

Channel Islands National Marine Sanctuary

Marine Zoning Monitoring

Management Issue

Marine zoning, or marine spatial management, is occurring in and around the Channel Islands National marine Sanctuary (CINMS or Sanctuary) driven by a diversity of overlapping mandates and management objectives. We need to understand the effectiveness of actions as well as the interactions between management actions.

Description

Marine zoning is occurring in a diversity of forms that range from marine reserves to shipping lanes to the boundaries of the CINMS itself.

One significant form of zoning is the marine reserve network that was implemented at the Channel Islands starting in 2003. Since implementation, there has been a need to measure the effectiveness of this management action. Reserve effectiveness is defined as restoration or protection of the ecosystem given anthropogenic impacts and perturbations away from historic condition. It is anticipated that fully effective reserves will improve conditions within their boundaries as a consequence of spatially heterogeneous mortality and density-dependant movement of individuals.

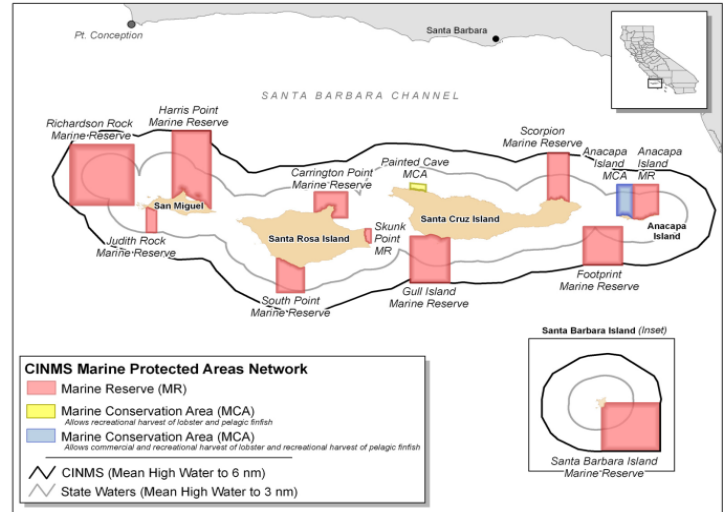
However, not all habitats, communities, and species are monitored, and not all sites in the sanctuary are monitored equally, which reduces the ability to understand, evaluate, and manage the resource. For example, species that are not observed on SCUBA surveys, such as rare, cryptic, deep or nocturnal species, and soft-bottom habitats, are not regularly monitored. Some additional monitoring effort is needed to fill in these gaps – particularly spatial coverage across the sanctuary. Most importantly, there is no systematic monitoring of indicators of ecosystem health – manifest in diversity, stability, integrity of food webs and resilience in the face of perturbations such as fishing pressure and climate variability.

However, more important than additional monitoring is the need for significant synthesis of available monitoring data. A review of the information sources used to compile the 2008 SWIM condition report for CINMS, revealed that local experts relied extensively on raw data holdings and much less so on published papers and reports. This suggests that the monitoring that is done is not assembled, synthesized and communicated as well or as quickly as it might. Therefore, a large science need in the CINMS is more synthesis and communication of available monitoring in the scientific literature.

In addition to the study of each zoning action, we need to understand the interactions across diverse actions. For example, recent California State air quality regulations that directed large ships to change to cleaner fuels in coastal waters changed large vessel traffic patterns. Ships stopped using the IMO designated shipping lanes in the Santa Barbara channel and diverted to trajectories south of the Channel Islands – and into the US Navy's Pacific Missile Testing Range. This change was unanticipated and has required significant mitigation in response. This series of events highlighted the interactions among air quality, commercial shipping, national defense, maritime safety and protected species management. We anticipate a growing need for critical analysis of these spatial management issues.

Questions and Information Needs

- 1) Are there changes in abundance, diversity, biomass, or spawning biomass for species before and after the implementation of marine reserves given that species are within reserves?
- 2) What are the reserve effects on rare, deep, cryptic, nocturnally active, or otherwise under-monitored species?



Map of Channel Islands National Marine Sanctuary. Map credit: CINMS

Current as of 11/28/2012

For More Information -- <http://www.sanctuaries.noaa.gov/science/assessment>

Questions and Information Needs *(continued)*

- 3) What is the effectiveness of the reserves at restoring systems to more historical states – i.e. are once plentiful, but recently rare species returning and taking up their historical roles in the food web?
- 4) What are relevant indicators of ecosystem health?
- 5) How does zoning alter ecosystem function – where ecosystem function is described as: diversity, stability, integrity of food web and resilience of the community to perturbation?
- 6) What are the rates of animal movement across zoning boundaries – either as adults or juveniles?
- 7) How do we more accurately forecast the trade-offs between multi-sector spatial uses of the sanctuary and potential unintended consequences of specific zoning actions for any given sector?

Scientific Approach and Actions

- Trapping (physical, video and acoustic “traps”) projects to capture species not observed on SCUBA surveys
- Soft sediment sampling, including regular eelgrass surveys
- Establish sites where there are spatial gaps in monitoring
- Evaluate rates of animal movement to incorporate into model of export process
- Support projects that study the effects of reserves on ecosystem function
- Management strategy evaluation projects for zoning scenarios

Key Partners and Information Sources

UC Santa Barbara, Channel Islands National Park, U.S Coast Guard, U. S. Dept. of Defense, Partnership for Interdisciplinary Studies of Coastal Oceans, California Department of Fish and Game, collaborative partnerships with fishers and shippers

Management Support Products

- Data, graphics, reports, & maps for a comprehensive list of species
- Species and habitat data from sites where information is lacking
- Reports on the effects of reserves on ecosystem function

Planned Use of Products and Actions

- Refine monitoring protocols
- Produce protocols to monitor indicators of ecosystem function
- Incorporate results into adaptive management of marine reserves
- Focus resource protection efforts on sensitive habitats and species
- Contribute to evaluations of shipping routes around CINMS via USCG Port Access Routing Studies

Program References

CINMS Management Plan

- Management Plan Conservation Science Action Plan CS.3

CINMS Condition Report

- What is the status of biodiversity and how is it changing?
- What is the status of environmentally sustainable fishing and how is it changing?
- What is the status of non-indigenous species and how is it changing?
- What is the status of key species and how is it changing?
- What is the condition or health of key species and how is it changing?
- What are the levels of human activities that may influence living resource quality and how are they changing?

ONMS Performance Measures

- Number of sites in which habitat, based on long-term monitoring data, is being maintained or improved

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