Status of the European Green Crab (*Carcinus maenas*) in California Estuaries

Progress Report
7/1/03-12/31/03

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Summary of Activities

Introduction

The overall goal of this collaborative project supported by the Pacific States Marine Fisheries Commission is to monitor the abundance, distribution and potential spread of the introduced European green crab *Carcinus maenas* along the west coast United States during 2003. The immediate goal of the portion of the project for which I am immediately responsible is to monitor the abundance, distribution and potential spread of the green crab in California waters. The information derived from these coastwide surveys will provide key information about the status of this important invasion and will aid in the development of an effective management plan for the European green crab. The national management plan for the green crab is now completed and under review by the Federal Aquatic Nuisance Species Task Force.

To reach the goal of this project, we have now quantified the abundance and distribution of *Carcinus maenas* for a second year at several locations along the California coast for which we have prior information. The trapping methods, which have remained constant, have been included in previous reports and will not be repeated here. Below I discuss the magnitude and timing of the survey effort this year in California. I summarize the major findings for each bay and include information about changes relative to last year. I conclude with the budget for current reporting period 7/1/03-12/31/03 and a discussion of how funds were spent.

Results from Summer Surveys

In summary, we captured a total of 1317 green crabs over the course of the 2003 monitoring period in California. Similar to last year, the data indicate the presence of large populations and strong recruitment in sites in central California from Elkhorn Slough to Bodega Harbor. Also consistent with last year, the population in northern California represented by Humboldt Bay have nearly disappeared and have probably not experienced substantial local recruitment since 1998. There is no evidence of any juveniles at all in these populations. Based on evidence from southern California including Morro Bay and Tijuana Slough, there is no evidence that green crabs have established populations south of Elkhorn Slough and no evidence of any green crabs at all south of Pt. Conception. Therefore, central California populations continue to represent the vast majority of green crabs found along the west coast and may be providing recruits for populations farther north, although this remains to be demonstrated.

Consistent with last year, we found that green crabs had the highest abundant in central California sites. This year Elkhorn Slough had dramatically higher population sizes with relatively huge CPUE, in on case greater than 50 crabs per trap day. Comparatively high abundances were found at Tomales Bay and Bodega Harbor with maximum CPUE values of greater than 13 and 5 respectively. Similar to last year, San Francisco Bay had maximu CPUE values of slightly greater than two with many sites well below this. At all of these sites there were juvenile crabs indicating significant recruitment.

Analyses in Progress

We are currently analyzing the data for other crabs and we do not have those to report at this point. From these trap data, we will be able to analyze changing patterns of abundance of small shore crabs that are preyed upon by green crabs. Those data will accompany the next report as will comparisons with CPUE from earlier population surveys during the 1990s to allow comparisons over the entire period of the green crab invasion. Although outside of the scope of the current contract, it seems a comparison with population levels during the early part of the invasion is important to make. Therefore, we will include a comparison of current CPUE with past CPUE during the expansion phase of the green invasion as part of the next report.

Site Name	Latitude	Longitude	Date	Trap Days	Carcinus	Carcinus CPUE
Tijuana River Slough						
Main Channel	32.55879	117.11938	8/2/2003	8	0	0.00
Model Marsh	32.54767	117.12271	8/1/2003	7	0	0.00
Oneonta Slough	32.56791	117.13165	7/31/2003	7	0	0.00
Tidal linkage	32.57362	117.12575	7/31/2003	7	0	0.00
Morro Bay						
St. Park	35 20.812	120 50.004	11/7/2003	16	0	0.00
Turri West	35 50.156	120 49.451	11/7/2003	16	0	0.00
Turri East	35 20.106	120 49.365	11/7/2003	16	0	0.00
St. Park 2	35 20.812	120 50.004	11/7/2003	16	0	0.00
Elkhorn Slough						
Azevedo Pond	36.84573	121.75358	10/22/2003	8	149	18.63
Hudson Landing West	36.85673	121.75495	10/23/2003	8	19	2.38
Hummingbird Is	36.82372	121.74278	10/22/2003	8	204	25.50
Kirby Park	36.84103	121.74630	10/23/2003	7	41	5.86
North Marsh	36.83463	121.73843	10/22/2003	8	402	50.25
Vierra	36.81110	121.77827	10/23/2003	8	0	0.00
Whistle Stop Lagoon	36.82397	121.73938	10/22/2003	8	141	17.63
San Francisco Bay						
Blackies Pasture/Richardson Bay	37.88958	122.48155	2/26/2003	18	0	0.00
Tiburon Yacht Club	37.91625	122.47816	2/26/2003	18	0	0.00
Presidio Yacht Club	37.83343	122.47430	2/27/2003	18	0	0.00
Bayview Pl/Airport Blvd	37.59204	122.34218	3/22/2003	6	0	0.00
Coyote Park1	37.59093	122.32426	3/22/2003	24	1	0.04
San Mateo Bridge	37.57365	122.26280	3/24/2003	15	39	2.60
Redwood City cross yacht	37.50340	122.21520	3/24/2003	24	10	0.42
Redwood Shores Lagoon	37.52924	122.25521	3/25/2003	14	5	0.36
Foster City - Marlin	37.56320	122.24832	3/27/2003	8	2	0.25
Coyote Park2, Marina	37.59160	122.31590	3/28/2003	12	0	0.00
Redwood City yacht harbor	37.30150	122.12500	4/16/2003	12	6	0.50
San Mateo - Anchor	37.34190	122.17355	4/17/2003	8	1	0.13
Marina (Marina & Scott)	37.48250	122.26240	4/18/2003	12	0	0.00
Elsie Roemer Sancutary	37.75110	122.24590	4/21/2003	44	2	0.05
Egret Dr, Seminary	37.88251	122.49728	5/2/2003	20	1	0.05
San Lorenzo	37.67739	122.16865	5/2/2003	40	19	0.48
Vincent Park	37.90767	122.35109	5/8/2003	11	3	0.27
Shimada Friendship Park	37.90764	122.34461	5/9/2003	7	4	0.57
Tomales Bay						
Rt 1 mile 40.05	38.10470	122.54320	4/20/2003	9	5	0.56
Hog Is Oyster; mile 38.1	38.09360	122.53410	4/20/2003	10	17	1.70
Tomales St Pk, Millerton Point;	38.06210	122.50590	4/20/2003	9	17	1.89
Miller Park, mile 41.5	38.20170	122.92235	5/5/2003	11	147	13.36
Bodega Bay						
Dorm Channel	38.31713	123.05681	5/5/2003	11	12	1.09
Doran Park Creek	38.31553	123.03757	5/7/2003	11	63	5.73
County Park			5/6/2003	9	7	0.78
Humboldt Bay						
Arcata Marsh	40 51.497	124 08.958	9/8/2003	20	0	0.00
Bracut	40 51.945	124 05.883	9/10/2003	20	0	0.00
Mad	40.45.658	124 13.357	9/8/2003	20	0	0.00
Hookton	40 49.877	124 05.110	9/10/2003	20	0	0.00