

Greater Farallones National Marine Sanctuary

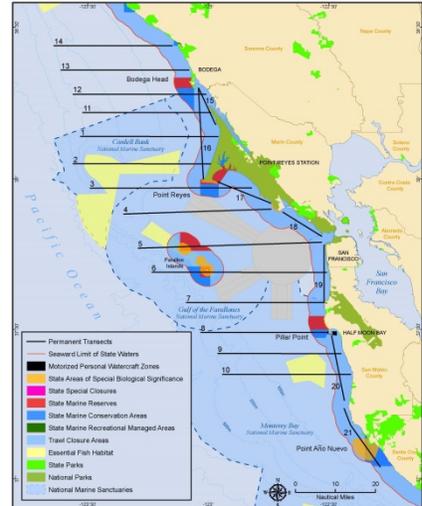
Marine Zone Effectiveness

Management Issue

Managers need monitoring information that compares the biological, environmental and habitat resources within and outside marine protected/regulatory zones, assesses the natural and anthropogenic factors influencing these resources, and evaluates the natural variation of the local ecosystem in relationship to long-term environmental changes such as global climate change and ocean acidification.

Description

Federal and state marine resource agencies have several regulatory zones within Greater Farallones National Marine Sanctuary (GFNMS or Sanctuary) and the northern portion of the Monterey Bay National Marine Sanctuary. The management zones range from seasonal closures to year-round restrictions. Restrictions vary depending on the issue, including: restrictions on commercial and recreational extraction to promote population recoveries and reduce non-sustainable extraction; restrictions on activities to reduce habitat destruction and wildlife disturbance; and restrictions on activities and extractions in order to develop habitat and wildlife refugia (e.g. Rockfish Conservation Zones, Essential Fish Habitat). In 2010, the State of California implemented a series of new marine protected areas and special closures, through the Marine Life Protection Act. A fine scale-monitoring program is needed to determine the effectiveness, connectivity and interaction of the new state MPA's and the current sanctuary and fisheries management zones. In order to fully assess effectiveness of marine protected areas and regulatory zones, managers need to include in their evaluation of the success or failure of management actions and regulatory zones, the major environmental influences within the MPA as well as regional factors such as upwelling, productivity, prey biomass (e.g. krill, copepods, and forage fish), ocean warming, and ocean acidification, etc.



Sanctuary monitoring programs survey areas within and adjacent to some of the marine protected areas and regulatory zones. Map Credit: GFNMS

Questions and Information Needs

- 1) What is the natural variation (seasonal and annual) of currents, wind stress, upwelling index, and frontal zones within the Gulf of the Farallones region?
- 2) What is the status and trends of pH, salinity and temperature within the Gulf of the Farallones region?
- 3) How do physical and chemical conditions near and off shore, vary from other regions in California?
- 4) How do the local environmental conditions vary on fine scale near and within management zones?
- 5) What are the natural and anthropogenic stressors influencing management zones?
- 6) What are the baseline levels, status, and trends of abundance and distribution of seabirds, marine mammals and their primary prey within and adjacent to management zones?
- 7) Is there a difference in the density of forage fish (e.g. smelt, anchovies) and invertebrates (e.g. krill) inside and outside management zones?
- 8) Are the established management zones (e.g. state designated MPA, sanctuary regulatory zones) effectively protecting physical and biological resources?
- 9) How can management staff access near, real-time status and trend information?

Updated: 5/1/2010

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

Scientific Approach and Actions

- Identify fine scale and regional habitat characterization programs that analyze:
 - physical factors (e.g. surface currents, frontal and convergent zones, larval transport and deposition zones)
 - chemical factors (e.g. salinity, pH, alkalinity, CO₂)
 - biological factors (e.g. abundance and distribution of seabirds, marine mammal, invertebrates)
- Characterize relationship between nearshore oceanographic processes, water quality, and marine life within and outside the MPA's and compare with regional and broad-basin scale trends
- Increase data sharing and integration of physical, chemical and biological information, and assess factors on local and regional scales to compare environmental influences within MPA's and regionally

Key Partners and Information Sources

Cordell Bank National Marine Sanctuary, University of California, Bodega Marine Lab, San Francisco State University, CA Ocean Protection Council and Ocean Science Trust Monitoring Enterprise, CA Sea Grant, PISCO, CA State University, USGS, National Marine Fisheries Service, California Department of Fish and Game, PRBO Conservation Science, Farallones Institute, Farallones Marine Sanctuary Association, Tenera Inc., NPS, USFWS

Management Support Products

- Interpretive, web enabled, maps that illustrate key data including physical, biological and behavioral data, habitat characterization, annual and seasonal variations, trend comparisons, historic data
- Database of key biological and physical data sets to detect changes in upwelling and productivity, and potentially support adaptive management strategies
- Models of key biological resources, physical processes and habitats in the near and off shore environments relative to marine zones, to highlight ecological hotspots

Planned Use of Products and Actions

- Review monthly or quarterly data and compare to trends in abundance and distribution of key species and processes relative to environmental factors and MPA's
- Highlight ecological hotspots and assess if MPA and regulatory zones are effective
- Develop adaptive management actions to adjust MPA boundaries and regulations
- Use of map products to illustrate ideal conditions and demonstrate to the public and schools groups, ecological principles, effectiveness of marine protected areas, and impacts of management actions

Program References

GFNMS Management Plan

- STRATEGY CS-1: Maintain the Beach Watch program to monitor marine life and human activities
- STRATEGY CS-2: Conduct research as needed, to guide permit conditions
- STRATEGY CS-3: Host a biennial research workshop to facilitate information exchange in the GFNMS
- STRATEGY CS-4: Develop and implement ecosystem assessment and monitoring programs, and integrate with regional observation programs along the west coast and the ONMS System Wide Monitoring Program
- STRATEGY CS-5: Complete characterization of sanctuary biological and physical features

GFNMS Condition Report

- Questions: 2, 6, 7, 8, 12, and 15.

ONMS Performance Measures

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

Other Documents

- Report to Congress - Implementation of the Deep Sea Coral Research and Technology Program.
- State of Deep Sea Coral Ecosystems in the Pacific Coast Region
- State of California Ocean Protection Council – Five-Year Strategic Plan

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