APPENDIX D

THRESHOLD REFERENCES

2018 RHMP Metric Thresholds Summary Table

Appendix Table D-1. Indicator Metrics to Assess Status and Trends in Water and Sediment Quality for the RHMP

Indicator Metric	Threshold Criteria	Value
Water Quality		
Dissolved Copper	**EPA Acute WQC (CMC)**	**4.8 µg/L**
	EPA Chronic WQO (CCC)	**3.1 µg/L**
Dissolved Zinc	EPA Acute WQC (CMC)	90 µg/L
	EPA Chronic WQO (CCC)	81 µg/L
Dissolved Nickel	EPA Acute WQC (CMC)	74 µg/L
	EPA Chronic WQO (CCC)	8.2 µg/L
Dissolved Oxygen	Basin Plan Objective - Water Column Mean	5.0 mg/L
Sediment Quality		
Chemistry		
Mean ER-M Quotient	**NA**	**0.2**
Copper (Cu)	SQO CSI Score - Lowest concentration for Moderate Exposure potential listed. Concentrations less than the threshold values are considered to have minimal or low exposure potential using this single LOE that relates sediment chemistry to benthic community condition.	96.5 mg/kg
Lead (Pb)		60.8 mg/kg
Mercury (Hg)		0.45 mg/kg
Zinc (Zn)		201 mg/kg
Total HPAHs		1325 µg/kg
Total LPAHs		312 µg/kg
Total PCBs		24.7 µg/kg
Total DDDs		3.56 µg/kg
Total DDEs		6.01 µg/kg
Total DDTs		2.79 µg/kg
Chlordane-alpha		1.23 µg/kg
Chlordane-gamma		1.45 µg/kg
∑SEM:AVS Ratio	Ratio - less than 40 = low toxicity potential	≤40
Integrated Chemistry SQO Score	**Minimal + Low Categories**	**Unitless**
Toxicity		
Amphipod Survival	Nontoxic + Low Toxicity	% Survival >82% of Control[a]
Bivalve Embryo Development		% Norma/Alive >82% of Cont. [b]
Integrated Toxicity SQO Score		**Unitless**
Benthic Community		
BRI	**Reference + Low Disturbance**	**<39.96**
Shannon Wiener Index	Reference Condition (RHMP)[c]	≥2.0
# of Taxa	Reference Condition (RHMP)[c]	≥24
Integrated Benthics SQO Score	**Reference + Low Disturbance**	**Unitless**
Final MLOE Integrated SQO Score	**Unimpacted + Likely Unimpacted**	**Unitless**

[a] If the response is not significantly different from the negative control, then % survival may be as low as 59% of the Control for the Low Toxicity category.

[b] If the response is not significantly different from the negative control, then % normal/alive may be as low as 42% of the Control for the Low Toxicity category.

[c] Based on San Diego Regional Harbors data as reported by Weston (2005b).

Bold values indicate primary metrics; non-bold indicate secondary metrics.

RHMP Historic Data Sources

Table D-2. Studies Used to Establish Historic Ambient Reference Values for RHMP

Study Name	Year	Dana Point Harbor	Oceanside Harbor	Mission Bay	San Diego Bay
Sediment Chemistry					
America's Cup Harbor	2001				X
Bight '98	1998	X		X	X
BPTCP	1994, 1996	X	X	X	X
Central SD Bay Nav. Channel Deepening	1998, 2003				X
Chollas Creek	2003				X
10th Avenue Marine Terminal	2002				X
National City Wharf Extension	1999				X
Navy Arco	2000				X
Navy P-326	2000				X
Paleta Creek	2003				X
Reference reconnaissance	2003				X
Sediment sampling	2003	X			
Toxic Hot Spots Sediment	2003				X
Water and Sediment Testing Project	2001-2003			X	
Bight '03	2003	X		X	X
RHMP Pilot Project	2005-2007	X	X	X	X
Benthic Infauna					
Ambient Bay and Lagoon Monitoring	2003		X	X	
America's Cup Harbor	2002				X
Bight '98	1998	X		X	X
Reference reconnaissance	2003				X
Switzer Creek	2002				X
Bight '03	2003	X		X	X
RHMP Pilot Project	2005-2007	X	X	X	X
Sediment Toxicity					
Bight '98	1998				X
Benthic Infauna Analysis	2003-2004	X			
National City Wharf Extension	1999				X
Water and Sediment Testing Project	2001-2003			X	
Bight '03	2003	X		X	X
RHMP Pilot Project	2005-2007	X	X	X	X
Water Column Chemistry					
Bay-wide Copper Assessment	2002				X
Dana Point monitoring	1992-2002	X			
Paco Bay Water measurements	1992-1999				X
RHMP Pilot Project	2005-2007	X	X	X	X

Table Source: *Originally published in the following report by MEC/ Weston Solutions for the RHMP: Establishment of Preliminary Reference Ambient Values and Preset Target Percentages, Progress Report for the Harbor Monitoring Program for San Diego Region, March 2005.*

ER-L and ER-M References

Table D-3.
ER-L and ER-M Screening Guideline Concentrations

Chemical		Screening Guideline Concentrations	
		ER-L	ER-M
Metals (mg/kg)	Arsenic	8.2	70
	Cadmium	1.2	9.6
	Chromium	81.0	370
	Copper	34.0	270
	Lead	46.7	218
	Mercury	0.15	0.71
	Nickel	20.9	51.6
	Silver	1.0	3.7
	Zinc	150	410
Organics (µg/kg)	Total PAHs	4,022	44,792
	Total Chlordanes	0.50	6.0
	Total DDTs	1.58	46.1
	Total PCBs	22.7	180

Notes:
µg/kg = microgram(s) per kilogram; DDT = dichlorodiphenyltrichloroethane; ER-L = effects range-low; ER-M = effects range-median; PAH = polycyclic aromatic hydrocarbon; PCB = polychlorinated biphenyl

Table D-4.
Comparison of Analytes Used to Derive the Integrated ER-L/ER-M Quotient and the CSI Following the SQO Approach

Chemical		ER-M Quotient	CSI
Metals	Arsenic	X	
	Cadmium	X	
	Chromium	X	
	Copper	X	X
	Lead	X	X
	Mercury	X	X
	Nickel	X	
	Silver	X	
	Zinc	X	X
Organics	LPAHs		X
	HPAHs		X
	Total PAHs	X	
	Total PCBs	X	X*
	Total DDDs		X
	Total DDEs		X
	Total DDTs	X	X**
	Alpha Chlordane		X
	Gamma Chlordane		X
	Total Chlordanes	X	

Notes:

* Total PCBs for CSI comparison used the sum of 16 select PCB congeners (PCB-8, 18, 28, 44, 52, 66, 101, 105, 110, 118, 128, 138, 153, 180, 187, and 195) multiplied by a correction factor of 1.72. See SQO Technical Manual for more detail (Bay et al., 2014).

** Total DDTs for CSI comparison used the sum of 2,4'- and 4,4'-DDT.

CSI = Chemical Score Index; DDD = dichlorodiphenyldichloroethane; DDE = dichlorodiphenyldichloroethylene; DDT = dichlorodiphenyltrichloroethane; ER-M = effects range-median; HPAH = high-molecular-weight polycyclic aromatic hydrocarbon; LPAH = low-molecular-weight polycyclic aromatic hydrocarbon; PAH = polycyclic aromatic hydrocarbon; PCB = polychlorinated biphenyl