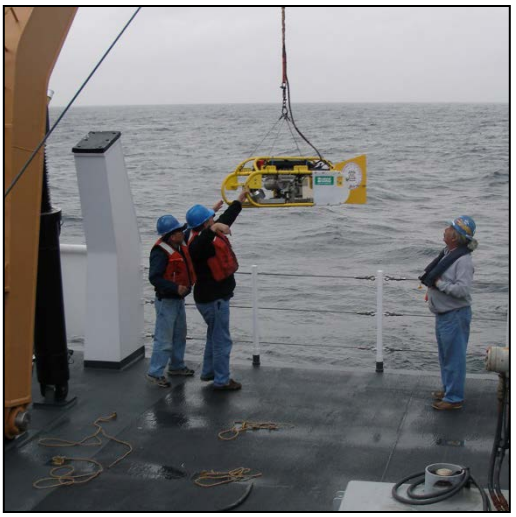
Greater Farallones National Marine Sanctuary

Deep Sea Coral Communities

Management Issue

Adequate protection of sensitive benthic resources (wildlife and habitats), such as the deep-sea coral communities that occur on rocky reefs, requires improved understanding of distribution and community structure of benthic communities. There is a need to locate, map, and characterize deep-sea corals within the Greater Farallones National Marine Sanctuary (GFNMS or Sanctuary).



Scientists from USGS deploy a side-scan sonar "fish" to aid in targeting areas for potential deep sea corals exploration. Photo credit: GFNMS

Description

There is a need to locate, identify and map deep-sea coral species within the sanctuary, produce a species inventory, characterize these sensitive communities, and to develop outreach materials that will aid sanctuary management in the protection of these habitats through better understanding and stewardship. Areas we expect to find deep-sea corals include: Rittenburg Bank, Fanny Shoal, Farallon Escarpment, Deep Reef (within the northern portion of Monterey Bay NMS), and The Football (within the proposed sanctuary expansion area off of Sonoma County).

Benthic mapping and corresponding ground-truthing will provide management with a portal to the health and status of the sanctuary's benthic communities, anthropogenic pressures on those communities and recovery after restoration, or mitigation practices. Locating and characterizing deep-sea corals within the sanctuary will help determine the severity of impacts from illegal and permitted activities, e.g. bottom trawling and recovery after cessation of trawling activities, cable laying, installation of alternative energy stations, entanglement and erosion from marine debris. Deep-sea coral surveys will also provide an assessment of threats to these corals by locating derelict fishing gear and other impacts such as scars and broken biogenic habitat caused from benthic fishing gear. Deep-sea coral benthic maps that include cultural resources can also provide management with improved inventory of cultural resources but also needed information on the status of sunken vessels as potential sources of pollutants.

Questions and Information Needs

1) Are there deep-sea corals in the GFNMS, northern portion of MBNMS, or within the proposed expansion area? If so, which species are present, where, and to what extent?

2) Where are deep-sea corals located within the sanctuary and do these communities coincide with marine zones that prohibit bottom gear impacts?

3) Are deep-sea corals adequately protected through federal and state fishing regulations, e.g. Essential Fish Habitat zones and areas where bottom trawling is regulated or prohibited?

4) Are there anthropogenic pressures on the deep-sea coral communities of the sanctuary? If so, which pressures are there and to what extent?

5) What are potential mitigation measures to reduce or eliminate these pressures?

6) It is already known that in some areas bottom trawling has had some impacts to the benthic communities. To what extent are these impacts specifically on deep-sea coral communities?

7) What are the species composition and densities of deep-sea coral communities within the sanctuary?

8) What are the physical and chemical variables effecting biodiversity and density of the deep-sea coral communities within the sanctuary?

Scientific Approach and Actions

- Conduct a species inventory from archived information and mapped information to identify information gaps and identify areas to target exploratory, fine-scale investigations.
- Identify areas that have been adequately mapped using technology such as side-scan sonar and multi-beam.
- Determine data gaps and survey areas of highest priority: Rittenburg Bank, Fanny Shoal, Farallon Escarpment, Deep Reef and The Football.
- Analyze information to develop fine-scale bathymetry maps, maps of marine debris, cultural resources, sunken vessels as potential sources of pollutants, and areas of regulatory zoning.
- Use fine scale maps to determine areas for further investigations using ground truthing techniques, such as ROV, AUV, submersible, camera sled arrays, acoustic surveys and habitat modeling.
- Identify pressures for specific areas of the sanctuary and corresponding mitigation measures.

Key Partners and Information Sources

CA Department of Fish and Game, University of CA Davis and Bodega Marine Lab, State Water Resources Control Board and the ASBS Northern Monitoring Ocean Unit, San Francisco State University-Romberg Tiburon Center for Environmental Studies, CA Ocean Protection Council and Ocean Science Trust Monitoring Enterprise, CA Sea Grant, EPA EMAP program, NOAA Status and Trends, SFBNERR, NOAA Restoration Center

Management Support Products

- Comprehensive maps of benthic habitats and associated species.
- Species inventory, density and distribution of deep-sea corals and associated benthic communities.
- Identification and extent of anthropogenic pressures.
- Maps of various impacts and recovery after mitigation or restoration.
- Assessment of resources at risk by comparing known locations of deep-sea corals, corresponding marine zoning and regulatory areas, and mitigation and restoration actions.

Planned Use of Products and Actions

- Develop criteria for selecting and prioritizing habitats to vulnerable anthropogenic pressures.
- Identify potential deep-sea coral communities most at risk from ocean acidification.
- Identification of potential sources of pollution from sunken vessels.
- Identification of sensitive species and habitats most vulnerable to anthropogenic pressures and development of adaptive management actions.

Program References

GFNMS Management Plan,

- STRATEGY EP-3: Develop strategy to protect habitats that are known to be “special areas of concern.”
- STRATEGY CS-5: Complete characterization of sanctuary biological and physical features.
- STRATEGY WQ-8: Develop an annotated bibliography of water quality research and monitoring
- STRATEGY FA-1: Develop a resource characterization of the sanctuary

GFNMS Condition Report

- Questions: 1, 2, 3, 6, 7, 11, and 12.

ONMS Performance Measures

- By 2015, 100% of the sanctuary system is adequately characterized.
- Number of sites in which select LMRs are being maintained or improved.
- Number of sites in which select habitat is being maintained or improved.
- Number of sites in which water quality is being maintained or improved.

Other Documents

- Report to Congress on the Implementation of the Deep-Sea Coral Research and Technology Program.
- State of Deep-Sea Coral Ecosystems in the Pacific Coast Region.
- NOAA Strategic Plan For Deep-Sea Coral and Sponge Ecosystems: Research, Management, and International Cooperation.
- NOAA-ONMS Performance Measures for adequate characterization.