SHEET

Date: 10/24/2018

Surface Station Identification: GATE 1-Top -P1 Sample depth: 1.0 m Time of Collection: 1025

Description: Boatwash gate station 1; one day post-diver cleaning; surface sample

Bottom Station Identification: GATE 1-Bottom -P1 Sample depth: 2.2 m Time of Collection: 10 30

Description: Boatwash gate station 1; one day post-diver cleaning; bottom sample

Tide: +6.17 ft↓

Weather conditions: sunny w/ some overcast, calm

Sea state & current direction: calm

Surface Water (1m) Physical Parameters	pH	Salinity (ppt)	Temperature (°C)	Turbidity (NTU)
Measurement:	7.95	33.40	19.7	0.66

Notes:

secchi depth: 2.9m

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
DIVER CLEANING FOLLOW-UP
OCTOBER 24, 2018

FIELD WATER QUALITY DATA SHEET

Date: 10/24/2018

Surface Station Identification: GATE 2-Top -P1 Sample depth: 1.0 m Time of Collection: 1035

Description: Boatwash gate station 2; one day post-diver cleaning; surface sample

Bottom Station Identification: GATE 2-Bottom - P1 Sample depth: 2.2 m Time of Collection: 1040

Description: Boatwash gate station 2; one day post-diver cleaning; bottom sample

Tide: +6 ft ↓

Weather conditions: See GATE 1

Sea state & current direction: See GATE 1

Surface Water (1m) Physical Parameters	pH	Salinity (ppt)	Temperature (°C)	Turbidity (NTU)
Measurement:	7.55	33.33 ~~32.69~~	19.7	0.75

Notes:

*Niskin #B used for all follow up sampling events.

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
DIVER CLEANING FOLLOW-UP
OCTOBER 24, 2018

FIELD WATER QUALITY DATA SHEET

Date: 10/24/2018

Surface Station Identification: BASIN 1-Top-P1 Sample depth: 1.0 m Time of Collection: 1050

Description: Boatwash basin station 1; one day post-diver cleaning; surface sample

Bottom Station Identification: BASIN 1-Bottom -P1 Sample depth: 2.2 m Time of Collection: 1055

Description: Boatwash basin station 1; one day post-diver cleaning; bottom sample

Tide: +5.82 ft ↓

Weather conditions: sunny w/ some overcast

Sea state & current direction: calm

Surface Water (1m) Physical Parameters	pH	Salinity (ppt)	Temperature (°C)	Turbidity (NTU)
Measurement:	7.9~~3~~5	33.~~43~~24	19.7	0.74

Notes:

Secchi depth: Can see to Basin bottom

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
DIVER CLEANING FOLLOW-UP
OCTOBER 24, 2018

FIELD WATER QUALITY DATA SHEET

Date: 10/24/2018

Surface Station Identification: BASIN 2-Top -P1 Sample depth: 1.0 m Time of Collection: 1100

Description: Boatwash basin station 2; one day post-diver cleaning; surface sample

Bottom Station Identification: BASIN 2-Bottom -P1 Sample depth: 2.2 m Time of Collection: 1105

Description: Boatwash basin station 2; one day post-diver cleaning; bottom sample

Tide: +5.53 ↓

Weather conditions: sunny, slightly breezy

Sea state & current direction: calm

Surface Water (1m) Physical Parameters	**pH**	**Salinity (ppt)**	**Temperature (°C)**	**Turbidity (NTU)**
Measurement:	7.94	33.43	19.7	0.77

Notes:

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
DIVER CLEANING FOLLOW-UP
OCTOBER 25, 2018

FIELD WATER QUALITY DATA SHEET

Date: 10/25/2018

Surface Station Identification: GATE 1-Top -P2 Sample depth: 1.0 m Time of Collection: ~~1030~~ 1045

Description: Boatwash gate station 1; two days post-diver cleaning; surface sample

Bottom Station Identification: GATE 1-Bottom - P2 Sample depth: 2.2 m Time of Collection: ~~1035~~ 1050

Description: Boatwash gate station 1; two days post-diver cleaning; bottom sample

Tide: +6.36ft ↓

Weather conditions: Misty + overcast, slightly breezy

Sea state & current direction: calm

Surface Water (1m) Physical Parameters	**pH**	**Salinity (ppt)**	**Temperature (°C)**	**Turbidity (NTU)**
Measurement:	7.90	32.86	19.7	0.78

Notes: at 1130: 8.00 33.52 19.7

Secchi depth: 2.8m

Hull cleaners in vicinity. Ended at 1025

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
DIVER CLEANING FOLLOW-UP
OCTOBER 25, 2018

FIELD WATER QUALITY DATA SHEET

Date: 10/25/2018

Surface Station Identification: GATE 2-Top -P2 Sample depth: 1.0 m Time of Collection: ~~1040~~ 1055

Description: Boatwash gate station 2; two days post-diver cleaning; surface sample

Bottom Station Identification: GATE 2-Bottom -P2 Sample depth: 2.2 m Time of Collection: ~~1045~~ 1100

Description: Boatwash gate station 2; two days post-diver cleaning; bottom sample

Tide: +6.24 ft ↓

Weather conditions: See GATE 1

Sea state & current direction: calm

Surface Water (1m) Physical Parameters	**pH**	**Salinity (ppt)**	**Temperature (°C)**	**Turbidity (NTU)**
Measurement:	7.93	33.56	19.7	0.88

Notes:

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
DIVER CLEANING FOLLOW-UP
OCTOBER 25, 2018

FIELD WATER QUALITY DATA SHEET

Date: 10/25/2018

Surface Station Identification: BASIN 1-Top-P2 Sample depth: 1.0 m Time of Collection: ~~1055~~ 1110

Description: Boatwash basin station 1; two days post-diver cleaning; surface sample

Bottom Station Identification: BASIN 1-Bottom -P2 Sample depth: 2.2 m Time of Collection: ~~1700~~ 1115

Description: Boatwash basin station 1; two days post-diver cleaning; bottom sample

Tide: +5.95 ft ↓

Weather conditions: sunny + warm, slightly hazy

Sea state & current direction: calm

Surface Water (1m) Physical Parameters	**pH**	**Salinity (ppt)**	**Temperature (°C)**	**Turbidity (NTU)**
Measurement:	7 98	33.64	19.7	0.65

Notes:

Secchi depth: Can see to bottom.

FIELD WATER QUALITY DATA SHEET

Date: 10/25/2018

Surface Station Identification: BASIN 2-Top -P2 Sample depth: 1.0 m Time of Collection: 11 ~~05~~ 20

Description: Boatwash basin station 2; two days post-diver cleaning; surface sample

Bottom Station Identification: BASIN 2-Bottom -P2 Sample depth: 2.2 m Time of Collection: 11 ~~0~~ 25

Description: Boatwash basin station 2; two days post-diver cleaning; bottom sample

Tide: + 5.78 ft ↓

Weather conditions: Same at ~~Sat~~ Basin 1

Sea state & current direction: calm

Surface Water (1m) Physical Parameters	**pH**	**Salinity (ppt)**	**Temperature (°C)**	**Turbidity (NTU)**
Measurement:	7.99	33.57	19.7	0.74

Notes:

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
DIVER CLEANING FOLLOW-UP
OCTOBER 26, 2018

FIELD WATER QUALITY DATA SHEET

Date: 10/26/2018

Surface Station Identification: GATE 1-Top -P3 Sample depth: 1.0 m Time of Collection: 1100

Description: Boatwash gate station 1; three days post-diver cleaning; surface sample

Bottom Station Identification: GATE 1-Bottom - P3 Sample depth: 2.2 m Time of Collection: 1105

Description: Boatwash gate station 1; three days post-diver cleaning; bottom sample

Tide: +6.65ft ↓

Weather conditions: Sunny, clear, light breeze

Sea state & current direction: calm

Surface Water (1m) Physical Parameters	**pH**	**Salinity (ppt)**	**Temperature (°C)**	**Turbidity (NTU)**
Measurement:	8.00	33.50	19.9	1.36

Notes:

Secchi depth - 3.5m

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
DIVER CLEANING FOLLOW-UP
OCTOBER 26, 2018

FIELD WATER QUALITY DATA SHEET

Date: 10/26/2018

Surface Station Identification: GATE 2-Top -P3 Sample depth: 1.0 m Time of Collection: 1110

Description: Boatwash gate station 2; three days post-diver cleaning; surface sample

Bottom Station Identification: GATE 2-Bottom - P3 Sample depth: 2.2 m Time of Collection: 1115

Description: Boatwash gate station 2; three days post-diver cleaning; bottom sample

Tide: + 6.5 ft ↓

Weather conditions: see Gate 1

Sea state & current direction: see Gate 1

Surface Water (1m) Physical Parameters	**pH**	**Salinity (ppt)**	**Temperature (°C)**	**Turbidity (NTU)**
Measurement:	8.00	33.55	20.0	0.81

Notes:

oil sheen present, is coming from transient dock.

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
DIVER CLEANING FOLLOW-UP
OCTOBER 26, 2018

FIELD WATER QUALITY DATA SHEET

Date: 10/26/2018

Surface Station Identification: BASIN 1-Top-P3 Sample depth: 1.0 m Time of Collection: 1125

Description: Boatwash basin station 1; three days post-diver cleaning; surface sample

Bottom Station Identification: BASIN 1-Bottom -P3 Sample depth: 2.2 m Time of Collection: 1130

Description: Boatwash basin station 1; three days post-diver cleaning; bottom sample

Tide: +6.32ft ↓

Weather conditions: sunny, clear, light breeze

Sea state & current direction: calm

Surface Water (1m) Physical Parameters	pH	Salinity (ppt)	Temperature (°C)	Turbidity (NTU)
Measurement:	7.99	33.54	19.8	0.94

Notes:

Secchi depth: Can see to bottom of basin

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
DIVER CLEANING FOLLOW-UP
OCTOBER 26, 2018

FIELD WATER QUALITY DATA SHEET

Date: 10/26/2018

Surface Station Identification: BASIN 2-Top -P3 Sample depth: 1.0 m Time of Collection: 1135

Description: Boatwash basin station 2; three days post-diver cleaning; surface sample

Bottom Station Identification: BASIN 2-Bottom -P3 Sample depth: 2.2 m Time of Collection: 1140

Description: Boatwash basin station 2; three days post-diver cleaning; bottom sample

Tide: + 6.1 ft ↓

Weather conditions: see Basin 1

Sea state & current direction: see Basin 1

Surface Water (1m) Physical Parameters	pH	Salinity (ppt)	Temperature (°C)	Turbidity (NTU)
Measurement:	8.01	33.67	19.8	0.66

Notes:

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
DIVER CLEANING FOLLOW-UP
OCTOBER 30, 2018

FIELD WATER QUALITY DATA SHEET

Date: 10/30/2018

Surface Station Identification: GATE 1-Top -P7 Sample depth: 1.0 m Time of Collection: 1055

Description: Boatwash gate station 1; seven days post-diver cleaning; surface sample

Bottom Station Identification: GATE 1-Bottom - P7 Sample depth: 2.2 m Time of Collection: 1100

Description: Boatwash gate station 1; seven days post-diver cleaning; bottom sample

Tide: +5.57 ft ↑

Weather conditions: overcast, light breeze

Sea state & current direction: calm

Surface Water (1m) Physical Parameters	**pH**	**Salinity (ppt)**	**Temperature (°C)**	**Turbidity (NTU)**	SPC
Measurement:	8.03	33.21	19.4	1.18	50477

Notes:

Secchi depth: 2.7 m

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
DIVER CLEANING FOLLOW-UP
OCTOBER 30, 2018

FIELD WATER QUALITY DATA SHEET

Date: 10/30/2018

Surface Station Identification: GATE 2-Top -P7 Sample depth: 1.0 m Time of Collection: 1105

Description: Boatwash gate station 2; seven days post-diver cleaning; surface sample

Bottom Station Identification: GATE 2-Bottom - P7 Sample depth: 2.2 m Time of Collection: 1110

Description: Boatwash gate station 2; seven days post-diver cleaning; bottom sample

Tide: + 5.67 ft ↑

Weather conditions: see GATE 1

Sea state & current direction: calm

Surface Water (1m) Physical Parameters	**pH**	**Salinity (ppt)**	**Temperature (°C)**	**Turbidity (NTU)**	Spc
Measurement:	8.05	33.55	19.4	1.31	51021

Notes:

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
DIVER CLEANING FOLLOW-UP
OCTOBER 30, 2018

FIELD WATER QUALITY DATA SHEET

Date: 10/30/2018

Surface Station Identification: BASIN 1-Top-P7 Sample depth: 1.0 m Time of Collection: 1120

Description: Boatwash basin station 1; seven days post-diver cleaning; surface sample

Bottom Station Identification: BASIN 1-Bottom -P7 Sample depth: 2.2 m Time of Collection: 1125

Description: Boatwash basin station 1; seven days post-diver cleaning; bottom sample

Tide: +5.77ft ↑

Weather conditions: overcast & light breeze

Sea state & current direction: calm

Surface Water (1m) Physical Parameters	**pH**	**Salinity (ppt)**	**Temperature (°C)**	**Turbidity (NTU)**	Spc
Measurement:	8.02	33.63	19.5	0.76	51116

Notes:

Secchi depth: can see basin bottom

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
DIVER CLEANING FOLLOW-UP
OCTOBER 30, 2018

FIELD WATER QUALITY DATA SHEET

Date: 10/30/2018

Surface Station Identification: BASIN 2-Top -P7 Sample depth: 1.0 m Time of Collection: 1130

Description: Boatwash basin station 2; seven days post-diver cleaning; surface sample

Bottom Station Identification: BASIN 2-Bottom -P7 Sample depth: 2.2 m Time of Collection: 1135

Description: Boatwash basin station 2; seven days post-diver cleaning; bottom sample

Tide: +5.85 ft ↑

Weather conditions: partly cloudy, light breeze

Sea state & current direction: calm

Surface Water (1m) Physical Parameters	**pH**	**Salinity (ppt)**	**Temperature (°C)**	**Turbidity (NTU)**	SPC
Measurement:	8.03	33.78	19.5	0.75	51271

Notes:

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
DIVER CLEANING FOLLOW-UP
NOVEMBER 6, 2018

FIELD WATER QUALITY DATA SHEET

Date: 11/06/2018

Surface Station Identification: GATE 1-Top -P14 Sample depth: 1.0 m Time of Collection: 1230

Description: Boatwash gate station 1; fourteen days post-diver cleaning; surface sample

Bottom Station Identification: GATE 1-Bottom - P14 Sample depth: 2.2 m Time of Collection: 1235

Description: Boatwash gate station 1; fourteen days post-diver cleaning; bottom sample

Tide: +1.46ft ↓

Weather conditions: sunny breezy

Sea state & current direction: ripples

Surface Water (1m) Physical Parameters	**pH**	**Salinity (ppt)**	**Temperature (°C)**	**Turbidity (NTU)**	SpC
Measurement:	8.02	32.48	19.7	1.41	49558

Notes:

Secchi depth: 3.1m

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
DIVER CLEANING FOLLOW-UP
NOVEMBER 6, 2018

FIELD WATER QUALITY DATA SHEET

Date: 11/06/2018

Surface Station Identification: GATE 2-Top -P14 Sample depth: 1.0 m Time of Collection: 1240

Description: Boatwash gate station 2; fourteen days post-diver cleaning; surface sample

Bottom Station Identification: GATE 2-Bottom - P14 Sample depth: 2.2 m Time of Collection: 1245

Description: Boatwash gate station 2; fourteen days post-diver cleaning; bottom sample

Tide: +1.21 ft ↓

Weather conditions: sunny, windy

Sea state & current direction: calm, w some ripples moving N

Surface Water (1m) Physical Parameters	**pH**	**Salinity (ppt)**	**Temperature (°C)**	**Turbidity (NTU)**
Measurement:	8.04	33.49	19.8	1.81

Notes:

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
DIVER CLEANING FOLLOW-UP
NOVEMBER 6, 2018

FIELD WATER QUALITY DATA SHEET

Date: 11/06/2018

Surface Station Identification: BASIN 1-Top-P14 Sample depth: 1.0 m Time of Collection: 1255

Description: Boatwash basin station 1; fourteen days post-diver cleaning; surface sample

Bottom Station Identification: BASIN 1-Bottom-P14 Sample depth: 2.2 m Time of Collection: 1300

Description: Boatwash basin station 1; fourteen days post-diver cleaning; bottom sample

Tide: + 0.99ft ↓

Weather conditions: Sunny + breezy

Sea state & current direction: calm in basin

Surface Water (1m) Physical Parameters	**pH**	**Salinity (ppt)**	**Temperature (°C)**	**Turbidity (NTU)**
Measurement:	8,03	34.18	19.7	0.96

Notes:

Secchi depth: can see to bottom

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
DIVER CLEANING FOLLOW-UP
NOVEMBER 6, 2018

FIELD WATER QUALITY DATA SHEET

Date: 11/06/2018

Surface Station Identification: BASIN 2-Top -P14 Sample depth: 1.0 m Time of Collection: 1305

Description: Boatwash basin station 2; fourteen days post-diver cleaning; surface sample

Bottom Station Identification: BASIN 2-Bottom -P14 Sample depth: 2.2 m Time of Collection: 1310

Description: Boatwash basin station 2; fourteen days post-diver cleaning; bottom sample

Tide: +0.75ft ↓

Weather conditions: sunny + breezy

Sea state & current direction: calm

Surface Water (1m) Physical Parameters	pH	Salinity (ppt)	Temperature (°C)	Turbidity (NTU)
Measurement:	8.03	33.99	19.9	0.99

Notes:

EVENT 3 (BOATWASH CLEANING)
FIELD DATA SHEETS

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
BOATWASH CLEANING
MARCH 27, 2019

FIELD WATER QUALITY DATA SHEET

Date: 03/27/2019

Surface Station Identification: BASIN 1-Top-T0 Sample depth: 1.0 m Time of Collection: 0815

Description: Basin pre-cleaning event, surface sample

Bottom Station Identification: BASIN 1-Bottom-T0 Sample depth: 2.2 m Time of Collection: 0820

Description: Basin pre-cleaning event, bottom sample

Tide: +1.3 ft

Weather conditions: partly cloudy w/ light breeze

Sea state & current direction: calm in basin

Surface Water (1m) Physical Parameters	Temperature (°C)	Sp. Cond. (µS/cm)	Salinity (ppt)	pH	Turbidity (NTU)
Measurement:	17.0	50519	33.18	7.90	3.26

Notes: Niskin #3

Secchi depth: can see basin bottom

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
BOATWASH CLEANING
MARCH 27, 2019

FIELD WATER QUALITY DATA SHEET

Date: 03/27/2019

Surface Station Identification: BASIN 2-Top-T0 Sample depth: 1.0 m Time of Collection: 0825

Description: Basin pre-cleaning event, surface sample

Bottom Station Identification: BASIN 2-Bottom-T0 Sample depth: 2.2 m Time of Collection: 0830

Description: Basin pre-cleaning event, bottom sample

Tide: +1.2 ft

Weather conditions: same as BASIN 1

Sea state & current direction: Calm in basin

Surface Water (1m) Physical Parameters	Temperature (°C)	Sp. Cond. (µS/cm)	Salinity (ppt)	pH	Turbidity (NTU)
Measurement:	17.0	51024	33.54	7.94	1.23

Notes: Niskin #3

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
BOATWASH CLEANING
MARCH 27, 2019

FIELD WATER QUALITY DATA SHEET

Date: 03/27/2019

Surface Station Identification: BASIN 1-Top-T1 Sample depth: 1.0 m Time of Collection: 1020

Description: Basin post-cleaning, pre-vessel release, surface sample (1st boat of day)

Bottom Station Identification: BASIN 1-Bottom-T1 Sample depth: 2.2 m Time of Collection: 1025

Description: Basin post-cleaning, pre-vessel release, bottom sample (1st boat of day)

Tide: + 0.59 ft ↓

Weather conditions: partly cloudy, slight breeze

Sea state & current direction: calm in basin

Surface Water (1m) Physical Parameters	**Temperature (°C)**	**Sp. Cond. (µS/cm)**	**Salinity (ppt)**	**pH**	**Turbidity (NTU)**
Measurement:	17.1	51169	33.65	7.95	1.81

Notes:

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
BOATWASH CLEANING
MARCH 27, 2019

FIELD WATER QUALITY DATA SHEET

Date: 03/27/2019

Surface Station Identification: BASIN 2-Top-T1 Sample depth: 1.0 m Time of Collection: 1030

Description: Basin post-cleaning, pre-vessel release, surface sample (1st boat of day)

Bottom Station Identification: BASIN 2-Bottom-T1 Sample depth: 2.2 m Time of Collection: 1035

Description: Basin post-cleaning, pre-vessel release, bottom sample (1st boat of day)

Tide: +0.59 ↓

Weather conditions: same as BASIN 1

Sea state & current direction: calm in basin

Surface Water (1m) Physical Parameters	**Temperature (°C)**	**Sp. Cond. (µS/cm)**	**Salinity (ppt)**	**pH**	**Turbidity (NTU)**
Measurement:	17.2	51247	33.71	7.96	1.72

Notes:

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
BOATWASH CLEANING
MARCH 27, 2019

FIELD WATER QUALITY DATA SHEET

Date: 03/27/2019

Surface Station Identification: BASIN 1-Top-T2 Sample depth: 1.0 m Time of Collection: 1045

Description: Basin post-vessel release, surface sample (1st boat of day)

Bottom Station Identification: BASIN 1-Bottom-T2 Sample depth: 2.2 m Time of Collection: 1050

Description: Basin post-vessel release, bottom sample (1st boat of day)

Tide: + 0.65 ft ↑

Weather conditions: partly cloudy ; slight breeze

Sea state & current direction: calm in basin

Surface Water (1m) Physical Parameters	**Temperature (°C)**	**Sp. Cond. (µS/cm)**	**Salinity (ppt)**	**pH**	**Turbidity (NTU)**
Measurement:	17.1	51318	33.76	7.95	1.61

Notes:

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
BOATWASH CLEANING
MARCH 27, 2019

FIELD WATER QUALITY DATA SHEET

Date: 03/27/2019

Surface Station Identification: BASIN 1-Top-T2-Rep Sample depth: 1.0 m Time of Collection: 1055

Description: Replicate sample; Basin post-vessel release, surface sample (1st boat of day)

Bottom Station Identification: NA Sample depth: NA Time of Collection: NA

Description: NA

Tide: + 0.65 ft ↑

Weather conditions: Same as BASIN 1

Sea state & current direction: calm in basin

Surface Water (1m) Physical Parameters	Temperature (°C)	Sp. Cond. (µS/cm)	Salinity (ppt)	pH	Turbidity (NTU)
Measurement:	17.1	51316	33.75	7.95	1.63

Notes:

FIELD WATER QUALITY DATA SHEET

Date: 03/27/2019

Surface Station Identification: BASIN 2-Top-T2 Sample depth: 1.0 m Time of Collection: 1100

Description: Basin post-vessel release, surface sample (1st boat of day)

Bottom Station Identification: BASIN 2-Bottom-T2 Sample depth: 2.2 m Time of Collection: 1105

Description: Basin post-vessel release, bottom sample (1st boat of day)

Tide: + 0.65 ft ↑

Weather conditions: partly cloudy; breezy.

Sea state & current direction: calm in basin

Surface Water (1m) Physical Parameters	Temperature (°C)	Sp. Cond. (µS/cm)	Salinity (ppt)	pH	Turbidity (NTU)
Measurement:	17.2	51334	33.78	7.96	2.48

Notes:

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
BOATWASH CLEANING
MARCH 27, 2019

FIELD WATER QUALITY DATA SHEET

Date: 03/27/2019

Surface Station Identification: BASIN 1-Top-T3 Sample depth: 1.0 m Time of Collection: 1500

Description: Basin post-cleaning, pre-vessel release, surface sample (last boat of day)

Bottom Station Identification: BASIN 1-Bottom-T3 Sample depth: 2.2 m Time of Collection: 1505

Description: Basin post-cleaning, pre-vessel release, bottom sample (last boat of day)

Tide: +2.56 ft ↑

Weather conditions: mostly sunny, breezy

Sea state & current direction: calm in basin

Surface Water (1m) Physical Parameters	Temperature (°C)	Sp. Cond. (µS/cm)	Salinity (ppt)	pH	Turbidity (NTU)
Measurement:	17.4	51259	33.71	8.00	2.98

Notes:

Secchi depth = 2.1m

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
BOATWASH CLEANING
MARCH 27, 2019

FIELD WATER QUALITY DATA SHEET

Date: 03/27/2019

Surface Station Identification: BASIN 2-Top-T3 Sample depth: 1.0 m Time of Collection: 1510

Description: Basin post-cleaning, pre-vessel release, surface sample (last boat of day)

Bottom Station Identification: BASIN 2-Bottom-T3 Sample depth: 2.2 m Time of Collection: 1515

Description: Basin post-cleaning, pre-vessel release, bottom sample (last boat of day)

Tide: +2.56 ft↑

Weather conditions: same as BASIN 1

Sea state & current direction:

Surface Water (1m) Physical Parameters	Temperature (°C)	Sp. Cond. (µS/cm)	Salinity (ppt)	pH	Turbidity (NTU)
Measurement:	17.5	51329	33.77	8.00	2.85

Notes:

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
BOATWASH CLEANING
MARCH 27, 2019

FIELD WATER QUALITY DATA SHEET

Date: 03/27/2019

Surface Station Identification: BASIN 1-Top-T4 Sample depth: 1.0 m Time of Collection: 1520

Description: Basin post-vessel release, surface sample (last boat of day)

Bottom Station Identification: BASIN 1-Bottom-T4 Sample depth: 2.2 m Time of Collection: 1525

Description: Basin post-vessel release, bottom sample (last boat of day)

Tide: +2.79 ft ↑

Weather conditions: mostly sunny, breezy

Sea state & current direction: calm in basin

Surface Water (1m) Physical Parameters	**Temperature (°C)**	**Sp. Cond. (µS/cm)**	**Salinity (ppt)**	**pH**	**Turbidity (NTU)**
Measurement:	17.5	51293	33.74	8.00	2.51

Notes:

Secchi depth:

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
BOATWASH CLEANING
MARCH 27, 2019

FIELD WATER QUALITY DATA SHEET

Date: 03/27/2019

Surface Station Identification: BASIN 2-Top-T4 Sample depth: 1.0 m Time of Collection: 1530

Description: Basin post-vessel release, surface sample (last boat of day)

Bottom Station Identification: BASIN 2-Bottom-T4 Sample depth: 2.2 m Time of Collection: 1535

Description: Basin post-vessel release, bottom sample (last boat of day)

Tide: +2.79 ft ↑

Weather conditions: Same as BASIN 1

Sea state & current direction:

Surface Water (1m) Physical Parameters	Temperature (°C)	Sp. Cond. (µS/cm)	Salinity (ppt)	pH	Turbidity (NTU)
Measurement:	17.5	51294	33.76	8.00	2.67

Notes:

Secchi depth = 2.3m

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
BOATWASH CLEANING
MARCH 27, 2019

FIELD WATER QUALITY DATA SHEET

Date: 03/27/2019

Surface Station Identification: BASIN 1-Top-T5 Sample depth: 1.0 m Time of Collection: 1710

Description: Basin, 2 hours post-cleaning event, surface sample

Bottom Station Identification: BASIN 1-Bottom-T5 Sample depth: 2.2 m Time of Collection: 1715

Description: Basin, 2 hours post-cleaning event, bottom sample

Tide: + 3.21 ft ↑

Weather conditions: sunny, breezy

Sea state & current direction: calm in basin

Surface Water (1m) Physical Parameters	Temperature (°C)	Sp. Cond. (µS/cm)	Salinity (ppt)	pH	Turbidity (NTU)
Measurement:	17.6	51293	33.75	8.00	3.16 ~~2.94~~ CG

Notes:

Secchi depth:

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
BOATWASH CLEANING
MARCH 27, 2019

FIELD WATER QUALITY DATA SHEET

Date: 03/27/2019

Surface Station Identification: BASIN 2-Top-T5 Sample depth: 1.0 m Time of Collection: 1720

Description: Basin, 2 hours post-cleaning event, surface sample

Bottom Station Identification: BASIN 2-Bottom-T5 Sample depth: 2.2 m Time of Collection: 1725

Description: Basin, 2 hours post-cleaning event, bottom sample

Tide: +3.27 ft ↑

Weather conditions: Sunny, breezy

Sea state & current direction: Calm in basin

Surface Water (1m) Physical Parameters	**Temperature (°C)**	**Sp. Cond. (µS/cm)**	**Salinity (ppt)**	**pH**	**Turbidity (NTU)**
Measurement:	17.5	51401	33.83	8.00	2.94

Notes:

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
BOATWASH CLEANING
MARCH 27, 2019

FIELD WATER QUALITY DATA SHEET

Date: 03/27/2019

Surface Station Identification: GATE 1-Top-T0 Sample depth: 1.0 m Time of Collection: 0815

Description: Gate pre-cleaning event, surface sample

Bottom Station Identification: GATE 1-Bottom-T0 Sample depth: 2.2 m Time of Collection: 0820

Description: Gate pre-cleaning event, bottom sample

Tide: +1.3 ft ↓

Weather conditions: partly cloudy w/ light breeze

Sea state & current direction: calm, some ripples. moving SW.

Surface Water (1m) Physical Parameters	**Temperature (°C)**	**Sp. Cond. (µS/cm)**	**Salinity (ppt)**	**pH**	**Turbidity (NTU)**
Measurement:	17.0	50477 ~~42748~~	33.10	7.85	1.43

Notes:

NISKIN #2

Secchi depth: 4.1 m

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
BOATWASH CLEANING
MARCH 27, 2019

FIELD WATER QUALITY DATA SHEET

Date: 03/27/2019

Surface Station Identification: GATE 2-Top-T0 Sample depth: 1.0 m Time of Collection: 0825

Description: Gate pre-cleaning event, surface sample

Bottom Station Identification: GATE 2-Bottom-T0 Sample depth: 2.2 m Time of Collection: 0830

Description: Gate pre-cleaning event, bottom sample

Tide: +1.2 ft ↓

Weather conditions: same as GATE1

Sea state & current direction:

Surface Water (1m) Physical Parameters	Temperature (°C)	Sp. Cond. (µS/cm)	Salinity (ppt)	pH	Turbidity (NTU)
Measurement:	16.9	50587	33.21	7.94	1.41

Notes:

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
BOATWASH CLEANING
MARCH 27, 2019

FIELD WATER QUALITY DATA SHEET

Date: 03/27/2019

Surface Station Identification: GATE 1-Top-T1 Sample depth: 1.0 m Time of Collection: 1020

Description: Gate post-cleaning, pre-vessel release, surface sample (1st boat of day)

Bottom Station Identification: GATE 1-Bottom-T1 Sample depth: 2.2 m Time of Collection: 1025

Description: Gate post-cleaning, pre-vessel release, bottom sample (1st boat of day)

Tide: +0.59 ft ↓

Weather conditions: light breeze, overcast, sun breaking through

Sea state & current direction: small ripples in water

Surface Water (1m) Physical Parameters	Temperature (°C)	Sp. Cond. (µS/cm)	Salinity (ppt)	pH	Turbidity (NTU)
Measurement:	17.4	50526	33.2	8.05	1.85

Notes:

Boat #1 "of Cornish time"

washing start at 1000

washing end at 1019

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
BOATWASH CLEANING
MARCH 27, 2019

FIELD WATER QUALITY DATA SHEET

Date: 03/27/2019

Surface Station Identification: GATE 2-Top-T1 Sample depth: 1.0 m Time of Collection: 1030

Description: Gate post-cleaning, pre-vessel release, surface sample (1st boat of day)

Bottom Station Identification: GATE 2-Bottom-T1 Sample depth: 2.2 m Time of Collection: 1035

Description: Gate post-cleaning, pre-vessel release, bottom sample (1st boat of day)

Tide: +0.59 ft ↓

Weather conditions: light breeze, slightly overcast

Sea state & current direction: small ripples on surface

Surface Water (1m) Physical Parameters	Temperature (°C)	Sp. Cond. (µS/cm)	Salinity (ppt)	pH	Turbidity (NTU)
Measurement:	17.3	50600	33.3	8.05	1.95

Notes:

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
BOATWASH CLEANING
MARCH 27, 2019

FIELD WATER QUALITY DATA SHEET

Date: 03/27/2019

Surface Station Identification: GATE 1-Top-T2 Sample depth: 1.0 m Time of Collection: 1045

Description: Gate post-vessel release, surface sample (1st boat of day)

Bottom Station Identification: GATE 1-Bottom-T2 Sample depth: 2.2 m Time of Collection: 1050

Description: Gate post-vessel release, bottom sample (1st boat of day)

Tide: 0.65 ft ↑

Weather conditions: breezy and overcast

Sea state & current direction: ripples from wind

Surface Water (1m) Physical Parameters	**Temperature (°C)**	**Sp. Cond. (µS/cm)**	**Salinity (ppt)**	**pH**	**Turbidity (NTU)**
Measurement:	17.3	50640	33.3	8.04	1.56

Notes:

gate up at 1044

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
BOATWASH CLEANING
MARCH 27, 2019

FIELD WATER QUALITY DATA SHEET

Date: 03/27/2019

Surface Station Identification: GATE 1-Top-T2-Rep Sample depth: 1.0 m Time of Collection: 1055

Description: Replicate sample; gate post-vessel release, surface sample (1st boat of day)

Bottom Station Identification: NA Sample depth: NA Time of Collection: NA

Description: NA

Tide: +0.65ft ↑

Weather conditions: breezy and overcast

Sea state & current direction: ripples from wind

Surface Water (1m) Physical Parameters	Temperature (°C)	Sp. Cond. (µS/cm)	Salinity (ppt)	pH	Turbidity (NTU)
Measurement:	17.3	50651	CG ~~30~~ 33.3	8.04	1.36

Notes:

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
BOATWASH CLEANING
MARCH 27, 2019

FIELD WATER QUALITY DATA SHEET

Date: 03/27/2019

Surface Station Identification: GATE 2-Top-T2 Sample depth: 1.0 m Time of Collection: 1100

Description: Gate post-vessel release, surface sample (1st boat of day)

Bottom Station Identification: GATE 2-Bottom-T2 Sample depth: 2.2 m Time of Collection: 1105

Description: Gate post-vessel release, bottom sample (1st boat of day)

Tide: + 0.65 ft ↑

Weather conditions: breezy + overcast

Sea state & current direction: ripples from wind

Surface Water (1m) Physical Parameters	**Temperature (°C)**	**Sp. Cond. (µS/cm)**	**Salinity (ppt)**	**pH**	**Turbidity (NTU)**
Measurement:	17.4	50621	33.3	8.02	1.41

Notes:

Hull Cleaner @ 1144 at adjacent
slip (National City Pilot)
plume noted
gone by 1200

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
BOATWASH CLEANING
MARCH 27, 2019

FIELD WATER QUALITY DATA SHEET

Date: 03/27/2019

Surface Station Identification: GATE 1-Top-T3 Sample depth: 1.0 m Time of Collection: 1500

Description: Gate post-cleaning, pre-vessel release, surface sample (last boat of day)

Bottom Station Identification: GATE 1-Bottom-T3 Sample depth: 2.2 m Time of Collection: 1505

Description: Gate post-cleaning, pre-vessel release, bottom sample (last boat of day)

Tide: +2.56 ft ↑

Weather conditions: sunny + windy

Sea state & current direction: mid-large ripples SW direction

Surface Water (1m) Physical Parameters	Temperature (°C)	Sp. Cond. (µS/cm)	Salinity (ppt)	pH	Turbidity (NTU)
Measurement:	17.5	50436	33.1	8.09	1.52

Notes:

FIELD BLANK
@ 1230

Secchi depth = 3.2 m

Boatwash started 1453
+ pressure washing

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
BOATWASH CLEANING
MARCH 27, 2019

FIELD WATER QUALITY DATA SHEET

Date: 03/27/2019

Surface Station Identification: GATE 2-Top-T3 Sample depth: 1.0 m Time of Collection: 1510

Description: Gate post-cleaning, pre-vessel release, surface sample (last boat of day)

Bottom Station Identification: GATE 2-Bottom-T3 Sample depth: 2.2 m Time of Collection: 1515

Description: Gate post-cleaning, pre-vessel release, bottom sample (last boat of day)

Tide: + 2.56 ft ↑

Weather conditions: sunny + windy

Sea state & current direction: mid-large size ripples SW direction

Surface Water (1m) Physical Parameters	Temperature (°C)	Sp. Cond. (µS/cm)	Salinity (ppt)	pH	Turbidity (NTU)
Measurement:	17.3	50628	33.3	8.08	1.69

Notes:

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
BOATWASH CLEANING
MARCH 27, 2019

FIELD WATER QUALITY DATA SHEET

Date: 03/27/2019

Surface Station Identification: GATE 1-Top-T4 Sample depth: 1.0 m Time of Collection: 1520

Description: Gate post-vessel release, surface sample (last boat of day)

Bottom Station Identification: GATE 1-Bottom-T4 Sample depth: 2.2 m Time of Collection: 1525

Description: Gate post-vessel release, bottom sample (last boat of day)

Tide: +2.79 ft ↑

Weather conditions: sunny + very windy

Sea state & current direction: midsize ripples, SW direction

Surface Water (1m) Physical Parameters	Temperature (°C)	Sp. Cond. (µS/cm)	Salinity (ppt)	pH	Turbidity (NTU)
Measurement:	17.5	50626	~~33.6~~ cg 33.3	8.09	1.46

Notes:

Secchi depth:

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
BOATWASH CLEANING
MARCH 27, 2019

FIELD WATER QUALITY DATA SHEET

Date: 03/27/2019

Surface Station Identification: GATE 2-Top-T4 Sample depth: 1.0 m Time of Collection: 1530

Description: Gate post-vessel release, surface sample (last boat of day)

Bottom Station Identification: GATE 2-Bottom-T4 Sample depth: 2.2 m Time of Collection: 1535

Description: Gate post-vessel release, bottom sample (last boat of day)

Tide: +2.79 ft ↑

Weather conditions: sunny + very windy

Sea state & current direction: mid-large ripples, SW direction

Surface Water (1m) Physical Parameters	Temperature (°C)	Sp. Cond. (µS/cm)	Salinity (ppt)	pH	Turbidity (NTU)
Measurement:	17.5	50630	33.3	8.07	1.48

Notes:

secchi depth = 3.4m

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
BOATWASH CLEANING
MARCH 27, 2019

FIELD WATER QUALITY DATA SHEET

Date: 03/27/2019

Surface Station Identification: GATE 1-Top-T5 Sample depth: 1.0 m Time of Collection: 1710

Description: Gate, 2 hours post-cleaning event, surface sample

Bottom Station Identification: GATE 1-Bottom-T5 Sample depth: 2.2 m Time of Collection: 1715

Description: Gate, 2 hours post-cleaning event, bottom sample

Tide: +3.21ft ↑

Weather conditions: windy, getting cooler but clear

Sea state & current direction: large wind ripples

Surface Water (1m) Physical Parameters	Temperature (°C)	Sp. Cond. (µS/cm)	Salinity (ppt)	pH	Turbidity (NTU)
Measurement:	17.6	50620	33.3	8.09	1.35

Notes:

Secchi depth:

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
BOATWASH CLEANING
MARCH 27, 2019

FIELD WATER QUALITY DATA SHEET

Date: 03/27/2019

Surface Station Identification: GATE 2-Top-T5 Sample depth: 1.0 m Time of Collection: 1720

Description: Gate, 2 hours post-cleaning event, surface sample

Bottom Station Identification: GATE 2-Bottom-T5 Sample depth: 2.2 m Time of Collection: 1725

Description: Gate, 2 hours post-cleaning event, bottom sample

Tide: + 3.27 ft ↑

Weather conditions: windy + cool, clear

Sea state & current direction: large ripples n water

Surface Water (1m) Physical Parameters	Temperature (°C)	Sp. Cond. (µS/cm)	Salinity (ppt)	pH	Turbidity (NTU)
Measurement:	17.4	50668	33.3	8.11	1.95

Notes:

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
BOATWASH CLEANING FOLLOW-UP
MARCH 28, 2019

FIELD WATER QUALITY DATA SHEET

Date: 03/28/2019

Surface Station Identification: GATE 1-Top-P1 Sample depth: 1.0 m Time of Collection: 1240

Description: Boatwash gate station 1; one day post-boatwash cleaning; surface sample

Bottom Station Identification: GATE 1-Bottom-P1 Sample depth: 2.2 m Time of Collection: 1245

Description: Boatwash gate station 1; one day post-boatwash cleaning; bottom sample

Tide: + 0.53 ft ↑

Weather conditions: sunny + windy

Sea state & current direction: small ripples, moving SW

Surface Water (1m) Physical Parameters	Temperature (°C)	Sp. Cond. (µS/cm)	Salinity (ppt)	pH	Turbidity (NTU)
Measurement:	17.7	50572	33.21	7.98	1.26

Notes:

Secchi depth: Forgot secchi ☹
can almost see bottom of basin

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
BOATWASH CLEANING FOLLOW-UP
MARCH 28, 2019

FIELD WATER QUALITY DATA SHEET

Date: 03/28/2019

Surface Station Identification: GATE 2-Top-P1 Sample depth: 1.0 m Time of Collection: 1250

Description: Boatwash gate station 2; one day post-boatwash cleaning; surface sample

Bottom Station Identification: GATE 2-Bottom-P1 Sample depth: 2.2 m Time of Collection: 1255

Description: Boatwash gate station 2; one day post-boatwash cleaning; bottom sample

Tide: + 0.68 ft ↑

Weather conditions: sunny + windy

Sea state & current direction: small ripples moving SW

Surface Water (1m) Physical Parameters	Temperature (°C)	Sp. Cond. (µS/cm)	Salinity (ppt)	pH	Turbidity (NTU)
Measurement:	17.7	50810	33.42	8.01	1.12

Notes:

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
BOATWASH CLEANING FOLLOW-UP
MARCH 28, 2019

FIELD WATER QUALITY DATA SHEET

Date: 03/28/2019

Surface Station Identification: BASIN 1-Top-P1 Sample depth: 1.0 m Time of Collection: 1300

Description: Boatwash basin station 1; one day post-boatwash cleaning; surface sample

Bottom Station Identification: BASIN 1-Bottom-P1 Sample depth: 2.2 m Time of Collection: 1305

Description: Boatwash basin station 1; one day post-boatwash cleaning; bottom sample

Tide: +0.68 ft ↑

Weather conditions: sunny + windy

Sea state & current direction: calm in basin

Surface Water (1m) Physical Parameters	Temperature (°C)	Sp. Cond. (µS/cm)	Salinity (ppt)	pH	Turbidity (NTU)
Measurement:	17.8	50866	33.43	8.00	1.32

Notes:

Secchi depth: Forgot secchi
can almost see basin bottom

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
BOATWASH CLEANING FOLLOW-UP
MARCH 28, 2019

FIELD WATER QUALITY DATA SHEET

Date: 03/28/2019

Surface Station Identification: BASIN 2-Top-P1 Sample depth: 1.0 m Time of Collection: 1310

Description: Boatwash basin station 2; one day post-boatwash cleaning; surface sample

Bottom Station Identification: BASIN 2-Bottom-P1 Sample depth: 2.2 m Time of Collection: 1315

Description: Boatwash basin station 2; one day post-boatwash cleaning; bottom sample

Tide: +0.89 ft ↑

Weather conditions: sunny + windy

Sea state & current direction: calm in basin

Surface Water (1m) Physical Parameters	Temperature (°C)	Sp. Cond. (µS/cm)	Salinity (ppt)	pH	Turbidity (NTU)
Measurement:	17.7	50849	33.42	8.02	1.21

Notes:

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
BOATWASH CLEANING FOLLOW-UP
MARCH 29, 2019

FIELD WATER QUALITY DATA SHEET

Date: 03/29/2019

Surface Station Identification: GATE 1-Top-P2 Sample depth: 1.0 m Time of Collection: 1045

Description: Boatwash gate station 1; two days post-boatwash cleaning; surface sample

Bottom Station Identification: GATE 1-Bottom-P2 Sample depth: 2.2 m Time of Collection: 1050

Description: Boatwash gate station 1; two days post-boatwash cleaning; bottom sample

Tide: + 1.14 ft↓

Weather conditions: sunny + warm + very pleasant!

Sea state & current direction: calm

Surface Water (1m) Physical Parameters	Temperature (°C)	Sp. Cond. (µS/cm)	Salinity (ppt)	pH	Turbidity (NTU)
Measurement:	17.7	50923	33.5	8.02	0.88

Notes: Niskin 2 used.

Secchi depth: Water looks murky, however secchi depth = 4.0m

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
BOATWASH CLEANING FOLLOW-UP
MARCH 29, 2019

FIELD WATER QUALITY DATA SHEET

Date: 03/29/2019

Surface Station Identification: GATE 2-Top-P2 Sample depth: 1.0 m Time of Collection: 1055

Description: Boatwash gate station 2; two days post-boatwash cleaning; surface sample

Bottom Station Identification: GATE 2-Bottom-P2 Sample depth: 2.2 m Time of Collection: 1100

Description: Boatwash gate station 2; two days post-boatwash cleaning; bottom sample

Tide: +1.14 ft ↓

Weather conditions: sunny +warm

Sea state & current direction: calm

Surface Water (1m) Physical Parameters	Temperature (°C)	Sp. Cond. (µS/cm)	Salinity (ppt)	pH	Turbidity (NTU)
Measurement:	17.7	50889	33.5	8.05	0.87

Notes:

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
BOATWASH CLEANING FOLLOW-UP
MARCH 29, 2019

FIELD WATER QUALITY DATA SHEET

Date: 03/29/2019

Surface Station Identification: BASIN 1-Top-P2 Sample depth: 1.0 m Time of Collection: 1105

Description: Boatwash basin station 1; two days post-boatwash cleaning; surface sample

Bottom Station Identification: BASIN 1-Bottom-P2 Sample depth: 2.2 m Time of Collection: 1110

Description: Boatwash basin station 1; two days post-boatwash cleaning; bottom sample

Tide: + 0.78 ↓

Weather conditions: Sunny, warm, + pleasant

Sea state & current direction: Calm in basin

Surface Water (1m) Physical Parameters	Temperature (°C)	Sp. Cond. (µS/cm)	Salinity (ppt)	pH	Turbidity (NTU)
Measurement:	17.3	50803	33.4	8.01	1.0

Notes:

Secchi depth: Can see bottom of BW.

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
BOATWASH CLEANING FOLLOW-UP
MARCH 29, 2019

FIELD WATER QUALITY DATA SHEET

Date: 03/29/2019

Surface Station Identification: BASIN 2-Top-P2 Sample depth: 1.0 m Time of Collection: 1115

Description: Boatwash basin station 2; two days post-boatwash cleaning; surface sample

Bottom Station Identification: BASIN 2-Bottom-P2 Sample depth: 2.2 m Time of Collection: 1120

Description: Boatwash basin station 2; two days post-boatwash cleaning; bottom sample

Tide: +0.78 ft ↓

Weather conditions: sunny + warm; wind picked up

Sea state & current direction: calm in basin

Surface Water (1m) Physical Parameters	**Temperature (°C)**	**Sp. Cond. (µS/cm)**	**Salinity (ppt)**	**pH**	**Turbidity (NTU)**
Measurement:	17.4	50893	33.5	8.03	1.05

Notes:

Niskin 2

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
BOATWASH CLEANING FOLLOW-UP
MARCH 30, 2019

FIELD WATER QUALITY DATA SHEET

Date: 03/30/2019

Surface Station Identification: GATE 1-Top-P3 Sample depth: 1.0 m Time of Collection: 0850

Description: Boatwash gate station 1; three days post-boatwash cleaning; surface sample

Bottom Station Identification: GATE 1-Bottom-P3 Sample depth: 2.2 m Time of Collection: 0855

Description: Boatwash gate station 1; three days post-boatwash cleaning; bottom sample

Tide: + 3.37 ft ↓

Weather conditions: sunny + warm

Sea state & current direction: calm, some small ripples

Surface Water (1m) Physical Parameters	Temperature (°C)	Sp. Cond. (µS/cm)	Salinity (ppt)	pH	Turbidity (NTU)
Measurement:	17.0	50811	33.39	7.92	1.4

Notes: oil sheen in surrounding areas
strong petroleum odor.

Secchi depth: 3.9 m

* Niskin 3 used.

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
BOATWASH CLEANING FOLLOW-UP
MARCH 30, 2019

FIELD WATER QUALITY DATA SHEET

Date: 03/30/2019

Surface Station Identification: GATE 2-Top-P3 Sample depth: 1.0 m Time of Collection: 0900

Description: Boatwash gate station 2; three days post-boatwash cleaning; surface sample

Bottom Station Identification: GATE 2-Bottom-P3 Sample depth: 2.2 m Time of Collection: 0905

Description: Boatwash gate station 2; three days post-boatwash cleaning; bottom sample

Tide: +3.37 ft ↓

Weather conditions: sunny + warm

Sea state & current direction: calm, some small ripples

Surface Water (1m) Physical Parameters	Temperature (°C)	Sp. Cond. (µS/cm)	Salinity (ppt)	pH	Turbidity (NTU)
Measurement:	16.9	50806	33.43	7.96	1.43

Notes:

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
BOATWASH CLEANING FOLLOW-UP
MARCH 30, 2019

FIELD WATER QUALITY DATA SHEET

Date: 03/30/2019

Surface Station Identification: BASIN 1-Top-P3 Sample depth: 1.0 m Time of Collection: 0910

Description: Boatwash basin station 1; three days post-boatwash cleaning; surface sample

Bottom Station Identification: BASIN 1-Bottom-P3 Sample depth: 2.2 m Time of Collection: 0915

Description: Boatwash basin station 1; three days post-boatwash cleaning; bottom sample

Tide: + 2.88 ft ↓

Weather conditions: sunny + warm

Sea state & current direction: calm in basin

Surface Water (1m) Physical Parameters	Temperature (°C)	Sp. Cond. (µS/cm)	Salinity (ppt)	pH	Turbidity (NTU)
Measurement:	17.0	50922	33.47	7.95	1.08

Notes: oil sheen w/in boatwash
strong petroleum odor.

Secchi depth: can see basin bottom

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
BOATWASH CLEANING FOLLOW-UP
MARCH 30, 2019

FIELD WATER QUALITY DATA SHEET

Date: 03/30/2019

Surface Station Identification: BASIN 2-Top-P3 Sample depth: 1.0 m Time of Collection: 0920

Description: Boatwash basin station 2; three days post-boatwash cleaning; surface sample

Bottom Station Identification: BASIN 2-Bottom-P3 Sample depth: 2.2 m Time of Collection: 0925

Description: Boatwash basin station 2; three days post-boatwash cleaning; bottom sample

Tide: + 2.88 ft ↓

Weather conditions: Sunny + warm

Sea state & current direction: calm in basin

Surface Water (1m) Physical Parameters	Temperature (°C)	Sp. Cond. (µS/cm)	Salinity (ppt)	pH	Turbidity (NTU)
Measurement:	17.0	50916	33.46	7.96	2.80

Notes:

FIELD WATER QUALITY DATA SHEET

Date: 04/03/2019

Surface Station Identification: GATE 1-Top-P7 Sample depth: 1.0 m Time of Collection: 1015

Description: Boatwash gate station 1; one week post-boatwash cleaning; surface sample

Bottom Station Identification: GATE 1-Bottom-P7 Sample depth: 2.2 m Time of Collection: 1020

Description: Boatwash gate station 1; one week post-boatwash cleaning; bottom sample

Tide: +4.96 ft ↓

Weather conditions: overcast + breezy

Sea state & current direction: small ripples, moving NW

Surface Water (1m) Physical Parameters	Temperature (°C)	Sp. Cond. (µS/cm)	Salinity (ppt)	pH	Turbidity (NTU)
Measurement:	17.0	49919	32.77	8.01	0.8

Notes: Niskin #2

Secchi depth: 3.3m

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
BOATWASH CLEANING FOLLOW-UP
APRIL 3, 2019

FIELD WATER QUALITY DATA SHEET

Date: 04/03/2019

Surface Station Identification: GATE 2-Top-P7 Sample depth: 1.0 m Time of Collection: 1025

Description: Boatwash gate station 2; one week post-boatwash cleaning; surface sample

Bottom Station Identification: GATE 2-Bottom-P7 Sample depth: 2.2 m Time of Collection: 1030

Description: Boatwash gate station 2; one week post-boatwash cleaning; bottom sample

Tide: +4.55 ft ↓

Weather conditions: See Gate 1

Sea state & current direction: See Gate 1

Surface Water (1m) Physical Parameters	**Temperature (°C)**	**Sp. Cond. (µS/cm)**	**Salinity (ppt)**	**pH**	**Turbidity (NTU)**
Measurement:	16.8	50892	33.46	8.04	1.25

Notes:

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
BOATWASH CLEANING FOLLOW-UP
APRIL 3, 2019

FIELD WATER QUALITY DATA SHEET

Date: 04/03/2019

Surface Station Identification: BASIN 1-Top-P7 Sample depth: 1.0 m Time of Collection: 1035

Description: Boatwash basin station 1; one week post-boatwash cleaning; surface sample

Bottom Station Identification: BASIN 1-Bottom-P7 Sample depth: 2.2 m Time of Collection: 1040

Description: Boatwash basin station 1; one week post-boatwash cleaning; bottom sample

Tide: +4.55ft ↓

Weather conditions: mostly sunny, breezy

Sea state & current direction: calm in basin

Surface Water (1m) Physical Parameters	**Temperature (°C)**	**Sp. Cond. (µS/cm)**	**Salinity (ppt)**	**pH**	**Turbidity (NTU)**
Measurement:	16.8	50931	33.47	8.04	0.95

Notes:

Secchi depth: water looks murky but can see bottom of basin

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
BOATWASH CLEANING FOLLOW-UP
APRIL 3, 2019

FIELD WATER QUALITY DATA SHEET

Date: 04/03/2019

Surface Station Identification: BASIN 2-Top-P7 Sample depth: 1.0 m Time of Collection: 1045

Description: Boatwash basin station 2; one week post-boatwash cleaning; surface sample

Bottom Station Identification: BASIN 2-Bottom-P7 Sample depth: 2.2 m Time of Collection: 1050

Description: Boatwash basin station 2; one week post-boatwash cleaning; bottom sample

Tide: + 4.04 ft ↓

Weather conditions: See BASIN 1

Sea state & current direction: See BASIN 1

Surface Water (1m) Physical Parameters	Temperature (°C)	Sp. Cond. (µS/cm)	Salinity (ppt)	pH	Turbidity (NTU)
Measurement:	16.8	50966	33.50	8.05	0.64

Notes:

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
BOATWASH CLEANING FOLLOW-UP
APRIL 10, 2019

FIELD WATER QUALITY DATA SHEET

Date: 04/10/2019

Surface Station Identification: GATE 1-Top-P14 Sample depth: 1.0 m Time of Collection: ~~[illegible]~~ 1550

Description: Boatwash gate station 1; two weeks post-boatwash cleaning; surface sample

Bottom Station Identification: GATE 1-Bottom-P14 Sample depth: 2.2 m Time of Collection: ~~[illegible]~~ 1555

Description: Boatwash gate station 1; two weeks post-boatwash cleaning; bottom sample

Tide: + 2.81 ft ↓

Weather conditions: sunny + windy

Sea state & current direction: ~~calm in basin~~ small wind ripples

Surface Water (1m) Physical Parameters	Temperature (°C)	Sp. Cond. (µS/cm)	Salinity (ppt)	pH	Turbidity (NTU)
Measurement:	18.2	50774	33.40	7.99	1.1

Notes:

Secchi depth: can see bottom of basin

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
BOATWASH CLEANING FOLLOW-UP
APRIL 10, 2019

FIELD WATER QUALITY DATA SHEET

Date: 04/10/2019

Surface Station Identification: GATE 2-Top-P14   Sample depth: 1.0 m   Time of Collection: [illegible] 1600

Description: Boatwash gate station 2; two weeks post-boatwash cleaning; surface sample

Bottom Station Identification: GATE 2-Bottom-P14   Sample depth: 2.2 m   Time of Collection: [illegible] 1605

Description: Boatwash gate station 2; two weeks post-boatwash cleaning; bottom sample

Tide: + 2.81 ft ↓

Weather conditions: See [illegible] GATE 1

Sea state & current direction: See GATE 1

Surface Water (1m) Physical Parameters	Temperature (°C)	Sp. Cond. (µS/cm)	Salinity (ppt)	pH	Turbidity (NTU)
Measurement:	18.4	51160	33.60	8.00	1.0

Notes:

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
BOATWASH CLEANING FOLLOW-UP
APRIL 10, 2019

FIELD WATER QUALITY DATA SHEET

Date: 04/10/2019

Surface Station Identification: BASIN 1-Top-P14 Sample depth: 1.0 m Time of Collection: ~~1550~~ 1610

Description: Boatwash basin station 1; two weeks post-boatwash cleaning; surface sample

Bottom Station Identification: BASIN 1-Bottom-P14 Sample depth: 2.2 m Time of Collection: ~~1555~~ 1615

Description: Boatwash basin station 1; two weeks post-boatwash cleaning; bottom sample

Tide: + 2.81ft ↓

Weather conditions: sunny + windy

Sea state & current direction: ~~small ripples~~ calm in basin

Surface Water (1m) Physical Parameters	Temperature (°C)	Sp. Cond. (µS/cm)	Salinity (ppt)	pH	Turbidity (NTU)
Measurement:	~~18.2~~ 18.3	~~50774~~ 51314	~~33.40~~ 33.79	~~7.99~~ 8.00	~~1.1~~ 0.7

Notes:

Secchi depth: ~~didn't bring secchi~~
can see bottom of basin

PORT OF SAN DIEGO
BOATWASH PILOT STUDY
BOATWASH CLEANING FOLLOW-UP
APRIL 10, 2019

FIELD WATER QUALITY DATA SHEET

Date: 04/10/2019

Surface Station Identification: BASIN 2-Top-P14 Sample depth: 1.0 m Time of Collection: ~~[illegible]~~ 1620

Description: Boatwash basin station 2; two weeks post-boatwash cleaning; surface sample

Bottom Station Identification: BASIN 2-Bottom-P14 Sample depth: 2.2 m Time of Collection: ~~[illegible]~~ 1625

Description: Boatwash basin station 2; two weeks post-boatwash cleaning; bottom sample

Tide: + 2.68 ft ↓

Weather conditions: see ~~GATE 1~~ BASIN 1

Sea state & current direction: "

Surface Water (1m) Physical Parameters	Temperature (°C)	Sp. Cond. (µS/cm)	Salinity (ppt)	pH	Turbidity (NTU)
Measurement:	~~18.4~~ 18.2	~~51160~~ 51271	~~33.60~~ 33.75	~~8.00~~ 8.00	~~1.0~~ 0.7

Notes:

APPENDIX F
AQUARIUS IN-WATER HULL CLEANING BMP PLAN

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AQUARIUS
Yacht Services, Inc.

"San Diego's Best Yacht Maintenance Service"

BEST MANAGEMENT PRACTICES PLAN
FOR
IN-WATER HULL CLEANING SERVICES

AQUARIUS YACHT SERVICE, INC
2726 Shelter Island Dr #98
San Diego, CA 92106

January 2005

California Professional Divers Assoc
2726 Shelter Island Dr #98
San Diego, CA 92106

Best Management Practices (BMP) Plan Objectives

The objective of the BMP Plan is to identify the practices and procedures that your business will use to minimize the water quality impacts from in-water hull cleaning. BMPs may include a variety of pollution control measures such as: activity schedules, prohibition of practices, process improvements and maintenance procedures that can be used to prevent a visible paint plume during hull cleaning.

As required by the In-Water Hull Cleaning Regulations recently adopted by the San Diego Unified Port District, all businesses conducting hull cleaning on Port Tidelands are required to develop and follow a BMP Plan to receive an in-water hull-cleaning permit (Permit). The BMP Plan must include a description of 1) the tools that will be used during hull cleaning activities, 2) the methods in which the tools will be used, 3) a description of the process to revise the BMP Plan if a paint plume or cloud is observed, and 4) how to meet the training requirement that is necessary to ensure that hull cleaners can clean without producing a visible paint plume or cloud.

This document serves as a sample template for the development of a BMP Plan. It identifies the minimum components that must be included in your BMP Plan to secure a Permit and also includes guidance for implementing optional practices your business may elect to use. The use of this document is intended to be representative of the practices and procedures your business will use to prevent visible paint plumes during cleaning. You will need to tailor the language within each section so that it is specific to your business. The use of this BMP template is not required, but is provided for your guidance.

Section 1 General Facility/Business Information

1.A. OWNER INFORMATION

Owner Name: William F. Rocco

Address: 2726 Shelter Island Dr. #98 San DIEGO, CA 92106

Contact Name & Phone: Kristine VanVleet 619-222-4147

1.B. FACILITY/BUSINESS DETAILS

This section is intended to provide a brief description of the business operations. Information that you may wish to provide could include: years in service, number of employees, contractors/sub-contractors, primary areas of the bay serviced, etc.

Example: Business Name has been conducting hull cleaning in San Diego Bay (Chula Vista, Harbor Island, and Shelter Island) since MM/DD/YYYY. Mr. X is the owner and operator of Business Name Business Name has XXX employees who all perform hull cleaning service. All employees are responsible for pollution prevention. However, Mr. X has the responsibility for training all staff members.

Section 2 Best Management Practices (BMPs)

BMPs help to maintain the hull paint, to prevent pollution and visible paint plumes, and to protect the environment. This section discusses several categories of BMP options to minimize pollution associated with hull-cleaning operations. The subsections provided below can be included in your business' BMP Plan; those that are required for the Permit are identified as such.

2.A. HULL CLEANING TOOLS (REQUIRED)

This section discusses the tools and materials your business will use to conduct hull-cleaning operations in a manner that will not produce a visible paint plume. Tools such as pads, brushes, and carpet vary in their abrasiveness. Understanding which tools are needed to clean specific paint types is important to ensure that hulls are cleaned properly, that the paint will remain effective for its expected life span, and that the cleaning will not damage the hull. It is important that your divers understand what tools are a part of your BMP Plan.

List and describe the tools your business will require your divers to use when cleaning. (Examples of cleaning tools: White Pad, carpet, terry cloth towel, hand mitt)

Hand hull cleaning method only using carpet,
White Pad, Blue Pad, Brown Pad as determined
by bottom paint age & toxicity (see CPDA Pad char

Some businesses may also elect to prohibit their divers from using specific tools or specify conditions in which certain tools can only be used. If this is the case, please list here the tools your business will restrict. (Examples: wire brush, steel wool)

Scrapers, sandpaper, steel wool & wire brushes
to be used on bare metal surfaces only

2.B. HULL-CLEANING METHODS (REQUIRED)

This section should be used to describe the cleaning methods your business will use. Understanding how to clean specific paint types is important to ensure that hulls are cleaned properly, that the paint will remain effective for its expected life span, and that the cleaning will not damage the hull. Examples of cleaning methods can include hand cleaning, cleaning by rotary brush, or spot cleaning (only clean where needed). The tools you have identified above are most effective when used properly. Proper use of each cleaning tool is essential to ensure that cleaning will not produce a visible paint plume.

The cleaning method information you provide should describe how the tool will be used, under what conditions it will be used, and for what types of paint it is most appropriate. List and describe the cleaning methods your business will require your divers to use when cleaning. Describe how the specific tools will be used and why using them in the manner described will prevent a paint plume. (For example, Business X will use only hand cleaning. Carpet will be used for cleaning copper paints. Divers should apply light pressure taking care not to remove any paint,)

Carpet & white pads used on new copper paints
Hand hull cleaning method only no power tools used
(see CPDA Pad chart) / Ablative paints are
not scrubbed.

If your business has elected to prohibit specific tools or to limit the use of certain tools (Section 2.A.), please list here the tools and under which conditions the tools will be restricted. (For example, Business X will not allow wire brushes to be used on ablative paints.)

Aquarius does not allow divers to use
electric compressors or power washing tools
Ablative paints are not scrubbed

2.C. IDENTIFICATION OF DIFFERENT TYPES OF HULL PAINT (OPTIONAL)

Businesses may elect to include measures to identify different types of hull paint prior to cleaning a boat hull. In many cases, knowledge of the type of paint that is on the boat's hull can help to determine what type of cleaning tool to use. For example, what measures will be considered so that your divers understand the difference between ablative and non-ablative hull paints?

List and describe the processes your business will use, if any, to ensure your employees understand what type of hull paint is being cleaned. (Examples: Have divers get verification from boat owner; divers may check with boatyards; businesses may keep a log of the boats they service and the paints that are on those boats, etc.)

All customers are required to provide Bottom paint
information when they sign up with Aquarius Yacht.
If they do not have information, Dive Supervisor
identifies type of paint to be cleaned
All Divers are trained from CPDA Manual
identify paint types. / Ablative Paints are not clea

2.D. CLEANING SCHEDULES/FREQUENCIES (OPTIONAL)

This section identifies the cleaning schedule and frequency that may be considered as part of the BMP Plan to prevent a visible paint plume. Cleaning schedules may help businesses conduct regular inspections and clean boat hulls only when needed. It is important to have divers understand when cleaning is necessary. For example, in some cases a low level of slime is acceptable. Businesses may want to consider schedules and inspections as part of their BMP Plan.

If your business intends to use cleaning schedules or frequencies as a BMP, list and describe cleaning schedules and/or frequencies that will be used. (Examples: 3-week inspections; only clean when needed; less cleaning in colder months; etc)

All customers are scheduled per CPDA recomendations
1X month Winter / 3 weeks Summer
frequent hull cleaning with least abrasive pad
extends life of copper based bottom paints

Section 3 Employee Training (REQUIRED)

The permit requires training for all new and existing employees. Prior to obtaining a Permit and as part of the Permit application, each in-water hull-cleaning business must submit proof that its employees, agents, and representatives, including independent contractors conducting in-water hull cleaning have been trained.

This section should identify how employees will be trained. Training should ensure that employees: 1) have read and understood the Permit conditions; 2) will adhere to the BMPs in this BMP Plan; and 3) will conduct cleaning activities in a manner that does not produce a visible paint plume or cloud.

List and describe the processes 1) your business will use to train employees, and 2) how you will document their training. The required proof of training includes dates of training, names of persons trained, topics covered, printed name, and signature of employee and trainer, and the written materials used for the training (A Training Log example is provided below).

All divers are trained by CPDA BMP manual
and instructors. Valid BMP card is issued
upon completion of training. Divers awaiting
opening in Class are intermittently trained by owner
William F. Rocco,

Example Training Log

Date (DD/MM/YY)	**Employee Name**	**New Employee (Y/N)**	**Topics Covered**	**Materials Used**	**Trainer Signature**	**Employee Signature**
			Ex: Cleaning tools, paints, etc.	*Ex: Handout, booklets, etc.*		

Section 4 Review/Modification of BMPs (REQUIRED)

This section describes how the BMP Plan will be modified if a paint plume becomes visible during in-water hull-cleaning activities. For example, if a paint plume becomes visible during cleaning, what will the procedure be:

1) to stop the activity
2) modify cleaning tools
3) revise the BMP Plan, if necessary
4) train (or retrain) the employees, if necessary

In this section, describe the process that your business will use to modify the cleaning activity to stop the paint plume from continuing. It should also include a description of the steps that will be taken to change BMPs and modify the BMP Plan to ensure a plume will not happen again in the future.

When a diver reports creating paint plume during cleaning he immediately stops service, Customer is contacted and metal parts only service is provided until such time that the boat is hauled and hard type paint is applied.

Section 5 Record of Review and Amendments

An important part of maintaining a BMP Plan is to regularly review and revise BMPs if they do not appear to be working. All reviews and amendments to the BMP Plan should be summarized and documented. The tables in this section can be used to track revisions made to the BMP Plan. The Water Quality Manager is responsible for maintaining a current copy of this BMP Plan.

RECORD OF REVIEW (ANNUALLY)

Date	Reviewed By	Comments
9-2015	William Rocco	All Divers received
		refresher BMP
		Plan using CPDA
		BMP Manual
9/30/16	William Rocco	" "
9/27/17		" "

RECORD OF AMENDMENTS (AS NEEDED)

Date	Reviewed By	Comments

CPDA Cleaning Fouling Growth Rate Chart

Because divers experience varies widely and growth rates differ greatly from region to region and bay to bay, below is a growth rate chart for all divers to follow and guide them through appropriate cleaning schedules:

Type 1 Growth: Lightly Fouled with Silt only. Hull Paint Pigment is prominently visible. No hard growth present or light visibility of hard growth present on running gear.

Cleaning Guideline: Boat may be spot cleaned only and clean metal parts and running gear.

Type 2 Growth: Light to moderately fouling with Silt and grass. May be 100% lightly silted with heavier fouling on waterline and rudder areas. Hard growth may be present on running gear or around thru hulls. Paints pigment is visible but covered by light silt layer.

Cleaning Guidelines: Boat should be cleaned with appropriate soft pads as per this manual and pad chart. Clean metal parts and running gear.

Type 3 Growth: Moderate to Heavy fouling growth. Heavy silting may be present on 100% of hull. Some moderate hard growth may be present on hull concentrated around the running gear and through hulls.

Special Performance Note: Vessels performance and fuel economy will be affected with this type of growth.

Cleaning Guidelines: Boat should be cleaned immediately being careful as not to damage coating with the use of harsh scrubbing pads to quickly remove the sea growth on hull paint.

Special care instructions: Newer or soft paints should not be left to this fouling state. Cleaning this level of growth with harsh scrubbing will result in paint loss.

Type 4 Growth: Heavy Fouling Growth. Heavy Silt layer on 100% of the hull. Paints Pigment color may be difficult to determine. Moderate harder growth or sea squirts may be present.

Special Performance Notes: Vessel with this type growth may prevent the coating from effectively working and will affect boats performance and fuel economy.

Cleaning Guideline: Cleaning this level of growth with harsh scrubbing will result in Paint loss.

Type 5 Growth: Heavy fouling Growth. Heavy Silt and Harder growth on more than 75% of the vessels hull.

Cleaning Guidelines: Hull cleaning will involve scrapping of hull surfaces. Cleaning this level of growth with harsh scrubbing and scrapers will result in paint loss. Use of plastic scrapers may prevent paint degradation and loss into the water environment.

CPDA Hull Cleaning Pad Chart

Pad Progress/Type	Manufacturer Part #
Soft	
1) Carpet	*Acquired from Carpet Stores, scrap stock*
2) White Pad	*3m #H-08440 or 07445*
Carpet Spec: Soft Medium to Long Shag	

Usage

Theses Pads are used to gently remove slime, sediment, light algae and other very soft fouling. Suitable for all surfaces and coatings when new and sufficient fouling accumulates to significantly affect vessel performance. Suitable for continued use on all paints until biocide effectiveness becomes weakened enough to require more rigorous wiping than is practical with a soft pad. The carpet and soft white pads are the only appropriate pads for use on newly painted antifouling surfaces.

Medium	
3) Green/Blue	*3M #H-3242*
4) Purple	*3M #H-07447*
5) Gray	*3M #H-07448*

Usage

Theses Pads are used to remove heavy slime, sediment and moderate algae impregnation, light marine grass growth and other soft fouling. Suitable for surfaces and coatings at mid-life span. Suitable for use on most hard paints until biocide effectiveness becomes weakened enough to require more rigorous wiping than is practical with a medium pad. These pads are the only pads appropriate for use on the mid-life painted antifouling surfaces. These pads are not suitable for soft paint.

Course	
6) Brown	*3M #H-0541*

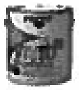
Usage

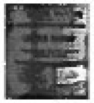
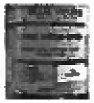
*Theses Pads are used to remove heavy slime, sediment and algae impregnation, Moderate marine grass growth and other soft fouling on hard non biocide free coatings only. They can also be used to remove small areas of light hard fouling growth. Suitable for hard surfaces and hard non toxic coatings. These pads are not suitable on soft or any antifouling bottom paint.

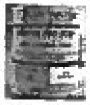
Abrasive	
7) Steel Wool/Pad	*Sterling Hunt Item # 10043*

Usage

These pads are used to scour unpainted surfaces only. This pad will remove heavy marine grass and other soft and medium hard fouling from unpainted surfaces. These pads are not suitable for use on any antifouling painted surfaces. Examples of appropriate areas of use are: propellers, shafts, unpainted trim tabs, unpainted hulls and sterndrive units.

 Monterey	Yes/Copper	Ablative	At least 2	18+	Ablative	Hand clean/carpet only	Waterbased
 Sharkskin	Yes/Copper	Epoxy	2	12+	Epoxy	Hand or Mechanical Brush	May need to be cleaned soon after new bottom paint in the water
 Smart Solutions	Yes/Econea	Ablative	At least 2	18+	Econea/Ablative	Hand clean/carpet only	Econea/Metal Free
 ViViD Eco	Yes/Zinc/Econea	Ablative	At least 2	18+	Econea/Zinc Ablative	Hand clean/carpet only	Econea/Zinc
 EP2000	Yes/Zinc	Hard*	At least 2	24+	Zinc	Hand clean/carpet only	Zinc/Hard Coating
 EP-21	Yes/Zinc	Ablative	At least 2	18+	Zinc	Hand clean/carpet only	Zinc/Ablative

 Copper Pro SCX Hard	Yes/Copper	Epoxy	2	24+	Epoxy	Hand or Mechanical Brush	
 Shelter Island	Yes/Zinc	Ablative	At least 2	18+	Zinc	Hand clean/carpet only	
 Aqua Sheild	Yes/Copper	Ablative	At least 2	18+	Ablative	Hand clean/carpet only	Waterbase
 Copper Shield	Yes/Copper	Ablative	At least 2	18+	Ablative	Hand clean/carpet only	
 Copper Shield Hard	Yes/Copper	Epoxy	2	12+	Epoxy	Hand or Mechanical Brush	May need to be cleaned soon after new bottom paint in the water
 Kolor	Yes/Copper	Ablative	At least 2	18+	Ablative	Hand clean/carpet only	Used mostly on Sterndrives/Aluminum Hulls
 Tropikoat	Yes/Copper	Epoxy	2	24+	Epoxy	Hand or Mechanical Brush	
 Islands 77 Plus	Yes/Copper	Ablative	At least 2	18+	Ablative	Hand clean/carpet only	
 Mission Bay CSF	Yes/Zinc	Ablative	At least 2	18+	Zinc	Hand clean/carpet only	Waterbased/Zinc
 Mission Bay	Yes/Zinc	Ablative	At least 2	18+	Zinc	Hand clean/carpet only	

 Ultra	Yes/Copper	Epoxy	2	24+	Epoxy	Hand or Mechanical Brush	
 Micron Extra VOC	Yes/Copper	Epoxy	At least 2	18+	Epoxy	Hand clean/carpet only	
 Trinadad SR	Yes/Copper	Epoxy	2	24+	Epoxy	Hand or Mechanical Brush	
 The Protector	Yes/Copper	Epoxy	2	24+	Epoxy	Hand or Mechanical Brush	
 Unepoxy	Yes/Copper	Epoxy	2	12+	Epoxy	Hand or Mechanical Brush	May need to be cleaned soon after new bottom paint in the water
 Micron 66	Yes/Copper	Ablative	At least 2	18+	Ablative	Hand clean/carpet only	
 Bottomkoat Pro	Yes/Copper	Ablative	At least 2	12+	Ablative	Hand clean/carpet only	Professional Use
 Aqua	Yes/Copper	Hard*	2	18+	Hard*	Hand or Mechanical Brush	*Hard WaterBase. May use Epoxy or Vinyle BMP
 SR 21	Yes/Copper	Hard*	3 Initially, 1 or 2 after	18+	Hard*	Hand or Mechanical Brush	*Hard. May use Epoxy or Vinyle BMP, Mostly used for Racing Bottom Finish
 Copper Pro SCX	Yes/Copper	Ablative	At least 2	18+	Ablative	Hand clean/carpet only	

 ACT Bottom Coat	Yes/Copper	Ablative	At least 2	18+	Ablative	Hand clean/carpet only	
 Trinadad VOC	Yes/Copper	Epoxy	2	24+	Epoxy	Hand or Mechanical Brush	
 Super Premium	Yes/Copper	Epoxy	2	24+	Epoxy	Hand or Mechanical Brush	
 Horizons	Yes/Copper	Ablative	At least 2	18+	Ablative	Hand clean/carpet only	
 Pure Oceans Ablative	Yes/Copper	Ablative	At least 2	18+	Ablative	Hand clean/carpet only	Waterbase
 Transducer Paint	Yes/Zinc	Ablative	At least 2	12+	Ablative	Hand clean/carpet only	Used for underwater transducers and metal
 Pacifica Plus	Yes/Zinc/Econea	Ablative	At least 2	18+	Zinc	Hand clean/carpet only	
 ViViD Free	Yes/Zinc	Ablative	At least 2	18+	Zinc	Hand clean/carpet only	Teflon (PTFE) Additive
 Ultra Koat	Yes/Copper	Epoxy	2	24+	Epoxy	Hand or Mechanical Brush	
 California Bottomkoat	Yes/Copper	Epoxy	2	12+	Epoxy	Hand or Mechanical Brush	Must start Cleaning one month after splash in water after new

CPDA Bottom Paint Quick Referance BMP Guide Effective Fall 2010

Name/Brand	Biocide	Type	Rec. No. Coats	Expected Lifespan	Paint BMP	Cleaning BMP	Special Notes
 Hydrocoat	Yes/Copper	Ablative	At least 2	18+	Ablative	Hand clean/carpet only	Waterbase
 Inflatable A/F Paint	Yes/Copper	Ablative	At least 2	18+	Ablative	Hand clean/carpet only	Waterbase Used for HBI with Rubber or Hypolon Inflated Tubes
 Micron CSC	Yes/Copper	Ablative	At least 2	18+	Ablative	Hand clean/carpet only	
 Micron Extra	Yes/Copper	Ablative	At least 2	18 +	Ablative	Hand clean/carpet only	
 Propspeed	No	Epoxy	1	12+	Biocide Free	Hand clean/carpet only	Used Mostly for Metal and Running Gear
 Trilux 33	Yes/Copper	Ablative	At least 2	12+	Ablative	Hand clean/carpet only	Used mostly on Sterndrives/Aluminum Hulls
 Ultima SR 40	Yes/Copper	Ablative	At least 2	18+	Ablative	Hand clean/carpet only	
 Ultima SR 60	Yes/Copper	Ablative	At least 2	18+	Ablative	Hand clean/carpet only	Commercial Use
 ViViD	Yes/Copper	Ablative	At least 2	18+	Ablative	Hand clean/carpet only	

(1) A Rotary Brush with .040 or .050 thick bristles can also be used on unpainted out drive flat areas.

Just Delete this sentence

(2) WHAT TO DO WHEN THE CUSTOMER WILL NOT BOTTOM PAINT
Notified the customer and clean the vessel bottom more frequently as to reduce hull paint wear or hull paint release.
Black Algea
The thicker bristle brush (.40) can clean remove all the attached black algae at every cleaning. Continue to inform the customer that he needs new bottom paint. The old bottom paint is not repelling growth and the Boats' performance will be affected if a shortened cleaning cycle for poor paint is not be done.
Note: All vessels needing this brush should be hauled out for new bottom paint.
OTHER USES FOR THE .040 INCH AND .050 INCH BRUSH

Change to

When after 2-years or maybe 3-years and using a .032 bristled nylon brush will not remove fouling, notify the customer that he needs new bottom paint and until the boat is repainted his cleaning cycle will be, in San Diego area, every 2-weeks.

---

(3)

Good	Fair	Poor Ready for Paint	Very Poor
1 2 3 4	5 6	7 8 9	10
			Painting is overdue
#1——thru——#4 .028 Bristle	#5—thru—#7 .032 Bristle	#8 & #9 .040 Bristle	#10 .050 Bristle

Change to

Good Paint	Fair Paint	Poor Paint
.028 Bristle	.032 Bristle	Increase cleaning frequency To every 2-weeks in San Diego With a .032 Bristle Brush

(4)

Hull cleaning companies that clean exclusively with the slowly rotating non - abrasive nylon brush have found that when paint reaches a grade of #7, it is time for new bottom paint. This will prevent prolonged periods of harsh mechanical scrubbing.

Change to

Hull cleaning companies that clean exclusively with the slowly rotating non - abrasive nylon brush have found that when paint reaches a grade of Poor Paint ,it is time for new bottom paint and we will increase the customers cleaning frequency to every 14-days to prevent bottom paint from being removed when cleaning with the .032 nylon bristled brush.

AQUARIUS
Yacht Services, Inc.

"San Diego's Best Yacht Maintenance Service"

In-Water Hull Cleaning Permit Application

1a.
Aquarius Yacht Services, DBA: Barnacle Buzz Diving, LLC
2726 Shelter Island Dr #98
San Diego, CA 92106
Office:619-222-4147
Email: bill@aquariusyacht.com

1b.
Aquarius Yacht Service, DBA: Barnacle Buzz Diving, LLC has been conducting hull cleaning operations since 1989 in San Diego Bay. Aquarius Yacht Services, Inc has 14 staff members, 9 are responsible for hull cleaning and other marine related duties. The California Professional Divers Association provides In-Water Hull Cleaning BMP training to Aquarius Yacht Services, DBA: Barnacle Buzz Diving, LLC

2a.
Tools:
List of tools used and prohibited uses by Aquarius Yacht Service, DBA: Barnacle Buzz Diving, LLC are found in California Professional Divers Association 2011 Manual Pages 85-108 (manual portions provided) and online at www.prodivers.org.

2b.
Hull Cleaning Methods:
List of Methods to Clean Hull Bottom Paint by Aquarius Yacht Service, DBA: Barnacle Buzz Diving, LLC are found in California Professional Divers Association 2011 Manual pages 42-55 and 85-108 (manual portions provided), CPDA 2011 Bottom Paint Quick Reference Guide (provided) and online at www.prodivers.org.

APPENDIX G
DOME STUDY REPORT

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Data Report

Comparison of In-Situ Copper Release Rates from Two Hull Cleaning Methods

April 2019

Submitted to:
Wood Environment and Infrastructure Solutions, Inc.
9210 Sky Park Court, Suite 200
San Diego, CA 92123

Submitted by:
Coastal Monitoring Associates, LLC
4741 Orchard Ave.
San Diego, CA 92107

TABLE OF CONTENTS

LIST OF ACRONYMS

BMP	Best Management Practices
CV	Coefficient of Variation
EPA	Environmental Protection Agency
FEP	Fluorinated ethylene propylene
PARCC	Precision, Accuracy, Representativeness, Completeness, and Comparability
psu	Practical Salinity Units
pH	−log10 of the hydrogen ion concentration
QA	Quality Assurance
r^2	Coefficient of Determination

UNITS

°C	degrees Celsius
cm	centimeters
cm^2	square centimeters
day	day
ft	feet
in	inches
m	meters
µg	micrograms
µg/L	micrograms per liter
$\mu g/cm^2$	micrograms per square centimeter
$\mu g/cm^2/day$	micrograms per square centimeter per day
ml	milliliters
ml/min	milliliters per minute
min	minutes
%	percent

LIST OF FIGURES

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1 INTRODUCTION

1.1 BACKGROUND

This data report describes the results of a study comparing the in-situ release rate of copper from recreational vessel hulls cleaned by two methods. The work was performed by Coastal Monitoring Associates in collaboration with and under contract to Wood Environment and Infrastructure Solutions, Inc. as part of a scope of work for the Port of San Diego (Port).

1.2 SITE CHARACTERISTICS

The study area was conducted at the Seaforth Boat Rentals facility located at 1715 Strand Way in Coronado, California (Figure 1-1). The boats utilized during the study were rental boats from the Seaforth facility. The facility is located within San Diego Bay, and the boats and facility are representative of typical recreational boats and marina facilities in the area. For cleaning prior to dome testing, one of the vessels was cleaned using standard diver cleaning methods (including use of current best management practices [BMPs]), and the other boat was cleaned using the Rentunder Boatwash system (Boatwash), an in-water boat wash that is undergoing pilot testing as a potential alternative to current in-slip cleaning practices.

1.3 OBJECTIVES OF THE PROJECT

The objective of the project was to compare the leach rates of the copper AFPs following two different hull cleaning methods to determine if there were significant differences between the in-water diver using BMP methods and the boat wash method based on measurements of in-situ copper release rates.

Figure 1-1. Study area within San Diego Bay at the Seaforth Boat Rental facility on Coronado Island (Images: Google Earth).

2 PROJECT TECHNOLOGY AND METHODOLOGY

2.1 TECHNOLOGY DESCRIPTION

The primary technology utilized for the study was the in-situ dome system. The dome system was used to measure the passive leaching rate of dissolved copper utilizing the method of Seligman and Neumeister (1983). The dome system (Seligman et al., 2001; Valkirs et al., 2003) allows for a confined volume of water to be exposed to the effects of leaching from a surface area with small aliquots withdrawn at regular intervals (Figure 2-1). The system consists of a 12-inch diameter polycarbonate dome connected by two 50-foot lengths of 1/4-inch (inside diameter) Teflon (Fluorinated ethylene propylene; FEP) tubing to a peristaltic pump (Figure 2-2). The pump is used to create a vacuum to hold the dome to the hull, to continually circulate water through the dome, and to collect samples. An in-line vacuum gauge is used to verify attachment of the dome and to monitor the pressure within the system during sampling. A series of valves is used in conjunction with the pump to purge water during the attachment of the dome, collect water during sampling, and inject air during removal of the dome. On the dome, there is an inlet and an outlet manifold that serve to remove, return, and recirculate water within the dome. The dome, tubing manifold and tubing connections are constructed from polycarbonate based on its low adsorption of metals. To seal to the hull, the dome is fitted with a soft, closed-cell, circular neoprene gasket that is glued to the flange around the perimeter of the dome. Pump tubing and soft tubing connections between the Teflon tubing and dome were made ¼-inch silicone tubing. A photograph of the dome setup used for the study is shown in Figure 2-3.

2.2 SAMPLING DESIGN

The sampling design for the study called for measurement of in-situ leach rate measurements on two sailboats, a Catalina 320 “Chubasco”, and a Catalina 270 “Meridian” (Figure 2-4). The Catalina 320 has an overall length of 32.5 ft, a beam of 11.75 ft, and a draft of 6.46 ft. The Catalina 270 has an overall length of 27.0 ft, a beam of 9.83 ft, and a draft of 5.00 ft. Both vessels were recently coated with new antifouling bottom paint (Pettit Marine Paint Trinidad SR, EPA Registration NO. 60061-94) on

6/18/18, approximately 170 days prior to commencement of the study. No other cleaning events occurred during the period prior to the test cleaning events reported here.

2.2.1 DIVER CLEANING METHODS

The bottom coating of the Meridian was cleaned by divers from Barnacle Buzz Diving, LLC (Port of San Diego Permit Number 58115) following the Best Management Practices (BMPs) set forth in their BMP Plan. Cleaning of the Meridian took place on 12/7/2018. In general, these BMPs were developed to minimize impacts on the environment when performing in-water hull cleaning, zinc replacement and propeller maintenance to maximize the performance and longevity of antifouling hull paint.

2.2.2 BOATWASH CLEANING METHODS

The Chubasco was cleaned using the Rentunder Drive-in Boatwash (Rentunder, 2019). Cleaning of the Chubasco took place on 12/7/2018. The Boatwash is currently undergoing pilot testing and is installed at the transient dock located in Shelter Island Yacht Basin (San Diego Bay). The Boatwash has rotating brushes made from non-abrasive plastic. Boats are driven into the basin and the rotating brushes automatically align and fit to the hull. The brushes move along the boat from aft to the stern, clearing the boat of marine fouling. The cleaner changes direction and the brushes move in the opposite direction until they return to the starting position. For a 10-meter boat, the whole process takes about 20 minutes.

2.2.3 SAMPLE COLLECTION SCHEDULE

For each vessel, a series of in-situ leach rate measurements were made prior to cleaning and for a series of time following the cleaning. The measurements were made on the same schedule for both boats. For reference, the first post-cleaning event was identified as Day 0. The events are described in Table 2-1.

2.3 SAMPLING METHODS

The methodology for determining in-situ leach rates was as follows: the dome and attached tubing were placed in the water at the test site, and water was circulated through the system for approximately 10 minutes in order to flush any residual water from the dome and equilibrate with ambient conditions. An ambient sample was collected at the end of this 10-minute period and prior to installation of the dome onto the hull. Water quality measurements were also taken during this time including temperature, pH, conductivity and salinity.

The divers then positioned the dome with the gasket against the hull at the selected sampling location (Figure 2-5 and Figure 2-6). A volume of water was then pumped from the closed system until a sufficient vacuum was established to hold the dome in place. The actual vacuum was monitored using the in-line vacuum gauge. A ratchet strap attached to a line looped under the boat was used to assist in holding the dome onto the hull while vacuum was achieved (Figure 2-7).

The volume of water in the system was continually recirculated using a flow rate maintained at approximately 500 ml/min. Fifty milliliter (ml) samples were then withdrawn from the system starting immediately after placement and continuing every 15 minutes until a total of five samples had been collected over a 1-hour period.

This procedure was repeated for each boat on each sampling day. In addition, replicate samples were collected on the 60-minute sampling time from one boat, and a complete replicate dome deployment was made on one boat during the Day 3 event.

Following collection, all samples were stored on ice prior to filtration, acidification, and analysis.

2.4 DATA ANALYSIS METHODS

As described above, the in-situ leach rate measurements result in a time series of concentrations for the metal of interest (copper) within the dome system. This concentration time series is converted into a leach rate as follows:

1. The concentration is converted to copper mass by multiplying by the dome system volume. The volume is corrected at each sampling interval for the volume removed by the previous sample.
2. A linear regression of time and mass is used to determine the time rate of change of mass within the dome system (slope of the regression line) as mass of copper per unit time.

3. The time rate of change of mass is divided by the surface area of hull exposed within the dome system to determine the final in-situ leach rate as mass of copper per unit time per unit area of hull.

The concentrations are determined by analysis of the samples collected. The dome system volume is determined by filling the system with water in the lab, and then measuring the amount of water required to completely fill the system with it sealed against a flat plate. The exposed hull area is determined by measurement of the diameter of the dome inside the sealing gasket and then calculating the area of the circle associated with this diameter. In-situ leach rates for copper are generally reported in units of $\mu g/cm^2/day$.

Table 2-1. Sample Collection Schedule.

Event	**Date**	**Description**
Pre-Cleaning Day -4	12/4/2018	Measurements on both boats prior to hull cleaning.
Hull Cleaning Event	12/7/2018	Hull cleaning of both boats.
Post-Cleaning Day 0	12/8/2018	Measurements on both boats within 24 hours of hull cleaning.
Post-Cleaning Day 3	12/11/2018	Measurements on both boats three days after hull cleaning.
Post-Cleaning Day 14	12/22/2018	Measurements on both boats 14 days after hull cleaning.
Post Cleaning Day 32	1/9/2019	Measurements on both boats 32 days after hull cleaning.

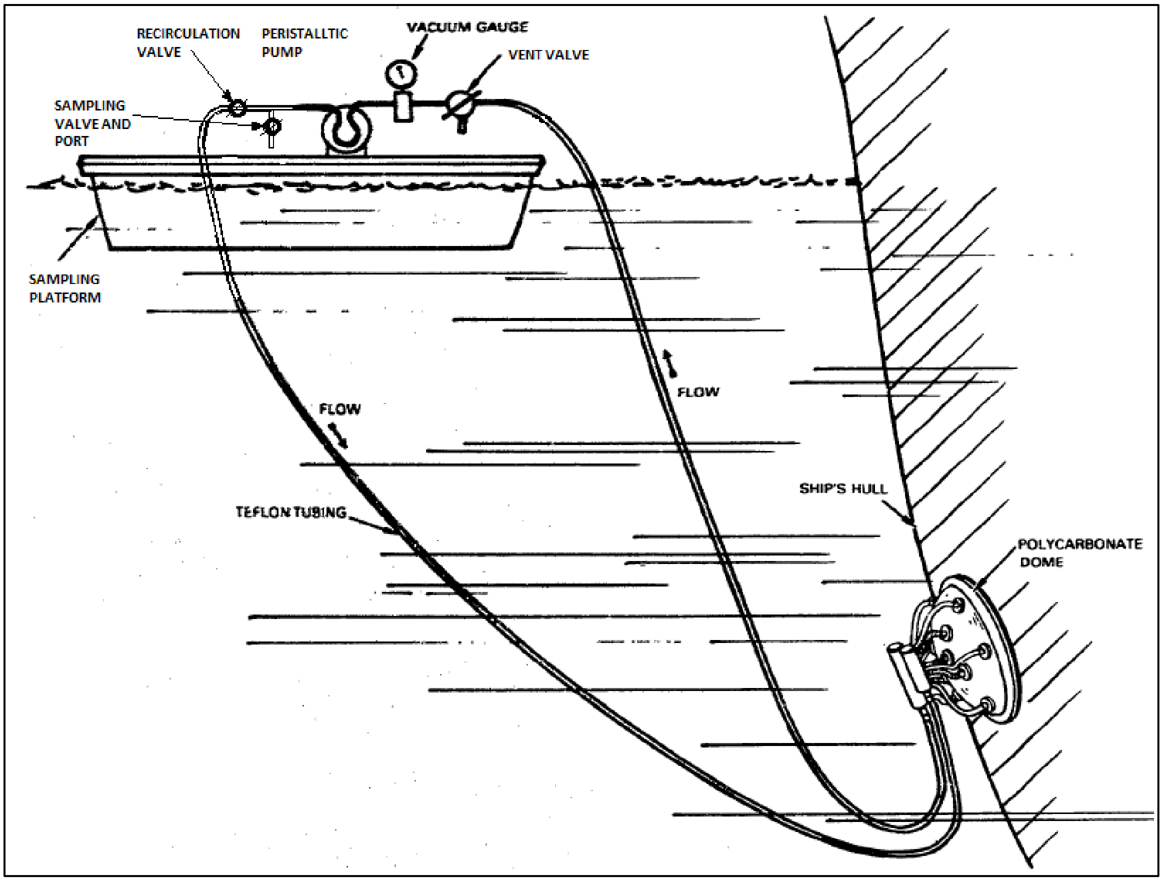

Figure 2-1. Schematic diagram of the dome sampling system (adapted from Lieberman et al., 1985).

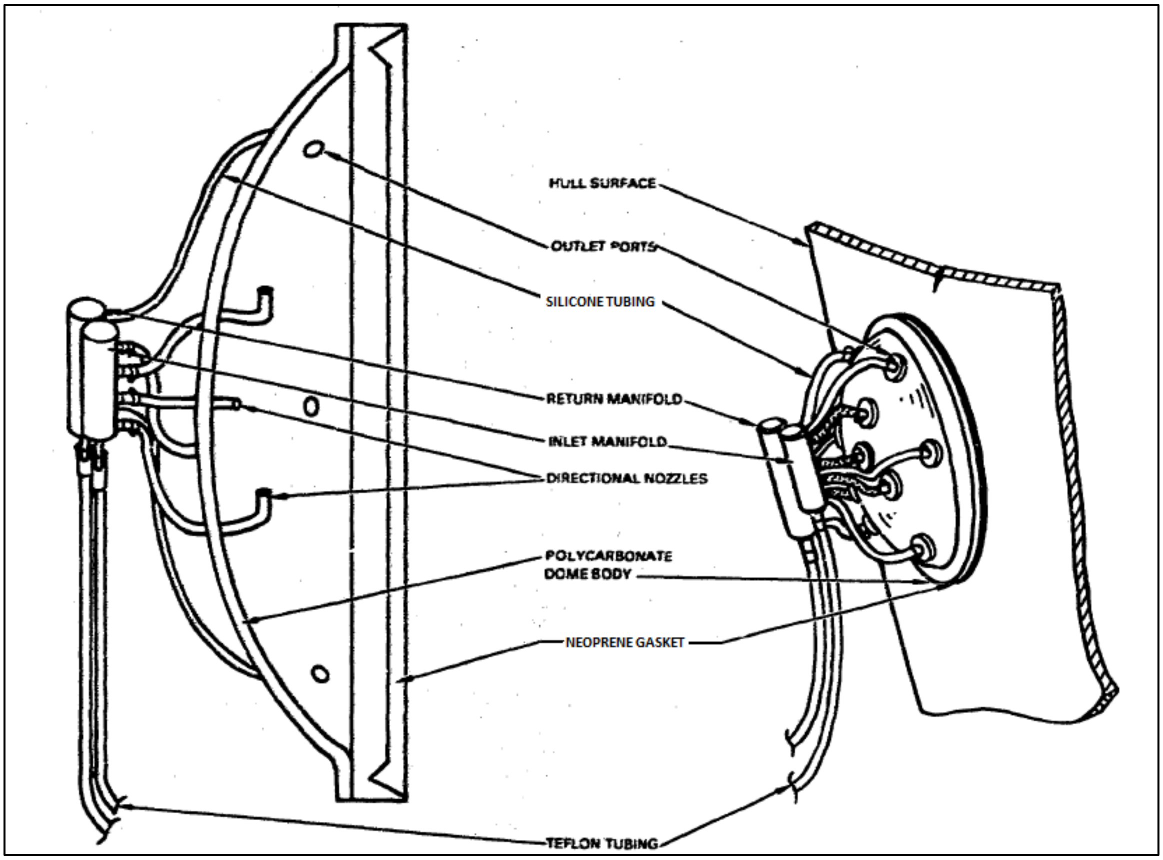

Figure 2-2. Detailed diagram of the dome component showing the inlet and outlet manifolds, gasket seal, and tubing connections (adapted from Lieberman et al., 1985).

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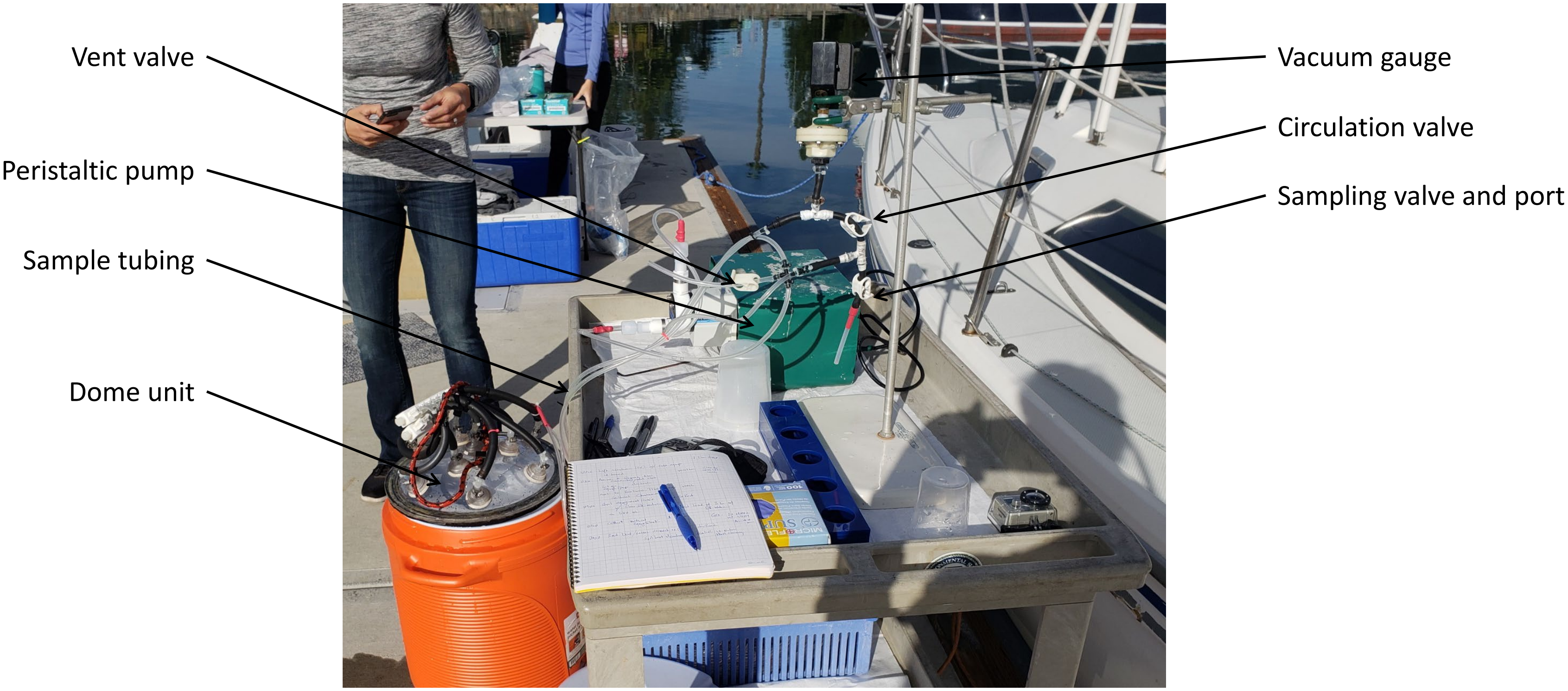

Figure 2-3. Photograph of the dome sampling setup used during the study.

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Figure 2-4. The sailboats used in the study including the Chubasco (above), and the Meridian (below).

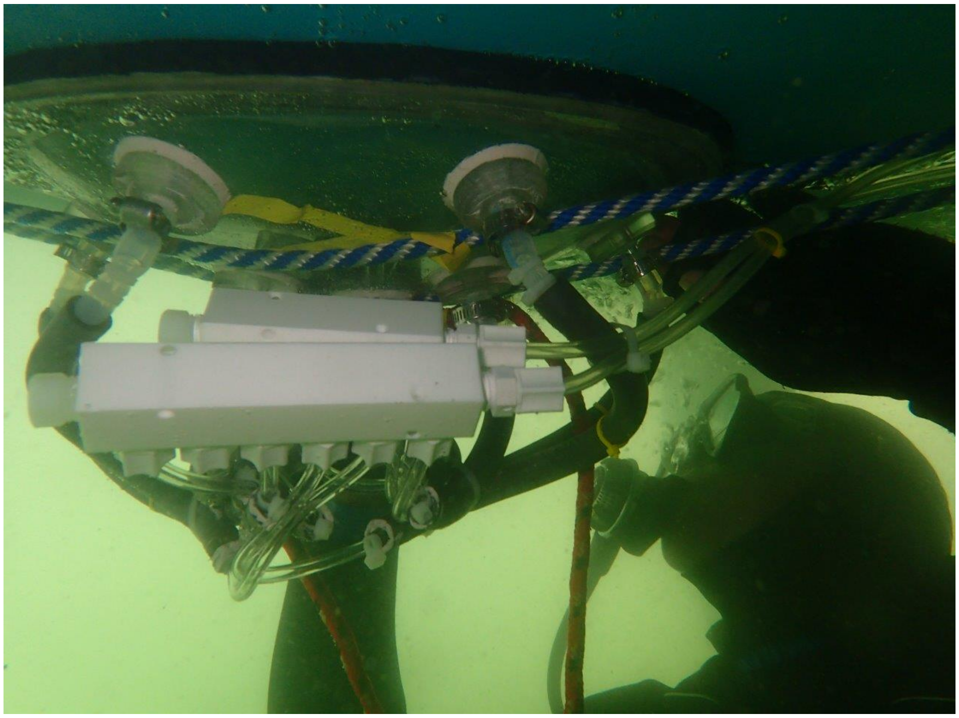

Figure 2-5. Placement of the dome by diver on the hull of the boat.

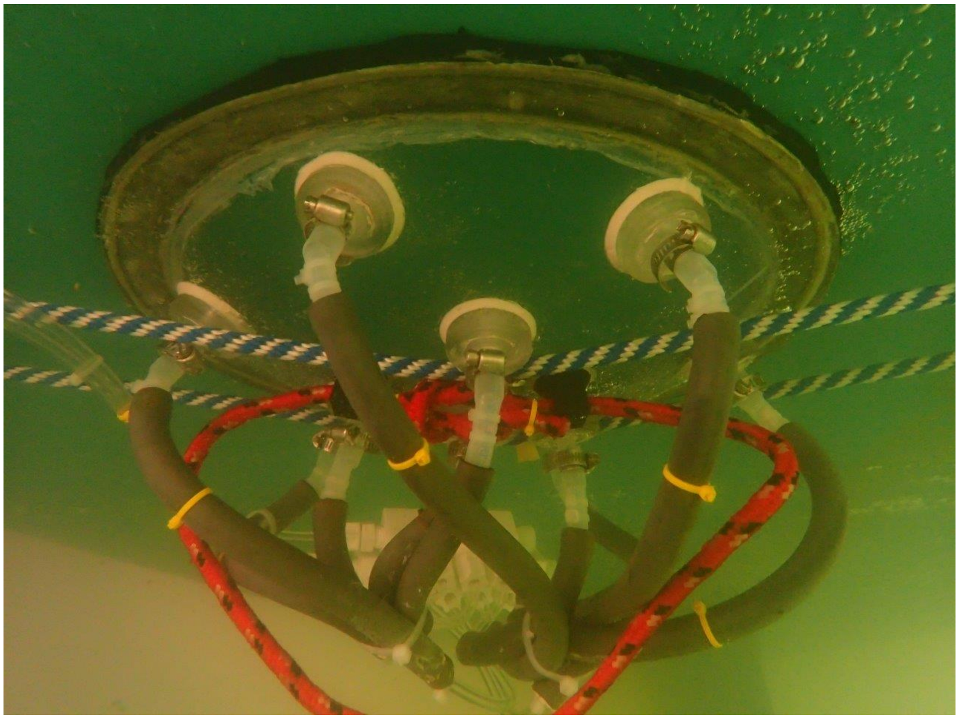

Figure 2-6. Fully installed dome during sampling operations.

Figure 2-7. Ratchet strap and line used to help secure the dome in place during sampling operations.

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3 RESULTS

3.1 DATA QUALITY RESULTS

The quality assurance (QA) objective of this field investigation was to collect data of known and appropriate quality for the project objectives. The QA processes included the application of: (1) appropriate field techniques; (2) appropriate tools and methods; and (3) measurement objectives for precision, accuracy, representativeness, completeness, and comparability (PARCC). Results for the QA objectives for the study are summarized below. This section summarizes the data quality objectives for this investigation and addresses whether the data quality objectives were achieved.

3.1.1 PRECISION

Precision for the leach rate measurements was assessed on the basis of replicate analysis of samples collected from the domes. This measure of variability captures all of the variability associated with the sample collection, handling and analysis. Replicate samples were generally collected at the final sampling time from one of the dome systems during each of the five monitoring event. Precision was quantified based on the coefficient of variation (CV) for the duplicates. CVs ranged from a low of 0% for the baseline event on the Meridian, to a high of 6% for the Day 30 event on the Meridian (Table 3-1). These levels of variability are typical for environmental measurements and indicate an acceptable level of precision for the data.

Precision was also gauged based on a complete replicate leach rate measurement performed during the Day 3 event on the Chubasco. The replicate measurement was collected by conducting the initial leach rate measurement following the standard procedures, and then moving the dome slightly to a new area on the hull and repeating the measurement. Thus the variability reflected in these replicates incorporates all aspects of the leach rate measurement itself, but may also be attributed to an unknown degree to the different leach rates present at these two different locations on the hull. The two replicate measurements (Table 3-2) showed leach rates of 6.7 and 7.1 $\mu g/cm^2/day$, respectively. This equates to a coefficient of variation in the leach rate measurement of about 4%, which is comparable to the range of variability observed in the individual sample replicates. The replicate leach rate measurements indicate an acceptable level of precision and the measured CV provides a measure of the expected variability for consideration when comparing the results from the different hull cleaning methods and the different events.

3.1.2 ACCURACY

Accuracy of the leach rate measurement cannot be directly assessed without evaluating a standard material with a known leach rate, which was not feasible for this effort and is generally not a standard part of the protocol. As a proxy for accuracy, we assessed the linearity of the leach rate response during each event on each boat. So long as the water in the dome is well mixed, does not become saturated, and there are no significant leaks in the system, the dome response should be highly linear. Thus a measure of linearity provides a good indicator of the relative accuracy of a given leach rate measurement. The coefficient of determination (r^2) for the linear regression of the dome concentrations versus time was used as a relative measure of linearity. Values of r^2 ranged from a low of 0.95 during the baseline event on the Chubasco, to a high of 1.00 during the Day 0 event on the Meridian (Table 3-2 and Table 3-3). These results generally indicate a high degree of linearity, and thus the relatively accurate results were obtained for all events.

One minor exception was for the baseline event on the Chubasco which indicated minimal change in concentration between the t = 0 min and t = 15 min samples. It is possible that some disturbance of the dome occurred which precluded the buildup of copper within the dome volume as would normally be expected. This would have a tendency to bias the leach rate toward a lower value than the actual value, thus impacting accuracy. To assess the potential inaccuracy associated with this inconsistency, we dropped the initial (t = 0 min) sample from the regression and recalculated the leach rate. The leach rate changed from 2.9 $\mu g/ cm^2/day$ when the t = 0 min sample was included, to 3.6 $\mu g/ cm^2/day$ with the t = 0 min sample excluded, and the r^2 value increased from 0.97 to 1.00. For this reason, we reported the slightly higher value which is based only on the portion of the data that displayed a linear trend.

Accuracy can also be influenced by biases that could be introduced by copper contamination not associated with the leaching from the hull. For example, if the surface of the dome had high levels of copper that continued to leach out during the measurement, this would tend to bias the leach rate higher than the actual value. To address these potential concerns, equipment blanks were collected from the dome samplers to determine if there were copper levels sufficiently high to influence the leach rate measurement. Equipment blanks were collected after the equipment was decontaminated and prior to use. Blanks were collected on 12/4/18 and 1/9/19 from the domes used on each vessel (Table 3-4). Equipment blanks ranged from a low of 2.8 μg/L for the Meridian dome on 1/9/19 to a high of 9.8 μg/L for the Chubasco dome on 12/4/18. The blanks from 12/4/18 were generally somewhat higher than the blanks on 1/9/19. However, all of the blanks were generally low compared to the dome concentrations used to determine the leach rates, which typically ranged from an average of 25-109 μg/L for the t = 0 min and t = 60 min samples on the Meridian, and from 19-117 μg/L for the same samples on the Chubasco. Thus the influence of any equipment contamination on the leach rate measurements is not considered to be significant with respect to the accuracy of the slope measurements used to determine the leach rate.

3.1.3 REPRESENTATIVENESS

The representativeness is an expression of the degree to which sample data accurately represent the characteristics of a population, parameter variations at a sampling point, or an environmental condition that they are intended to represent. Representativeness was maximized by (1) selecting the appropriate number of samples and sampling locations, and (2) using appropriate and established sample collection, handling, and analysis techniques to provide information that reflects actual site conditions.

Representativeness for the leach rate measurements is limited to the vessels, coatings, cleaning methods, and environmental conditions under which the studies were conducted. To the degree that these coatings, methods and conditions are generally consistent with other boats, methods and locations, the results may be more broadly representative. The coating on the vessels that were tested was Pettit Marine Paint Trinidad SR (EPA Registration NO. 60061-94). The vessels were moderate sized recreational sailboats including the Catalina 320 and the Catalina 270. Cleaning methods included the diver BMP method, and the drive-in Rentunder Boatwash. Environmental conditions were generally consistent with winter conditions at a marina site in San Diego Bay with ambient copper concentrations ranging from 1.7 to 8.8 µg/L, water temperatures ranging from 14.4 to 16.6 °C, salinity ranging from 30.55 to 32.89 psu, and pH ranging from 7.94 to 8.10 over the period of the sampling events (Table 3-5).

3.1.4 COMPLETENESS

Completeness assesses the amount of valid data obtained from a measurement system compared to the amount of data required to achieve a particular statistical level of confidence or in relation to the data required to achieve the project objectives. The percent completeness was calculated as the number of sampling events yielding acceptable data divided by the total number of sampling events planned to be collected and multiplied by 100. Leach rate measurements of acceptable quality were completed for a total of 10 of 10 target events for a completeness of 100%. This level of completeness is generally acceptable for field environmental sampling.

3.1.5 COMPARABILITY

Comparability is a qualitative parameter that expresses the degree of confidence that one data set may be compared to another. This goal was achieved through the use of (1) standardized techniques to collect and analyze samples, and (2) appropriate units to report analytical results. The comparability of the data was maximized by using standard analytical methods when possible, reporting data in consistent units, reporting data in a tabular format, and by validating the results against commonly accepted methodologies and target limits.

Table 3-1. Dissolved copper results (µg/L) for replicate samples collected immediately following the t = 60 minute time interval for each sampling event, with associated statistics including standard deviation, mean, and coefficient of variation.

Event	Time	Vessel	Replicate 1 Conc. (ug/L)	Replicate 2 Conc. (ug/L)	Replicate Standard Deviation (ug/L)	Replicate Mean (ug/L)	Coefficient of Variation (%)
Baseline	T60	Meridian	130	130	0.0	130	0%
Day 0	T60	Chubasco	180	170	7.1	175	4%
Day 3	T60	Meridian	98	99	0.7	99	1%
Day 14	T60	Chubasco	93	98	3.5	96	4%
Day 32	T60	Meridian	120	130	7.1	125	6%

Table 3-2. Leach rate measurements for the Chubasco (Boatwash-cleaned) for each sampling event with associated data and coefficient of determination (r^2).

Event	Sample	Diss. Copper Conc. (µg/L)	Dome Volume (ml)	Mass (µg)	Slope (µg/day)	r^2	Leach Rate (µg/cm^2/day)
Baseline	T0	39	2200	86	2573	1.00	3.6
	T15	40	2150	86			
	T30	54	2100	113			
	T45	69	2050	141			
	T60	83	2000	166			
Day 0	T0	14	2200	31	7687	0.98	10.9
	T15	58	2150	125			
	T30	110	2100	231			
	T45	140	2050	287			
	T60	175	2000	350			
Day 3	T0	17	2200	37	4769	0.99	6.7
	T15	48	2150	103			
	T30	72	2100	151			
	T45	95	2050	195			
	T60	120	2000	240			
Day 3 Dup	T0	32	2200	70	5033	1.00	7.1
	T15	56	2150	120			
	T30	86	2100	181			
	T45	110	2050	226			
	T60	140	2000	280			
Day 14	T0	13	2200	29	3973	0.99	5.6
	T15	32	2150	69			
	T30	57	2100	120			
	T45	77	2050	158			
	T60	96	2000	191			
Day 32	T0	14	2200	31	4481	1.00	6.3
	T15	39	2150	84			
	T30	63	2100	132			
	T45	84	2050	172			
	T60	110	2000	220			

Table 3-3. Leach rate measurements for the Meridian (diver-cleaned) for each sampling event with associated data and coefficient of determination (r^2).

Event	Sample	Diss. Copper Conc. (µg/L)	Dome Volume (ml)	Mass (µg)	Slope (µg/day)	r^2	Leach Rate (µg/cm^2/day)
Baseline	T0	40	1950	78	3622	1.00	5.1
	T15	63	1900	120			
	T30	90	1850	167			
	T45	110	1800	198			
	T60	130	1750	228			
Day 0	T0	14	1950	27	3024	1.00	4.3
	T15	32	1900	61			
	T30	51	1850	94			
	T45	68	1800	122			
	T60	88	1750	154			
Day 3	T0	28	1950	55	2753	0.99	3.9
	T15	46	1900	87			
	T30	65	1850	120			
	T45	77	1800	139			
	T60	99	1750	172			
Day 14	T0	11	1950	21	4269	0.98	6.0
	T15	36	1900	68			
	T30	65	1850	120			
	T45	95	1800	171			
	T60	110	1750	193			
Day 32	T0	30	1950	59	3893	1.00	5.5
	T15	50	1900	95			
	T30	79	1850	146			
	T45	100	1800	180			
	T60	125	1750	219			

Table 3-4. Results for equipment blanks performed during the study.

Date	Dome	Vessel	Diss. Copper Conc. (µg/L)
12/4/2018	Yellow	Chubasco	9.8
	Red	Meridian	8.6
1/9/2019	Yellow	Chubasco	3.4
	Red	Meridian	2.8

Table 3-5. Environmental conditions during the study including ambient copper concentrations, temperature, salinity and pH.

Vessel	Event	Date	Ambient Copper Conc. (μg/L)	Temperature (C)	Salinity (psu)	pH
Meridian	Baseline	12/4/2018	4.9	NA	NA	NA
	Day 0	12/8/2018	1.7	15.4	30.55	8.07
	Day 3	12/11/2018	4.4	16.4	32.15	7.94
	Day 14	12/22/2018	4.4	16.6	32.8	8.01
	Day 32	1/9/2019	8.8	14.4	32.89	8.05
Chubasco	Baseline	12/4/2018	4.1	NA	NA	NA
	Day 0	12/8/2018	5.2	15.2	30.87	8.08
	Day 3	12/11/2018	7.5	16.4	32.15	7.94
	Day 3 Rep	12/11/2018	8.3	16.4	32.62	8.10
	Day 14	12/22/2018	5.4	16.5	32.46	8.00
	Day 32	1/9/2019	6.2	15.9	32.14	7.94

3.2 IN-SITU LEACH RATE RESULTS

3.2.1 BASELINE EVENT

In-situ leach rate results from the baseline monitoring event are shown in Table 3-2 and Table 3-3, and Figure 3-1. This event was conducted prior to the hull cleaning for both vessels and thus represents the condition of the hulls with a certain level of fouling present associated with accumulation since the original painting in June of 2018 with no other intervening cleaning events. Diver observations indicated that the level of fouling was light. In-situ leach rates for the two vessels were ranged from 3.6 μg/ cm^2/day for the Chubasco, to 5.1 μg/ cm^2/day for the Meridian. Thus the baseline rate for the Chubasco was somewhat higher than the Meridian (29%) and a statistical comparison of the slopes for the two systems indicated that they were statistically different (at α=0.05). The leach rates appeared to both be consistent with the known and observed condition of the boats, with relatively new coatings and light fouling that had not been recently refreshed by cleaning.

3.2.2 DAY 0 EVENT

In-situ leach rate results from the Day 0 monitoring event are shown in Table 3-2 and Table 3-3, and Figure 3-2. This event was conducted the day after the hull cleaning for both vessels and thus represents the condition of the hulls immediately after cleaning. Diver observations indicated that both hulls appeared relatively free of observable fouling. In-situ leach rates for the two vessels ranged from 4.3 μg/ cm^2/day for the Meridian, to 10.9 μg/ cm^2/day for the Chubasco. Thus the Day 0 rate for the Chubasco was substantially higher than the Meridian (61%) and a statistical comparison of the slopes for the two systems indicated that they were statistically different (at α=0.05). The leach rate for the Chubasco appeared to be consistent with a coating that was recently refreshed by cleaning, while the release rate for the Meridian appeared to be similar to the baseline leach rate observed prior to cleaning.

3.2.3 DAY 3 EVENT

In-situ leach rate results from the Day 3 monitoring event are shown in Table 3-2 and Table 3-3, and Figure 3-3. This event was conducted three days after the hull cleaning for both vessels and thus represents the condition of the hulls several days after cleaning. Diver observations indicated that both hulls remained relatively free of observable fouling. In-situ leach rates for the two vessels ranged from 3.9 µg/ cm^2/day for the Meridian, to 6.7 µg/ cm^2/day for the Chubasco. The Chubasco replicate leach rate measurement for this event was similar to the initial measurement with a rate of 7.1 µg/ cm^2/day. Thus the Day 3 rate for the Chubasco remained somewhat higher than the Meridian (42%) and a statistical comparison of the slopes for the two systems indicated that they were statistically different (at α=0.05). The leach rate for the Chubasco appeared to be consistent with a coating that was recently refreshed by cleaning but declining in leach rate, while the release rate for the Meridian appeared to be similar to the baseline leach rate observed prior to cleaning.

3.2.4 DAY 14 EVENT

In-situ leach rate results from the Day 14 monitoring event are shown in Table 3-2 and Table 3-3, and Figure 3-4. This event was conducted fourteen days after the hull cleaning for both vessels and thus represents the condition of the hulls weeks after cleaning. Diver observations indicated that both hulls remained relatively free of observable fouling with some light patchy fouling near the water line on both vessels. In-situ leach rates for the two vessels ranged from 5.6 µg/ cm^2/day for the Chubasco, to 6.0 µg/ cm^2/day for the Meridian. Thus the Day 14 rates for the two vessels were very comparable (difference ~7%), and a statistical comparison of the slopes for the two systems indicated that they were not statistically different (at α=0.05). The leach rate for both vessels appeared to be consistent with the baseline leach rates observed prior to cleaning.

3.2.5 DAY 32 EVENT

In-situ leach rate results from the final Day 32 monitoring event are shown in Table 3-2 and Table 3-3, and Figure 3-5. This event was conducted 32 days after the hull cleaning for both vessels and thus represents the condition of the hulls approximately one month after cleaning. Diver observations indicated that both hulls showed areas of light fouling. In-situ leach rates for the two vessels ranged from 5.5 µg/ cm^2/day for the Meridian, to 6.3 µg/ cm^2/day for the Chubasco. Thus the Day 32 rates for the two vessels were very comparable (difference ~13%). Nevertheless, a statistical comparison of the slopes for the two systems indicated that they were statistically different (at $\alpha=0.05$). As with the Day 14 event, the leach rate for both vessels during this final event appeared to be consistent with the baseline leach rates observed prior to cleaning.

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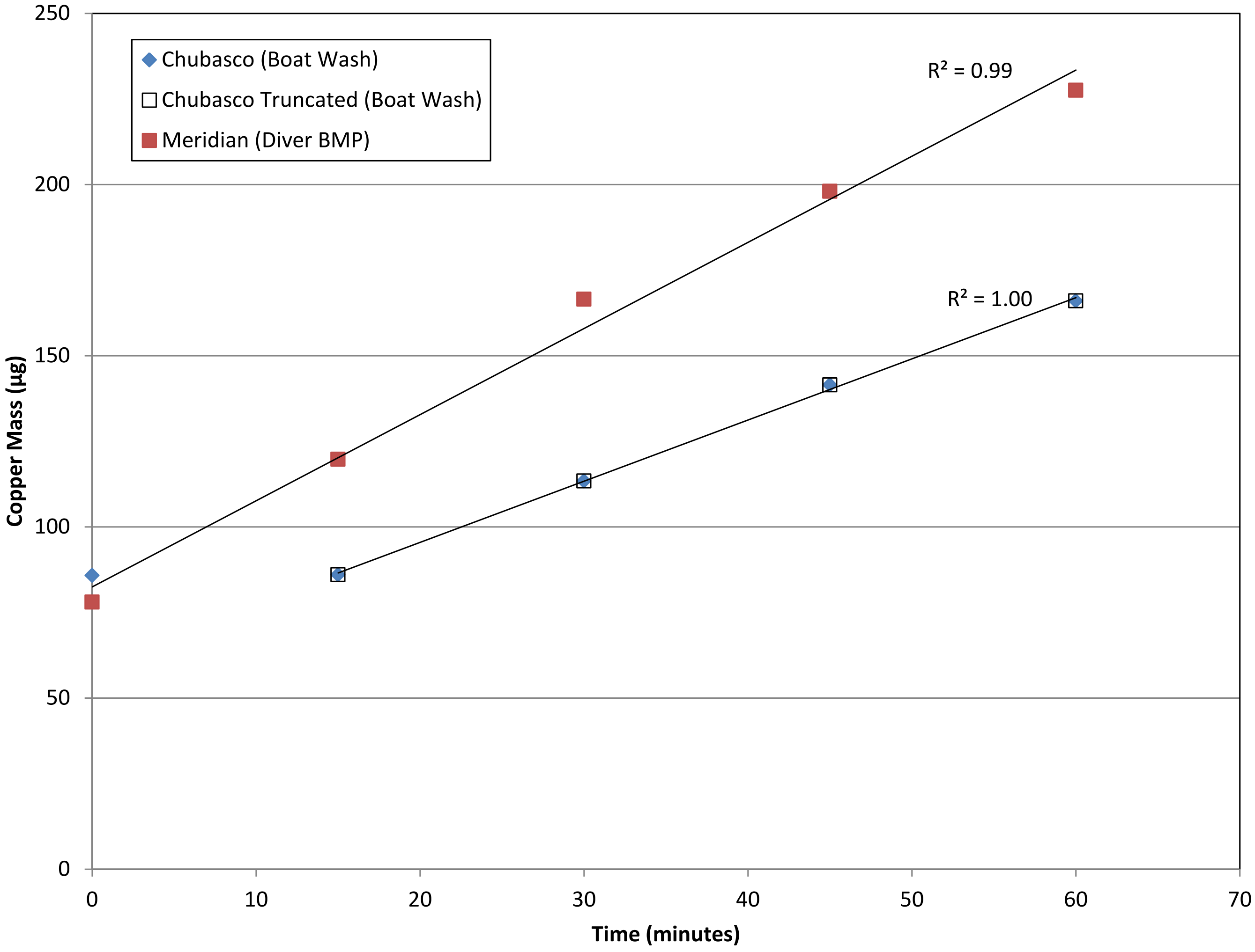

Figure 3-1. Copper mass time series results for the Baseline event. Note that due to the lack of trend in the first data point for the Chubasco, this point was not included in the regression to determine the slope.

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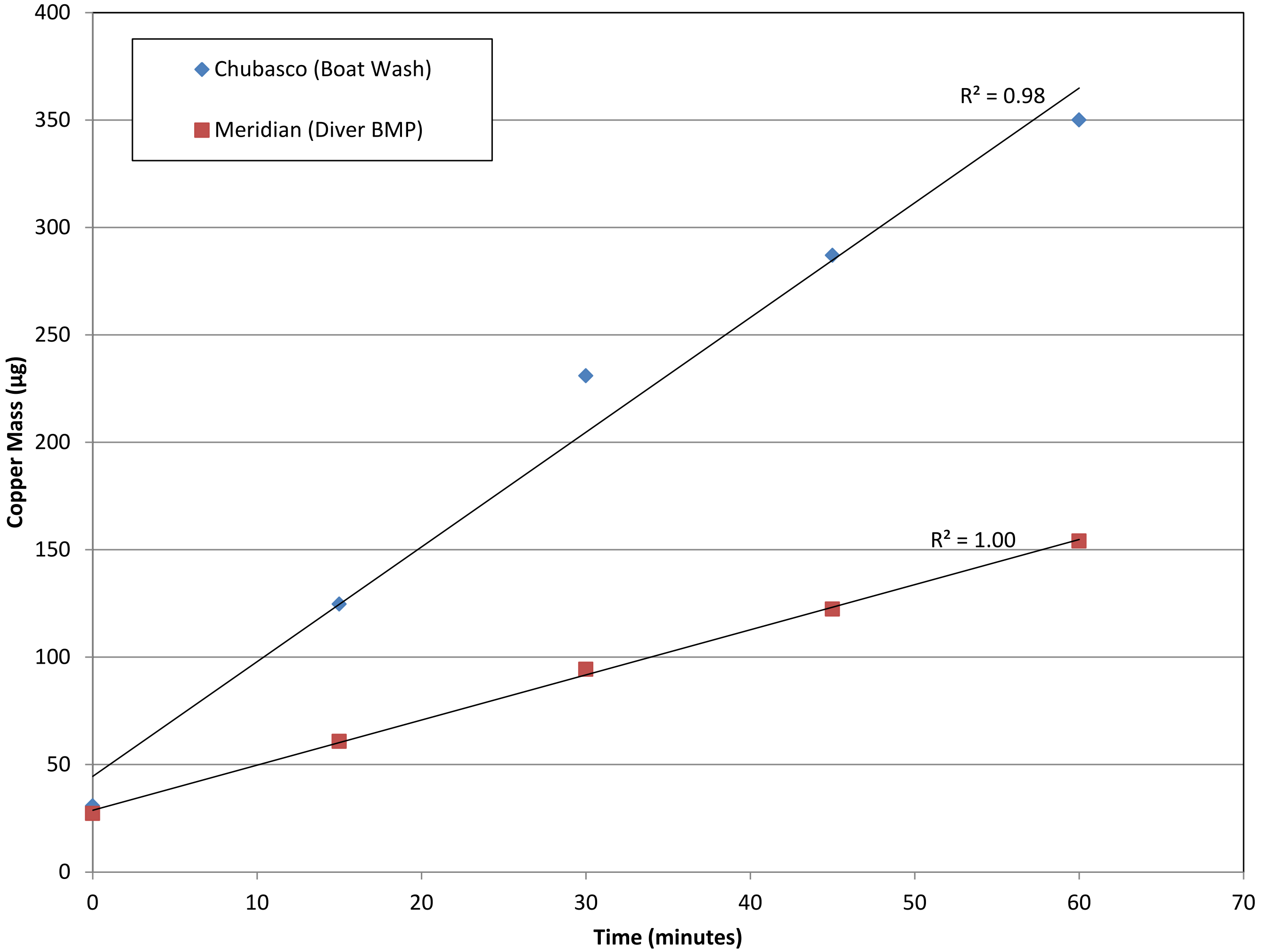

Figure 3-2. Copper mass time series results for the Day 0 event.

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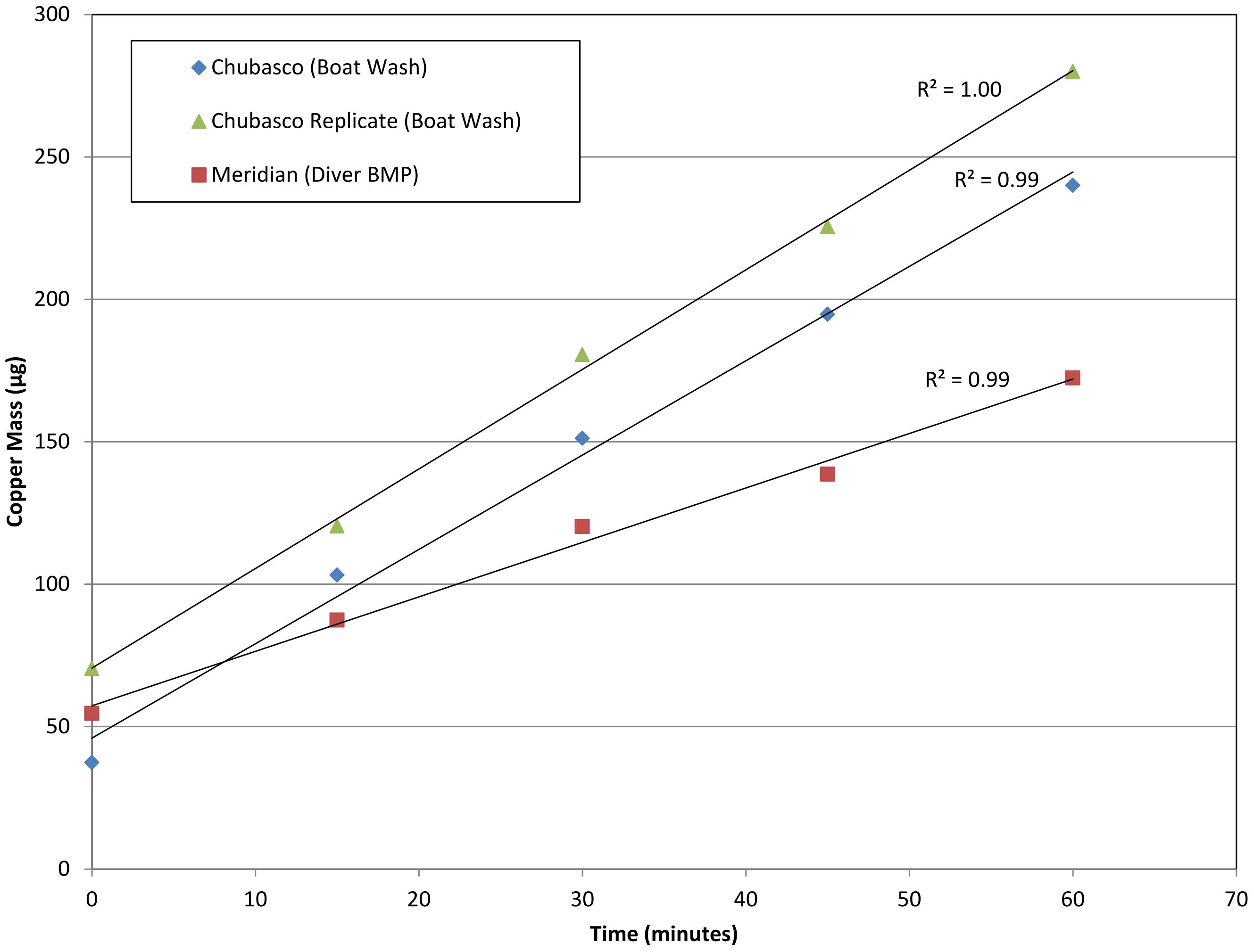

Figure 3-3. Copper mass time series results for the Day 3 event.

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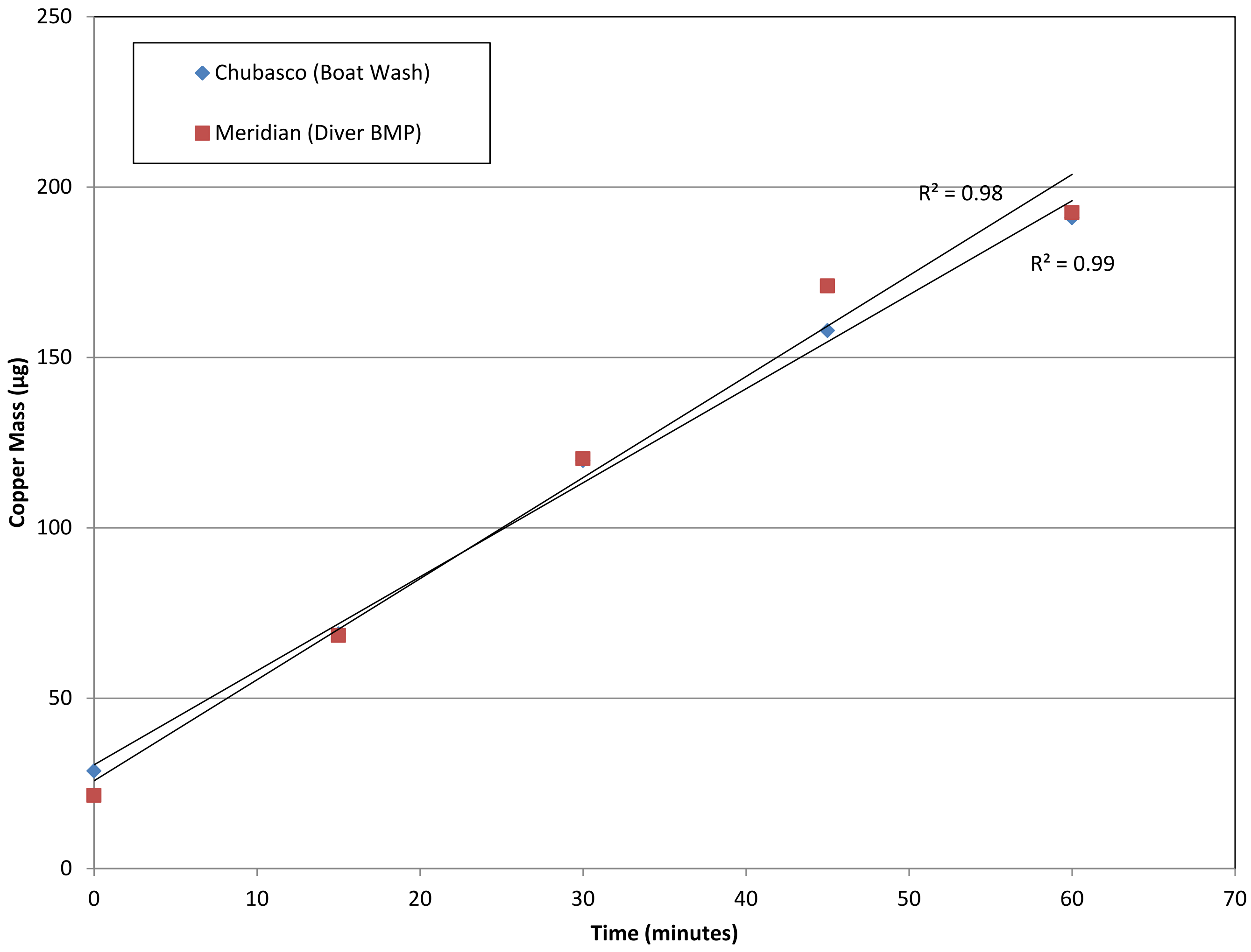

Figure 3-4. Copper mass time series results for the Day 14 event.

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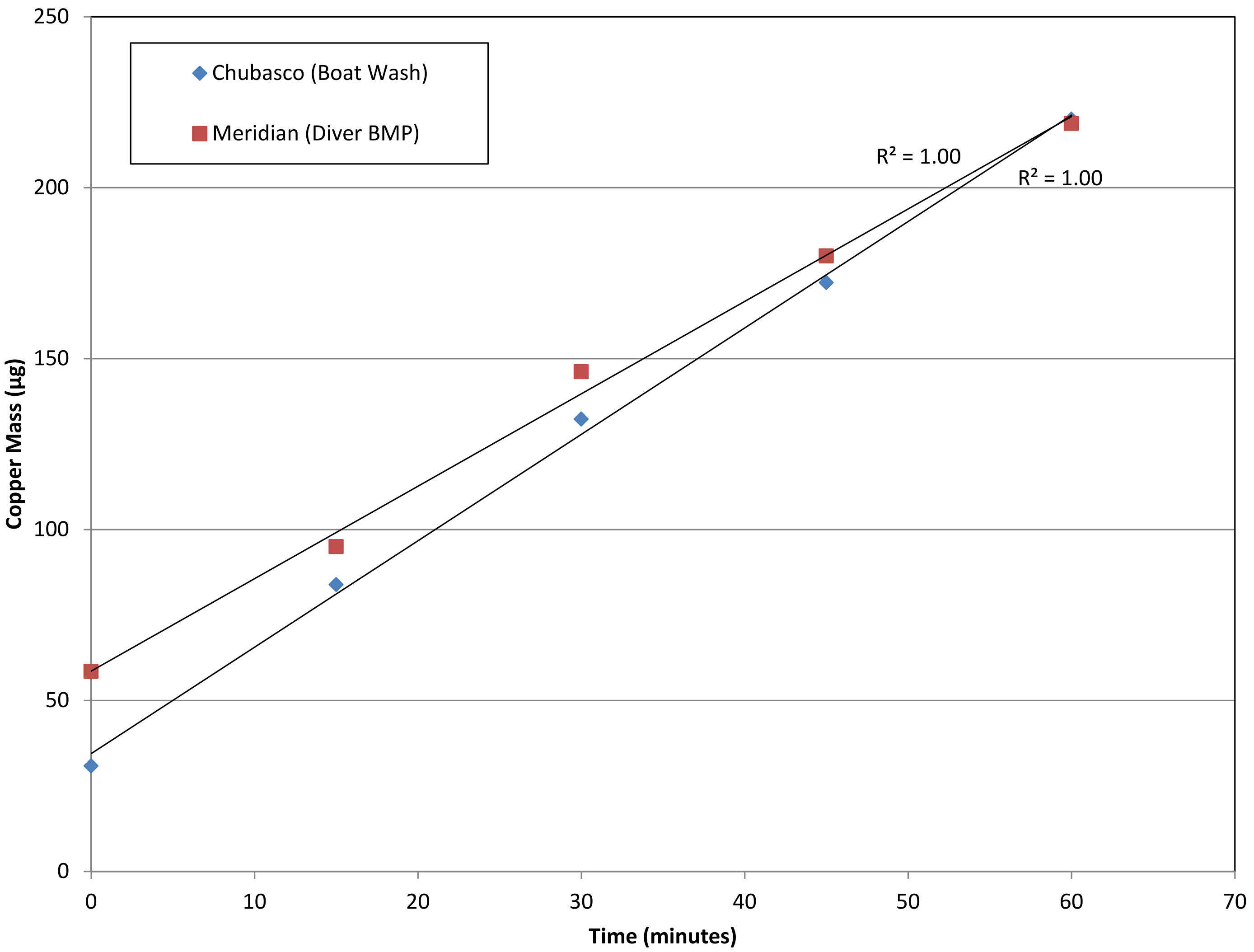

Figure 3-5. Copper mass time series results for the Day 32 event.

4 DISCUSSION AND CONCLUSIONS

Overall results for in-situ leach rates for the two different vessels using the BMP and boat wash cleaning methods are shown in Figure 4-1. The results indicate a difference between the two methods, where the boat wash method shows an increase in leach rate that subsequently tapers off following the cleaning. A statistical comparison of the leach rates for the two vessels (paired, two-sample t-test for means) indicated a statistically significant difference between the two treatments. Because the vessels were similar, the coatings were the same, and all aspects of the testing were comparable, the most likely explanation for this difference is the hull cleaning method. The overall plot and the statistical comparisons for the individual events indicate that the differences were limited primarily to the Day 1 and Day 3 time periods, and that the leach rates had essentially equalized by the Day 14 event.

To evaluate the potential influence of this difference on copper loading, we integrated the leach rate data over time and derived estimates of the overall area-normalized loading for each of the vessels. The baseline leach rate was assumed to apply for all days prior to the cleaning. Starting with Day 0, for days with measurements, the actual leach rate value was used, and for intermediate days, the leach rate was assumed to vary linearly with time in order to create a complete daily time series of leach rates for integration. The results indicate an overall loading of 6.9 $\mu g/cm^2/day$ for the Chubasco with boat wash cleaning, and an overall loading of 5.9 $\mu g/cm^2/day$ for the Meridian with diver BMP cleaning, indicating about a 14% higher loading associated with the boat wash cleaning. These rates are based on the entire 32-day period of the study. They also are only indicative of the loading difference associated with the release of dissolved copper during passive leaching following an in-water hull cleaning event, and do not include any loading associated with the cleaning activities themselves.

An explanation for the observed differences may be related to the differences in the diver BMP and boat wash cleaning methods. The diver BMP specifically calls out for the diver to use the least aggressive cleaning process that is effective. The BMP also indicates that if fouling is not visibly present, then no cleaning should be performed in those areas. In contrast, the boat wash utilizes a static cleaning process along the entire hull, independent of the fouling condition. Thus, it is possible that the diver BMP method was effective at removing the observed fouling but without significantly refreshing the coating surface, while the boat wash method both cleaned the fouling and refreshed the surface. No clear differences were observed in the development of fouling on the two vessels over the 32-day period of the study following the cleaning.

Based on the results of the study, it appears that the two cleaning methods both were effective at removing observable fouling. In this case, the diver BMP method appears to have been less aggressive and likely removed the fouling without significantly refreshing the paint surface. The boat wash method appears to have both removed the fouling and refreshed the surface. Previous studies of the life-cycle of leach rates through cleaning events usually indicate a significant increase in leach rate immediately following cleaning if the paint surface had been refreshed (Earley et al., 2014), which was only observed for the boat wash method in our study. However, in the Earley study, this increase was generally lower for the BMP method compared to a more aggressive non-BMP method, consistent with our findings. The differences in cleaning methods did not appear to result in an obvious difference in the development of fouling on the two vessels after the cleaning. The more aggressive cleaning from the boat wash resulted in higher copper leach rates that persisted through the Day 3 sampling event.

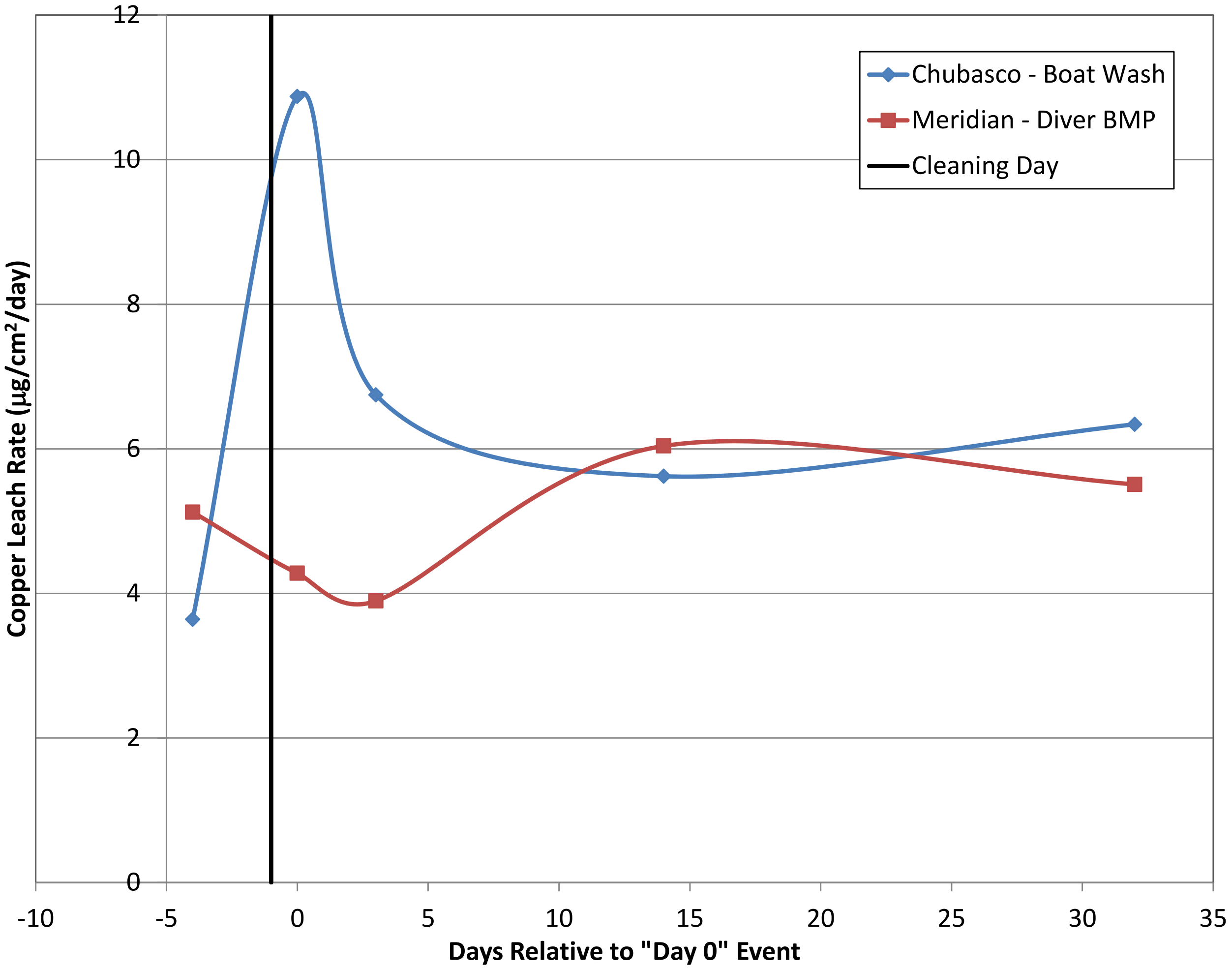

Figure 4-1. Copper leach rate comparison for the Chubasco (Boat Wash) and the Meridian (Diver BMP) based on the 5 monitoring events.

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