Introduction

The Marine Life Protection Act was passed in 1999 by California State Legislature and requires the state to reevaluate marine protected areas (MPAs). In 2007, the Central California Coast MPA Network was the first region to be implemented and is regulated by the California Department of Fish and Game. The network ranges from Pigeon Point to Point Conception and consists of 29 MPAs (18% of this region’s state waters), each assigned one of three levels of protection (Figure 1). Four monitoring studies were conducted to create a baseline of marine resources, assess the performance of the MPAs, and provide adaptive management of the network. Each of the open coast MPAs were monitored by one or more of the following four groups. There is an emphasis here on intertidal habitats due to accessibility by the general public and vulnerability to human impacts.

1. Collaborative Fisheries Research Program

Rick Starr & Dean Wendt

This study utilized the knowledge and expertise of fishermen and skippers within a standardized experimental framework using a controlled hook-and-line, catch-and-release fisheries program as well as commercial trapping (Fig. 2). The project fostered communication and mutual education among the scientific, management, and fishing communities and demonstrated the advantages of this collaboration.

2. Deep Rock Habitat Surveys

Mary Yoklavich & Rick Starr

Scientists from Moss Landing Marine Lab and NOAA National Marine Fisheries Service surveyed fishes, macro-invertebrates, and associated habitats (Fig. 6) on rocky banks, outcrops, underwater pinacles, cobble fields, and mud flats (Fig. 7) at depths from 20 to 365 meters on the shelf and upper slope in Monterey Bay and along the Big Sur coast.

3. Subtidal Kelp Forest Surveys

Mark Carr

Researchers from the Partnership for Interdisciplinary Studies of Coastal Oceans (PISCO) at UC Santa Cruz monitored 14 of the Central Coast MPAs with 4 sites inside and 4 sites outside each of these MPAs. Fish and benthic surveys (Fig. 10) were carried out in rocky habitats between 5-20 m using SCUBA in order to quantify the density and abundance of invertebrates and macro-algae as well as document substrate composition.

4. Rocky Intertidal Surveys

Pete Raimondi

Coastal Biodiversity Survey (CBS)

Researchers from UC Santa Cruz PISCO quantified algae and invertebrate species’ distributions (Fig. 11) and abundances by mapping them over the topography of a rocky intertidal bench creating a 3D GIS map. Below are the types of data that were collected:

- Algae and sessile invertebrate point contacts
- Mobile invertebrate counts
- Sea stars and abalone swaths
- Laser leveler and GPS readings for topography (Fig. 12)

Community Structure Monitoring

UC Santa Cruz PISCO researchers conduct surveys 2-3 times a year to monitor community structure by quantifying percent cover and distribution of algae and invertebrates (see Figures 13-18). These surveys have established a long-term data set for the central California coast that include:

- 44 rocky intertidal sites
- Sampled between 2-17 years
- 8 sites added for MPA baseline study
- Sites within 12 MPAs

Community structure monitoring provides managers with insight into the causes and consequences of changes in species abundance resulting from human and non-human factors.

Example of How these Monitoring Data are Used

Intertidal monitoring data shows the northward progression of withering syndrome in black abalone. This fatal wasting disease has caused a decline in abundance (Fig. 19) as far north as San Simeon and threatens to move further into the Monterey Bay National Marine Sanctuary (MBNMS). Having this long term dataset is vital to monitoring black abalone populations because it is needed to differentiate between natural fluctuations and actual declines.

Future Monitoring of California’s MPAs

In January 2010, 21 new MPAs were established along the north central coast, ranging from Pigeon Point to Alder Creek (near Pt. Arena). Like the central coast MPAs, these were adopted as part of the Marine Life Protection Act. They represent 20% of state waters in this region, with approximately 11% of this area being no-take reserves. Two MPAs are within the MBNMS, the Montana State Marine Reserve and Pillar Point State Conservation Area. There are existing sites within this network that will continue to be monitored; new sites will be added within the MPAs as well as outside reference sites. Rocky intertidal monitoring will begin summer 2010 using the methods described above.

Contacts

Monitoring data submitted for the Central Coast MPA Study (CCFRP) has been part of a study involving many people and organizations. CCFRP has been funded by grants from the National Science Foundation, CalCOFI, the National Marine Fisheries Service, and the California State Coastal Conservancy. For more information visit the website at http://seagrant.mlml.calstate.edu or contact the authors at:

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