

## **Merkel & Associates, Inc.**

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March 30, 2009  
M&A #07-046-02

Eileen Maher  
San Diego Unified Port District  
P.O. Box 120488  
San Diego, CA 92112

### **Re: Embarcadero Fishing Pier and Le Meridien Fish Enhancement Structures 3<sup>rd</sup> Quarterly Report**

Dear Eileen:

This letter reports the biological observations made at the Embarcadero Marina South (Figure 1) and Le Meridien (Figure 2) artificial reef sites. The reef structures were installed by Merkel & Associates, Inc. (M&A) on March 20 and 21, 2008 (M&A 2008). These observations constitute the third quarterly biological monitoring of the artificial reef sites.

#### **Embarcadero Marina South**

The biological survey at Embarcadero Marina South was performed on March 13, 2009 by M&A biologist, Heather Krish. Invertebrate species observed utilizing the newly installed structures were California spiny lobsters (*Panulirus interruptus*) and unidentified encrusting bryozoans (Bryozoa). Although some was seen, there was a dramatic decrease in abundance of the invasive colonial bryozoan, *Zoobotryon verticillatum*. The fish species observed within or near the reef structures were consistent with the second quarterly survey and included kelp bass (*Paralabrax clathratus*), spotted bass (*Paralabrax maculatofasciatus*), barred bass (*Paralabrax nebulifer*), opaleye (*Girella nigricans*), yellowfin croaker (*Umbrina roncadore*) and several unidentified surfperch (*Embiotocidae*). Algal growth continues on the A-jacks, but dominance has shifted from *Sargassum muticum* to the invasive algae *Undaria*. Together, these two algae almost completely cover the entirety of both the newly installed A-jacks as well as the older pipe reefs. As expected, more fishing line, lures, and lead weights were seen on both old and new sections of reef than in previous surveys.

#### **Le Meridien**

Ms. Krish also performed the biological survey at Le Meridien on March 13, 2009. The dominant fish and invertebrate species were the same as those observed at the Embarcadero Marina South site with the exceptions of the fish opaleye and yellowfin croaker, which were not observed. The density of *Zoobotryon verticillatum* dramatically decreased on these structures, as it did on the Embarcadero A-jacks. In addition, a higher number of San Diego Dorids (*Diaulula sandiegensis*) were observed during this survey than in any of the past surveys. *Undaria* was present but in much lower densities in comparison to the Embarcadero structures. *Sargassum muticum* was the most abundant algae, covering most of the reef. Pictures of *Undaria* can be seen on Photo Page 1.

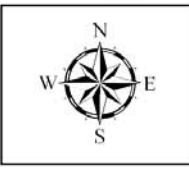
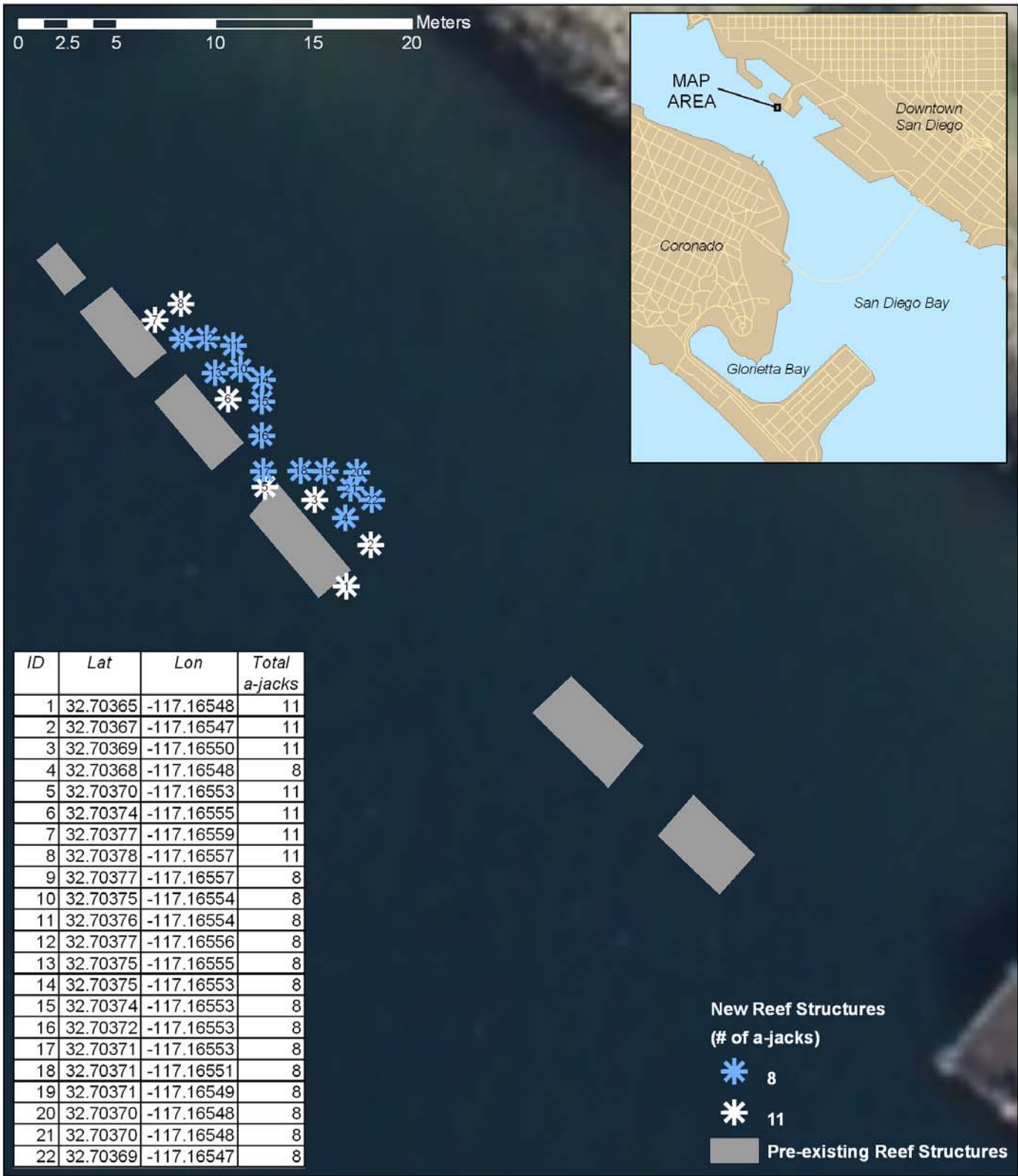
It has been a pleasure working on this project with the Port of San Diego. We look forward to the next monitoring event in June 2009. If you have any questions regarding this letter or the included materials, please contact me at (858) 560-5465.

Sincerely,

Robert Mooney, Ph.D.  
Senior Biologist

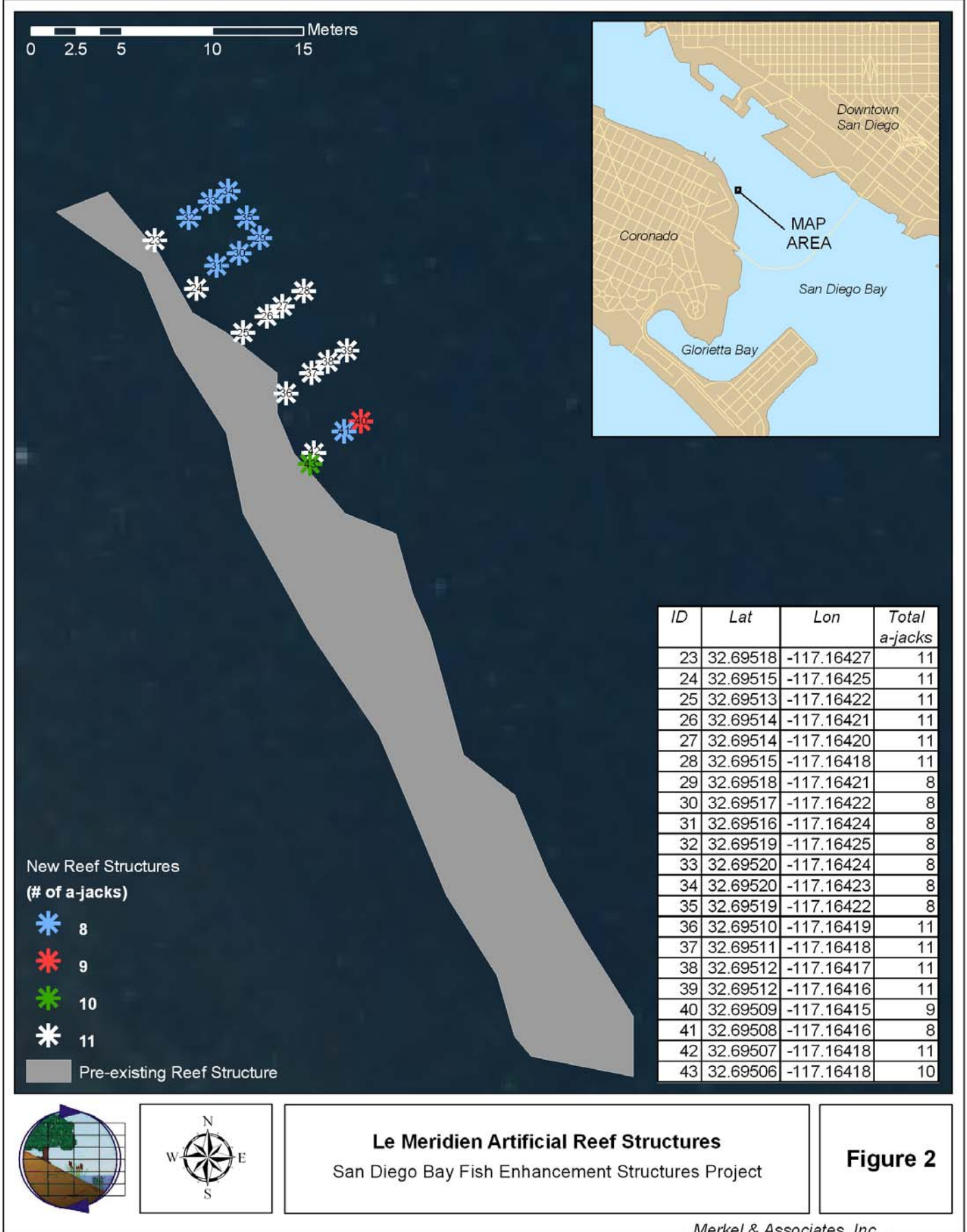
**References:**

[M&A] Merkel & Associates, Inc. 2008. Embarcadero Fishing Pier and Le Meridien Fish Enhancement Structures. Letter report regarding installation process. Prepared for the San Diego Unified Port District. March 15, 2008.



**Embarcadero Artificial Reef Structures**  
San Diego Bay Fish Enhancement Structures Project

**Figure 1**







**Photo Page 1. Photographs of the exotic marine algae, *Undaria pinnatifida*, observed at both the Embarcadero Marina South and LeMeridien artificial reef sites.**