Final Report

DFG Contract No. P0170015
to the
Foundation of California State University Monterey Bay
Project No. A025006901

June 10, 2004

Hydrographic Data Acquisition In Support Of MLPA And MLMA Implementation

Prepared by
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Saori Zurita, Bryan Jones, Erica Morris

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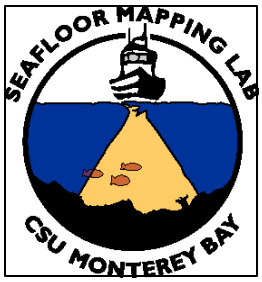

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PROJECT SUMMARY

The goal of this three-year contract has been to produce high-resolution marine habitat maps of nearshore sites deemed critical to the implementation of the Marine Life Protection Act (MLPA) and Marine Life Management Act (MLMA) by the California Department of Fish and Game (DFG) Marine Region management team. As part of this contract, the CSUMB Seafloor Mapping Lab (SFML) ran 2755 km of hydrographic survey lines, mapping a total of 243 km^2 of habitat in southern and central California. The maps include three of the MPAs and their associated controls within the new Channel Island Marine Reserve Network, as well as nearshore data gaps from the Monterey Peninsula to Point Sur.

Table 1. Total survey track lines run and habitat area mapped in central and southern California.

Areas Surveyed		Depth Range (m)		Survey Track	Area Mapped	
Location	Site	Minimum	Maximum	Lines (km)	km^2	mi^2
Channel Islands	Gull Island	4	261	591	55	21
	Carrington Pt	3	88	835	66	25
	South Point	7	252	275	40	15
Central Coast	Monterey Peninsula	6	240	289	27	10
	Yankee Pt.	5	100	216	15	6
	Soberanes Pt.	7	105	156	12	5
	Kasler's Pt	8	93	245	16	6
	Hurricane Pt.	5	56	147	12	5
Total				2755	243	94

Because DFG redirected the focus of this contract to the Channel Islands in late 2002, greatly increasing the original geographic scope of work, the products from the mapping surveys are limited to those derived from multibeam bathymetry and sidescan sonar (where appropriate). The products from the entire mapping effort are being provided as GIS layer content to DFG as part of this report in DVD format. Because the contract was terminated a month early by DFG, final cleaning of the central California bathymetry grid data from Yankee Point to Point Sur is being completed with support from the Monterey Bay National Marine Sanctuary SIMoN Project, and will be provided to DFG by August 2004. Products delivered with this report include:

Channel Islands MPA's

Multibeam bathymetry

- Shaded relief geotiffs – gray scale
- Shaded relief geotiffs – colored by depth contours
- Bathymetry DEM grids
- Slope analysis grids
- Rugosity analysis grids
- Habitat classification (rock versus sediment) grids
- Bathymetric contour line shapefiles
- Statistical comparison of habitat distributions in the 3 MPA's versus their control sites
- Sidescan sonar mosaics (where depth ranges are appropriate)

- Xyz bathymetry asci files
- Xyz bathymetry shapefiles
- Base map data (MPA boundaries, coastlines, nautical charts)
- Full FGDC metadata

Central Coast (All of Monterey Peninsula to Pt Sur)

Multibeam bathymetry

- Shaded relief geotiffs – gray scale
- Shaded relief geotiffs – colored by depth contours
- Full FGDC metadata

Report and data on the identification of seafloor squid egg distribution in the sidescan sonar records.

Report on GIS habitat analysis of the Del Monte shale beds relating rockfish distribution to habitat models derived from multibeam bathymetry. (GIS data available upon request.)

SIGNIFICANT FINDINGS

HABITAT IN CHANNEL ISLANDS MARINE RESERVES COMPARED TO THEIR CONTROLS

Two of the Channel Island MPA sites, Carrington Point and South Point on Santa Rosa Island, had no significant difference between the distributions of habitat types (rock versus sediment) within the MPAs versus their paired control sites. Gull Island, the Santa Cruz Island MPA, however, did contain significantly more rocky habitat than its paired control site, both in total and when stratified by depth according to the habitat preferences of keys species of concern.

PREDICTING ROCKFISH DISTRIBUTION FROM MULTIBEAM BATHYMETRY DATA

The central coast habitat data was applied to two fisheries related issues during the course of the project. At the Del Monte shale beds, multibeam-derived products (rugosity, slope, topographic position index and depth) were used to create GIS spatial data models that successfully predicted the distribution of 8 species of rockfish (example shown in Fig. 20). The results from this work are presented as a separate report in the appendix. The numerous GIS analysis files are available upon request from SFML.

SIDESCAN SONAR MAPPING ACCURATELY IDENTIFIES SQUID EGG MASSES ON SEAFLOOR

During the spring 2004 habitat mapping surveys, SFML staff and colleagues from the Woods Hole Marine Biological Laboratory used sidescan and multibeam sonar to identify and map the distribution and abundance of squid egg masses and associated habitat geomorphology. Squid egg clusters < 1m in diameter as well as dense aggregations can be easily discerned in the sidescan imagery and were verified using georeferenced ROV video surveys (Fig. 21). These results demonstrate that acoustic remote sensing could be of immense value in the management of the California squid fishery, because this technology can be used to identify essential spawning habitat critical for squid recruitment, as well as monitoring seasonal reproductive output as a means of regulating the squid fishery.

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