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July 12, 2010

Eileen Maher
Assistant Environmental Director
Environmental Services Department
San Diego Unified Port District
PO Box 120488
San Diego, CA 92112-0488

Dear Ms. Maher,

This letter serves as our progress report for the second quarter of 2010 for our project “Movement and population size of spiny lobsters in San Diego Bay” (Hovel and Neilson).

Our project involves the use of 18 acoustic receivers designed to detect transmitters affixed to lobsters moving throughout San Diego Bay and within adjacent kelp forest habitat. Lobsters were tagged with active transmitters from May – June 2009 in four general areas: (i) outside the bay (within 1 km of the bay mouth), (ii) at the bay mouth (Pt. Loma lighthouse), (iii) in the vicinity of Shelter Island/North Island, and (iv) in the mid-bay near the Coronado Bay Bridge. Lobsters that move within range of receivers while tagged are detected by the receiver; this record is stored in memory which subsequently is downloaded to a computer by removing the receiver from the water for several minutes after divers retrieve it from the bottom of the bay. We have been visiting receivers bi-monthly since May 2009 to download these data.

In May 2010 we made a final download of these data from all 18 receivers and then returned receivers to the SDSU Coastal and Marine Institute Laboratory. We pulled receivers from the water because it has been approximately one year since lobsters first were tagged with acoustic transmitters. Lobster molting and transmitter battery life limit the practical period of passive tracking with receivers to one year.

Over the next quarter we will be reviewing receiver logs and quantifying lobster movement over the course of the year. We have included a preliminary analysis in this report that is our initial look at overall lobster movement trends in the bay. The data suggest that most lobsters visited only 1 or 2 stations over the course of the study (Figure 1), and few lobsters visited more than 3 stations, suggesting that in general, lobsters in San Diego Bay are relatively residential to particular areas. Approximately 9% of lobsters tagged with transmitters were never detected after release. Overall, it appears that lobsters tagged outside the bay remained in the kelp forest (though these lobsters were detected infrequently); that lobsters tagged at the bay mouth and in the vicinity of Shelter Island/North Island moved frequently among a small number of stations in that general area, and overall tended to move towards the bay mouth (but not out of the bay); and that lobsters tagged farther back in the bay by the Coronado Bay Bridge generally remained in that area.

We also quantified the total number of detections per receiver for all stations, and pasted this information into our preliminary population size estimate table (Table 1). Generally, receivers in the middle of our range (northern ecoregion of San Diego Bay) had the most detections, with stations outside of the bay, as well as station 20 at the Coronado Bay Bridge receiving the fewest detections. Note that this is not the equivalent of the total number of

lobsters detected, but rather the total number of detections, which may include many detections from only a few resident lobsters. In fact, several stations in the northern ecoregion likely have small lobster populations, but also lobsters that are residential and appear to remain in the vicinity of one station only (Table 1).

Presently we are engaged in deploying traps in selected areas of the bay to attempt to capture lobsters that have been at-large for the last year. With this effort we hope to obtain data on lobster growth rates in the bay, as well as to determine whether lobsters tend to exhibit high fidelity to particular sites over longer time scales.

Finally, though our receivers are set to detect acoustically tagged turtles in San Diego Bay, over the course of our lobster tagging study we have detected no turtles.

Sincerely,

A handwritten signature in black ink, appearing to read "Kevin A. Hovel", with a long horizontal flourish extending to the right.

Dr. Kevin A. Hovel
Associate Professor of Biology



Figure 1. Locations of receivers deployed throughout San Diego Bay and within adjacent kelp forest habitat.

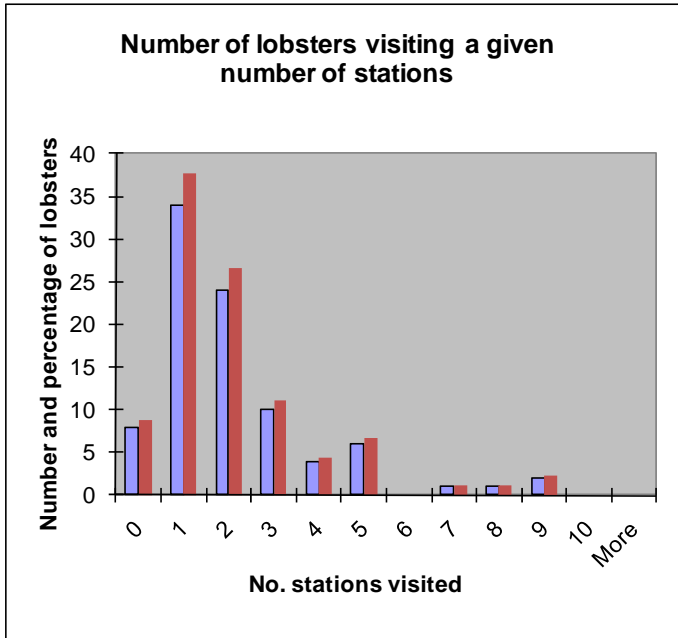


Figure 2. Number (gray bars) and percentage (red bars) of lobsters visiting stations in San Diego Bay over the course of one year. Zero station data represents lobsters that were never detected after being tagged.

Table 1. Location of stations (acoustic receivers) in San Diego Bay, the preliminary estimated size of the lobster population at each location, and the total number of detections of acoustic transmitters at each location after one year. Stations with small population size estimates but large numbers of detections generally are thought to house residential lobsters that do not often move (e.g. stations 15, 17, and 19) whereas stations with large population estimates but low to moderate numbers of detections are thought to be in locations the lobsters frequently enter and leave (e.g. stations 4, 6, and 7).

Station	Location	Pop. estimate	No. detections
1	In kelp forest, northern most site	na	95
2	Outside of Pt. Loma	na	4,839
3	In kelp at Pt. Loma	na	2,666
4	Along inside shoreline of Pt. Loma	45,295	10,464
5	Zuniga Jetty, bay side	8,013	10,584
6	Zuniga Jetty, concrete dolphin	42,568	23,518
7	Ballast Pt. eelgrass bed	50,350	8,492
8	Ammunition pier off of North Island	8,937	na ^a
9	South end of Shelter Island	4,705	23,899
10	Fish structures off of North Island	19,365	32,574
11	Shelter Island, north end	1,348	18,452
12	mid Harbor Island	na	23,272 ^b
13	I beams off ramp no. 7, west of "J&K" pier	1,334	21,888
14	East end of Harbor Island near cruise ships	1,959	637
15	Coast Guard station, near rip-rap	263	8,741
16	North Island shoreline, off ramps and hangars	2,495	47,621 ^c
17	Eelgrass and rocks in front of Marriott Hotel	961	102,687
18	Embarcadero Park South, fish structures	320	2,689
19	North of Coronado Bridge, near marina	622	56,012
20	50 m south of Coronado Bridge, west side of bay	na	6
Total		188,534	399,136
	^a station 8 receiver malfunctioned after 2 months and was not replaced		
	^b station 12 receiver stolen after 4 months and replaced		
	^c station 16 receiver stolen after 6 months and not replaced		
	na: not enough tagged lobsters found at site for population estimate		