

Channel Islands National Marine Sanctuary

Deep Water Monitoring

Management Issue

Deep water habitats in the Channel Islands National Marine Sanctuary (CINMS or Sanctuary) are poorly understood and monitored, affecting our ability to fully evaluate diverse management action effectiveness.

Description

Over 91.5% of the Sanctuary is deeper than 100 feet in depth – or inaccessible to scientists diving on SCUBA equipment on a regular basis – and is thus much more expensive to monitor. Therefore, much more than 90% of what we know about the marine environment in the Sanctuary comes from less than 10% of the site. In spring 2004 a framework for a deep water monitoring plan for the sanctuary was developed and in 2008 a proposal outline for monitoring was created. However, a monitoring plan has not been fully developed and implemented. Effort is needed to both finalize the plan and to implement the monitoring. In addition, federal reserves were established in 2007 and the majority of state reserves established in 2003 contain large portions of the deep water habitat that need to be monitored to evaluate the effectiveness of these zoning actions. Current knowledge gaps exist on both the conceptual and technical sides of the research, monitoring and evaluation problem. Conceptual gaps include an incomplete knowledge of deep water ecosystem dynamics sufficient to limit our ability to correctly target indicators of effectiveness of management actions –including MPA establishment. For example, the deep water monitoring framework from 2004 has a list of species of interest, but it is unclear what role these species play in the deep water community to suggest that knowledge of their population or stock status would be an indicator of ecosystem health. On the technical side of the problem, all of the available tools for working in deep water (ROV's, AUV's, towed instruments, submarines, deep diving technology, etc.) are potentially expensive. However, there is still no concise and comprehensive guidance on the relative cost per data point from these separate technologies operating in the diversity of deep water habitats existing in the sanctuary. The lack of such guidance prohibits the development of an effective monitoring program that would provide answers to the conceptual questions with the greatest economy. As a first step, compilations of existing data, as well as baseline assessments involving ROVs, AUVs, and submersibles, should be initiated. Then a comparative review of all available technologies should be performed. Finally, a broad study needs to be deployed to assay some framework elements of ecosystem dynamics in the deep waters around the Sanctuary. With these tools in hand a successful and economical deep water research, monitoring and evaluation program can be deployed.



*Cowcod observed in deep water by the Delta Submersible.
Photo credit: NMFS/UCSB*

Questions and Information Needs

- 1) What habitats, species, and communities exist in deep water areas of the Sanctuary?
- 2) What are the major sources of carbon in the deep water communities?
- 3) Do the deep water communities demonstrate a parallel range of diversity to the shallow water communities going from the far east to the far west of the Sanctuary?
- 4) How complex and diverse is the food web of the deep water communities (how hard will it be to assay the health of the food web for a given complexity)?
- 5) Are there changes in abundance, diversity, biomass, and spawning biomass in reserves compared to outside reserves?
- 6) What are the distributions, status and health of deep water habitat types, including biologically structured habitats, and how are they changing?
- 7) Are specific or multiple stressors, including changing oceanographic and atmospheric conditions affecting water quality, habitat status or ecosystem health?
- 8) What is the status of extracted species, how is it changing and how is extraction affecting the health of Sanctuary resources?

Current as of 11/28/12

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

Scientific Approach and Actions

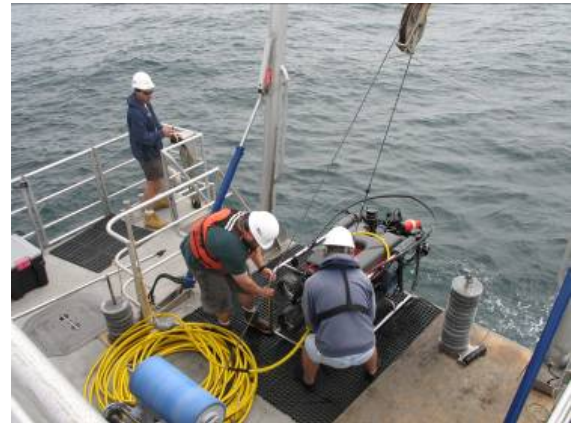
- Review all existing data and history of monitoring of deep water habitats in the Sanctuary
- Maintain surveys using ROVs, AUVs, towed instruments, gliders, acoustics and submersibles
- Review performance and capabilities (including cost) of available technologies for deep water monitoring
- Establishment of sites to be monitored annually.
- Establish the connectedness of deep water communities with shallow water communities
- Synthesize model food web for the deep water community and develop model of net carbon flux in the deep water

Key Partners and Information Sources

UC Santa Barbara, Marine Applied Research and Exploration, California Department of Fish and Game, National Marine Fisheries Service, UC Santa Barbara Dr. Milton Love, Minerals Management Service, Monterey Bay Aquarium Research Institute, Ocean Protection Council & MPA Monitoring Enterprise

Management Support Products

- Products including data, graphics, and maps illustrating the state of species, populations, and communities in deepwater habitat.
- Measures of connectedness between shallow and deep water communities that can inform predictions of management action consequences across boundaries.



ROVs are used to access areas below SCUBA-diver depths. Photo credit: CDFG

Planned Use of Products and Actions

- Test and refine deep water monitoring protocols
- Improve decision making for management in deep water
- Incorporate results into adaptive management of reserves
- Create and update resource inventory for deep water habitat
- Focus research and resource protection efforts on sensitive habitats and species

Program References

CINMS Management Plan

- Management Plan Conservation Science Action Plan CS.3, CS. 6

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
- Number of sites in which living marine resources, based on long-term monitoring data, are being maintained or improved

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