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# GULF OF THE FARALLONES NATIONAL MARINE SANCTUARY

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## FINAL MANAGEMENT PLAN

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PREPARED AS PART OF THE  
JOINT MANAGEMENT PLAN REVIEW (JMPR)

VOLUME II OF IV

OCTOBER 2008

U.S. DEPARTMENT OF COMMERCE  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
NATIONAL OCEAN SERVICE  
NATIONAL MARINE SANCTUARY PROGRAM





NATIONAL MARINE  
SANCTUARIES

GULF OF THE  
FARALLONES

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**GULF OF THE FARALLONES  
NATIONAL MARINE SANCTUARY  
MANAGEMENT PLAN**

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2008

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The Gulf of the Farallones National Marine Sanctuary (GFNMS) Management Plan represents the outcome of a multi-year community-based process. The issue areas and programs addressed in this document were built with guidance from the general public, sanctuary staff, agency representatives, experts in the field and the sanctuary advisory council. We would like to give special thanks to the members of the sanctuary advisory council who collectively dedicated over 2,800 hours of volunteer time to this effort. Bob Breen, Richard Charter, Brenda Donald, Mark Dowie, Barbara Emley, Peter Grenell, Gwen Heistand, Jim Kelley, Mick Menigoz, Don Neubacher, Brian O’Neill, Karen Reyna and Bob Wilson – your contribution of time and input into the completion of this Final Management Plan cannot be overstated.

Please direct all questions or comments concerning this management plan to:

Maria Brown, Superintendent  
Gulf of the Farallones National Marine Sanctuary  
991 Marine Drive, The Presidio  
San Francisco, CA 94129  
(415) 561-6622  
Maria.Brown@noaa.gov

For readers that would like to learn more about the management plan, GFNMS policies and community-based management processes, we encourage you to visit our website at [www.farallones.noaa.gov](http://www.farallones.noaa.gov). Readers who do not have Internet access may call the Sanctuary office at (415) 561-6622 to request relevant documents or further information.

The National Oceanic and Atmospheric Administration’s (NOAA) National Marine Sanctuary Program seeks to increase public awareness of America’s ocean and Great Lakes treasures by conducting scientific research, monitoring, exploration and educational programs. Today, the program manages thirteen national marine sanctuaries and one coral reef ecosystem reserve that together encompass more than 150,000 square miles of America’s ocean and Great Lakes natural and cultural resources.

The NOAA Ocean Service manages the sanctuary program and is dedicated to exploring, understanding, conserving and restoring the nation’s coasts and oceans and works to balance environmental protection with economic prosperity in its mission promoting safe navigation, supporting coastal communities, sustaining coastal habitats and mitigating coastal hazards.

NOAA, an agency of the U.S. Commerce Department, is dedicated to enhancing economic security and national safety through the prediction and research of weather and climate-related events and providing environmental stewardship of our nation’s coastal and marine resources.

<p>Cover Photo Credits: Tufted Puffin (<i>Fratercula cirrhata</i>) –Jeff Foott Blue Whale (<i>Balaenoptera musculus</i>) –Thomas M. Johnson White Shark (<i>Carcharodon carcharias</i>) – Scot Anderson</p>
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# JOINT MANAGEMENT PLAN REVIEW STUDY AREA MAP



# GULF OF THE FARALLONES NATIONAL MARINE SANCTUARY MAP



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## EXECUTIVE SUMMARY



*SOUTH FARALLON ISLANDS SERVE AS A CRITICAL BREEDING AND FEEDING GROUND FOR MANY SEABIRD AND MARINE MAMMAL POPULATIONS OF THE SANCTUARY. PHOTO: NOAA*

### **Current Status**

This document is the Final Management Plan for Gulf of the Farallones National Marine Sanctuary (GFNMS), resulting from a management plan review of the sanctuary, the first since the implementation of its final regulations in 1981. The National Oceanic and Atmospheric Administration (NOAA) has prepared the plan in cooperation with sanctuary staff, the public, state and federal agencies, stakeholders, and the Gulf of the Farallones Sanctuary Advisory Council.

### **GFNMS Designation**

GFNMS has been vested with the authority, in accordance with the National Marine Sanctuaries Act (NMSA), to provide comprehensive and coordinated conservation and management of the marine resources extending seaward from the mean high water mark or the seaward boundary of the Point Reyes National Seashore (PRNS). Between Bodega Head and Point Reyes Headlands, the sanctuary extends seaward to 3 nautical miles beyond territorial waters. The sanctuary also includes the waters within 12 nautical miles of Noonday Rock and the mean high water mark on the Farallon Islands, and to the waters between the islands and the mainland from Point Reyes Headlands to Rocky Point. The sanctuary includes Bolinas Bay, Bolinas Lagoon, most of Tomales Bay, Estero Americano, Estero de San Antonio, and Bodega Bay, but not Bodega Harbor. This area of special significance was designated a national marine sanctuary because these waters provide important marine and nearshore habitats for a diverse array of marine mammals and marine birds, as well as fishery, plant, algae, and benthic resources. The marine mammals and seabirds present in abundant numbers on the Farallon Islands and the mainland coast depend as much on the integrity and productivity of these adjacent ocean and estuarine waters as on the preservation of the shore areas they use for breeding, feeding, and hauling out.

## **Management Plan Review**

The 1992 amendments to the NMSA required that each of the national marine sanctuaries engage in a management plan review process every five years to reevaluate site-specific goals and objectives, management techniques, and strategies. The National Marine Sanctuary Program (NMSP) reviewed the management plans of Gulf of the Farallones, Cordell Bank, and Monterey Bay national marine sanctuaries jointly. These sanctuaries are located adjacent to one another, are managed by the same program, and share many of the same resources and issues. In addition, all three sites share overlapping interest and user groups. It has also been more cost effective for the NMSP to review the three sites jointly, rather than conducting three independent reviews.

This management plan review process has provided GFNMS with the opportunity to: take a closer look at how the marine environment has changed over the past twenty years; understand the cause and effect relationship of human activity and natural perturbations on the marine resources; and engage the public in the management decision-making process. As a result of this process, GFNMS is reshaping how it manages the marine resources, from restructuring its program areas to reevaluating its regulations.

## **GFNMS Original Management Plan**

The specific requirements of GFNMS' original management plan were compatible with the overall sanctuary management concepts embodied within the NMSA of 1972 and its implementing regulations (15 CFR, Part 922), which require that a management plan be prepared for each national marine sanctuary.

The original management plan, developed at the time of designation of the sanctuary in 1981, provided guidelines to ensure that all management actions undertaken in the first five years of designation were directed to resolving important issues as a means of meeting sanctuary objectives. Management objectives were considered in three areas: resource protection, interpretation, and research. The management plan also called for promulgation of five regulations or prohibitions.

## **GFNMS Revised Management Plan**

This new GFNMS Final Management Plan is one of three (Volume II of IV) final management plans, including a Final Environmental Impact Statement (FEIS), that comprise the set of proposed regulatory and management actions for the three sanctuaries that have been engaged in the Joint Management Plan Review (JMPR). Although there has been every attempt to coordinate structure and content across the three management plans, each plan reflects the different working groups, make-up of sanctuary advisory councils and sanctuary staff, and site-specific approaches to the management plan review process. Additionally, each of the three sanctuaries has a different history and is in a different stage of its life cycle.

Originally designated in 1981 as the Point Reyes-Farallon Islands Marine Sanctuary, sanctuary management responsibilities were delegated to the California Department of Fish and Game

(CDFG). Historically, the site focused largely on education and public awareness of biologically, culturally, or historically significant underwater resources. The national marine sanctuary program has identified six phases that describe the evolution of a sanctuary from designation to maturation over a period of approximately 10-20 years. The phases include pre-designation and designation, start-up and early operations, transition (first management plan review), mature operations, recalibration (second management plan review), and adaptive management. Today, GFNMS is in the transition phase, implementing its first management plan with the support of a staff of twelve and a budget of \$1.4 million, and many new partnerships. The new management plan addresses six priority resource management issues through the three program areas listed below.

The GFNMS revised management plan will guide the operation of the sanctuary for the next five to ten years, helping the sanctuary set budget and project priorities each year in preparation of its annual operating plan. Timelines and annual estimates are presented in this plan to assist staff in the development of the GFNMS annual operating plan; assist the sanctuary advisory council in advising management on priority issues; and help the public to better understand the approximate time frames and costs needed to carry out the strategies and activities presented throughout the plan. The management plan/final environmental impact statement proposes and analyzes regulatory changes and additions.

Nine action plans are contained in the final management plan:

1. Water Quality
2. Wildlife Disturbance
3. Introduced Species
4. Ecosystem Protection: Impacts from Fishing Activities
5. Vessel Spills
6. Education and Outreach
7. Conservation Science
8. Resource Protection
9. Administration

The implementation of the nine action plans within the GFNMS management plan will take place within the framework of the Ecosystem Protection Implementation Plan (Appendix I), which is organized around four key habitats of the sanctuary: estuarine, rocky shores, sandy shores and open ocean. This approach ensures that the sanctuary adequately addresses the priority resource management issues within each key habitat. It also allows sanctuary staff to identify opportunities to collaborate between program areas, focused around priority sanctuary habitats.



# INTRODUCTION

## OVERVIEW

### Purpose and Need for Designation

Gulf of the Farallones National Marine Sanctuary (GFNMS) has been vested with the authority, in accordance with the National Marine Sanctuaries Act (NMSA) (1972), to provide comprehensive and coordinated conservation and management of 966 square nautical miles of nearshore and offshore waters of the eastern Pacific. A complete spectrum of marine habitats ranging from unique inland estuarine, to intertidal, pelagic, and deep oceanic environments are found within the sanctuary. These productive marine environments support an abundance of living resources including: at least 36 species of marine mammals; 54 species of birds which use the sanctuary during their breeding season; and 26 threatened or endangered species. In 1981, the National Oceanic and Atmospheric Administration (NOAA) determined that these offshore areas contain exceptional natural resources, and that these waters around the Farallon Islands and along the mainland coast of the Point Reyes Peninsula between Bodega Head and Rocky Point deserved special recognition, protection, and designation as a national marine sanctuary.

### Description of GFNMS

Located in the waters west of San Francisco, the GFNMS provides many examples of the marine life and habitats characteristic of cold temperate waters of the eastern Pacific marine region that extends from Point Conception to British Columbia. Most of the sanctuary lies in the Gulf of the Farallones between the western edge of the continental shelf and the coast of Marin and Sonoma counties. Some of the largest and most diverse eastern Pacific populations of seabirds and pinnipeds (seals and sea lions) south of Alaska occur in the Gulf. Large flocks of Cassin's Auklets, Common Murres, Western Gulls, and the endangered Brown Pelican (under consideration to be delisted) feed on the small fish and crustaceans that are abundant in the surface waters of the sanctuary. This food source also supports California's largest breeding population of harbor seals, as well as the growing population of northern elephant seals. Large numbers of whales and dolphins, including the California gray whale, the Pacific humpback whale and the blue whale are found in the area. Around the Farallon Islands is one of the world's largest seasonal congregations of white sharks. There are also many significant nearshore habitats represented within the sanctuary, such as the inland reaching Estero de San Antonio and Estero Americano; Tomales Bay and Bolinas Lagoon; and the large intertidal and subtidal reef at Duxbury Reef. See Appendix III E, F and G for sanctuary species list (March 2007).



*Bodega Head and Bay at the northern reach of GFNMS.*  
*Photo: NOAA*

## ***Introduction***

### ***GFNMS Management Plan***

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The sanctuary also illustrates how important the ocean and its wildlife and habitats are for the economic and social well-being of the region. The area has supported large commercial fisheries, including a large percentage of the San Francisco fleet. Sport fishing also generates revenue for the party boat fleets operating out of San Francisco Bay, Half Moon Bay, and Bodega Bay. Whale watching and offshore excursions are other uses of the sanctuary that have grown in popularity. In addition, the sanctuary contains some of the West Coast's busiest shipping lanes.

### **History of GFNMS**

In April 1978, NOAA held a public workshop in Mill Valley, California, to discuss a proposal to designate the sanctuary. An issue paper on possible California marine sanctuary sites, including the Point Reyes-Farallon Islands area, was circulated for review and discussion in December 1978. In March and April 1979, the California Coastal Commission (CCC) held regional and state hearings to solicit reaction to the possibility of a marine sanctuary located offshore from Point Reyes and the Farallon Islands. Based on public response and a recommendation by the CCC to develop a final environmental impact statement (FEIS), NOAA prepared a FEIS which described the proposed alternative of sanctuary designation and included draft regulations. In October 1979, NOAA distributed copies and solicited comments on a preliminary draft of the Description of Affected Environment and discussion on alternatives. A meeting was held in Point Reyes Station to discuss these sections. The FEIS was distributed for review on March 31, 1980 with public hearings in May. In response to NOAA's findings and public interest, the Point Reyes – Farallon Island National Marine Sanctuary was designated on January 26, 1981.

The original management plan, developed at the time of designation of the sanctuary, provided guidelines to ensure that all management actions undertaken in the first five years of designation were directed to resolving important issues as a means of meeting sanctuary objectives. Management objectives were considered in three areas: resource protection, interpretation, and research. The management plan also called for promulgation of six regulations or prohibitions.

### **Management Plan Reviews**

The 1992 congressional legislation that reauthorized the NMSA required that each of the thirteen national marine sanctuaries engage in a management plan review process every five years to reevaluate site-specific goals and objectives, management techniques, and strategies. This management plan review process has provided GFNMS with the opportunity to: take a closer look at how the environment has changed over the past twenty years; understand the cause and effect relationship of human activity and natural perturbations on the marine ecosystem; and engage the public in the management decision making process. As a result, GFNMS is reshaping how it manages the marine ecosystem, from restructuring its program areas to reevaluating its regulations.

### **Joint Management Plan Review Process (JMPR)**

In 2001, the National Marine Sanctuary Program (NMSP) began a joint review of the management plans of Gulf of the Farallones, Cordell Bank, and Monterey Bay national marine sanctuaries. These sanctuaries are located adjacent to one another, managed by the same

program, and share many of the same natural resources and issues. In addition, all three sites share overlapping interest and user groups. It has also been more cost effective for the NMSP to review the three sites jointly rather than to conduct three independent reviews. During the review, the sanctuaries evaluated management and operational strategies, regulations, and boundaries. The review process provided an opportunity to better coordinate programs between the three sanctuaries.

### **Biogeographic Assessment**

In support of the JMPR process, NOAA's Biogeography Program developed an assessment to identify important biological zones, time periods and ecological linkages within the three national marine sanctuaries and their encompassing biogeographic region. This geographic information systems (GIS) analysis extended from Point Arena in the north to Point Sal in the south, and identified key biological areas (e.g., areas of species richness and reproductive areas), time periods, and communities within the area of interest; focused on the continental shelf and slope. The results of the biogeographic assessment for seabirds and marine mammals have been integrated into the Final Management Plan/ Final Environmental Impact Statement (FMP/FEIS).

### **The Value in Building Community Partnerships**

Recognizing the challenges that lay ahead with the management plan review process, in January 2001 a GFNMS Sanctuary Advisory Council was assembled with eight members and six alternates to provide guidance and advice to the sanctuary manager on ecosystem management issues. The sanctuary advisory council included one agency and seven stakeholder representatives, with an alternate for each seat. The advisory council provides a platform for public input into the management of the GFNMS. This partnership has allowed GFNMS to make use of and build on the knowledge, roles, and resources that the private sector and other agencies have to offer. The sanctuary advisory council participated in the entire management plan review process from scoping meetings to providing input on the range of issues to be addressed in the new management plan. The sanctuary advisory council has been a vehicle for making progress through cooperation, including the community in the decision-making process, and drawing in public support.

## **BUILDING A NEW MANAGEMENT PLAN**

### **Vision Statement**

The vision, goals and objectives that follow are based on those in the original management plan. At the commencement of the JMPR process, GFNMS staff worked together to build a vision for the future of the site that reflects the current sanctuary framework and needs.

The Gulf of the Farallones is characterized by a broad extension of the eastern Pacific continental shelf. The interaction of major currents, wind, and topography creates coastal upwelling, driving the productivity of the area, creating and supporting an abundance of resident and migratory marine life. The sanctuary includes more than 400,000 breeding seabirds, the largest concentration in the contiguous United States; at least 36 species of marine mammals, including one-fifth of the California population of harbor seals; over 50 species of rockfish; one

## ***Introduction***

### ***GFNMS Management Plan***

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of the world's largest seasonal congregations of white sharks; and 26 endangered and threatened species. GFNMS protects a diversity of offshore environments such as benthic and pelagic habitats and nearshore areas including bays and estuaries.

GFNMS' highest priority is ecosystem protection. The sanctuary and its partners work to protect habitats, biological communities, and ecosystem dynamics. Through the watersheds and out to the sea, GFNMS addresses current management issues and anticipates future challenges in order to maintain and protect the environment now and for future generations.

### **GFNMS Goals and Objectives**

GFNMS has clearly defined goals and objectives on which to develop program areas and regulations. These goals and objectives are broad and intended to be for the site as a whole. Specific goals and objectives were also developed for each issue or program area in the management plan. In order to be consistent with the guiding legislation established in the NMSA, the mandate for the thirteen national marine sanctuaries, GFNMS has chosen the following priority goals:

Improve the conservation, understanding, and wise and sustainable use of marine resources;

Enhance public awareness, understanding, and stewardship of the marine environment;

Maintain for future generations the habitat and ecological services of the natural assemblage of living resources that inhabit these areas;

Maintain the natural biological communities to protect, and where appropriate, restore and enhance natural habitats, populations, and ecological processes;

Provide authority for comprehensive and coordinated conservation and management of these marine areas, and activities affecting them, in a manner which complements existing regulatory authorities;

Create models of and incentives for ways to conserve and manage these areas, including the application of innovative management techniques; and

Cooperate with global programs encouraging conservation of marine resources.

The strategies of the GFNMS management plan are directed to meet these goals and objectives. It should be noted that although the sanctuary goals and objectives are listed discretely, they are overlapping. Collectively, the strategies developed in the management plan address the full range of goals and objectives set forth in the previous paragraph.

### **Regulations and Program Areas**

The GFNMS management plan is made up of two complementary parts: regulatory and non-regulatory. The regulatory component includes site-specific regulations or prohibitions (see Appendix III), and general regulations that apply to all thirteen national marine sanctuaries (see Appendix III). Regulations are used to control or restrict human behavior that is not compatible

with protection of sanctuary resources or qualities. The non-regulatory component of the management plan includes GFNMS' three program areas: Conservation Science; Education and Outreach; and Resource Protection. These three program areas are supported by an administrative framework which ensures that all ecosystem management activities are coordinated, and provides an appropriate infrastructure needed to help meet the goals and objectives set forth by this management plan. Collectively, the above-mentioned parts make up the whole of the management plan and are important tools for effective ecosystem management.

The regulatory and non-regulatory components of the management plan are structured to address the priority ecosystem management issues identified during the management plan review, which include the following site-specific issues and programs: Water Quality; Wildlife Disturbance; Introduced Species; Ecosystem Protection: Impacts from Fishing Activities; Vessel Spills; Education and Outreach; Conservation Science; Resource Protection; and Administration. The priority cross-cutting issues and programs identified through the management plan review process include: Maritime Heritage; Ecosystem Monitoring; Community Outreach; Administration; and Boundary Modifications. The spatial context for addressing these issues is not limited by the geographically drawn and often politically driven boundaries of just one sanctuary, but rather across all three sanctuaries included in the JMPR process, as well as areas outside of Gulf of the Farallones, Cordell Bank, and Monterey Bay national marine sanctuaries.

### **Addressing Goals and Objectives within an Ecosystem Context**

The priority goals and objectives listed above led GFNMS to take an ecosystem-based approach to managing a fluid marine environment with great temporal and spatial complexity and diversity. The management plan review process has shown that the scientific community, natural resources agencies, and the public have recognized the importance of an integrated ecosystem-based approach to protect marine biodiversity and habitats. NMSP's emphasis on marine ecosystem management is consistent with other state and federal agencies' programs and initiatives.

Very early on, the NMSP took the steps to ensure an ecosystem approach for the management plan review process by identifying a study area that would be inclusive of a broader biogeographic area from Point Arena to Point Sal where biological zones, time periods, and ecological linkages could be identified irrespective of the political boundaries of the individual sanctuaries. In looking at ecological components across boundaries, human-use activities and corresponding ecosystem-based management issues were evaluated across and, as appropriate addressed across, a broader geographic boundary than that of a single sanctuary. This broad-scale ecosystem approach is carried over into the action plans in this Management Plan.

### **Tools for Effective Management Planning**

GFNMS' management plan was designed not only to protect the marine resources and biodiversity, but also to consider maintenance of economic equity, cultural integrity and human social structures. GFNMS is looking at a wide range of activities that take place in the sanctuary and evaluating them in terms of whether they are compatible with ecosystem protection and protect the structure, function, and diversity of the marine environment. In order to better evaluate human-use activities and their impacts on the ecosystem, GFNMS used three strategic

## ***Introduction***

### ***GFNMS Management Plan***

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tools in the development of the management plan: science, socioeconomics and local knowledge.

#### **Science**

Protection of living and nonliving marine resources is the primary objective of the NMSP, and science serves an important tool for understanding, measuring, and predicting change in the status and health of the marine ecosystem. Scientific inventories, habitat characterization, research, and monitoring provide an important information base for natural resource managers to understand and evaluate effectiveness of management regimes. NOAA collected data from site programs, individual researchers and institutions throughout the region and, where possible, integrated it into GIS to spatially identify significant living and nonliving marine resources, habitats, and physical and geological features. These data were used to describe and define the ecosystem, identify areas of special significance, and locate important ecosystem support systems.



*Sanctuary researchers monitor the rocky intertidal of the Farallon Islands. Photo: NOAA*

#### **Socioeconomics**

In California, the total gross domestic product from the ocean economy accounted for approximately \$42 billion dollars in 2000. Coastal recreation and tourism alone brings in approximately \$12 billion to California annually. These numbers paint an important picture about the need to properly manage the marine resources. A sustainable community recognizes both ecosystem sustainability and economic sustainability as mutually beneficial. The NMSP not only considers the potential economic cost of management restrictions on income generating activities, but also public benefits derived from long-term protection of nationally significant resources. A cost/benefit analysis may be found in the FEIS to determine socioeconomic impacts and benefits to user groups from any proposed actions in this management plan.

#### **Local Knowledge**

Local knowledge represents the voice of direct experience and interaction with the marine environment over time. Many of the community partners involved in the management plan review have been linked to the waters of the sanctuary for up to half a century. Their knowledge is more extensive and long range than much of the scientific research available for the study area. GFNMS not only honors and incorporates historical knowledge, but also acknowledges that stakeholder groups have a strong connection and knowledge about their environment. These local voices also represent local interests, issues and concerns to be balanced against those from outside interests. The sanctuary advisory council members, local mariners, interest groups, and the public provided valuable input to the development of this management plan.



*Commercial fishing has long been an important industry in GFNMS. Photo: NOAA*

### **Looking at the Next Five Years and Beyond**

Since its establishment in 1972, the NMSP has been building models for better marine ecosystem-based management. But even today, with better knowledge of the natural world and more experience managing human behavior, the NMSP continues to build new models to enhance ecosystem protection. This is why the GFNMS management plan is referred to as a “living document,” serving as a dynamic and responsive framework to guide ecosystem-based management.

GFNMS’ “living document” also serves as a proactive tool for planning a sustainable future. Instead of reacting to the symptoms of ecosystem degradation by applying panaceas, the GFNMS management plan addresses the roots of the problems, which begin and end at the point where the human community interacts with the marine community in a way that is not compatible with ecosystem protection. To ensure a sustainable future, GFNMS’ “living document” will provide a framework for not only addressing ecosystem management issues of the present, but also anticipating those emerging issues of the future.

The emergence of new issues and other unforeseeable factors may affect specific aspects of sanctuary management as described in this plan. However, the overall goals, management objectives, and general guidelines will continue to be relevant. Throughout the next five years of this plan, the aim is to carefully adjust the plan to changing circumstances in light of the experience gained through actual management. Additionally, modifications to the scope and scale of the action plans may have to be made due to unforeseeable changes in levels of funding. Again, the goals and objectives of the management plan will remain unchanged.



## SANCTUARY SETTING

### ECOSYSTEM PROCESSES

#### Location

Gulf of the Farallones National Marine Sanctuary (GFNMS) lies off the California coast to the west and north of the Marin, San Francisco and San Mateo Counties. Included are nearshore waters up to the mean high tide line from Bodega Head to Rocky Point in Marin County and offshore waters extending out to and around the Farallon Islands

#### Geology

The GFNMS is characterized by the widest continental shelf on the West Coast of the contiguous United States. In the Gulf of the Farallones, the shelf reaches a width of 32 nautical miles (59 km). Shoreward of the Farallon Islands, the continental shelf is sandy and contains large underwater sand dunes. The shelf slopes gently to the west and north from the mainland shoreline and provides an especially large and relatively shallow (120 meters) foraging and habitat area for coastal and oceanic seabirds, marine mammals, and fish.



*Southeast Farallon Island provides a range of habitats for sanctuary inhabitants, including cliffs for seabird nesting, rocky shores for marine mammal haulouts and subtidal areas for fish and invertebrate shelter. Photo: NOAA*

The Farallon Islands are seven islands and large rocks, which lie along the outer edge of the continental shelf, between 13 and 19 nautical miles (24 and 35 km) southwest of Point Reyes and roughly 26 nautical miles (48 km) due west of San Francisco. The islands are located on part of a larger submarine ridge that extends for approximately 30 nautical miles between the Farallon Islands and Cordell Bank near the shelf break. The Farallon Islands provide secluded habitat that is essential for seabirds and marine mammals. Submarine rock outcrops surrounding the islands and extending to Cordell Bank provide rich habitat for a diverse rocky reef community.



*The esteros provide important nursery habitat for sanctuary fish species and forage habitat for local and migratory birds. Photo: NOAA*

The GFNMS coast includes sandy beaches, rocky cliffs, open bays (Bodega Bay, Drakes Bay, Bolinas Bay) and enclosed bays or estuaries (Bolinas Lagoon, Tomales Bay, Estero Americano, and Estero de San Antonio). High-energy waves typical of the winter storm season distribute sediment washed into the sanctuary by rivers and from shoreline erosion and move sand down-coast from beach to beach. The two Esteros are typically closed during summer and fall by seasonally formed sand bars, isolating the Esteros from the ocean. Tomales Bay and Bolinas Lagoon, however, remain open to the ocean year-round. Water and water-borne materials in these bays and lagoon are exchanged with the open ocean through tidal currents,

although inner bay and lagoon waters may take a long time to exchange. The open bays are

sheltered from prevailing southerly currents by headlands and are important nutrient and plankton retention areas. Tomales Bay, Bolinas Lagoon and Bodega Bay lie directly on the San Andreas Fault.

### **Climate and Oceanography**

Gulf of the Farallones currents are dominated by seasonal winds. Lying inshore of the large California Current, these waters are characterized by wind-driven upwelling, localized eddies and counter-current gyres, high nutrient supply and high levels of phytoplankton. The inner Gulf of Farallones is also influenced by outflow from San Francisco Bay.

During the spring-summer upwelling season (typically March 15-August 14), strong northwest winds drive surface waters offshore (due to the Coriolis effect) and cold deep waters are upwelled to the surface over the continental shelf. The California Undercurrent (also called the Davidson Current) carries cold high-salinity waters north at depth along the shelf-edge and is a source for upwelled waters. These waters are rich in nutrients and feed very high levels of primary production near-surface. The resultant phytoplankton blooms are the foundation of the rich GFNMS food webs, involving zooplankton, benthic and pelagic invertebrates, fish, birds, and mammals.

Spring-summer currents over the middle and outer shelf strongly move southeastward during upwelling, but nearshore flow patterns are mixed. San Francisco Bay and other nearshore outflows are carried both north and south by prevailing coastal currents and eddies. During brief periods of weak winds (relaxation periods), much of the inner and mid-shelf Gulf of the Farallones waters reverse direction and flow north. Phytoplankton levels peak during these relaxation periods.

In the fall, upwelling winds weaken and water temperatures increase. Sometimes known as the oceanic season, this period (typically August 15-November 15) is characterized by onshore flow of oceanic surface waters (warmer and lower salinity). Periods of upwelling winds and phytoplankton blooms do still occur during the fall.

Winter in the GFNMS is characterized by the passage of rain-bearing cold fronts, accompanied by westerly and southerly winds which drive surface currents northward and downwelling over the shelf. After the fall transition period and the cessation of the upwelling winds, the Davidson undercurrents come to the surface with a weak northeastward flow. While storm fronts characterize the months of December through March, upwelling winds are equally common and many upwelling events are also observed at this time of year (although lower levels of light in winter produce only weak phytoplankton blooms). During the downwelling events, warm oceanic surface waters move onshore and land runoff is held nearshore. Large plumes of terrestrial runoff from the mainland are also subject to the Coriolis effect, hence San Francisco Bay outflow typically remains close to shore and flows north around Point Reyes following major rain and runoff events. On occasion the influences of the San Francisco Bay outflow extend west to the Farallon Islands. Lowest surface seawater salinities are observed in the GFNMS during the winter runoff season.

Eddies are found both offshore, in the core of the California Current, and in the waters over the shelf. In the coastal waters of the GFNMS, fast flow past headlands like Point Reyes and Bodega Head may create eddies that move through the region. Eddies and open embayments partly retain nutrient-rich, upwelled waters and help explain the high levels of plankton, fish, mammals and birds observed in this region year-round. The sanctuary contains bottom features of higher rigosity (slope variability), and counter-clockwise eddies north and south of Bodega Head, Point Reyes, Pillar Point, and Pigeon Point. As a result, the sanctuary is one of the most productive areas along the California Coast, and in the world.

## **SANCTUARY ECOSYSTEMS**

The coast of the Gulf of the Farallones is a complex array of habitats from exposed rocky headlands to protected sandy beaches; from open bays to calm estuaries; from rocky intertidal habitats to productive mudflats; from offshore islands to submerged seamounts; and from the continental slope dissected by numerous submarine canyons to the deep sea.

### **Rocky Shores**

The intertidal habitat between the low and high tides is biologically rich, supporting diverse assemblages of algae, plants and animals. It is characterized by extreme conditions caused by wind, waves, and the fluctuation of tides. Organisms living in the intertidal face many challenges that are unique to living at the edge of the ocean, including threat of desiccation, physical wave action, and limited space. Rocky shores are found throughout the Gulf of the Farallones region, but particularly at Bodega Head and Duxbury Reef.

Four zones of rocky intertidal organisms are traditionally associated with different tidal heights. Species distributions are restricted according to physiological tolerance along the thermal and moisture gradient in the intertidal zone. The splash zone is almost always exposed to air, and has relatively few species. The high intertidal zone is exposed to air for long periods twice a day. The mid-intertidal zone is exposed to air briefly once or twice a day. The low intertidal zone is exposed only during the lowest tides. (See Appendix III-H for the rocky intertidal species list.)

### **Splash Zone**

The periwinkle, *Littorina keenae*, and the barnacle, *Balanus glandula*, can be used as an indicator of the splash zone. Microscopic algae are common in the splash zone in winter months when large waves produce consistent spray on the upper portions of the rocky shore. Black Oystercatchers and Black Turnstones are the common birds along the rocky shoreline off central and northern California. These birds are most abundant during fall and winter, and during this period, are accompanied by small numbers of Ruddy Turnstones, Surfbirds, and Wandering Tattlers. Black Oystercatchers nest along rocky coasts including the Farallon Islands (Sowls et al. 1980). A variety of species commonly considered land birds also feed along rocky shores, including Black Phoebe, American Crow, Brewer's Blackbird and European Starlings.

### **High and Middle Intertidal Zones**

Perennial macrophytes exhibit conspicuous zonation in the rocky intertidal community. Descending into the intertidal are several zones dominated by (1) furoid and ceramial algae in the high intertidal; (2) a dense turf of erect coralline and gigartinal algae in the mid-intertidal;

and (3) beds of rhodymenials and laminarials in the low intertidal zone. Intertidal invertebrates also exhibit conspicuous zonation. In northern California, the barnacle, *Balanus glandula*, and red algae, *Endocladia muricata* and *Mastocarpus papillatus*, are used as indicators of the high intertidal zone, but these species are also found in other areas of the rocky shore. At wave-exposed sites, the mussel, *M. californianus*, can dominate the available attachment substratum in the mid-intertidal zone. Intertidal predators generally include whelks, sea stars, sea urchins, octopus, fishes, and shore crabs.

### **Low Intertidal Zone**

The low intertidal zone is subjected to nearly constant wave action and exposed only for short periods of time during the lowest tides. The presence of the seagrass, *Phyllospadix*, is a good indicator of the mean low water level.

### **Sandy Beaches**

Northern California beaches exhibit classic structure: cliffs or dunes demarcate the upper boundary of the beach; the mean high tide line is generally indicated by a berm; and beach flats, troughs, or sand bars form the seaward side of the beach. Exposed sand beaches are harsh environments subjected to high wave action, wide temperature range, and periodic tidal exposure. Quiet-water beaches of estuaries and bays are protected environments subjected to less wave action.

Species distributions within the sandy beach habitat are strongly influenced by physical factors on exposed sand beaches, whereas biological factors, e.g., competition and predation, influence species distributions on protected beaches of estuaries and bays. Exposed beaches of northern California show distinct patterns of biological zonation defined by the amount of tidal inundation to each region. The biological zones of the sandy beach habitat are: upper intertidal beach zone, mid-littoral beach zone, swash zone, low intertidal beach zone, and the surf zone.

### **Upper Intertidal Beach**

The upper intertidal beach is submerged for a short time and exposed to the widest range of temperatures. It is often sparsely inhabited, because the food supply on sandy beaches is unpredictable. The major sources of food on the sandy beach include plankton, macroalgae, and occasional corpses of fishes, birds, and marine mammals that are washed ashore by waves. As a result, the upper intertidal is primarily dominated by scavengers on beach wrack, such as talitrid amphipods, flies, isopods, and Coleopteran beetles (Berzins 1985). When beach wrack washes ashore, it is colonized first by the highly mobile talitrid amphipods and flies (Diptera).

Eventually, the beach wrack is colonized by terrestrial isopods and Coleopteran beetles. The pill bug, *Alloniscus perconvexus*, burrows into the sand just beneath the surface and emerges at night to feed on beach wrack. During the day, beach hoppers (genus *Megalorchestia*) are usually in shallow burrows or under piles of macroalgae. At night, the hoppers emerge to forage on algae and other detritus.

### **Mid-Littoral Beach**

The mid-littoral beach zone is characterized by a moderate inundation time, but is subject to many of the same rigors as the upper zone (e.g., temperature extremes and fresh water).

The mid-littoral beach fauna is dominated by species with high mobility such as the cirrolanid isopod, *Excirrolana*, which are preyed upon by various shorebirds. The mid-littoral zone fauna must be highly mobile because this zone is subjected to rapid sediment removal during storms.

### **Swash Zone**

The swash zone, where waves break on the beach, is characterized by the highest water movement and is submerged approximately twelve hours per day (Oakeden and Nybakken 1977). Thus, the swash zone is not subjected to extreme temperatures and salinity characteristic of the high- and mid-littoral zones. The dominant species in the swash zone is the sand (mole) crab, *Emerita analoga*, an herbivorous species that forms the basis for much of the sandy intertidal food web.

### **Low Intertidal Zone**

The low intertidal zone is subjected to nearly constant wave action and exposed only for short periods of time during the lowest tides. Most of the inhabitants of the low intertidal are either rapid burrowers or protected against mechanical damage. Numerous invertebrate species burrow into superficial sediments and flourish in wave-disturbed sand bottoms (Slattery 1980).

### **Surf Zone**

The surf zone is submerged continuously and experiences constant motion of waves breaking against the sea floor. Many studies suggest that sandy beach surf zones are low diversity environments, dominated by small planktivores and benthic feeding fishes and their predators (Gunter 1958, McFarland 1963, Edwards 1973a, Modde and Ross 1981, Lasiak 1983, McDermott 1983). The trophic structure of surf zone fish communities appears to be controlled primarily by three factors: (1) primary production input to the surf zone; (2) water movement; and (3) geomorphology of the sandy beaches.

Over 180 bird species were observed on beaches between Bodega Head and the northern Santa Cruz County border from October 1993 to September 1999 (Roletto et al. 2000). Sanderlings, Western Gulls, and Brown Pelicans were observed most frequently. Most of the bird species that occur in coastal wetlands (especially Sanderlings, Willets and Marbled Godwits) also occur on outer sand beaches (Davis and Baldrige 1980). Snowy Plovers, which have decreased significantly during the past two decades, nest in coastal dunes.

Breeding populations of pinnipeds are found on sand beaches off northern California. The species most commonly found along Northern California beaches, rocks and mudflats include California sea lions (*Zalophus californianus*) and harbor seals (*Phoca vitulina*).

### **Estuaries Including Bays, Mudflats, and Marshes**

Bays and estuaries are among the most productive natural systems. Their physical, chemical, and biological characteristics are critically important to sustaining living resources (Mann 1982, Weinstein 1979). Bays and estuaries are important nursery areas that provide food, refuge from predation and a variety of habitats. The four main estuaries within the sanctuary are Tomales Bay, Estero Americano, Estero de San Antonio, and Bolinas Lagoon.

Tomales Bay is located between the shores of West Marin and the Point Reyes National Seashore (PRNS). Tomales Bay is an example of a fault-controlled valley along the San Andreas Fault. Lagunitas Creek, which drains into Tomales Bay, supports a run of approximately 500 Coho salmon, or 10 percent of California's current Coho salmon population. Dense seagrass meadows are found throughout Tomales Bay. Pacific herring use the seagrass beds for spawning. Tomales Bay also supports seasonal populations of salmon, steelhead, sardines, and lingcod. The shallow bay's sandy bottom attracts a variety of bottom-dwelling fish including sole, halibut, skates and rays. Leopard sharks are common in Tomales Bay and occasionally blue sharks are sighted. White sharks, although not found in enclosed bays or estuaries, do hunt for seals and sea lions that frequent the bays to haul out on the sandy beaches and rocks near the mouth of Tomales Bay. Over 20,000 shorebirds and seabirds, including loons, grebes, geese, cormorants, and ducks, spend the winter in Tomales Bay.

The Esteros Americano and de San Antonio are coastal estuaries located on Bodega Bay. Estero Americano drains into Bodega Bay at the Sonoma-Marin County line. South of Estero Americano, Stemple Creek becomes the Estero de San Antonio, also draining into Bodega Bay. Many different habitat types are found in the esteros including mudflats, marshes, rocky shore, coastal scrub, and grasslands. With the variety of habitats, the esteros support many species of plants, invertebrates, fishes, birds, and mammals. They provide essential feeding and resting areas for shore and sea birds. Some common fish species found in the esteros include Pacific herring, staghorn sculpins and starry flounder. The endangered tidewater goby breeds in the shallow waters of Estero de San Antonio.

Seagrass beds occur on the extensive mudflats in Tomales Bay, Bolinas Lagoon and within the esteros. Seagrass supports a unique and diverse assemblage of invertebrates and fishes, including snails, shrimp, nudibranchs and sea hares. The structure of seagrass beds provides protection from predation, especially for juvenile invertebrates and fishes. Pacific herring, invertebrates, and birds depend on seagrass beds in Tomales Bay to spawn and feed.

The soft bottom habitats associated with estuarine environments support large concentrations of burrowing organisms, such as clams, snails, worms, and crabs. Benthic invertebrates in estuaries have a large effect on community structure.

Willetts and Marbled Godwits are among the most abundant large shorebirds in northern California estuaries whereas Sanderlings, Western Sandpipers, Least Sandpipers, Dowitchers, and Dunlins are the most abundant small shorebirds in wetlands and the outer coast beaches from Point Reyes to Bodega Bay. There are some differences within estuaries in the abundances of shorebirds. Horned and Eared Grebes, American Coots, and numerous ducks (including Buffleheads, Goldeneyes, Pintail, Mallard, and Cinnamon Teal dominate the coastal bird assemblage in shallow, tidal waters of local sloughs and estuaries while egrets and herons use brackish and salt marshes as roosting and feeding habitats during high tides [Davis and Baldrige 1980]). The time of migration and the routes of travel between breeding and wintering grounds seasonally affect the patterns in abundance of shorebird species in northern California (Ramer et al. 1991). Most species of wintering shorebirds move into California from August through March and leave wintering grounds for northern breeding grounds between late March and early May.

Fish assemblages in estuaries of the Gulf of the Farallones exhibit similar trophic structure and taxonomic structure. The most abundant estuarine fish are juvenile planktivores or low-level carnivores on infaunal invertebrates (Yoklavich et al. 1991). Fish assemblages exhibit higher abundance and species richness during the summer with the invasion of young-of-the-year marine species (Allen and Horn 1975, Hoff and Ibara 1977, Allen 1982, Onuf and Quammen 1983, Yoklavich et al. 1991). Species richness (diversity of species) and the change in species composition decline with distance from the ocean (Loneragen et al. 1986, Blaber et al. 1989, Yoklavich et al. 1991). The mouths of bays and estuaries are strongly influenced by marine hydrographic processes (Broenkow 1977), and are therefore more accessible to coastal marine species.

### **Kelp Forests**

The rocky nearshore environment of northern California is characterized by dense forests of kelp growing at depths from 2 meters to more than 30 meters (Foster and Schiel 1985). The bull kelp, *Nereocystis luetkeana*, is the dominant canopy-forming kelp north of Santa Cruz to the Aleutian Islands (Foster 1982). The shallow areas inshore of kelp forests are often characterized by canopies of the feather boa kelp, *Egregia menziesii*, and other Laminariales (Foster and Schiel 1985).

Kelp forests are spatially complex communities. They alter turbulent flow patterns in the nearshore region through drag generated by their large size and frequently high densities (Duggins 1988). The biological ramifications of this type of hydrodynamic influence are potentially very important to a wide range of nearshore organisms. Disruption of flow by kelp forests is likely to have significant effects on feeding and growth (particularly in suspension and deposit feeders), dispersal and recruitment (Duggins 1988). Food and dispersal stages of many kelp forest organisms are passively dispersed, and their transport and settling characteristics will be determined largely by the movement of water in which they are suspended. Kelp beds may retain larvae released within the bed, and the strong deceleration of flow at the margins of the bed could facilitate settlement of larvae imported from outside the bed (Duggins 1988). The concentration of zooplankton at the upcurrent edge of a kelp bed, and the corresponding higher densities and feeding rates of fish in that area, are probably results of alterations of current flow by kelp (Bray 1981). Predation risk may increase the association between certain species and kelp forests because predation (by fish, birds, and marine mammals) is lower in spatially complex environments such as kelp beds (Gooding and Magnuson 1967, Wickham and Russell 1974).

Kelp forests harbor a large potential source of invertebrate and fish prey for birds (Foster and Schiel 1985). Gulls, terns, Snowy Egrets, Great Blue Herons and cormorants are associated commonly with kelp forests (Foster and Schiel 1985). Other species (e.g., phalaropes) feed on the plankton and fish larvae associated with kelp.

Harbor seals (*Phoca vitulina*) and California sea lions (*Zalophus californianus*) are common in and around kelp forests off northern and central California. Harbor seals feed on fishes in the kelp forest whereas California sea lions probably limit their use of the kelp forests to transitory feeding (Foster and Schiel 1985).

Gray whales (*Eschrichtius robustus*) have been observed entering kelp forests to feed on invertebrates such as mid-water crustacean swarms and to escape predation from killer whales (*Orcinus orca*).

### **Open Ocean**

The habitat covering the largest area within the GFNMS is the open continental shelf and the pelagic (open ocean) habitat. This habitat is strongly influenced by the oceanographic patterns of the northern California coast (for more detail, see Climate and Oceanography section above). The strong upwelling events stimulate the productivity of organisms at all levels of the marine food web. Cool, nutrient-rich, upwelled waters support high primary productivity.

All the food that drives the biology of the deep ocean originates in the very thin, near surface layer, the euphotic zone. Therefore, the feeding conditions of the ocean floor are linked with primary production. Deep-sea communities depend on the distribution and quantity of primary production, the rate of movement of organic material to the bottom, and the conditions of deposition and transformation of the organic matter in the sediment.

Distribution and abundance of zooplankton are related to the physical dynamics of the California Current system (Reid et al. 1958, Parrish et al. 1981, Huntley et al. 1995). Zooplankton are usually most abundant in neritic and inshore regions (Colebrook 1977), as compared with waters of the offshore California Current. Large populations of zooplankton are associated with subarctic water and intense upwelling along the northern/central coast of California extending to Point Conception (Reid et al. 1958, Loeb et al. 1983a).

Crustacean larvae, euphausiids, and copepods are dominant groups in the epipelagic zone (Colebrook 1977). Euphausiid swarms often concentrate near Cordell Bank, the Farallon Islands (Rice 1977, Kieckhefer 1995) and in Monterey Bay, due to high local productivity and oceanographic characteristics of the regions (e.g., upwelling, fronts, canyons, and vertical walls). Distributions of the euphausiids, *Euphausia pacifica* and *Thysanoessa spinifera*, vary seasonally in response to both temperature and light availability. Changes in euphausiid behavior can reduce the availability of prey in surface waters to predators such as seabirds (Ainley et al. 1996, Veit et al. 1997) and rorqual whales (Schoenherr 1991, Croll et al. 1998).

California blue whales respond to the seasonal patterns in productivity in foraging areas along the west coast of North America. Blue whales exhibit strong seasonal migration feeding primarily on euphausiids in the Gulf of the Farallones and migrating to the lower latitudes where they feed on “upwelling-modified” waters (Fielder et al. 1998, Croll et al. 1998), mate and give birth (Lockyer 1981). California humpback whales follow similar migration patterns as the blue whales and primarily feed on small schooling fish and euphausiid prey in the Gulf of the Farallones and migrate to Mexican waters to mate and give birth (Kieckhefer 1992).

The composition of fish species in the pelagic zone varies throughout the year with migration and spawning and from year to year with environmental fluctuations. A small number of migratory pelagic species dominate the fisheries of central and northern California, including northern anchovy (*Engraulis mordax*), Pacific sardine (*Sardinops sagax*), Pacific hake (*Merluccius productus*), and jack mackerel (*Trachurus symmetricus*). These pelagic species

spawn in the Southern California Bight and migrate into waters off central and northern California. However, the composition of larval fish species off central and northern California varies with oceanographic conditions.

The deep-sea pelagic invertebrate fauna is dominated by the following Phyla: cnidarians (or coelenterates), ribbon worms (Nemertean), ctenophores, chaetognaths, mollusks, annelids (including Polychaetes), and crustaceans. The cnidarians include hydroids, sea anemones, corals, jellyfishes, and their relatives. The mollusks include marine snails (Prosobranchia), sea slugs (Opisthobranchias and Pulmonata), clams (Bivalves), chitons (Polyplacophora), squids and octopuses (Cephalopods including the Decapods, Octopods, and Siphonophora). The crustaceans include barnacles (Cirripedia), isopods, amphipods, copepods, shrimps (Caridea), ghost shrimps (Macrura), hermit crabs (Anomura), and true crabs (Brachyura).

### **Continental Shelf and Slope Communities (0-200 meters)**

The continental shelf off central and northern California is generally quite gradual, and the bottom substrate is a combination of varying amounts of sand, silt, and clay. Much of the mud and sand on the continental shelf was deposited by rivers that formed during the melting of the glaciers approximately 18,000 years ago (Eittrheim et al. 2000). At water depths between about 40 to 90 meters, the continental shelf off central California is covered by a nearly continuous blanket of mud as much as 30 meters thick. In areas of high wave energy, mud and sand may be resuspended and transported away from the shore. A zone of outcropping bedrock and sands is located seaward of the mud accumulation zone, on the far outer shelf where water depth exceeds 90 meters.

### **Sandy Continental Shelf Communities**

Although sandy sediments may appear less productive than rocky reefs and kelp forests, numerous organisms are adapted to the shifting environments on the sandy shelf. Some animals find shelter by living in tubes and burrows. Clams lie permanently buried with their siphons extended to the surface of the sediment. Some crustaceans and mollusks live beneath the sand, emerging at night to forage. Flatfishes are camouflaged on the sandy surface of the sea floor. Ocean shrimp (*Pandalus jordani*) are found in California from depths of 240 to 750 feet. Spot prawns are found in depths of 150 to 1,600 feet and concentrate in the regions around the Farallon Islands and offshore banks. Many species of fish prey on ocean shrimp, including Pacific hake, arrowtooth flounder, petrale sole, sablefish, and several rockfishes.

Many species of flatfishes (Pleuronectidae and Bothidae) use the soft-bottom habitats along the continental shelf. English sole (*Paraphrys vetulus*) are distributed from northwest Alaska to San Cristobal Bay, Baja California, in waters as deep as 1,800 feet. Spawning of English sole generally occurs over sand and mud-sand bottoms at depths of 200 to 360 feet from September to April (Pearson et al. 2001).

Dungeness crabs (*Cancer magister*) are commonly found in a variety of habitats, but populations are concentrated on sandy to sandy-mud bottoms from the intertidal to a depth of 300 feet. Dungeness crabs are opportunistic feeders, consuming clams, fish, isopods, and amphipods.

## **Rocky Continental Shelf Communities**

Along the northern California coast, rocky reefs support extensive macroalgal growth and associated abalones, sea urchins, and rockfishes.

Juvenile red abalone settle as postlarvae on coralline algae in crevices between rocks (Haaker et al. 2001). Sea urchins are abundant subtidal herbivores that play an important ecological role in the structure of kelp forest communities. Red sea urchins (*Strongylocentrotus franciscanus*) are found on rocky shores of open coasts from the low-tide water line to 300 feet deep. Purple sea urchins (*S. purpuratus*) are found on rocky shores with moderately strong surf from the low-tide line to 525 feet deep.

Fish commonly found in the rocky habitats of the continental shelf include surfperches, rockfish (black and shortbelly), cabezon, and bocaccio. The surfperches (Embiotocidae) are small abundant fishes found predominantly in temperate eastern North Pacific waters. Schools of black rockfish (*Sebastes melanops*) frequently occur 10 to 20 feet above shallow rocky reefs. Shortbelly rockfish (*Sebastes jordani*) are found in greatest abundances between the Farallon Islands. The peak abundance of adults is over the bottom at depths of 400 to 700 feet. Adults commonly form very large schools often near or on the bottom during the day. At night, aggregations of shortbelly rockfish may loosen as the fish move up in the water column. Cabezon (*Scorpaenichthys marmoratus*) are found on hard bottoms in shallow water from intertidal pools to depths of 250 feet. Cabezon are common in subtidal habitats in and around rocky reefs and kelp beds. Bocaccio (*Sebastes paucispinis*) ranges from Kodiak Island, Alaska, to central Baja California.

## **Continental Slope Communities (200-2000 meters)**

At a depth of about 200 meters, the continental slope drops steeply to the sea floor. The deep waters of the continental slope are characterized by extremely low light conditions, nearly freezing temperatures, and very high pressures (Laidig 2002). Continental slope species eat less frequently, are slower at digesting their food, and move more slowly than species in warmer waters. In order to achieve sexual maturity and successful reproduction under conditions of reduced growth, continental slope species may live longer than species in warmer waters.

The invertebrate infaunal and epifaunal communities along the continental slope include many species such as polychaete worms, pelecypod and scaphopod mollusks, shrimp, and brittle stars.

Productive commercial fisheries for deep-sea fish operate on the continental slope. The species targeted include deep-sea rockfishes such as Cowcod (*Sebastes levis*) and Blackgill rockfish (*Sebastes melanostomus*), thornyheads (genus *Sebastolobus*), sablefish (*Anoplopoma fimbria*), and Dover sole (*Microstomus pacificus*). Many of these species occupy similar habitats and generally are caught together.

## **Submarine Banks, Canyons, and Seamounts**

Submarine banks and shoals are found near the shelf break along a submarine ridge that extends for approximately 30 nautical miles between the Farallon Islands and Cordell Bank. The vertical

structure of Fanny Shoal, Rittenburg Bank, and the submerged rocky outcrops surrounding the Farallon Islands provide rich habitat for a diverse rocky reef community.

To the west of the Farallon Islands and the continental shelf, the seafloor drops precipitously to depths over 6,000 feet. Submarine canyons and gullies indent the steep continental slope of the Farallones Escarpment.

Pioneer and Guide Seamounts are found west of the sanctuary. These underwater islands of volcanic origin are home to colorful, long-lived invertebrates and other marine life adapted to living in dark, deep waters. Due to the difficulty in studying these remote habitats, it is possible that these seamounts harbor marine life that is yet unknown to science.

## LIVING MARINE RESOURCES

### Marine and Coastal Birds

One of the most spectacular components of the sanctuary's abundant and diverse marine life is its nesting and migratory seabirds (see Appendix III-G for a complete species list). The Gulf of the Farallones supports the largest concentration of breeding seabirds in the contiguous U.S. These birds forage in the Gulf of the Farallones and are highly dependent on the productive waters of the sanctuary. Eleven of the sixteen species of seabirds known to breed along the U.S. Pacific coast have breeding colonies on the Farallon Islands and feed in the sanctuary. Breeding colonies include Ashy and Leach's Storm-Petrels; Brandt's, Pelagic, and Double-crested Cormorants; Western Gulls; Common Murres; Pigeon Guillemots; Tufted Puffins; and Cassin's and Rhinoceros Auklets. The Black Oystercatcher, a moderate-sized shorebird, also nest on the Farallon Islands.



*Common Murres breed on the Farallon Islands and other craggy promontories within the sanctuary. They are particularly vulnerable to impacts from oil spills.  
Photo: NOAA*

The sanctuary also protects four estuaries, a lagoon, and one large coastal bay that provide foraging habitat for aquatic birds such as waterfowl, shorebirds, pelicans, loons, and grebes. These habitats are pristine compared to most coastal wetlands in California and provide habitat for thousands of migrating and wintering birds. More than 160 species of birds use the sanctuary for shelter, food, or as a migration corridor. Of these, over 50 species of birds are known to use the

sanctuary during their breeding season.

Six marine and aquatic bird species that are federally listed as threatened or endangered can be found in the sanctuary (March 2007). These include the Marbled Murrelet, California Brown Pelican, Western Snowy Plover, and Short-tailed Albatross.



*GFNMS was designated to protect the seabirds of the Gulf of the Farallones. Here are a few examples. Northern Fulmar (left) forage within the open waters of the sanctuary, Snowy Egrets (center) inhabit the shallow estuarine waters, and Western Gulls and other birds fill the skies above the sanctuary. Photos: NOAA*

### Marine Mammals

Thirty-six species of marine mammals have been observed in the GFNMS. This includes six species of pinnipeds (seals and sea lions), twenty-eight species of cetaceans (whales, dolphins, and porpoises), and two species of otter. Many of these mammals occur in large concentrations and are dependent on the productive and secluded habitats for breeding, pupping, hauling out,

feeding, and resting during migration. The Farallon Islands provide habitat for breeding populations of five species of pinnipeds, and support the largest concentrations of California sea



*Common marine mammals of the GFNMS include California and Steller sea lions (left), gray whales (center), and longbeaked common dolphins (right). Photo: NOAA*

lions and northern elephant seals within the sanctuary.

### **Fish Resources**

Fish resources are abundant over a wide portion of the Gulf of the Farallones. Because of the comparatively wide continental shelf and the configuration of the coastline, the sanctuary is vital to the health and existence of salmon (chinook and coho), northern anchovy, rockfish, and flatfish stocks. The extension of Point Reyes and the resulting current patterns tend to retain larval and juvenile forms of these and other species within the sanctuary, thereby easing recruitment pressures and ensuring continuance of the stocks. Sanctuary waters offshore of the Farallon Islands act as a location for shallow and intertidal fishes which further enhance finfish stocks.



*The rockfish group of fish (*Sebastes* spp.) are among the most diverse fish species in the sanctuary nearshore and deep habitats. Photo: NOAA*



*White sharks migrate to the Gulf of the Farallones in the fall to prey upon the marine mammal populations. Photo: NOAA*

The sanctuary includes many diverse habitats, thereby contributing to the region's high productivity. Bays and estuaries are especially important as feeding, spawning, and nursery areas for a wide variety of finfish. Common fish species of the major bays and estuaries include the Pacific herring, smelts, starry flounder, surfperch, sharks and rays, and coho salmon. The rocky intertidal zone supports a specialized group of fish adapted for life in tide pools, including monkey face eels, rock eels, dwarf surfperch, juvenile cabezon, sculpins, and blennies. Many of these stocks are important as forage for shorebirds and seabirds. Subtidal habitats support large populations of juvenile finfish (e.g., flatfish, rockfish, etc.). Nearshore pelagic environs are habitat to large predatory finfish such as sharks, tunas, and mackerel. Northern anchovies, Pacific mackerel, and market squid are abundant and can be commercially valuable. Pelagic fish resources in the study area generally parallel species living in the nearshore subtidal zone. At the mid-depth or meso-pelagic range over sand and mud bottoms, bocaccio, chilipepper, widow rockfish, and Pacific hake are

abundant. Kelp beds substantially increase the useable habitat for pelagic and demersal species and offer protection to juvenile finfish.

### **Marine Flora**

Significant algal and plant communities within the sanctuary include kelp beds, salt marshes, and seagrass beds. The importance of these plants, algae, and microscopic phytoplankton for habitat and food cannot be overstated.



*The intertidal algae the sea palm is a State-species of special concern and is found in pockets along the GFNMS rocky shores*

Kelp forests include the giant kelp species bull kelp. The highest concentration of kelp beds in the sanctuary occurs along the mainland coast between Point Reyes Headlands and Bolinas Lagoon. As noted above, these kelp beds provide important habitat and food for many invertebrate and finfish species.



*Kelp forests in GFNMS are dominated by bull kelp (Nereocystis luetkeana). Photo: NOAA*

Salt marshes offer food and protected habitat for many coastal species during vulnerable lifecycle stages. For example, some flounders breed near salt marshes to allow juveniles to develop in the marsh system. Herons, sandpipers, duck, rails, and geese are also dependent upon the marsh for feeding and breeding.

Seagrass beds are situated on subtidal estuarine flats, in bays, and coastal inlets. Seagrass beds provide important breeding and nursery habitat for organisms such as herring, which attach their eggs to eelgrass. Although some marine organisms feed directly on seagrass, the principal food chain supported by seagrass is based on detritus.

### **Benthic Fauna**

Benthic fauna communities refer to invertebrates living directly on or in the seafloor. Benthic fauna communities differ according to habitat type and exist in all habitats of the sanctuary (bays and estuaries, intertidal zones, nearshore, and offshore). Generally, each habitat area supports differing benthic assemblages of most classes, e.g., worms, clams, or crabs. The most conspicuous species include abalone, crabs, and sea urchins. Hundreds of other species (including sea stars, clams, amphipods, and shrimp) are critical links in the food chains of fish, birds, and mammals.



*Sea urchins are important grazers in the intertidal ecosystem. Photo: NOAA*

## **HUMAN-USE IMPACTS ON ECOSYSTEMS**

A wide range of human-use activities occur in and around the waters of the GFNMS. The San Francisco Bay metropolitan area exerts considerable user influence on the scale and intensity of uses (often competitive) occurring in the area. The major near and offshore activities include commercial fishing and mariculture, commercial shipping, recreation, and research. Additional details on the extent of human-use activities in the sanctuary can be found in the introduction of each action plan.

### **Commercial Fishing and Mariculture**

The most important commercial harvests include Pacific herring, salmon, flatfish, albacore, tuna, and Dungeness crab. As of the date of publication, the offshore commercial groundfish fishery within the Gulf of the Farallones remains closed below 20 fathoms. Most of the commercial catches harvested in the sanctuary are landed in San Francisco, Bodega Bay, Oakland, Half Moon Bay, and Sausalito. A number of mariculture operations in Tomales Bay and Drakes Estero raise oysters, mussels, and other shellfish.



*Fishing vessels can be seen plying sanctuary waters for fish throughout the seasons. Photo: NOAA*

### **Commercial Shipping**



*Large cargo ships daily transit the sanctuary enroute to and from the Port of San Francisco. Photo: NOAA*

Three major shipping lanes converge in the sanctuary just west of the Golden Gate Bridge at the entrance to San Francisco Bay. The volume of traffic in and out of San Francisco Bay is large, totaling approximately 6,000 arrivals in calendar year 2003. This represents an average of over three tankers and ten other types of vessels per day. In recent years, the sanctuary is seeing an increase in cruise ship traffic. Cruise ship visitation to San Francisco Bay more than doubled in two years from 44 in 2002 to 91 in 2004.

### **Recreation**

The sanctuary is a popular recreation area because of its many outstanding natural features and its proximity to the San Francisco Bay metropolitan area. More than 58 coastal access points in Sonoma, Marin, San Francisco, and San Mateo Counties provide direct access and views of the sanctuary. Most of these access points are located in federal, state, county, and local parks.



*Kayaking is a popular way to experience the sanctuary, particularly on Tomales Bay. Photo: NOAA*

Sport fishing is one of the more popular activities in the sanctuary. King salmon and rockfish are the major species taken. Whale watching, Farallon Islands wildlife viewing, sailing, and oceanic birding excursions account for several thousands of visitors venturing offshore. The major onshore recreational uses include beach-related activities, bird watching,

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coastal hiking, wildlife viewing, tide pooling, surfing, kayaking, canoeing, boardsailing, clamming, and surf fishing. On some weekend days, more than 1,000 clam diggers harvest geoduck, gaper, Washington, and littleneck clams.

### **Research and Monitoring**

The diversity of physical and biological habitats throughout the sanctuary offers an outstanding opportunity for scientific research on marine and estuarine ecosystems. Several academic institutions, government agencies and nongovernmental organizations have ongoing monitoring and research programs in the area. Research on the Farallon Islands (Farallon National Wildlife Refuge) is coordinated by the U.S. Fish and Wildlife Service (USFWS), through a Cooperative Agreement with PRBO Conservation Science. The sanctuary collaborates with these and other institutions on conducting monitoring and research to help characterize the wildlife and habitats of the sanctuary and to help understand natural and human factors responsible for causing changes in the marine environment.



*Sanctuary scientists collect data on the rocky shores of the Farallon Islands to answer important resource management questions. Photo: NOAA*

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## **OVERVIEW OF JOINT MANAGEMENT PLAN REVIEW (JMPR) PROCESS**

The National Marine Sanctuary Act (NMSA) requires the National Marine Sanctuary Program (NMSP) to periodically review sanctuary management plans to ensure that sanctuary sites continue to best conserve, protect, and enhance their nationally significant living and cultural resources. Gulf of the Farallones National Marine Sanctuary (GFNMS) had not reviewed or revised its management plan since its designation in 1981. Recent scientific discoveries, advancements in managing marine resources, and new resource management issues provide the basis for the development of this new five-year management plan.

The NMSP has reviewed the management plans of GFNMS together with the Cordell Bank and Monterey Bay national marine sanctuaries. These sanctuaries are located adjacent to one another, managed by the same program, and share many of the same resources and issues. In addition, all three sites share many overlapping interest and user groups. It is also more cost effective for the program to review the three sites jointly rather than conducting three independent reviews. Using a community-based process that has provided numerous opportunities for public input, the NMSP identified priority resource management issues to be addressed in the management plans. Through the review process, management strategies, regulations, and boundaries were also evaluated.

The sanctuary's management plan describes the objectives, policies, and activities for GFNMS. It also outlines regulatory goals; describes boundaries; identifies staffing and budget needs; and sets timelines, priorities, and performance measures for conservation science and education programs. The management plan will guide the development of future management activities over the next five years.

### **STAGES OF THE GFNMS MANAGEMENT PLAN REVIEW PROCESS**

#### **Public Scoping Meetings**

The GFNMS management plan review process began in Fall 2001 with a two-month public scoping period to identify specific management priority issues for the next five to ten years. As a part of the Joint Management Plan Review (JMPR), the NMSP held twenty public scoping meetings in communities throughout the north-central California coast, in Sacramento, and in Washington, D.C. Approximately 1,000 people participated in these forums and submitted approximately 4,000 comments. All comments were compiled and posted on the JMPR website.



*The management plan review included twenty public scoping meetings. Photo: NOAA*

In addition to public scoping meetings, the NMSP accepted written comments. Comments were sent to the NMSP in the form of e-mails, letters, faxes, and petitions. The program received approximately 6,500 e-mails, 300 letters, thirteen faxes, and a petition with 1,700 signatures.

From these, a *Summary Scoping Document* was prepared and distributed to each of the sanctuary advisory councils. This document organized all the comments received through early February 2002 into thirty general issue categories. Background information and summary charts were included to help the NMSP staff and three advisory councils prioritize the issues. The document is also posted on the Jmpr website at <http://www.sanctuaries.nos.noaa.gov/jointplan/>.

### **Issue Prioritization**

Four prioritization workshops were held with each of the sanctuary advisory councils to evaluate the cross-cutting and site-specific marine resource management issues identified during the public scoping process. These recommendations were given to staff for consideration in developing the final list of issues to be addressed in the Jmpr.

The first workshop, held in April 2002 in Half Moon Bay, involved all three sanctuary advisory councils to prioritize the cross-cutting issues raised during the scoping process. Cross-cutting issues were defined as any issue that applied to two or more sanctuaries. Following this joint workshop, individual sanctuary advisory councils met to prioritize site-specific issues raised during the public scoping process. The results from these workshops were distributed to advisory council members in a document entitled *Report on Sanctuary Advisory Council Prioritization Workshops*. The document is posted on the Jmpr website at <http://www.sanctuaries.nos.noaa.gov/jointplan/>.

The *Report on Sanctuary Advisory Council Prioritization Workshops* summarizes the results from four prioritization workshops held with members of the Cordell Bank, Gulf of the Farallones, and Monterey Bay National Marine Sanctuary Advisory Councils. One workshop was held jointly with all three advisory councils to prioritize the cross-cutting issues. The three advisory councils also met individually to prioritize site-specific issues raised during scoping. This document includes the actual ranking the councils gave to each issue based upon the following criteria: Site Benefits, Urgency, and Feasibility.

NMSP staff (from all three sanctuaries and the NMSP headquarters) met to determine the final list of priority cross-cutting and site-specific marine resource management issues to address in the management plan reviews. This group developed the final list of management plan issues using the advice of the advisory council and sanctuary staff, including the *Report on Sanctuary Advisory Council Prioritization Workshops*. The final list was released to the public in the document entitled, *National Marine Sanctuary Program Selection of Priority Issues to Address in the Joint Management Plan Review*. This document is posted on the Jmpr website at <http://www.sanctuaries.nos.noaa.gov/jointplan/>.

The *National Marine Sanctuary Program Selection of Priority Issues to Address in the Joint Management Plan Review* report presented the priority issues the NMSP planned to address in the Jmpr process. The cross-cutting and site-specific priorities are presented in a summary chart as well as a text explanation of the rationale behind the decision to address or not address each issue.

## **Issue-Based Working Groups**

Issue-based working groups were established to recommend specific actions for the sanctuary to undertake to address the priority issues identified during the public scoping and prioritization phases. The working groups met an average of eight times over a seven-month period from December 2002 to June 2003. Members of the groups included sanctuary advisory council representatives, nominated experts from the community, and sanctuary staff. The groups heard from technical advisors, reviewed published documentation, and used this information to recommend specific management actions for the sanctuary to use in developing the revised management plan.

GFNMS created six working groups, two internal teams, and participated in five cross-cutting working groups. The GFNMS site-specific working groups were: Water Quality; Wildlife Disturbance; Introduced Species; Ecosystem Protection: Impacts from Fishing Activities; Vessel Spills; and Education and Outreach. The site-specific internal teams were Administration and Boundary Modifications. The cross-cutting working groups (including representatives from all three sanctuaries and advisory councils) were: Ecosystem Monitoring; Maritime Heritage; and Community Outreach. The cross-cutting internal teams were Boundary Modifications and Administration. The recommendations that came out of these working groups were prioritized and the highest ranked activities were compiled in a document entitled, *Gulf of the Farallones National Marine Sanctuary Recommendations*. The document is posted on the JMPR website at <http://www.sanctuaries.nos.noaa.gov/jointplan/>.

The *Gulf of the Farallones National Marine Sanctuary Recommendations* report details the goals, objectives, and strategies recommended by each working group. The report includes background information; an overview of the working group participants and process; a detailed description of each proposed strategy; and how each strategy was ranked according to the criteria of: Site Benefits; Complexity; Short-term Feasibility; Long-term Feasibility; Improved Coordination Between Sites; and Urgency.

## **Review of Working Group Recommendations**

The recommendations from the issue-based working groups underwent several rounds of review in preparation for creating the draft management plan. The recommendations were sent to the sanctuary advisory council members, who reviewed the document as a whole and forwarded it with their comments and priorities to the sanctuary manager. The sanctuary advisory council considered overlap or gaps within the recommendations, the feasibility and value of each proposed activity, and any suggestions or comments they had. The sanctuary advisory council also prioritized each activity as a high or low priority based on six criteria: Site Benefits; Complexity; Short-term Feasibility; Long-term Feasibility; Improved Coordination Between Sites; and Urgency (the same criteria used by the working groups).

The sanctuary staff then reviewed the sanctuary advisory council's recommendations, comments and priorities using the same considerations and criteria as the sanctuary advisory council had used. The sanctuary manager considered both the staff and advisory council comments and made the final decision regarding those activities to be included in the draft management plan.

### **Draft Management Plan**

A draft management plan (DMP) was released to the public for review and comment. It contained a series of strategies and action plans that addressed the priority resource management issues and general management of the sanctuary. It also included detailed timelines and budgets along with proposed regulatory changes. The DMP was written based on the results of the first four stages of the JMPR process described above.

The sanctuary accepted written comments (letters, e-mails, faxes) and hosted a series of public hearings to hear oral comments on the draft management plan. A supporting final environmental impact statement (FEIS) supports any changes, provides an environmental and socioeconomic analysis of proposed regulatory actions, and is packaged and reviewed with the DMP. After the close of the public comment period, the sanctuary reviewed and responded to comments and made necessary changes before issuing the final management plan (FMP).

### **Final Management Plan**

Following the DMP public comment period, sanctuary staff revised the DMP, as appropriate, based on comments received. From this, the FMP was created along with a final environmental impact statement (FEIS). The FMP/FEIS was released to the public and submitted to Congress and the Governor for review. Following a 45-day review period and completion of any necessary changes, the new management plan and accompanying regulations became effective.

## **STRUCTURE OF THE ACTION PLANS**

This management plan is constructed around a set of functionally based action plans that outline how Gulf of the Farallones National Marine Sanctuary (GFNMS) will be managed for the next five years. Each action plan outlines how different strategies will be conducted; presents the costs that might be incurred for each strategy; sets a coordinated timeline for carrying out all strategies; and proposes performance indicators as a measure of management effectiveness.

### **DEVELOPMENT OF ACTION PLANS**

Through the extensive community-based management plan review, priority resource management issues to be addressed in the management plan were identified. Working groups were formed to address each of these issues. Working groups consisted of sanctuary staff, members of the sanctuary advisory council, experts, agency representatives, and the public, who worked together to identify the priority issues the sanctuary faced and the outcomes that should be sought for each issue. The working groups developed the goals and objectives; strategies; and activities to achieve those outcomes. The following issues and program areas are addressed in this management plan:

- A. Water Quality
- B. Wildlife Disturbance
- C. Introduced Species
- D. Ecosystem Protection: Impacts from Fishing Activities
- E. Impacts from Vessel Spills
- F. Education and Outreach
- G. Conservation Science
- H. Resource Protection
- I. Administration

### **OUTLINE OF ACTION PLANS**

Each action plan is structured so that sanctuary staff and constituents may quickly and easily reference this document. Each action plan is divided into eight sections that are described in detail below.

### **Issue Statement/ Program Statement**

The issue (or program) statement clearly and concisely provides an introduction about “why” this is an issue to be addressed by the sanctuary in the management plan. It may include a brief description of the current situation or problem, and areas that need attention.

### **Issue Description/ Program Description**

The issue (or program) description provides a general background on what the sanctuary currently knows or understands about an issue. Program descriptions explicitly describe the types of actions already undertaken by the sanctuary and the general direction it would like to move in the future. It includes the status of natural resources, related human-use activities occurring in the sanctuary, and jurisdictional authorities pertinent to the specific issue.

### **Goals**

The goal states “what” is the desired future state of the sanctuary ecosystem and management relevant to the specific resource management issue or program area. The goal is a broad statement about a long-term desired outcome that may or may not be completely obtainable.

### **Objectives**

The objectives are measurable outcomes for evaluating progress and success in moving toward the future desired condition. Objectives will be achieved in a specific time frame to help accomplish the desired goal.

### **Strategies**

This section is a description of how the objectives will be accomplished for the particular issue or program area. Each strategy addresses one or more objectives and is divided into specific activities for the sanctuary staff to carry out. Activities are developed and implemented to achieve the goals and objectives of the issue or program area.

Where applicable, the potential partners, products, and complementary strategies are listed. The potential partners are only those organizations that the sanctuary has identified as possible partners on the particular activity and that have shown interest in contributing to the effort. This list does not limit the partners the sanctuary may work with, but merely serves as a guide when implementing the activity. The sanctuary may partner with other organizations as work on the particular activity progresses. Likewise, the products listed are projected, but additional or altered products may become more appropriate as the strategy is completed. A list of acronyms used in this plan is found in Appendix IIIC.

Many activities within this management plan complement each other by providing the groundwork for other activities to take place or by being similar such that efficiencies can be achieved by working on them together. Where this is the case, the complementary strategies are listed beneath the activity.

## **Timeline**

A general timeline is included for each action plan and presents the projected calendar for initiating and completing each strategy over the next five years. The timeline shows the planning, implementation, and where appropriate, the completion stage for each strategy. These timelines are based upon staff workload, coordination with related strategies, and the assumption that funds will be available. Timelines of strategies by program area are also included with program area action plans.

## **Budget**

The budget table for each action plan presents the estimated costs per year for conducting the activities and strategies contained in this management plan. These budget numbers represent the sanctuary's best estimate of what it will cost to conduct the programs and projects described over a five-year period. However, each year the sanctuary will prepare an annual operating plan (AOP) that will determine that year's priorities and costs in the context of not only the overall revised management plan, but current issues facing the site and general national priorities as well. Therefore, costs as estimated in this management plan may be somewhat different than determined by the AOP each year. These estimates are also subject to a number of other caveats:

- The sanctuary's base budget is available each year from appropriated funds;
- There are both availability of and opportunity to receive additional funding from appropriated funds;
- The estimates do not take into account increasing personnel costs each year or inflation; and
- The estimates do not take into account unexpected events or emergencies or unforeseen projects.

## **Performance Measures**

Each action plan includes a chart presenting the outcomes expected and the performance indicators that will be used to measure progress toward the outcome. This effort is being undertaken to measure the sanctuary's management effectiveness (e.g., the achievement of a planned effort or activity). The methodology to be used to assess the effectiveness of each strategy in achieving the desired goal is detailed below. The definitions for the performance measure terminology follow.

<i>Strategy</i>	The management action taken by the sanctuary to address a particular issue.
<i>Performance Goal</i>	The over-arching, very broad target for the action plan.
<i>Desired Outcome (Objective)</i>	The more specific outcomes we want to achieve with our activities within the scope of the performance goal.
<i>Outcome Measure</i>	A specific amount or degree of the indicator that shows progress towards a desired outcome. This could contain temporal (by year) and range targets (e.g., percentage or fraction).

**Structure of the Action Plans**  
**GFNMS Management Plan**

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<i>How Measured</i>	Describes exactly how the outcome measure will be measured.
<i>Who Measures</i>	Identifies the staff or outside partner who will measure the outcome measure.
<i>Output Measure</i>	A specific product or tool that results from the activities. Its production demonstrates a completed objective.

**OVERVIEW MATRIX OF PROGRAM AREA STRATEGIES**

From a manager’s perspective, every strategy in the management plan is a task for staff in one or more of the program areas. The Program Area Overview Matrixes (Appendix II) organize all strategies and activities into the four program areas: Administration; Education and Outreach; Conservation Science; and Resource Protection. The overview matrix lists the Strategies, Activities, Objectives, and Complementary Strategies under each program area.

**IMPLEMENTATION OF THE MANAGEMENT PLAN**

This plan is designed to guide management of the marine resources of GFNMS for the next five years. Implementation of this new management plan will require cooperation and coordination among many federal, state, and local government agencies, as well as private organizations and individuals. Information exchange, sharing facilities and staff, and the coordination of policies and procedures within an ecosystem context are features of this management plan and each of its program areas. As this plan is being implemented, the sanctuary will work to facilitate all public and private uses of those resources that are compatible with the primary objective of resource protection.

**Limitations**

Although this five-year management plan for GFNMS details the action plans for the four program areas, how these strategies are implemented may be affected by multiple factors. These include: (1) funding – the primary source of funding comes from congressional appropriations that may fluctuate from year to year; (2) GFNMS’ ability to forge new partnerships in which staff, facilities and financial resources may be shared; (3) GFNMS’ need to be responsive to the ever changing impacts on the sanctuary’s marine resources from both natural perturbations and human activities; (4) an increased understanding of the complexity of the ecosystem, habitats and living marine resources; and (5) learning better ways to manage the resources through experience, experimentation, and the sharing of knowledge. Sanctuary staff, the sanctuary advisory council, the public, and GFNMS’ partners will, as appropriate, provide oversight and guidance for redirecting any management plan strategies. A summary of the estimated cost for each action plan is included in Table 1.

**Incremental Funding Scenarios**

Table 2 provides an outline of how the various strategies in the management plan will be implemented. The implementation of the strategies depends on various factors including:

1. Status of strategy implementation

2. Priority of strategy implementation
3. Coordination level necessary with partners for implementation, and
4. Funding source for strategy implementation

The status of the strategy indicates the amount of work completed or the level of implementation of a strategy at the time of the management plan review. Certain strategies and activities have been partially or wholly implemented prior to or during the management plan review. Other strategies are new as part of the updated management plan or may not be initiated until the future.

The priority of a strategy or action plan is indicated by the level of implementation based upon the funding or resources available. As stated previously, full implementation of the management plan exceeds the resources available to the GFNMS therefore requiring some prioritization of the action plan or strategies. As resources become available, a greater level of implementation is possible. Table 2 outlines how much implementation could occur with the existing amount of resources and how increases in resources would affect the amount of implementation possible for each strategy or action plan.

Implementation of most of the strategies in this management plan will require some input or coordination from partners, particularly other government agencies, research institutions and non-government organizations (NGOs). Table 2 outlines the level of involvement expected from partners to achieve full implementation of each strategy. Many action plans and strategies are completely dependent on involvement from other agencies or dependent on research conducted by a research institution.

Funding for implementation of many of the strategies will require a mix of internal National Marine Sanctuary Program (NMSP) funds as well as funding from external sources such as grants, the Farallones Marine Sanctuary Association (FMSA), or in-kind work from partner agencies. Table 2 highlights the probable source of funding as primarily internal or external or a mix of funding sources.

**Structure of the Action Plans  
GFNMS Management Plan**

*Table 1: Estimated Cost for Action Plans*

Action Plan	Estimated Annual Cost (1000's)*					Total Est. ,5-Year Cost (1000's)
	YR 1	YR 2	YR 3	YR 4	YR 5	
<b>Issue-Based Action Plans</b>						
<b>Water Quality</b>	\$10.5	\$230	\$210.7	\$210.9	\$205.3	\$867.40
<b>Wildlife Disturbance</b>	\$131.7	\$280.5	\$342	\$442	\$209	\$1405.20
<b>Introduced Species</b>	\$12	\$87	\$151.5	\$208.5	\$216	\$675
<b>Ecosystem Protection: Impacts from Fishing Activities</b>	\$679	\$354	\$361	\$321	\$375	\$2090
<b>Impacts from Vessel Spills</b>	\$145	\$218	\$191	\$219	\$185	\$958
<b>Program-Based Action Plans</b>						
<b>Education and Outreach</b>	\$1237	\$1029	\$1223	\$1,578	\$1,492	\$6559
<b>Conservation Science</b>	\$1703	\$1301	\$1374	\$1525	\$1507	\$7410
<b>Resource Protection</b>	\$268	\$2708	\$457	\$332	\$332	\$4097
<b>Administration</b>	\$549	\$4094	\$4394	\$4644	\$1894	\$15575
<b>Cross-Cutting Action Plans</b>						
<b>Administration and Operations</b>	\$288	\$276	\$264	\$264	\$264	\$1356
<b>Community Outreach</b>	\$144	\$180	\$180	\$180	\$216	\$900
<b>Ecosystem Monitoring</b>	\$381	\$525	\$567	\$531	\$471	\$2475
<b>Maritime Heritage</b>	\$237	\$237	\$246	\$270	\$270	\$1260
<b>Northern Management Area Transition Plan</b>	\$526	\$518	\$613	\$692.5	\$680	\$3,029.50
<b>Total Estimated Annual Cost</b>	\$6,311.2	\$12,037.5	\$10,574.2	\$11,417.9	\$8,316.3	\$48,657.10
The sanctuary's base budget is available each year from appropriated funds.						
There is both availability of and opportunity to receive additional funding from appropriated funds.						
The estimates do not take into account increasing personnel costs each year or inflation.						
The estimates do not take into account unexpected events or emergencies or unforeseen projects.						

Table 2: Incremental Funding Scenarios

		<b>Funding Scenarios and Implementation of Action Plan Strategies</b>					
		A Activity Status:	B Implementation Level Funding: Scenario 1	C 10% per year Increase: Scenario 2	D 20% per year Increase: Scenario 3	E Partnership Coordination	F Primary Funding Sources
<b>Issue Area Action Plans</b>							
Water Quality							
	WQ-1: Water Quality Monitoring Coordination	○	L	M	M	●	◐
	WQ-2: Harbor and Marina Water Quality	○	M	M	H	●	◐
	WQ-3: Land-based Discharges	○	L	M	M	●	◐
	WQ-4: ASBS Water Quality	○	M	M	H	●	◐
	WQ-5: Mussel Watch Monitoring Program	○	M	M	H	●	●
	WQ-6: Water Quality Working Group	○	M	H	H	●	○
	WQ-7: Water Quality Staff Support	○	M	H	H	○	○
	WQ-8: Water Quality Bibliography	○	M	H	H	◐	○
	WQ-9: Nonpoint Education for Municipal Officials (NEMO)	○	L	M	H	●	◐
Wildlife Disturbance							
	WD-1: Web-Based Database	○	M	M	H	◐	○
	WD-2: Volunteer Monitoring Programs	○	M	H	H	◐	○
	WD-3: Agency Monitoring Programs	○	M	H	H	●	◐
	WD-4: Interpretive Enforcement	○	M	M	H	●	◐
	WD-5: Wildlife Viewing Guidelines	◐	H	H	H	●	◐
	WD-6: Outreach and Media	◐	H	H	H	◐	◐
Introduced Species							
	IS-1: Introduced Species Database	○	H	H	H	●	●
	IS-2: Estuarine Detection and Monitoring	○	M	M	H	◐	◐
	IS-3: Intertidal Detection and Monitoring	○	M	M	H	◐	○
	IS-4: Pelagic Detection and Monitoring	●	H	H	H	●	●
	IS-5: Early Detection Outreach Program	○	L	M	M	◐	◐
	IS-6: Technical Advisory Council	○	L	M	M	●	◐
	IS-7: Rapid Response Plan	○	M	M	M	●	◐
	IS-8: Regulatory Actions	○	H	H	H	○	○
	IS-9: Outreach to Prevent Introductions	○	M	M	H	◐	◐
Ecosystem Protection: Impacts from Fishing Activities							
	FA-1: Resource Characterization	◐	M	H	H	◐	◐
	FA-2: Socioeconomic Profile of Fishing Activities	○	H	H	H	●	◐
	FA-3: Develop Compatibility Index	○	M	H	H	◐	○
	FA-4: Address Impacts from Fishing Activities	○	M	H	H	◐	◐
	FA-5: Develop Maritime Heritage Model	○	M	H	H	●	○
	FA-6: Sanctuary Representation At Fisheries Management Meetings	○	H	H	H	●	○
	FA-7: Krill Harvesting Ban	○	H	H	H	●	◐
	EP-1: Evaluate Marine Zoning	○	M	H	H	●	○
	EP-2: Living Resource and Habitat Protection Working Group	○	H	H	H	●	○

**Structure of the Action Plans  
GFNMS Management Plan**

		A	B	C	D	E	F
		Activity Status:	Implementation Level Funding: Scenario 1	10% per year Increase: Scenario 2	20% per year Increase: Scenario 3	Partnership Coordination	Primary Funding Sources
	EP-3: Estero Marine Reserves	○	M	H	H	●	○
	Impacts from Vessel Spills						
	VS-1: Expand Drift Analysis Model	◐	M	M	M	●	●
	VS-2: Refine Spill and Drift Model	◐	M	M	H	●	◐
	VS-3: Profile Vessel Activity	○	M	H	H	◐	○
	VS-4: Evaluate Vessel Routing Changes	◐	M	H	H	◐	●
	VS-5: Refine Resources At Risk Model	◐	H	H	H	●	◐
	VS-6: Participate in Regional Response Team	◐	H	H	H	●	◐
	VS-7: Revise Internal Emergency Response Plan	◐	H	H	H	○	○
	VS-8: Integrate Beach Watch Data Into Area's Contingency Plan	◐	M	H	H	◐	◐
	VS-9: Mariner Outreach	○	M	H	H	◐	◐
	VS-10: Maritime Trade Advisory Council Seat	○	M	M	M	◐	○
	VS-11: Sanctuary Representation At Vessel Traffic Forums	○	H	H	H	◐	◐
	VS-12: Vessel Spills Working Group	○	H	H	H	●	○

<b>Legend</b>			
Column A	Column B, C, D	Column E	Column F
<b>Strategy Status:</b> ● – Existing w/o significant modification ◐ – Existing w/ significant modification ○ – New (since '05) or future (not yet implemented)	<b>Implementation* (w/ NMSP Funding):</b> H - High M - Medium L - Low * Implementation ranking considers the priority of each strategy as well as the percentage of activities that could be initiated, maintained, and/or completed under differing funding scenarios.	<b>Necessary Partnership Coordination:</b> ● - Not possible w/o partners ◐ - Significant reliance on partners ○ - Little reliance on partners	<b>Primary Funding Sources (e.g., grants, Foundation):</b> ● - External (e.g., grants) ◐ - Internal/ External ○ - Internal



## **ISSUE-BASED ACTION PLANS**

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# **GFNMS MANAGEMENT PLAN**

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- I. Water Quality**
- II. Wildlife Disturbance**
- III. Introduced Species**
- IV. Ecosystem Protection: Impacts from Fishing Activities**
- V. Impacts from Vessel Spills**





SITE-SPECIFIC ISSUE  
WATER QUALITY  
**ACTION PLAN**

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## **ISSUE STATEMENT**

Water quality within Gulf of the Farallones National Marine Sanctuary (GFNMS) is generally good due to the rural nature of the coastline and strong currents of the open ocean. Nevertheless, depending on coastal currents, the 8 million people living in the Bay Area and the discharge of the San Francisco Bay Estuary (including agricultural wastes from the Central Valley and residual sediments and metals from historic mining), periodically impact the sanctuary. The coastal waters of the sanctuary, particularly the estuarine habitats of Bolinas Lagoon, Tomales Bay, Estero Americano, and Estero de San Antonio, are vulnerable to land-based nonpoint source pollution. Sources of concern include runoff, agriculture, marinas and boating activities, mining, and aging and undersized septic systems. Other potential threats to water quality include activities such as diversion of fresh water, spills, dumping, land use changes, and pollutants such as floating debris (e.g., plastics), pathogens, emerging pollutants (e.g., endocrine disrupters), and residual materials such as radioactive waste and chemical contaminants including bioaccumulative legacy pollutants (e.g., DDT, PCBs).

## **ISSUE DESCRIPTION**

### **Impacts on Estuarine Environments**

As with much of California and the nation, the sanctuary is threatened by nonpoint source pollution. Given the rural nature of the sanctuary's coastline, the greatest current threat is not from urban development, but from livestock grazing, agricultural activities, mining activities, and aging and undersized septic systems. Of special concern are the estuarine habitats of Bolinas Lagoon, Tomales Bay, Estero Americano, and Estero de San Antonio where circulation is more restricted than on the open coast and where organisms that rely on estuarine conditions are exposed to the relatively undiluted effects of polluted runoff. Due to restricted circulation, the estuarine environment is especially threatened by accidental spills from ships, land-based tanks or other sources, as well as by poorly regulated small-scale discharges such as oily bilge water, detergents from deck wash, runoff from shipyards, or sewage from boats, septic systems, or leaking sewers. Residual pollutants from past practices such as mining operations and diversion of freshwater have the greatest potential impact in restricted waterways such as estuaries and creeks. Several of these sources of impact have occurred in Tomales Bay, which has been identified by the State Water Resources Control Board as not in compliance with state water quality standards for mercury (from an abandoned mine), pathogens, sediment, and nutrients.

### **Impacts on Open Coastal Environments**

The open coastal environments of the sanctuary are also threatened by nonpoint source pollution, but the threat is generally considered to be less (than for estuaries) due to the greater distance from most sources (mines, residential runoff, storm water runoff, septic systems, high density grazing) and greater water circulation. Nevertheless, the areas near the mouths of creeks or estuaries can be subject to impacts from nonpoint source pollution.

### **Impacts on Offshore Environments**

The greatest protection for the offshore waters of the sanctuary was the designation of the sanctuary itself. The size of the sanctuary and the restrictions placed on its use provide additional oversight and protections to offshore waters. The offshore areas of the sanctuary are somewhat unaffected by threats to water quality by their distance from the sources of pollutants and land-based runoff, as well as the continuous circulation of the offshore waters at many scales. Nevertheless, water quality in the offshore regions could be threatened or impacted by large or continuous discharges from the shore, spills by vessels, illegal dumping activities, or residual contaminants from past dumping activities. Discharges from sunken vessels and illegal discharges from oil tankers and cargo vessels have been a periodic source of negative impacts to marine organisms within the sanctuary. The threat of an offshore spill is a constant presence in areas near well-used shipping lanes. In the event of an oil spill, the impact to the open coast would mainly be determined by the wind and sea conditions, which could easily overcome protection efforts.

Persistent organic pollutants such as DDT and PCBs were widely used nationwide before the mid-1970s, and residuals of these chemicals still remain in sediments and organisms within the sanctuary. Elevated levels of pollutants have been reported for fish, seabirds, and marine mammals found within the sanctuary. The sanctuary should evaluate these reports to determine if they warrant recommendations for additional water quality protection efforts. Additionally, there are emerging pollutants whose effects should also be considered. Threats and strategies related to oil pollution are addressed under the issue-based action plan for Impacts from Vessel Spills and the program-based action plan for Conservation Science.

### **Impacts From the San Francisco Bay Area**

To the east of the sanctuary there are treated wastewater discharges from the City of San Francisco and outflow from the San Francisco Bay, potentially transporting pollution from the 8 million people living in the Bay Area. These include sewage outfalls, sewage overflows, agricultural waste products from the Central Valley, and residual sediments and metals from historical mining. The bay has been identified by the State Water Resources Control Board as not in compliance with state water quality standards for several pesticides, metals, PCBs, and exotic species. The potential for the outflow from the bay to degrade sanctuary water quality needs to be evaluated.

## **Impacts From Floating Debris (e.g., Plastics)**

Marine debris that threatens sanctuary resources may come from the San Francisco Bay outflow and local watersheds that drain into the sanctuary or from across the Pacific Ocean. The impact of plastic debris is a world-wide problem due to the many potential sources of debris, longevity of plastic in the marine environment, and impacts caused by plastics even as they degrade to smaller and smaller particles. Plastic particles may be ingested by marine organisms that select food by sight, filter feeders, or animals that live in the open water who mistake plastic for food. Plastic debris has also been shown to entangle marine wildlife. The sanctuary should evaluate the potential local efforts that could be taken to reduce the impacts of marine debris on sanctuary wildlife.

## **JURISDICTIONAL SETTING**

### **Water Quality Standards**

The federal Water Pollution Control Act (U.S. Clean Water Act) and California's Porter-Cologne Water Quality Control Act require the adoption of water quality control plans for the state's waters. Water quality control plans contain, among other things, the water quality standards for a particular water body. Standards are composed of two parts: beneficial uses and water quality objectives.

Four water quality control plans are primarily applicable to GFNMS. These are: (1) the California Ocean Plan; (2) the Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays and Estuaries of California (California Thermal Plan); (3) the Basin Plan for the North Coast Regional Water Quality Control Board (Region 1); and (4) the Basin Plan for the San Francisco Bay Regional Water Quality Control Board (Region 2). The Ocean Plan is applicable to nearshore ocean waters, but does not cover enclosed bays and estuaries. The Thermal Plan covers waste heat (e.g., from power plants) into all of the state's coastal waters. The Regional Board Basin Plans are applicable to freshwater bodies (e.g., streams and rivers) as well as enclosed bays and estuaries.

In addition, the state has a Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California (State Implementation Policy). The State Implementation Policy includes the measures by which California implements the U.S. Environmental Protection Agency's (EPA) California Toxics Rule. The California Toxics Rule establishes water quality criteria for priority toxic pollutants.

The State Water Resources Control Board adopts the statewide water quality control plans and policies, such as the Ocean Plan, the Thermal Plan, and the State Implementation Policy. The regional boards adopt and submit basin plans to the state board for approval. Title III, Section 303 of the U.S. Clean Water Act (CWA) requires California to submit statewide and basin plans to the EPA for approval.

California's waters extend three miles seaward from the coastline (including the coasts of its islands). These are considered nearshore waters. Ocean waters beyond three miles are regulated directly by the EPA, in consultation with the state and regional boards. Beyond three

miles from the mainland or the islands, EPA's water quality standards (for the receiving waters) and effluent limitations are applicable.

### **Areas of Special Biological Significance**

On March 21, 1974, the State Water Resources Control Board decided that, "The list of Areas of Special Biological Significance (ASBS) will be used to identify for planning purposes, those areas where the regional water quality control boards will prohibit waste discharges..." Thirty-one ASBSs were designated at that time. Two more ASBSs were designated later, one in 1974 and another in 1975. There are currently a total of 34 ASBSs, five of which are within the GFNMS. These are at Duxbury Reef, Point Reyes Headland, Double Point, Bird Rock, and the Farallon Islands.

Under the Marine Managed Areas Improvement Act's new classification system, codified in the Public Resources Code, an ASBS is a marine or estuarine area that is designed to protect marine species or biological communities from an undesirable alteration in natural water quality. The State Water Resources Control Board is responsible for designating these areas. In an ASBS, point source waste and thermal discharges are prohibited or limited by special conditions. Nonpoint source pollution is controlled to the extent practicable. No other use is restricted by the State in these areas.

The Ocean Plan prohibits the discharge of wastes to an ASBS. Discharges must be located a sufficient distance from an ASBS to ensure maintenance of natural water quality. Limited-term maintenance, repair and replacement activities (e.g., on boat facilities, sea walls, storm water pipes, and bridges) resulting in waste discharges in an ASBS may be approved by a Regional Water Quality Control Board. Such discharges are allowable only if they result in temporary and short-term changes in existing water quality, and do not permanently degrade water quality. All practical means must be implemented in order to minimize water quality degradation. The Ocean Plan does not regulate the discharge of vessel wastes, dredging, or the disposal of dredge spoil.

The Thermal Plan requires existing discharges of elevated temperature wastes to comply with limitations necessary to ensure protection of ASBSs. New discharges of elevated temperature wastes must be discharged a sufficient distance from an ASBS to ensure the maintenance of natural temperature in these areas. Additional limitations may be imposed in individual cases if necessary for the protection of ASBSs.

The state board is currently contracting with the Southern California Coastal Water Research Project and Moss Landing Marine Labs (MLML) to perform a survey of discharges into all of the ASBSs. The final results, in Geographic Information Systems (GIS) (ArcView) format, were released during the fall of 2003.

### **Pollution Sources**

Generally, sources of water pollution are divided into two different categories: point source and nonpoint source. Point sources of pollution are those that have a fixed discharge point. For example, sewage treatment plants (also called publicly owned treatment works) or industrial

facilities (such as power plants or oil refineries) are considered point sources. The EPA definition is as follows:

POINT SOURCE POLLUTION is any discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, or concentrated animal feeding operation from which pollutants are or may be discharged. This term does not include agricultural storm water discharges and return flows from irrigated agriculture.

NONPOINT SOURCE POLLUTION is simply any source of water pollution that is not point source pollution. Nonpoint source pollution results from, but is not limited to, land runoff, precipitation, atmospheric deposition, drainage, seepage, or hydrologic modification. Nonpoint sources of pollution are those that do not have a distinct pipe or other conveyance through which pollutants are discharged. Instead, the pollutants enter water over a large and diffuse area. Examples of nonpoint source pollution include, but are not limited to, air pollution fallout, timber harvesting, agriculture, grazing and small scale animal husbandry, boating and marinas, urban runoff, and hydro modification of streams and wetlands.

One commonly misunderstood category is urban stormwater runoff. Urban runoff has many of the same origins and problems as nonpoint source pollution. Together, nonpoint source pollution and urban runoff are the leading sources of pollution into California's waters. Originally, all urban runoff was considered a form of nonpoint source pollution. However, since 1987 the EPA and the State Water Resources Control Board have considered urban runoff collected in stormwater systems to be point sources of pollution. Urban stormwater systems, while collecting runoff over large and diffuse areas, do eventually drain through pipes or other distinct conveyances into natural water bodies. Hence, urban runoff is regulated as point source pollution.

### **Permits**

Parties identified with point sources of water pollution into surface waters (ocean, bays, streams, and lakes) are required to obtain a National Pollutant Discharge Elimination System (NPDES) permit. In California, the NPDES permits issued by the state and regional boards also double as Waste Discharge Requirements (WDRs). WDRs are required under Porter-Cologne for any discharges into surface or ground waters. Only activities that discharge in groundwater are issued WDRs, since the federal CWA (and therefore NPDES permits) only applies to surface waters. Under federal regulations, nonpoint source discharge into surface waters are also not issued NPDES permits. In California, regional boards may issue WDRs to nonpoint source dischargers. Alternatively, regional boards may allow certain nonpoint source dischargers to operate under conditional waivers.

Metropolitan areas in California having populations in excess of 100,000 people have been issued Phase I stormwater NPDES permits. San Francisco, the largest point source discharger near the GFNMS, is an unusual situation compared to other large California cities in that it has a combined storm sewer system, which handles both stormwater and sewage waste streams.

A draft Phase II general stormwater NPDES permit has been proposed to cover certain designated smaller municipalities in California serving populations of fewer than 100,000

people. Discharge to sensitive water bodies (e.g., ASBSs) is one of the factors to consider when evaluating a municipality's designation status. There are other stormwater permits in the state as well. The California Department of Transportation (CalTrans) currently operates under a statewide permit covering both municipal and construction related storm water discharges. Statewide general permits also are currently in effect for industrial and construction related storm water discharges.

### **Water Quality Impairments**

Section 303(d) of the CWA requires the states to submit to the EPA a list of water bodies that do not meet water quality standards for specific pollutants (i.e., are "impaired"). The 1998 list was approved by both the state board and the EPA. On February 4, 2003, the state board approved the most recent 303(d) list with some modifications. In the vicinity of the GFNMS, the following areas were identified:

- Estero Americano for nutrients and sediment (Americano Creek is a listed tributary). Summary of sources listed: pasture and range grazing (upland and riparian), intensive animal feeding operations, manure lagoons, dairies, hydro modification, removal of riparian vegetation, stream bank modification, erosion/siltation, and other nonpoint source.
- Estero de San Antonio for nutrients and sediment (Stemple Creek is a listed tributary). Summary of sources listed: agriculture and related storm runoff, irrigated crops, land development, pasture and range grazing (upland and riparian), intensive animal feeding operations, confined animal feeding operations (point source), manure lagoons, dairies, hydro modification, channelization, wetland drainage/fill removal of riparian vegetation, stream bank modification, erosion/siltation, natural sources, and other nonpoint source.
- Tomales Bay for pathogens, nutrients, mercury, and sediment (Walker and Lagunitas Creeks are listed tributaries). Summary of sources listed: agriculture, surface mining and mine tailings, intensive animal feeding operations, septage disposal, upstream impoundment, and urban runoff/storm sewers.
- Central San Francisco Bay for chlordane, DDT, diazinon, dieldrin, dioxin, furan compounds, mercury, PCBs, selenium, and exotic species. Summary of sources listed: industrial and municipal point sources, atmospheric deposition, resource extraction, agriculture, other nonpoint sources, natural sources, and ballast water. Other portions of San Francisco Bay and many tributaries to the bay are also listed, but were not described here for brevity.

### **Total Maximum Daily Loads**

Under the CWA, total maximum daily loads (TMDLs) are required to be developed for 303(d) listed water bodies. The purpose of a TMDL is to bring a water body back into compliance with the water quality objective for which it was listed. The development of a TMDL involves the identification of the various sources contributing to the water quality standard exceedance, including both point and nonpoint sources. The TMDL must also take into account the natural background level and a margin of safety. Once a TMDL is developed, it must be approved and included in the Basin Plan. Implementation of the TMDLs will, by necessity, include public

involvement and education, since many of our pollution problems are related to nonpoint sources and urban stormwater runoff. <sup>1</sup>

### **The Coastal Zone Management Act**

The Coastal Zone Management Act (CZMA) of 1972 established the authority for a federal-state partnership to manage development and use of the coastal zone. Under CZMA, the National Oceanic and Atmospheric Administration (NOAA) provides federal funding for the development and implementation of state coastal zone management programs. The CCC has been charged with developing and implementing a state coastal plan in accordance with CZMA. The commission also has the authority to review federal activities in the coastal zone to ensure consistency with California's coastal zone management program.

Through the Coastal Zone Authorization Amendments of 1990 (CZARA), the Coastal Nonpoint Pollution Control Program was established to address the control of nonpoint source pollution. The State Water Resources Control Board (SWRCB) and the CCC have submitted to the EPA and NOAA a Nonpoint Source Pollution Control Program Plan in accordance with CZARA Section 6217 requirements. The plan provides an outline for nonpoint source pollution management measures to be implemented over the next 15 years.<sup>2</sup>

The CCC addresses water quality issues through additional programs including:

- 1) Water Quality Unit, which provides technical assistance to district offices and statewide nonpoint source pollution coordination
- 2) Local Coastal Programs
- 3) Interagency Coordination Committee
- 4) Critical Coastal Areas
- 5) Model Urban Runoff Program
- 6) Contaminated Sediments Task Force
- 7) Snapshot Day
- 8) First Flush

### **Ocean Dumping Act**

Title I of the Marine Protection, Research, and Sanctuaries Act (Ocean Dumping Act), prohibits the unpermitted dumping of "any material transported from a location outside the United States" into the territorial sea of the United States, or into the zone contiguous to the territorial sea, to the

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<sup>1</sup> Gregorio, D.E., State Water Resources Board. February 5, 2003; *A Water Quality Primer for Gulf of the Farallones National Marine Sanctuary Water Quality Working Group* (unpublished)

extent discharge into the contiguous zone would affect the territorial sea or the territory of the United States. The act is administered by the EPA and is on top of any CWA requirements.

### **Sanctuary Regulations**

The sanctuary site-specific regulations affecting water quality in the GFNMS were under revision as a part of the management plan review. The draft regulations were available for review as a part of the draft management plan/environmental impact statement. The final regulations are included in the final management plan and final environmental impact statement (FMP/FEIS).

## **WATER QUALITY GOAL**

1. Engage in corrective and proactive measures to protect and enhance water quality in the estuarine, nearshore, and offshore environments of the sanctuary.

## **WATER QUALITY OBJECTIVES**

1. Develop a regionally based, cooperative water quality protection plan to address past, present and future point and non-point source water quality impacts.
2. Emphasize a watershed/ecosystem approach and address the range of water quality threats from chronic land-based runoff to catastrophic offshore events.

## **WATER QUALITY ACTION PLANS**

### **IMPACTS ON ESTUARINE AND NEARSHORE ENVIRONMENTS**

**STRATEGY WQ-1:** *Develop an umbrella program to coordinate partnerships in implementing a comprehensive and integrated water quality monitoring program in order to track impacts on the estuarine and nearshore environment.*

**Activity 1.1** Throughout the Marin and Sonoma county watersheds adjacent to the sanctuary, and in the estuarine and nearshore environments within the sanctuary, are a multitude of volunteer and expert-based water quality monitoring programs. Through better coordination, both efficiency and effectiveness could be improved, and monitoring needs and data gaps identified and filled. Steps to be taken include:

- A. Inventory and evaluate existing volunteer and expert-based monitoring programs, including data collected, sampling duration and frequency, analyses performed, ability to detect change over time.
- B. Identify sanctuary water quality monitoring data needs; evaluate against inventoried monitoring programs; and identify data gaps specific to sanctuary management needs.
- C. Develop strategy to fill data gaps, including partners and funding sources.

- D. Coordinate with agencies and water quality monitoring entities to: identify funding opportunities and potential collaborative partnerships; reduce sampling and analysis duplication; ensure quality assurance/quality control; and provide platform for data sharing.
- E. Use data to make informed management decisions specific to sanctuary issues and concerns.
- F. Extend Tomales Bay water quality monitoring program to other estuarine areas not fully monitored, including Bolinas Lagoon, Estero Americano and Estero de San Antonio.
- G. Establish a forum for bringing together representatives of volunteer water quality monitoring programs in and adjacent to sanctuary watersheds, estuarine, and nearshore environments, to promote continued coordination and maximize program potential.

**Potential Partners:** Tomales Bay Watershed Council, National Park Service (NPS), Beach Watch, State Health Dept. Harmful Algal Bloom (HAB) Program, Snapshot Day, First Flush

**Products:** Inventory (database) of existing monitoring programs; GIS-based database

**Complementary Strategies:** GFNMS FMP, Water Quality, STRATEGY WQ-2, STRATEGY WQ-3, STRATEGY WQ-4, STRATEGY WQ-5, STRATEGY WQ-6, STRATEGY WQ-7, STRATEGY WQ-8, STRATEGY WQ-9; Introduced Species, STRATEGY IS-2;

**STRATEGY WQ-2:** *Address sources of anthropogenic pathogens and pollutants on estuarine and nearshore environments from recreational and commercial boating activities and marinas.*

**Activity 2.1** Impacts from discharges such as oily bilge water, detergents from deck wash, runoff from shipyards and marinas, and sewage from boats are impacting Tomales Bay and Bodega Bay. The state is currently evaluating the need for sewage pumpout stations; the sanctuary will:

- A. Track the state's effort to survey and evaluate the need for a sewage waste and oily bilge pumpout station on Tomales, Bodega and San Francisco Bays.
- B. Become a cooperating partner with the state and make recommendations, as appropriate, on: where to locate pumpout stations; education and outreach efforts; tracking compliance; and maintenance of facilities.

**Potential Partners:** Marin Used Oil Program, Bodega Harbor District, California Department of Boating and Waterways (CDBW), State Water Resources Control Board (SWRCB), Dock Walkers, Integrated Waste Management Program, Point Reyes National Seashore (PRNS), California State

Parks (CSP), California Coastal Commission (CCC), Farallones Marine Sanctuary Association

**Complementary Strategies:** GFNMS FMP, Water Quality, STRATEGY WQ-3, Resource Protection, STRATEGY RP-12; Conservation Science, STRATEGY CS-1, CS-4, CS-5, CS-6; Ecosystem Monitoring, XEM-1, XEM-2, XEM-3; Northern Management Area Transition Action Plan, XNRM-1, XNRM-2, XNRM-4, XNRM-5

**Activity 2.2** Develop a combined outreach program on best management practices (BMPs) and interpretive enforcement for recreational and commercial user groups in and around Tomales and Bodega Bays (e.g., campers, kayakers, moored vessels and live-aboards) by taking the following steps:

- A. Inventory and evaluate existing BMPs and interpretive enforcement programs such as Dock Walkers.
- B. Develop partnerships with state agencies that participate in clean boating programs, such as Boating and Waterways, to develop and implement a BMP/interpretive enforcement outreach program.

**Potential Partners:** SWRCB, Regional Water Quality Control Boards (RWQCB) 1 and 2, harbor masters, Boating and Waterways, California Coastal Commission, Integrated Waste Management Board, kayak vendors

**Products:** Kiosk, printed outreach materials, workshops

**Complementary Strategies:** GFNMS FMP, Water Quality, STRATEGY WQ-1, STRATEGY WQ-3; Vessel Spills, STRATEGY VS-3; Education, STRATEGY ED-7; Monterey Bay National Marine Sanctuary (MBNMS) Water Quality, STRATEGY WQPP-1, STRATEGY WQPP-2; MBNMS FMP, Water Quality, STRATEGY WQPP-13, STRATEGY WQPP-15, STRATEGY WQPP-16, STRATEGY WQPP-17

**STRATEGY WQ-3:** *Coordinate with other agencies to address land-based discharges into the estuarine and nearshore areas of the sanctuary including Areas of Special Biological Significance (ASBS) and Critical Coastal Areas.*

**Activity 3.1** Land-based discharges from stormwater, aging and undersized septic systems, agricultural runoff, livestock grazing, mining and freshwater diversion are impacting the sanctuary's estuarine and nearshore environments. The sanctuary will take the following steps to understand and address impacts from pathogens, sediments, nutrients, residual pollutants, and other contaminants such as pharmaceutical waste, micropollutants and pesticides:

- A. Participate in the Interagency Coordinating Committee (IACC), chaired by the SWRCB, and implement management measures on state's nonpoint source pollution plan.

- B. Identify, cooperate, and exchange information with agencies and authorities that pertain to land-based discharges and impacts on water quality.
- C. Assess levels of land-based discharges and impacts on sanctuary resources.
- D. Identify water quality enforcement issues that are not being addressed adequately or appropriately and communicate to appropriate agencies.

**Potential Partners:** Regional Water Quality Boards 1 and 2, Marin County Storm Water Pollution Prevention Program, Sonoma County, Environmental Health Dept., UC Cooperative Extension, Bolinas Lagoon Technical Advisory Committee, Bolinas Bay Watershed Council, Tomales Bay Watershed Council, CCC, SWRCB, County Agriculture Commissioner

**Products:** Memorandums of Agreement

**Complementary Strategies:** GFNMS FMP, Water Quality, STRATEGY WQ-4, STRATEGY WQ-6, STRATEGY WQ-7

**Activity 3.2** There are known industries and specific areas that have been identified as having detrimental impacts on sanctuary water quality. Problematic areas should be addressed and industries that discharge into the watersheds in and adjacent to GFNMS (e.g., dairies, agriculture, marinas, mining facilities), should be encouraged through letters and awards of recognition to employ best management practices [BMPs]). Steps to be taken:

- A. Inventory and become familiar with existing BMPs including: SWRCB Non-Point Source Plan, RWQCB's specific BMPs for selected areas, and UC Davis BMPs for dairies.
- B. Profile all activities, users, and areas that may be impacting water quality in estuarine and nearshore environments and establish criteria for compatibility with the sanctuary's primary purpose of ecosystem protection. Use criteria to evaluate those to be awarded and those areas where additional effort is needed.
- C. Coordinate with agencies and entities that have developed BMPs on the implementation and evaluation of effective management practices. Collaborate with agencies and entities on evaluating and rewarding for successful integration of BMPs in industries potentially impacting sanctuary waters.

**Potential Partners:** Sonoma County, Marin County, RWQCB, SWRCB, Tomales Bay Watershed Council, Students and Teachers Restoring a Watershed (STRAW), Aroin County Stormwater Pollution Prevention Program (MCSTOPP), UC Cooperative Extension (UCCE)

**Products:** BMPs, criteria for evaluating BMPs, awards, letters of recognition, fliers, press releases, website on BMPs and recognition of award recipients

**Complementary Strategies:** GFNMS FMP, Water Quality, STRATEGY WQ-7; Education, STRATEGY ED-7, STRATEGY ED-11; MBNMS FMP, Water

Quality, STRATEGY WQPP-1, STRATEGY WQPP-18, STRATEGY WQPP-19, STRATEGY WQPP-20

**Activity 3.3** There are specific developed and developing areas, such as Bolinas Lagoon and Dillon Beach, where land-use activity is increasing. These activities are creating additional pressure in the watersheds adjacent to the sanctuary, potentially impacting the estuarine and nearshore environments within the sanctuary. Steps to be taken to address impacts from land development and encourage the use of BMPs during the planning, development and alteration of upland areas include:

- A. Identify and map specific upland areas adjacent to the sanctuary where development activities are taking place.
- B. Coordinate with agencies and entities that have developed BMPs on the implementation of effective management practices for land-use development. Collaborate with agencies and entities on evaluating and rewarding for successful integration of BMPs in land development adjacent to the sanctuary.
- C. Continue to track and evaluate development activities in watersheds adjacent to the sanctuary.

**Potential Partners:** Sonoma County, Marin County, RWQCB, SWRCB, PRNS, Tomales Bay Watershed Council, STRAW, MCSTOPP, UCCE, Army Corps of Engineers, Bolinas Lagoon Technical Advisory Committee

**Products:** BMPs, criteria for evaluating BMPs, awards, letters of recognition, fliers, press releases, website on BMPs and recognition of award recipients

**Complementary Strategies:** GFNMS FMP, Water Quality, STRATEGY WQ-7; Education, STRATEGY ED-11; MBNMS FMP, Water Quality, STRATEGY WQPP-1, STRATEGY WQPP-18, STRATEGY WQPP-19, STRATEGY WQPP-20

**STRATEGY WQ-4:** *Evaluate Areas of Special Biological Significance (ASBS) and make a determination whether to implement a vessel discharge prohibition within these areas of concern.*

**Activity 4.1** Develop a process to make a determination on the need for a prohibition on vessel discharge in ASBSs within the sanctuary to protect sanctuary wildlife and habitat. ASBSs are areas designated by the SWRCB to protect marine species or biological communities from an undesirable alteration in natural water quality. The five ASBSs in GFNMS are located adjacent to Duxbury Reef, Point Reyes Headlands, Double Point, Bird Rock, and the Farallon Islands. Within ASBSs, point source waste and thermal discharges are prohibited or limited by special conditions and nonpoint source pollution is controlled to the extent practicable. Discharges of vessel wastes are not currently restricted.

- A. GFNMS, in conjunction with the state and Regional Water Quality Control Boards, will initiate a process to evaluate the impacts to ASBSs from vessel discharges and determine whether a prohibition is needed.

**Potential Partners:** RWQCB, SWRCB

**Complementary Strategies:** GFNMS FMP, Water Quality, STRATEGY WQ-3

## **IMPACTS ON OPEN OCEAN COASTAL ENVIRONMENT**

**STRATEGY WQ-5:** *Ensure the continuation of the long-term data collection efforts under the Mussel Watch program.*

**Activity 5.1** The Mussel Watch program represents one of the longest term national efforts to track the impacts from nonpoint source pollution on bioaccumulation in the marine environment. Originally spearheaded by NOAA, the state adopted the program and has been a major source of support, although the program has been eroded in recent years by funding cutbacks. Mussel Watch has supplied critical data on the health of coastal, bay, and estuarine waters of the state. The sanctuary should seek to continue this program by taking the following step:

- A. The standing water quality working group of the sanctuary advisory council should work together with the state to investigate reliable, long-term funding mechanisms to help perpetuate the state's Mussel Watch sampling stations within GFNMS.

**Potential Partners:** California Department of Fish and Game (CDFG), RWQCB, SWRCB

**Complementary Strategies:** GFNMS FMP, Water Quality, STRATEGY WQ-1, STRATEGY WQ-6

## **ADDITIONAL AREAS TO BE ADDRESSED**

**STRATEGY WQ-6:** *Develop a standing water quality working group of the sanctuary advisory council, supported by sanctuary staff.*

**Activity 6.1** Create a working group of experts representing other agencies and institutions that can advise the advisory council on the development and implementation of a comprehensive and cooperative water quality protection plan. The working group will also provide advice on current, new, and emerging water quality issues. Objectives for the working group include:

- A. Develop specific water quality action plans for issues including: agriculture, urban areas, boating and marinas, marine debris, offshore impacts (radioactive materials, shipping, etc.), mining facilities and mariculture.
- B. Provide ongoing advice to the sanctuary advisory council for the sanctuary water quality program on current research, management techniques, and issues.
- C. Provide water quality expertise to the GFNMS research working group.
- D. Work with the state and counties on such issues as aging septic systems, discharge from live-aboards, urban runoff, moored vessels, total maximum daily loads (TMDLs), Critical Coastal Areas, agricultural runoff, and freshwater diversion.

**Potential Partners:** National Marine Fisheries Service (NMFS), SWRCB, RWQCB (1 and 2), City and County of San Francisco, Marin County, Sonoma County, San Mateo County, PRNS, United States Coast Guard (USCG), Tomales Bay Watershed Council, non-government organizations (NGOs), EPA, CCC, Office of Oil Spill Prevention and Response (OSPR), National Park Service (NPS), state Parks, county parks, Cordell Bank National Marine Sanctuary (CBNMS), MBNMS

**Complementary Strategies:** GFNMS FMP, Water Quality, STRATEGY WQ-1, STRATEGY WQ-3, STRATEGY WQ-4, STRATEGY WQ-7, STRATEGY WQ-9; Ecosystem Monitoring, STRATEGY XEM-4; Northern Management Area Transition Action Plan XNRM-2

**STRATEGY WQ-7:** *Develop administrative capacity to support a comprehensive and coordinated water quality protection plan.*

**Activity 7.1** Hire a full-time water quality specialist/coordinator.

**Activity 7.2** Create a water quality seat on the GFNMS Sanctuary Advisory Council.

**Complementary Strategies:** All Water Quality Strategies

**STRATEGY WQ-8:** *Develop an annotated bibliography of water quality research and monitoring programs in and adjacent to the sanctuary to evaluate data and determine the overall water quality of the sanctuary's ecosystem.*

**Activity 8.1** Inventory all short- and long-term water quality research and monitoring programs to determine status, data gaps, and sanctuary needs. Monitoring is used to determine where water quality is threatened, and also to determine compliance with state and federal law from the CWA to the Porter-Cologne Water Quality Control Act.

- A. Evaluate GFNMS' current monitoring programs that have a water quality component and recommend appropriate changes in order to better address water quality data needs.
- B. Integrate the inventory of water quality research and monitoring programs into a Web-based database or SIMoN.
- C. Assess data needs and make recommendations to other agencies and institutions on data collection gaps.

**Potential Partners:** Tomales Bay Watershed Council, PRNS, RWQCB, SWRCB, UCCE, California Department of Fish and Game (CDFG), Marin Rural Development Council (MRDC), Surfrider, National Oceanographic Data Center (NODC), National Marine Sanctuary Program (NMSP), Coastal Services Center (CSC)

**Products:** Comprehensive annotated bibliography

**Complementary Strategies:** GFNMS FMP, Water Quality, STRATEGY WQ-1, STRATEGY WQ-5; Conservation Science STRATEGY CS-6; Northern Management Area Transition Action Plan STRATEGY XNRM-1, XNRM-2

**STRATEGY WQ-9:** *Educate local decision makers on land-based water quality impacts in the sanctuary.*

**Activity 9.1** GFNMS will partner with the CCC and other agencies and institutions on Nonpoint Education for Municipal Officials (NEMO) to inform decision makers on the link between development/growth and water quality.

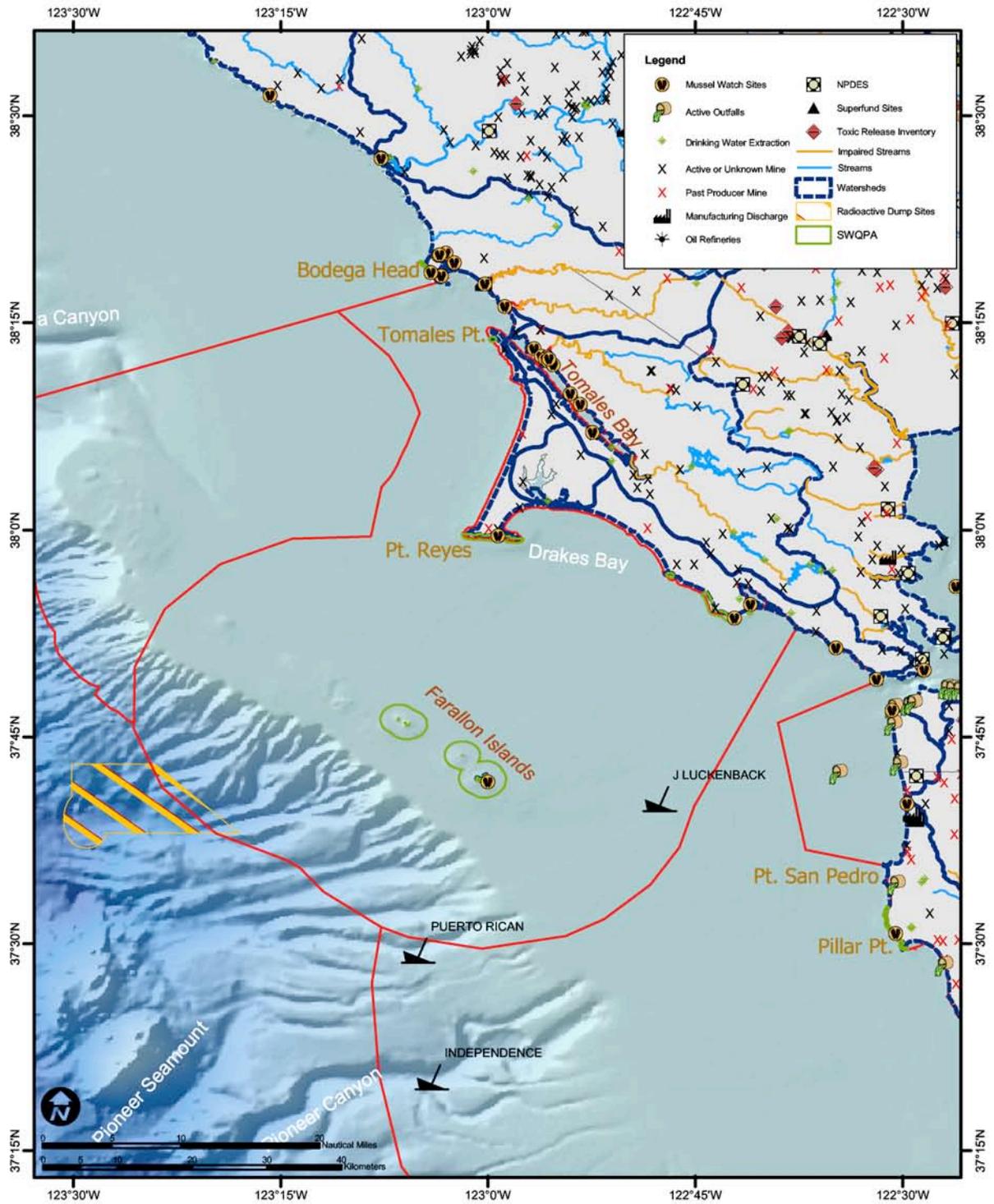
- A. Educate elected officials about the link between land use planning and the health of watersheds and coastal waters. Provide up-to-date and accurate information about specific issues and facts that pertain to water quality in the sanctuary.
- B. In areas where development is being planned, facilitate watershed planning and review of local regulations to promote better water quality and watershed protection.

**Potential Partners:** CCC, UC Sea Grant, Marin Resource Conservation District, PRNS, SF Bay Conservation and Development Commission

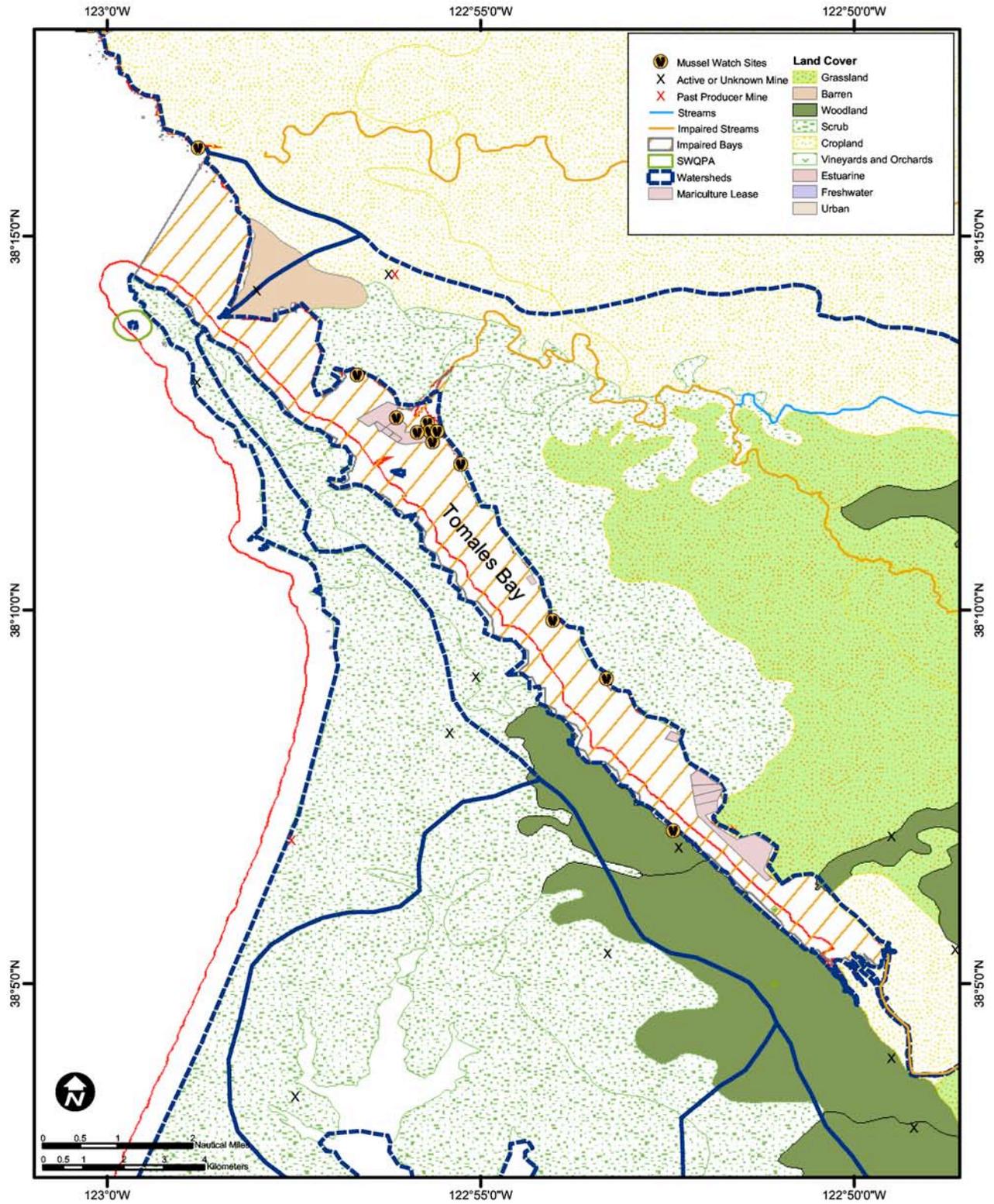
**Complementary Strategies:** GFNMS FMP, Water Quality, STRATEGY WQ-3, STRATEGY WQ-6



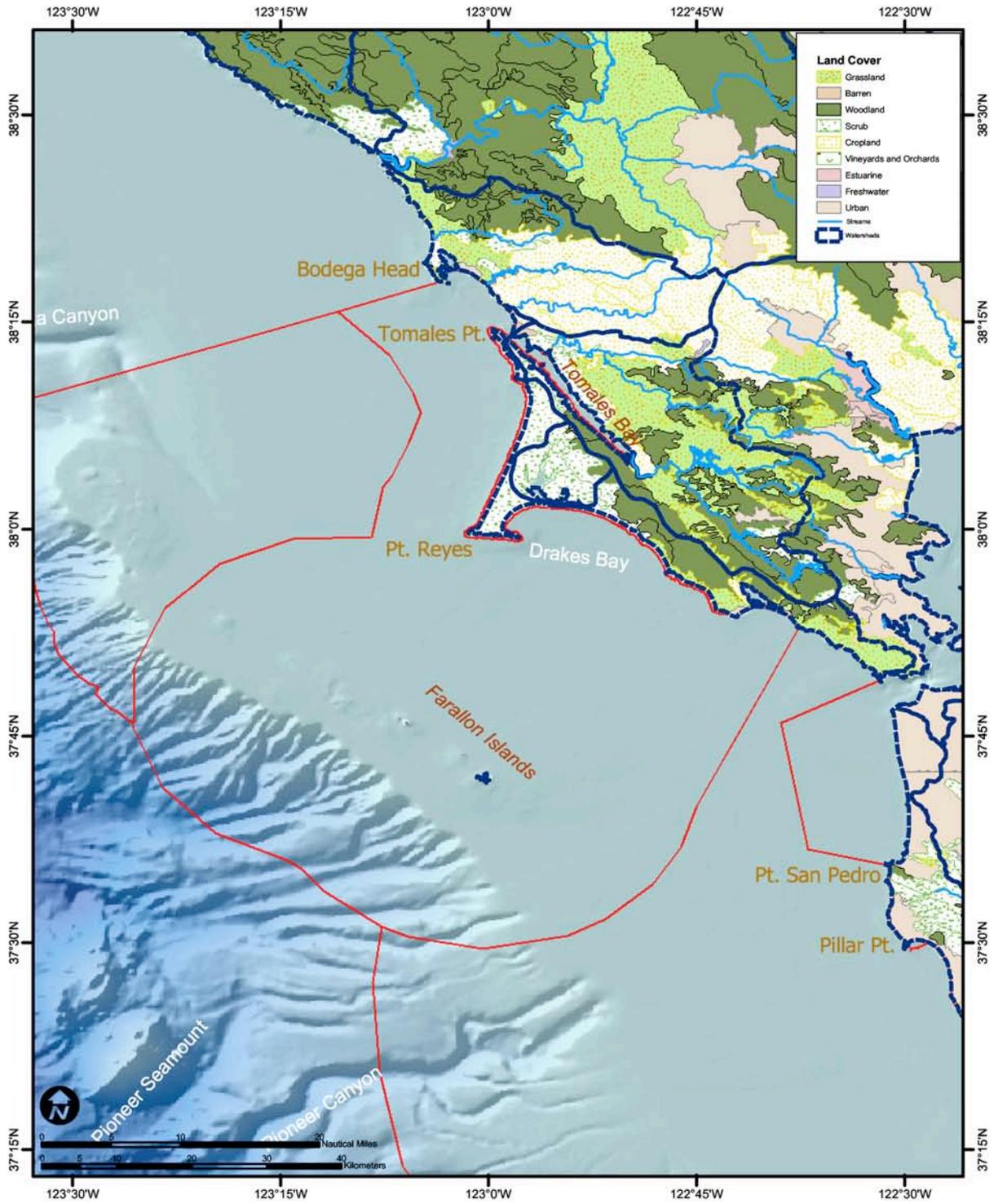
# Water Quality Map



## Tomales Bay Water Quality and Mariculture Map



# Land Cover Map



**Water Quality Action Plan  
GFNMS Management Plan**

GFNMS WATER QUALITY

**Timeline**

Water Quality Strategy	Year 1	Year 2	Year 3	Year 4	Year 5
STRATEGY WQ-1: Coordinate partnerships in implementing a comprehensive and integrated water quality monitoring program.					→
STRATEGY WQ-2: Address sources of anthropogenic pathogens and pollutants from recreational and commercial boating activities and marinas.					→
STRATEGY WQ-3: Coordinate with other agencies to address land-based discharges into the estuarine and nearshore areas of the sanctuary.					→
STRATEGY WQ-4: Evaluate need for no vessel discharge in ASBSs.				◆	
STRATEGY WQ-5: Ensure the continuation of the state's Mussel Watch program.				◆	
STRATEGY WQ-6: Develop a standing water quality working group.					→
STRATEGY WQ-7: Develop administrative capacity to support water quality protection plan.					→
STRATEGY WQ-8: Develop an annotated bibliography of water quality research and monitoring programs.				◆	
STRATEGY WQ-9: Educate local decision makers on water quality issues in the sanctuary.					→

**Legend:**

- Ongoing Activity
- .....→ Planning Stage
- ◆ Completed

GFNMS WATER QUALITY

## Budget

Strategy	Estimated Annual Cost (1000's)*					Total Est. 5-Year Cost (1000's)
	YR 1	YR 2	YR 3	YR 4	YR 5	
<b>STRATEGY WQ-1: Coordinate partnerships in implementing water quality monitoring program</b>	\$0	\$23	\$18	\$18	\$18	\$77
<b>STRATEGY WQ-2: Address sources of anthropogenic pathogens and pollutants from recreational and commercial boating activities and marinas</b>	\$0	\$28	\$24	\$24	\$25	\$101
<b>STRATEGY WQ-3: Coordinate with other agencies to address land-based discharges into the estuarine and nearshore areas of the sanctuary</b>	\$0	\$18	\$22.2	\$24.4	\$26.8	\$91.4
<b>STRATEGY WQ-4: Evaluate the need for no vessel discharge in SWQPAs</b>	\$0	\$0	\$13	\$14	\$0	\$27
<b>STRATEGY WQ-5: Ensure the continuation of the state's Mussel Watch program</b>	\$0	\$0	\$4	\$0	\$0	\$4
<b>STRATEGY WQ-6: Develop a standing Water Quality Working Group</b>	\$0	\$0	\$14	\$10	\$10	\$34
<b>STRATEGY WQ-7: Develop administrative capacity to support water quality protection plan</b>	\$0	\$100	\$105	\$110	\$115	\$430
<b>STRATEGY WQ-8: Develop an annotated bibliography of water quality research and monitoring programs</b>	\$0	\$50.5	\$0	\$0	\$0	\$50.5
<b>STRATEGY WQ-9: Educate local decision makers on water quality issues in the sanctuary</b>	\$10.5	\$10.5	\$10.5	\$10.5	\$10.5	\$52.5
<b>Total Estimated Annual Cost</b>	\$10.5	\$230	\$210.7	\$210.9	\$205.3	\$867.4
The sanctuary's base budget is available each year from appropriated funds.						
There is both availability of and opportunity to receive additional funding from appropriated funds.						

***Water Quality Action Plan***  
***GFNMS Management Plan***

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The estimates do not take into account increasing personnel costs each year or inflation.
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The estimates do not take into account unexpected events or emergencies or unforeseen projects.
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GFNMS WATER QUALITY

## Performance Measures

Strategy Title(s)	Performance Goal	Desired Outcome (Objective)	Outcome Measure	How Measured	Who Measures	Output Measure
STRATEGY WQ-1: Coordinate partnerships in implementing an integrated water quality monitoring program in estuarine and nearshore environments.	Engage in corrective and proactive measures to protect and enhance water quality in the estuarine, nearshore and other environments of the sanctuary.	Develop a regionally-based, cooperative water quality protection plan to address point and nonpoint source water quality impacts.	Collect sufficient data to make informed management decisions specific to protecting sanctuary resources.	1) Complete inventory of existing monitoring programs; identify data gaps; and identify sanctuary needs. 2) Establish collaborative partnership with agencies to create consistency, eliminate duplication, and leverage opportunities.	Ecosystem Protection Coordinator	Inventory (database) of water quality monitoring programs
STRATEGY WQ-2: Address sources of anthropogenic pathogens and pollutants from recreational and commercial boating activities and marinas.	Engage in corrective and proactive measures to protect and enhance water quality in the estuarine, nearshore and other environments of the sanctuary.	Emphasize a watershed/ecosystem approach and address the range of water quality threats from chronic land-based runoff to catastrophic offshore events.	Decrease, and over time, eliminate the discharge of pathogens and pollutants from recreational and commercial boating activities.	1) Become cooperating agency with state addressing the discharge of pathogens and pollutants. 2) Locate sewage waste and oily bilge pumpout stations in strategic locations. 3) Develop education and outreach effort targeting boaters. 4) Track compliance.	Ecosystem Protection Coordinator, Sanctuary Superintendent	1) Kiosk 2) Outreach materials 3) Sewage and bilge pumpout stations

**Water Quality Action Plan**  
**GFNMS Management Plan**

Strategy Title(s)	Performance Goal	Desired Outcome (Objective)	Outcome Measure	How Measured	Who Measures	Output Measure
STRATEGY WQ-3: Coordinate with other agencies to address land-based discharges into the estuarine and nearshore environments of the sanctuary.	Engage in corrective and proactive measures to protect and enhance water quality in the estuarine, nearshore and other environments of the sanctuary.	Emphasize a watershed/ecosystem approach and address the range of water quality threats from chronic land-based runoff to catastrophic offshore events.	Decrease discharge of land-based pathogens, sediments, nutrients and residual pollutants on estuarine and nearshore environments in the sanctuary.	1) Establish formal relationship with water quality agencies and authorities to implement the state's nonpoint source plan. 2) Take corrective action on enforcement issues related to land-based discharges into the sanctuary. 3) Coordinate with agencies and entities that have developed BMPs on the implementation and evaluation of effective management practices.	Sanctuary Superintendent, Ecosystem Protection Coordinator	1) Outreach and recognition materials related to BMPs 2) Successful prosecution of sanctuary discharge violations 3) Decrease in number of violations
STRATEGY WQ-8: Develop an annotated bibliography of water quality research and monitoring programs in and adjacent to the sanctuary to evaluate if the data are complete enough to determine the overall health of the sanctuary's ecosystem.	Engage in corrective and proactive measures to protect and enhance water quality in the estuarine, nearshore and other environments of the sanctuary.	Develop a regionally-based, cooperative water quality protection plan to address point and nonpoint source water quality impacts.	Ensure data is sufficient to determine where water quality is both threatened, and where there is compliance with state and federal standards.	Inventory all short- and long-term water quality research and monitoring programs to determine status, data gaps and sanctuary needs.	Research Coordinator, Ecosystem Protection Coordinator	Comprehensive annotated bibliography



SITE-SPECIFIC ISSUE  
**WILDLIFE DISTURBANCE  
ACTION PLAN**

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## **ISSUE STATEMENT**

The pressure on marine wildlife continues to grow as the human population increases around coastal areas and access to nearshore and offshore environments becomes easier. Of specific concern to Gulf of the Farallones National Marine Sanctuary (GFNMS) are wildlife disturbances associated with: harvesting and collecting in tide pools and mudflats; trampling of the intertidal zone; impacts from hikers and beach users, dogs, boaters, and kayakers on birds and marine mammals; entanglements; acoustic impacts; overflights; activities associated with increasing ecotourism; and the use of attractants or chumming.

## **ISSUE DESCRIPTION**

Wildlife disturbance is caused by direct and indirect factors. Wildlife disturbance may be a result of natural events such as storms, fluctuations in water temperature, or physical/chemical changes to water. Wildlife disturbance may also stem from anthropogenic causes. Of these, human interaction with wildlife is the most manageable. Ways in which humans can impact wildlife include observing and feeding wild animals; encroachment on breeding areas and rookeries; collecting tide pool inhabitants; and trampling intertidal habitats.

In 1996, more than 62 million Americans participated in some form of wildlife viewing or nature tourism—nearly one-third of all U.S. adults. Wildlife viewing has grown exponentially in the past decade, as state and local economies reported a 40 percent increase in spending by wildlife viewers between 1991 and 1996. New information indicates that the number of wildlife viewers is increasing. Nature tourism activities in the sanctuary include: wildlife viewing from shore or boat, photographing wildlife and scenery, wildlife viewing from aircraft, beach visitation, and paddling. California and Florida are the top two states for nature tourism and wildlife viewing.

## **SIGNIFICANT RESOURCES**

This area of northern California was selected and designated as the GFNMS because of significant concentrations of the following marine fauna and flora: seabirds and aquatic birds; marine mammals (pinnipeds and cetaceans); fish; marine flora (algae); benthic fauna; and estuarine environments.

The sanctuary has diverse biological communities in close proximity to one another. Habitats within the sanctuary include estuarine, pelagic (open ocean), benthic (sea floor), island, rocky intertidal, and sandy beach. The variety and size of habitats support a high diversity and abundance of species. The sanctuary's habitats are home to a number of species that are

federally listed as endangered or threatened. The list includes highly recognized species such as blue and humpback whales, Marbled Murrelets, and coho and chinook salmon, as well as lesser-known species such as the tidewater goby and Short-tailed Albatross. Of particular concern to the sanctuary are wildlife disturbance impacts on seabirds and marine mammals.

### **Seabirds**

The nesting seabird population is a significant wildlife resource of the sanctuary. The Farallon Islands support the largest concentrations of breeding seabirds in the contiguous United States. These birds forage in the Gulf of the Farallones, and are highly dependent on the productive waters of the sanctuary. Thirteen of the sixteen species of seabirds known to breed along the U.S. Pacific Coast have breeding colonies on the Farallon Islands and feed in the sanctuary. These include Ashy and Leach's Storm Petrels; Brandt's, Pelagic, and Double-crested Cormorants; Western Gulls; Common Murres; Pigeon Guillemots; Cassin's Auklets; and Rhinoceros Auklets. Black Oystercatchers, a shorebird, also breed on the Farallon Islands.

### **Aquatic Birds**

The sanctuary protects four estuaries, a lagoon, and one large coastal bay that provide foraging habitat for aquatic birds such as waterfowl, shorebirds, pelicans, loons, and grebes. These habitats are pristine compared to most coastal wetlands in California and provide important habitat for thousands of migrating and wintering birds. More than 160 species of birds use the sanctuary for shelter, food, or as a migration corridor. Of these, 54 species are known to use the sanctuary during their breeding season.

### **Marine Mammals**

Thirty-six species of marine mammals have been observed in the sanctuary; six species of pinnipeds (seals and sea lions), twenty-eight species of cetaceans (whales, dolphins, and porpoises), and two species of otter. Many of these animals occur in large concentrations and are dependent on the productive and secluded habitats for breeding, pupping, hauling-out, feeding, and resting during migration. The Farallon Islands provide habitat for breeding populations of five species of pinnipeds, and support the largest concentrations of California sea lions and northern elephant seals within the sanctuary.

Harbor seals breed on the Farallon Islands and on mainland rookeries. The Gulf of the Farallones region contains one-fifth of the California population of harbor seals, which was estimated at 28,000 in 2003. A small colony > 90 northern fur seals has recently resumed breeding on the south Farallon Islands during the summer. Prior to 1996, northern fur seals had not been known to breed on the Farallon Islands for over 170 years. From November to June, thousands of female and immature fur seals migrate through the western edge of the sanctuary along the continental shelf. Of all the marine mammals in the sanctuary, northern fur seals are the most sensitive to oil spills, because they depend largely on their fur for insulation.

Threatened Steller sea lions occur year-round in the sanctuary. This population has decreased dramatically in the southern part of its range, which includes the Farallon Islands. The decline has amounted to 30 percent of the total population over the past thirty years. The California sea

lion is the most conspicuous and widely distributed pinniped in the sanctuary. It is found year-round in the sanctuary with the population increasing at about 8 percent each year. The Northern elephant seal is the largest pinniped species found in the sanctuary, with a total breeding population in the sanctuary of about 1,500.

Twelve cetacean species are seen regularly in the sanctuary, and, of these, the minke whale, harbor porpoise, Dall's porpoise, and Pacific white-sided dolphin are considered year-round residents. The harbor porpoise is the most abundant small cetacean in the Gulf of the Farallones, with 4,000 to 5,000 residents.

Gray whales migrate from Alaska southward through the sanctuary from December through February. The northward migration begins at the end of February and peaks in March. A few gray whales remain in the sanctuary during the summer. The sanctuary waters represent critical feeding habitat for endangered species such as blue and humpback whales, which forage here from April through November.

An important breeding-age population of white sharks also feed at the Farallon Islands each fall.

## **JURISDICTIONAL SETTING**

Wildlife disturbance or "harassment" within the sanctuary is governed by a multitude of federal and state laws including the National Marine Sanctuaries Act (NMSA), the Endangered Species Act (ESA), the Marine Mammal Protection Act (MMPA), Migratory Bird Treaty Act, Airborne Hunting Act and the California Endangered Species Act. Site specific regulations for GFNMS address wildlife disturbance through prohibitions such as: disturbing seabirds or marine mammals by flying motorized aircraft at less than 1,000 feet (location specific); discharging or depositing (with exceptions); and altering the seabed (with exceptions). Additionally, GFNMS is proposing new regulatory actions to address wildlife disturbance issues including taking any marine mammal, marine reptile, or seabird and attracting or approaching white sharks.

### **Federal Law**

**Endangered Species Act (ESA):** This act provides for conservation of ecosystems upon which endangered species and threatened species depend, provides a program for conservation of those endangered species and threatened species, and provides for enforcement of special treaties and conventions for the protection of species of fish or wildlife and plants facing extinction.

**Marine Mammal Protection Act (MMPA):** This act directs the Secretary of Commerce to allow, upon request, the incidental, but not intentional, taking of marine mammals by United States citizens who engage in a specified activity (other than commercial fishing) within a specified geographical region if certain findings are made and regulations are issued. Permission may be granted for periods of five years or less if the National Marine Fisheries Service (NMFS) finds that a taking will have negligible impact on the species or stock(s); will not have any mitigatable adverse impact on the availability of the species or stock(s) for subsistence uses; and the permissible methods of taking and requirements pertaining to the monitoring and reporting of such taking are set forth.

## ***Wildlife Disturbance Action Plan*** ***GFNMS Management Plan***

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Migratory Bird Treaty Act (MBTA): This act implements various treaties and conventions between the U.S. and Canada, Japan, Mexico, and the former Soviet Union for the protection of migratory birds. Under the act, taking, killing, or possessing migratory birds is unlawful.

Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA): This act provides for conservation and management of the fishery resources in the Exclusive Economic Zone of the United States; encourages the implementation and enforcement of international fishery agreements; provides for fishery management plans; and establishes regional fishery management councils.

### **State Law**

California Endangered Species Act: The California Endangered Species Act definitions of endangered and threatened species parallel those of the federal ESA. Proposed species are candidate species for which the California Department of Fish and Game (CDFG) has sufficient information on biological vulnerability and threats to support proposals to list them as endangered or threatened.

California Species of Special Concern (CSC): It is the goal and responsibility of the CDFG to maintain viable populations of all native species. The department has designated certain vertebrate species as “species of special concern” because declining population levels, limited ranges, and/or continuing threats have made them vulnerable to extinction. The goal of designating species as CSC is to halt or reverse their decline by calling attention to these threats and addressing the issues of concern early enough to secure the species’ long-term viability.

California Fully Protected Species: Fully protected species may not be taken or possessed without a permit from the California Fish and Game Commission (FGC) and/or the CDFG.

State Lands Commission: The California State Lands Commission (SLC) has jurisdiction over all of California’s tide and submerged lands, and the beds of naturally navigable rivers and lakes all of which are sovereign lands, swamp, and overflow lands, and school lands (proprietary lands). Management responsibilities of the SLC extend to activities within submerged land and those within three nautical miles from shore.

### **WILDLIFE DISTURBANCE GOAL**

1. Lessen or eliminate future impacts, and remedy existing impacts on sanctuary marine wildlife and their habitats by encouraging responsible human behavior.

### **WILDLIFE DISTURBANCE OBJECTIVES**

1. Continually evaluate levels and sources of impacts on wildlife and habitats.
2. Address human behavior that is impacting wildlife and habitats.

## **WILDLIFE DISTURBANCE ACTION PLAN**

**STRATEGY WD-1:** *Create easily accessible centralized Web-based spatial database to house information pertaining to wildlife disturbance.*

**Activity 1.1** Coordinate with National Marine Sanctuary Program (NMSP) headquarters and the Coastal Services Center (CSC) to develop and maintain a well-designed information management and dissemination system. The system will support the ability to carry out any type of data processing and analysis, including statistical analysis, while providing information for management decisions. The data management system will serve as a tool to help facilitate better ecosystem protection by incorporating data from all sanctuary ecosystem protection issues and programs into one easily accessible database.

- A. Using outside software expertise, the sanctuary will develop a database system in which to integrate a large volume of data for separate programs, process all incoming data, synthesize, and analyze the data.
- B. Develop a Web-based spatial system widely accessible to GFNMS staff, scientists, decision makers and volunteers (available for individual offsite data entry and querying of all available data sets).
- C. Follow Federal Geospatial Data Center (FGDC) compliance standards for metadata base to accompany all data in system.
- D. Contract new personnel for data analysis and data system maintenance.

**Potential Partners:** Farallones Marine Sanctuary Association (FMSA), CSC, National Marine Sanctuary Program (NMSP)

**Products:** Web-based spatial database

**Complementary Strategies:** GFNMS Final management Plan (FMP), Introduced Species, STRATEGY IS-1; Conservation Science, STRATEGY CS-1, CS-4, CS-6; Water Quality, STRATEGY WQ-2, STRATEGY WQ-8; Introduced Species, STRATEGY IS-1, STRATEGY IS-2, STRATEGY IS-3; Fishing Activities, STRATEGY FA-1; Vessel Spills, STRATEGY VS-6, STRATEGY VS-12; Education, STRATEGY ED-2; Administration, STRATEGY AD-2

**STRATEGY WD-2:** *Through the use of volunteer monitoring programs, observe and record impacts from human activities on marine wildlife and key habitats of the sanctuary, such as the rocky intertidal.*

**Activity 2.1** Develop volunteer-based intertidal monitoring program to evaluate human impacts on the intertidal habitat of the sanctuary and measure recovery rates of closed areas. This program will fall under the Sanctuary Naturalist Corps umbrella, a coordinated and complementary set of volunteer outreach and monitoring programs.

- A. The volunteer-based intertidal monitoring program will be based on the Fitzgerald Marine Reserve (FMR) Intertidal Human Impact Study model, and used to

evaluate the effects of trampling and harvesting on sensitive and high traffic areas such as Duxbury Reef. This program will be adopted by a San Francisco Bay Area high school using materials developed by Long-term Monitoring Program and Experiential Training for Students (LiMPETS), which includes information on monitoring key species, sampling protocols, data sheets and data analysis methods. Initial steps in developing this program include identifying problem areas, areas for restoration, and areas to be zoned.

**Potential Partners:** FMR, Bodega Marine Laboratory (BML), Golden Gate National Recreation Area (GGNRA)

**Complementary Strategies:** GFNMS FMP, Education, STRATEGY ED-7; Introduced Species, STRATEGY IS-3; Conservation Science, STRATEGY CS-4, CS-5, CS-6; Ecosystem Monitoring XEM-2; Northern Management Area Transition XNRM-2, XNRM-4

Monterey Bay National Marine Sanctuary (MBNMS) FMP, Tidepool Protection, STRATEGY TP-1, STRATEGY TP-2

**STRATEGY WD-3:** *Coordinate with other agencies, institutions and programs to better understand and address anthropogenic noise, light and visual impacts on wildlife from vessels and low flying aircraft.*

**Activity 3.1** In coordination with partners, modify existing monitoring programs to identify types and frequency of impacts on wildlife from motorized and non-motorized aircraft and vessels both inside and outside restriction zones. Close vessel passes and low flying aircraft are known to create behavioral changes in wildlife including flushing, stampeding, and abandonment. Information from monitoring programs will help to identify key geographical areas with high disturbance frequency to be targeted for needed outreach and enforcement. Of particular concern are seabird colonies at Point Reyes Headlands, Bolinas Lagoon, Farallon Islands, Bird Rock, and Bodega Rock.

- A. Programs will focus on identifying disturbance to seabirds and increasing enforcement efforts. Observations will make distinctions between impacts associated with motorized (e.g., fixed wing, helicopters, motor boats) and non-motorized (e.g., paragliders, hang gliders, kayaks) aircraft and vessels, and provide valuable information on compliance with and effectiveness of the sanctuary's overflight and vessel restriction regulations.
- B. Create a standardized reporting system for monitoring programs and other wildlife disturbance data collection efforts.
- C. The sanctuary and its partners will seek to secure funding to support these programs. Potential funding sources include the Resource Trustee Council funds.

**Potential Partners:** PRBO Conservation Science (Point Reyes Bird Observatory) (PRBO), Point Reyes National Seashore (PRNS), FMSA, United States Fish and Wildlife Service (USFWS).

**Products:** Data collection and reporting system

**Complementary Strategies:** GFNMS FMP, Wildlife Disturbance, STRATEGY WD-7; Vessel Spills, STRATEGY VS-3; Conservation Science STRATEGY CS-1, CS-4, CS-5, CS-6; Ecosystem Monitoring XEM-2; Northern Management Area Transition Plan XNRM-2, XNRM- 4; Administration, STRATEGY AD-3; MBNMS FMP, Marine Mammal Seabird and Turtle Disturbance, STRATEGY MMST-2

**Activity 3.2** Through the use of permit conditions, reporting requirements, and/or tracking systems, the sanctuary will identify wildlife disturbance-related research and monitoring programs taking place in the sanctuary and collaborate with these researchers to collect data on wildlife disturbance in the sanctuary.

- A. Coordinate with research partners at PRBO and PRNS to document, while in the field, wildlife disturbance from vessels and low flying aircraft.
- B. Through SIMoN, identify institutions, principal investigators and actual location of data collection efforts taking place in the sanctuary.
- C. Inform researchers about responsible wildlife interactions, seasonal restrictions, and GFNMS' and other agency regulations.
- D. Use SIMoN to identify potential partnerships and opportunities to collect data on wildlife disturbance.
- E. Develop standardized data reporting system, including standardized protocols, for researchers to record wildlife disturbance observations and combine with data from monitoring programs (see also Activity WD-3.1C).
- F. As appropriate, request data sets from researchers to include in SIMoN for use by natural resource managers in addressing wildlife disturbance issues, to be submitted through an on-line reporting system.

**Potential Partners:** Research community, permitting agencies, USFWS

**Products:** Biennial symposium, tracking and reporting system

**Complementary Strategies:** GFNMS FMP, Wildlife Disturbance, STRATEGY WD-7; Conservation Science, STRATEGY CS-1 and CS-2; MBNMS FMP, Marine Mammal Seabird and Turtle Disturbance, STRATEGY MMST-2

**Activity 3.3** Evaluate emerging scientific studies delineating the impacts of anthropogenic noise, light and visual disturbance including vessel traffic, seismic surveys for hydrocarbon exploration and other industrial and governmental activities impacting sanctuary resources.

- A. Conduct a literature search, including grey literature, and develop an annotated bibliography.
- B. Coordinate with research partners to document anthropogenic noise, light and visual disturbance in the Sanctuary.

**Potential Partners:** USFWS, FMSA, PRNS, GGNRA, PRBO, USFWS

**Complementary Strategies:** GFNMS FMP, Conservation Science, STRATEGY CS-1 and CS-2, Resource Protection STRATEGY RP-2, STRATEGY RP-3, MBNMS FMP, Marine Mammal Seabird and Turtle Disturbance, STRATEGY MMST-2

**STRATEGY WD-4:** *Through interpretive enforcement and law enforcement efforts, address human behavior that may adversely impact wildlife.*

**Activity 4.1** Under the Sanctuary Naturalist Corps umbrella, develop a coordinated and complementary set of interpretive enforcement efforts to address human behavior and its impacts on sanctuary wildlife. Interpretive enforcement is intended to be a proactive and preventative method to avert potential negative impacts from human behavior before they occur. Sanctuary Naturalist Corps programs are volunteer-based peer education programs that use interpretation to change behavior and values to achieve voluntary compliance with sanctuary regulations.

- A. Continue interpretive enforcement through the Sanctuary Education Awareness and Long-term Stewardship (SEALS) Program. The SEALS program works to minimize disturbance to sanctuary seal colonies and educate the community about protection of habitat. The presence of visitors at seal observation sites provides an excellent opportunity for on-site education. SEALS volunteers answer questions on harbor seal behavior and natural history; explain the purpose of the SEALS program; inform the public on how to recognize and minimize disturbance to the seal colonies; and provide information about the marine sanctuaries and how human activity affects their health.
- B. Create a new interpretive enforcement program to address impacts from human trampling and harvesting on rocky intertidal habitats. Based on Fitzgerald Marine Reserve's (FMR) Roving Intertidal Docent Program, a similar volunteer-based program will be expanded to address trampling and harvesting on sensitive and high traffic areas such as Duxbury Reef.
- C. Develop and distribute wildlife viewing guidelines (posters, informational cards, brochures) to target audiences including: kayakers (Paddler's Etiquette); whale watching boats (based on Watchable Wildlife and Hawaiian Islands Humpback Whale National Marine Sanctuary [HIHWNMS] guidelines); and private boaters (including recreational and commercial boats).
- D. Develop interpretive enforcement/outreach program targeting pilot organizations, flight schools, flight clubs, aviation publications and airports.

**Potential Partners:** FMSA, state parks, The Marine Mammal Center (TMMC), PRNS, FMR, CDFG, MBNMS, Cordell Bank National Marine Sanctuary (CBNMS)

**Products:** Annual reports, interpretive enforcement materials

**Complementary Strategies:** GFNMS FMP, Wildlife Disturbance, STRATEGY WD-1, STRATEGY WD-3; Education, STRATEGY ED-7; Conservation Science STRATEGY CS-1, STRATEGY CS-4

**Activity 4.2** Develop a coordinated and cooperative Protected Resource Enforcement Plan to ensure sufficient patrol presence in the sanctuary.

- A. Through the development of partnerships and interagency cooperation, assess the potential to create a cross-deputization program with the CDFG, U.S. Fish and Wildlife Service (USFWS), National Oceanic and Atmospheric Administration (NOAA) Fisheries, and the National Park Service (NPS).
- B. Train enforcement officers in interpretive enforcement and sanctuary regulations.
- C. Maintain an active enforcement relationship with the United States Coast Guard (USCG) and the Civil Air Patrol (CAP).
- D. Hire a dedicated sanctuary enforcement officer.
- E. Investigate the potential for training volunteer uniformed interpretive enforcement officers.

**Potential Partners:** NOAA Enforcement, CDFG, NPS, Harbor Patrol, USCG, CAP, USFWS

**Products:** Interpretive enforcement materials

**Complementary Strategies:** GFNMS FMP, Wildlife Disturbance, STRATEGY WD-7, Resource Protection, STRATEGY RP-6; MBNMS FMP, Marine Mammal Seabird and Turtle Disturbance, STRATEGY MMST-8

**STRATEGY WD-5:** *Develop wildlife viewing guidelines to reduce disturbance to wildlife from human interactions.*

**Activity 5.1** Conduct an assessment of target audiences to determine appropriate messaging, products and avenues for communicating to wildlife viewers about responsible interactions with wildlife. Wildlife viewing guidelines will be developed in concert with NOAA's *Responsibly Watching California Marine Life* handbook and the National Ocean Etiquette program. The Ocean Etiquette program is a partnership between NOAA, other federal and state agencies, and non-profit organizations. This program is directed at the public and commercial operators to educate them about safe and responsible wildlife viewing, pertaining specifically to marine species and habitats. Other wildlife viewing models to be considered include: Paddler's Etiquette, The Marine Mammal Center's Stranded Mammal Etiquette and Marine Mammal Viewing Guidelines, and Audubon's Standards for Bird Viewing.

- A. Develop viewing guidelines and outreach materials for boaters based on species-specific behavioral responses and vessel approach and speed guidelines (to be consistent with whale watching guidelines and the National Ocean Etiquette Program).

***Wildlife Disturbance Action Plan  
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1. Develop volunteer program based on *Dockwalkers* model to reach boaters at harbors and marinas.
  2. Develop kiosk at key harbors to display wildlife viewing guidelines and animal identification cards.
  3. Reach boaters through vessel registration with Department of Motor Vehicles and through harbors and marinas.
- B. Develop wildlife watching guidelines based on the National Etiquette program and Hawaiian Islands Humpback Whale National Marine Sanctuary's guidelines for commercial operators.
1. Hold workshops for wildlife watching operators.
  2. Develop responsible wildlife viewing certification program for wildlife watching boats.
- C. Continue and expand distribution of Paddler's Etiquette and develop complementary outreach tools such as signage and animal identification cards.
1. Hold workshops for kayak vendors.
- D. In coordination with the Ocean Etiquette program, develop wildlife viewing and interaction guidelines for shoreline observers addressing marine mammals' strandings and trampling and harvesting in the rocky intertidal zone.
- E. Develop guidelines for wildlife interactions for researchers conducting research in the sanctuary.
1. Include outreach materials in research permit package.
  2. Distribute outreach materials to other agencies and institutions conducting research in the sanctuary that does not require a permit.
  3. Review permit conditions for consistency with wildlife viewing guidelines.

**Potential Partners:** FMSA, NMFS, USFWS, CDFG, NPS, TMMC, state parks, PRBO, harbors and marinas

**Products:** Handbook, signage, brochures, website, kiosk

**Complementary Strategies:** GFNMS FMP, Wildlife Disturbance, STRATEGY WD-7, Education, STRATEGY ED-7, Conservation Science, STRATEGY CS-2.

**STRATEGY WD-6:** *Maximize media venues to augment directed outreach efforts and increase public awareness of wildlife disturbance issues.*

**Activity 6.1** In conjunction with partners, develop a media communications plan to address wildlife disturbance issues.

- A. Identify target audiences.
- B. Work with partners on joint media messaging.
- C. Develop boilerplate messaging format for planned media communications and to be prepared for unplanned/emergency events (reactive) media coverage.
- D. Develop wildlife disturbance media kit.
- E. Identify opportunities for cooperative marketing efforts with other agencies and organizations.

**Potential Partners:** FMSA, San Francisco (SF) Ad Council, TMMC, state parks, USCG, NMFS, PRBO, GGNRA, MBNMS, CBNMS

**Products:** Wildlife disturbance media kit

**Complementary Strategies:** GFNMS FMP, Education, STRATEGY ED-11

***STRATEGY WD-7: Coordinate the Seabird Colony Protection Program aimed at improving the survival and recruitment of seabird colonies by reducing and eliminating human disturbances at seabird breeding and roosting sites from Point Reyes to Point Sur.***

**Activity 7.1:** In coordination with partners, provide appropriate education and outreach to government agencies and ocean and coastal users on the macro level by targeting organized events, association meetings, conferences, air and boat shows and ecotourism vendors; and on the micro level with individuals including pilots, researchers, rangers, sea kayakers, coastal recreational users, commercial and recreational fishermen, whale watchers and students. Breeding and roosting seabird populations are significant wildlife resources of the Central California Coast and the protection of seabird populations and habitats were a critical consideration in the sanctuary's designation.

- A. Use colony monitoring and surveillance data to identify key audiences and venues.
- B. Establish the Seabird Colony Education and Outreach Working Group

**Potential Partners:** USFWS, FMSA, PRBO, NPS, MBNMS, USCG, California Department of Boating and Waterways (CDBW), Coast Guard Auxiliary

**Products:** Outreach materials – booth displays for pilots and boaters, fact sheets for ocean users, posters, branding materials (stickers, tide books, pens, pocket maps), brochures, colony, roosting and overflight maps, news articles, Op-eds, power point presentations, and PSAs. Outreach events/venues- association meetings, conferences, air and boat shows and ecotourism vendors, airports, and pilot mailings.

**Complementary Strategies:** GFNMS FMP, Education, STRATEGY ED-11, STRATEGY ED-13, Wildlife Disturbance, STRATEGY WD-3

**Activity 7.2:** Based on research and monitoring findings, take appropriate actions to address impacts on seabirds from vessels and low-flying aircraft including:

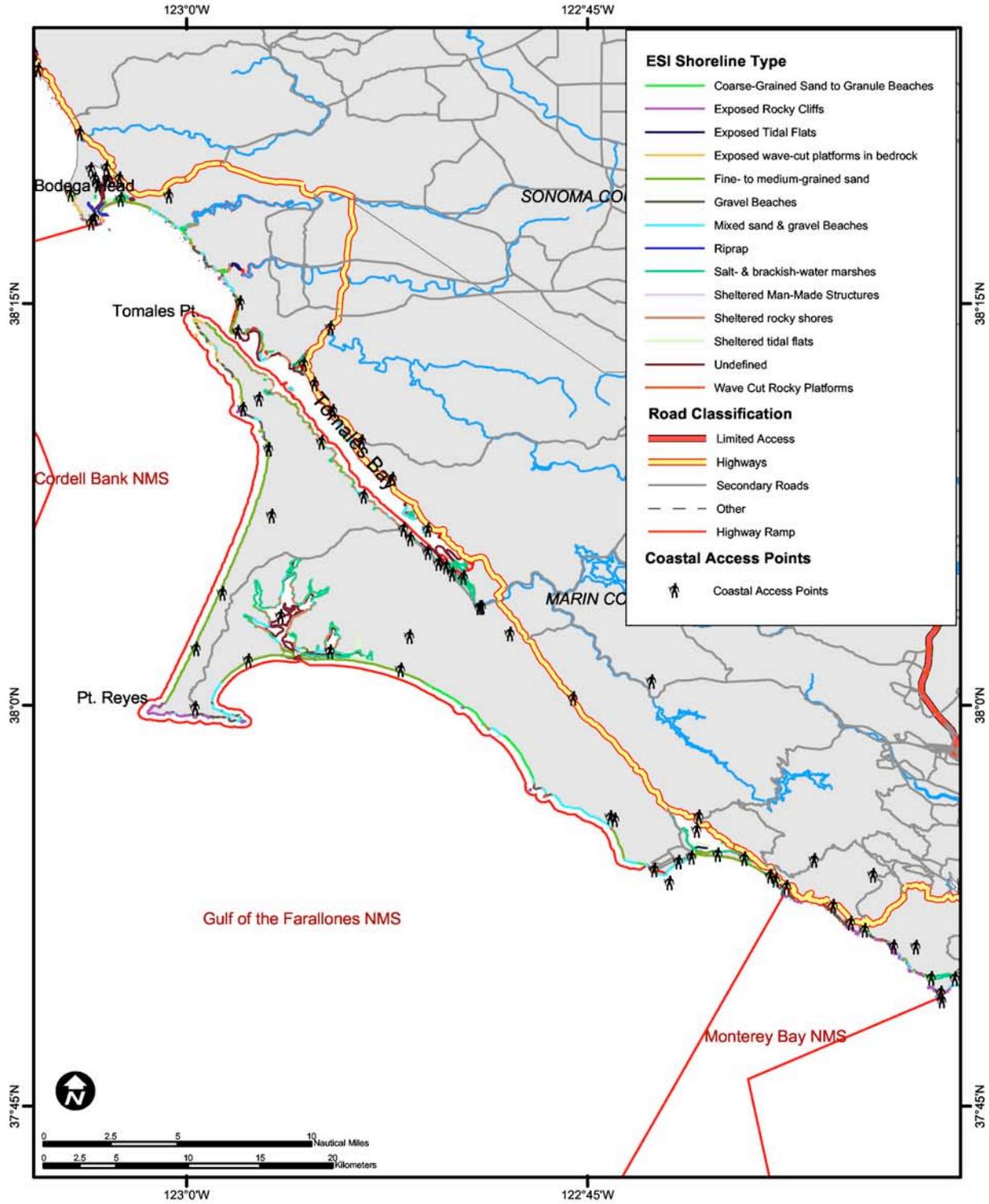
- A. Review current statutes, authorities, regulations and agency jurisdictions pertaining to managing and protecting seabirds and seabird colonies, conduct a gap analysis by determining what regulations need better enforcement and what geographic areas are subject to regulations, and whether or not additional or amended regulations are required. If justifiable, propose appropriate regulatory action or propose adjustments to current GFNMS' overflight and vessel restrictions to address impacts from low flying aircraft and vessels.
- B. Establish the Seabird Colony Coordinated Management and Enforcement Working Group.
- C. Work with enforcement agencies on the federal, state and local level to encourage active enforcement of laws and regulations that protect seabirds, and to promote a coordinated law enforcement effort.
- D. Maintain long-term monitoring to document disturbance and/or effectiveness of regulatory action and enforcement program.

**Potential Partners:** Federal Aviation Administration, NMFS, PRNS, GGNRA, PRBO, USFWS, CDFG, CDBW, Coast Guard Auxiliary, MBNMS

**Products:** Regulation(s) if necessary; Management products – buoy demarcation, standardized incident reporting form, incident reporting classes for researchers, rangers and fishermen; Enforcement products – MOU for seabird enforcement with partner agencies;

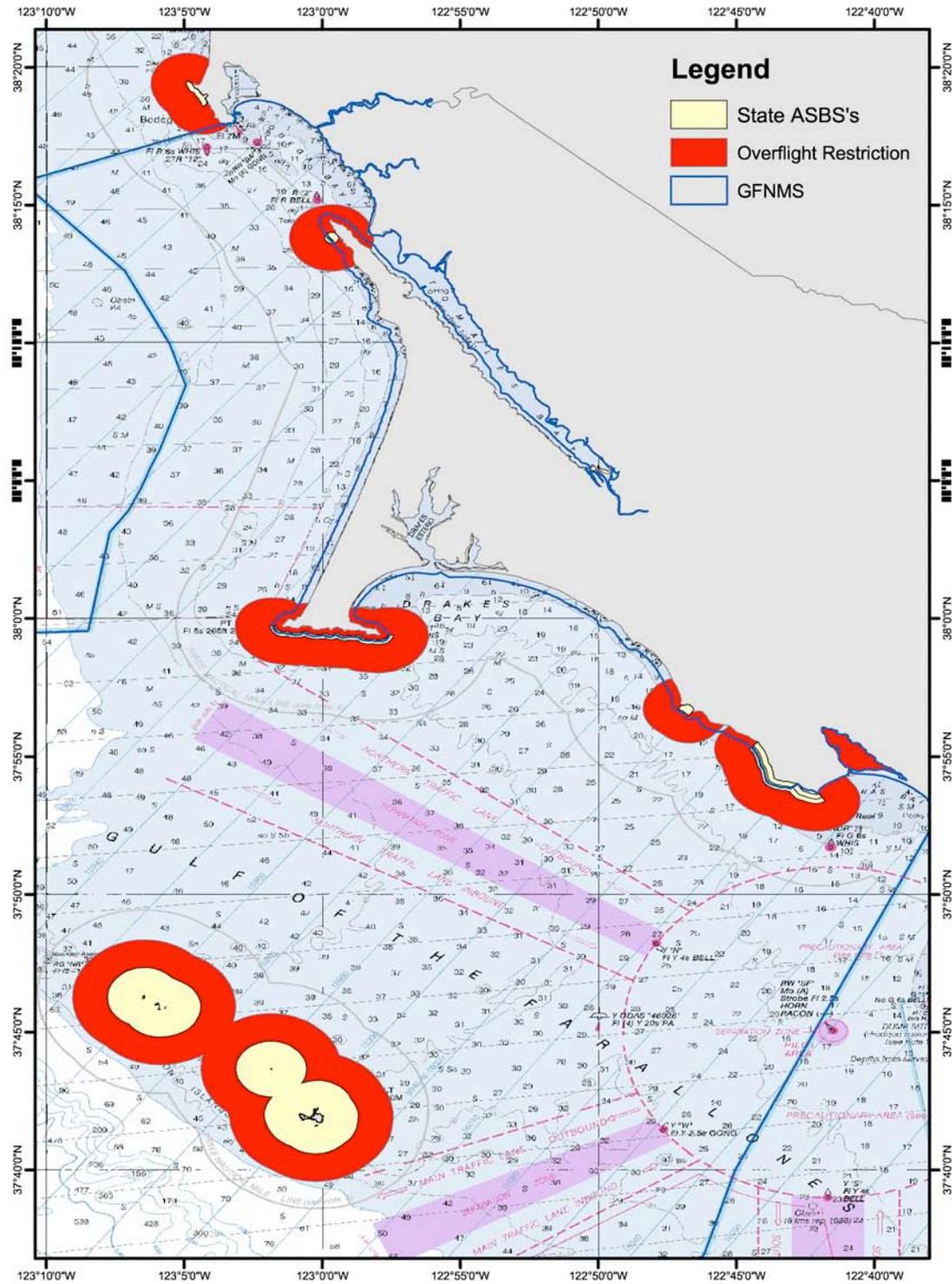
**Complementary Strategies:** GFNMS FMP, Wildlife Disturbance, STRATEGY WD-3, STRATEGY WD-4, STRATEGY WD-5; Ecosystem Protection, STRATEGY EP-1, Resource Protection, STRATEGY RP-6, STRATEGY RP-10; Education, STRATEGY ED-7; MBNMS FMP, Marine Mammal Seabird and Turtle Disturbance, STRATEGY MMST-2

# Coastal Access Points and Shoreline Types Map



# Overflight Restriction Map

Preliminary Look: 1nm Overflight Restriction



GFNMS regulations prohibit airplane flights below 1000 feet within 1 nautical mile of Areas of Special Biological Significance.

GFNMS WILDLIFE DISTURBANCE

## Timeline

Wildlife Disturbance Strategy	Year 1	Year 2	Year 3	Year 4	Year 5
STRATEGY WD-1: Create easily accessible centralized Web-based spatial database to house information pertaining to wildlife disturbance.		.....→			
STRATEGY WD-2: Using volunteer monitoring programs, observe and record impacts from human activity on rocky intertidal.			.....→		
STRATEGY WD-3: Coordinate with other agencies, institutions and programs to better understand and address anthropogenic noise, light and visual impacts on wildlife from vessels and low flying aircraft.	.....→				
STRATEGY WD-4: Using interpretive enforcement and law enforcement efforts, address human behavior that may be adversely impacting wildlife.		.....→			
STRATEGY WD-5: Develop wildlife viewing guidelines to reduce disturbance to wildlife from human interactions.	————→				
STRATEGY WD-6: Maximize media venues to augment direct outreach efforts and increase public awareness of wildlife disturbance issues.	.....→				
STRATEGY WD-7: Coordinate the Seabird Colony Protection Program to reduce and eliminate human disturbances at seabird breeding and roosting sites.	————→				

**Legend:**

- **Ongoing Activity**
- .....→ **Planning Stage**
- ◆ **Completed Activity**

GFNMS WILDLIFE DISTURBANCE

**Budget**

Strategy	Estimated Annual Cost (1000's)*					Total Est. 5-Year Cost (1000's)
	YR 1	YR 2	YR 3	YR 4	YR 5	
<b>STRATEGY WD-1: Create easily accessible centralized Web-based spatial database to house information pertaining to wildlife disturbance</b>	\$0	\$25	\$23	\$23	\$23	\$94
<b>STRATEGY WD-2: Using volunteer monitoring programs, observe and record impacts from human activities on marine resources and key habitats of the sanctuary, such as the rocky intertidal</b>	\$0	\$0	\$60	\$60	\$120	\$240
<b>STRATEGY WD-3: Better understand and address anthropogenic noise, light and visual impacts on wildlife from vessels and low flying aircraft.</b>	\$28	\$30	\$28	\$32	\$32	\$150
<b>STRATEGY WD-4: Through interpretive enforcement and law enforcement efforts, address human behavior that may adversely impact wildlife</b>	\$13	\$35	\$13	\$13	\$13	\$87
<b>STRATEGY WD-5: Develop wildlife viewing guidelines to reduce disturbance to wildlife from human interactions</b>	\$15	\$15	\$16	\$16	\$16	\$78
<b>STRATEGY WD-6: Maximize media venues to augment directed outreach efforts and increase public awareness of wildlife disturbance issues</b>	\$5	\$5	\$5	\$5	\$5	\$25
<b>STRATEGY WD-7: Coordinate the Seabird Colony Protection Program to reduce and eliminate human disturbances at seabird breeding and roosting sites.</b>	\$70.7	\$170.5	\$197	\$293	\$0	\$731.2
<b>Total Estimated Annual Cost</b>	<b>\$131.7</b>	<b>\$280.5</b>	<b>\$342</b>	<b>\$442</b>	<b>\$209</b>	<b>\$1,405.2</b>

The sanctuary's base budget is available each year from appropriated funds.

There is both availability of and opportunity to receive additional funding from appropriated funds.
The estimates do not take into account increasing personnel costs each year or inflation.
The estimates do not take into account unexpected events or emergencies or unforeseen projects.

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GFNMS WILDLIFE DISTURBANCE

**Performance Measures**

Strategy Title(s)	Performance Goal	Desired Outcome (Objective)	Outcome Measure	How Measured	Who Measures	Output Measure
STRATEGY WD-2: Through the use of volunteer monitoring programs, observe and record impacts from human activities on marine resources and key habitats such as the rocky intertidal.	Lessen or eliminate, and remedy impacts on the living marine resources of the sanctuary and their habitats by encouraging responsible human behavior.	Continually evaluate levels and sources of impacts on wildlife and habitats.	1) Increase sanctuary management and the public's understanding of the effects of human disturbance on key habitats and recovery rates. 2) Recovery of trampled intertidal habitat.	1) Complete design and implementation of volunteer monitoring program to evaluate impacts and recovery rates. 2) Use results of monitoring program to manage human impacts on rocky intertidal habitats in the sanctuary.	Research Coordinator, Education Coordinator, Ecosystem Protection Coordinator	Report on intertidal monitoring program findings
STRATEGY WD-4: Through the use of interpretive and law enforcement efforts, address human behavior that may be adversely impacting wildlife. STRATEGY WD-5: Develop wildlife viewing guidelines to reduce disturbance to wildlife from human interactions. STRATEGY WD-6: Maximize venues to augment directed outreach efforts and increase public awareness of wildlife disturbance issues.	Lessen or eliminate, and remedy impacts on the living marine resources of the sanctuary and their habitats by encouraging responsible human behavior.	Address human behavior that is impacting wildlife and habitats.	1) Increase awareness and change behavior of humans to lessen impacts while interacting with wildlife. 2) Reduce the number of disturbances to wildlife.	Monitor human interactions with wildlife to determine effectiveness of outreach and enforcement in affecting behavior.	Ecosystem Protection Coordinator, Education Coordinator	1) Technical data summaries 2) Fine-scaled seasonal distribution maps 3) Annual report of observed wildlife disturbances and sources of disturbance



SITE-SPECIFIC ISSUE  
**INTRODUCED SPECIES  
ACTION PLAN**

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## **ISSUE STATEMENT**

Introduced species have been identified in and around Gulf of the Farallones National Marine Sanctuary (GFNMS) waters and have the potential to cause ecological and economic degradation to the affected coastal areas. If detection, prevention, and eradication efforts are not taken, further introduction and spread of introduced species will continue in and adjacent to the sanctuary and potentially impact sanctuary wildlife and habitats. Current levels, in terms of abundance and diversity of introduced species are not well documented; nor are the impacts, existing or potential, well understood.

## **ISSUE DESCRIPTION**

In the context of GFNMS, introduced species in the marine/estuarine environment are defined as (1) a species (including any of its biological material capable of propagation) that is non-native to the ecosystem(s) protected by the sanctuary; or (2) any organisms into which genetic matter from another species has been transferred in order that the host organism acquires the genetic traits of the transferred genes. GFNMS is close to San Francisco Bay, which is considered the most invaded aquatic ecosystem in the world, with over 255 introduced species. Indications are that introduced species are the greatest threats to rare, threatened, or endangered species in this country, thought to be second only to habitat destruction. In general, introduced species in the marine/estuarine environment alter species composition; threaten the abundance and/or diversity of native marine species; interfere with the ecosystem's function; and disrupt commercial and recreational activities. Although several introduced species have been identified in the bays and estuaries throughout the range of GFNMS, a complete inventory is currently underway and has not been completed.

Nearshore discharge of ballast water is a common source of introduced species. Many organisms carried in ballast water are in the larval or diapause stage of their life cycle. Once discharged, estuaries and harbors provide optimal environments for the growth of these organisms. Viruses, bacteria, and other pathogens have also been identified in ballast water. With over 45,000 commercial cargo ships (6,000 vessels entering or exiting San Francisco Bay per year) transporting 10 billion tons of ballast water around the globe every year, the rate of introduced species will be certain to grow if efforts to prevent introductions do not occur.

Introduced species may also be transported on commercial and recreational vessel hulls, rudders, propellers, intake screens, ballast pumps, and sea chests. Other vectors for the spreading of introduced species include recreational and research equipment, debris, dredging and drilling

equipment, dry docks, and buoys. Organisms transported or used for research, restoration, educational activities, aquarium activities, live bait, aquaculture, biological control, live seafood, and rehabilitated and released organisms also have the potential for accidental or intentional release into the marine/estuarine environment. Of additional concern are genetically modified species that either escape or are released into nearshore or open ocean environments.

## **JURISDICTIONAL SETTING**

### **International**

**“Guidelines for the Control and Management of Ships’ Ballast Water to Minimize the Transfer of Harmful Aquatic Organisms and Pathogens” Resolution A.868(20)–Nov. 20, 1997:** Developed by the International Maritime Organization (IMO). These guidelines, which outline the techniques for minimizing introductions from cargo ship ballast discharge, are expected to become part of the International Convention for the Prevention of Pollution from Ships (MARPOL). This would require the U.S. Congress to enact legislation detailed in the guidelines.

**“International Council for Exploration of the Sea (ICES) Code of Practice Concerning Introductions and Transfers of Marine Species:”** A regulatory framework for member states to use in managing the introduction of non-native species. This Code of Practice is continually modified to incorporate new scientific knowledge.

**“Convention on International Trade in Endangered Species of Wild Fauna and Flora” (CITES):** Developed by the United Nations and signed by the U.S. in 1975. It is designed to restrict trade in listed species to protect depletion in the habitat of origin.

**“International Plant Protection Convention” (IPPC):** Developed by the United Nations and signed by the U.S. in 1972 with 94 other countries. It is designed to prevent the introduction and spread of agricultural pests.

### **Federal Law**

**Executive Order 13112, February 1999:** Directs federal agencies to prevent the introduction of invasive species and provide for their control; establishes the Invasive Species Council and directs them to write an invasive species management plan within eighteen months.

**National Invasive Species Act, 1996:** The federal National Invasive Species Act (NISA) strengthened the 1990 Nonindigenous Aquatic Nuisance Prevention and Control Act requiring open water exchange (OWE) of ballast water and mandatory ballast management plans and reporting.

**Title 50, U.S. Code of Federal Regulations; 58976-58981, 1993:** Enforced by U.S. Fish and Wildlife Service, Dept. of Interior, prohibiting importation of specific disease agents of salmonid fish.

**Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990:** Established the

Aquatic Nuisance Species Task Force program to prevent introduction and dispersal of aquatic nuisance species; to monitor, control and study such species; and to disseminate related information. It also encouraged governors of each state to submit state aquatic nuisance species management plans.

**Federal Noxious Weed Act of 1974 (amended 1990), Federal Plant Pest Act (1957) and Plant Quarantine Act (1912):** Gives the U.S. Dept. of Agriculture the authority to regulate the movement of plants, plant products, plant pests, and their vectors. Also regulates the introduction of genetically engineered organisms.

### **State Law**

**SB 497, signed into California state law in 2006:** requires the state to adopt regulations that require an owner or operator to implement performance standards for the discharge of ballast water.

**AB 433, The Marine Invasive Species Act, signed into California state law in 2003:** revised state law pertaining to control of nonindigenous species and ballast water management, including revising and adding definitions. It deleted exemptions for specified vessels from compliance with the act and imposed additional requirements upon vessel owners and operators to prevent the introduction of nonindigenous species. It also required the State Lands Commission to take samples from at least 25% of arriving vessels subject to nonindigenous species control requirements.

**AB 703, signed into California state law in 1999:** requires mid-ocean ballast water exchange in waters more than 200 nautical miles from land and in water at least 2,000 meters deep or retention of all ballast water on board the vessel for all U.S. and foreign vessels that enter California waters after operating outside the U.S. Exclusive Economic Zone (EEZ). “Good housekeeping” practices must be observed, which include the avoidance of discharge or uptake near marine sanctuaries, reserves, parks, coral reefs, and other areas.

Sanctuary prohibition on introducing or releasing an exotic species provides a greater impetus for vessels to comply with AB 703, as the sanctuary may enforce civil penalties up to \$130,000 per violation per day. The sanctuary prohibition is applicable to federal as well as state waters.

Other state regulations governing introduced species include:

- Fish and Game Code: Section 2116-2126 (illegal transportation of certain species)
- Fish and Game Code: Section 6300-6306 (infected, diseased or parasitic fish, amphibia or aquatic plants)
- Fish and Game Code: Section 6430-6433 (Ballast Water Management)
- Fish and Game Code: Section 6440-6460 (control of aquatic nuisance plants)
- Fish and Game Code: Section 8596-8598 (marine aquaria pet trade)
- Public Resources Code: Section 71210-71213 (ballast water)
- Public Resources Code: Section 71215 (Exotic Species Control Fund)

Hundreds of federal programs, state organizations, international organizations and non-profit organizations have established databases, community outreach, monitoring, eradication, research and education programs. Additionally, industry is working on a number of physical, biological and chemical means of treating or controlling organisms in ballast water.

## **INTRODUCED SPECIES GOALS**

Maintain an abundance and diversity of native marine/estuarine species:

1. Prevent future introductions of introduced species in the sanctuary.
2. Detect, manage, and where feasible, eradicate new and established introduced species in the sanctuary.

## **INTRODUCED SPECIES OBJECTIVES**

1. Understand the current extent of introduced species in GFNMS.
2. Create a new program and/or coordinate with existing programs to detect and monitor new introductions.
3. Develop management actions to eradicate and/or control existing and new introductions.
4. Identify and control current and potential pathways to prevent new introductions.

## **INTRODUCED SPECIES ACTION PLAN**

**STRATEGY IS-1:** *Develop a native and introduced species inventory and database specifically for GFNMS and areas adjacent to the sanctuary.*

**Activity 1.1** Although efforts are being made by California Department of Fish and Game (CDFG), Smithsonian, and others to create a centralized database, there has been no effort to profile and maintain a database specifically on the extent of introduced species in and adjacent to GFNMS. In order to understand the current extent of introduced species in the sanctuary, the following steps will be taken:

- A. As a component of STRATEGY FA-1, update current species list and integrate introduced species into this list. Perform a species abundance and distribution assessment, and an all-taxa inventory (species inventory) through a meta-analysis (identifying existing literature, specimens, and data).
- B. Perform an introduced species inventory literature search (mostly grey literature) and develop an annotated bibliography. Where possible, collect documents and catalog in library.

- C. Identify data gaps for native and introduced species (areas surveyed) inventories, particularly focusing on the outer coast. Address data gaps by working with researchers and partner organizations.

**Potential Partners:** Point Reyes National Seashore (PRNS), Integrative Graduate Education and Research Traineeship Program (IGERT) Intern Program, The National Centers for Coastal Ocean Science (NCCOS), Audubon, CDFG, Smithsonian, National Marine Fisheries Service (NMFS), United States Fish and Wildlife Service (USFWS), CalFed, Bodega Marine Laboratory (BML)

**Products:** Species inventory, introduced species inventory

**Complementary Strategies:** GFNMS Final Management Plan (FMP), Ecosystem Protection, STRATEGY FA-1; Conservation Science STRATEGY CS-1, CS-4, CS-5, CS-6; Northern Management Area Transition STRATEGY XNRM-1

**Activity 1.2** Develop an easily accessible and queryable database to be used by sanctuary superintendent, staff, researchers and other agencies and institutions.

- A. Create a centralized Web-based spatial database on SIMoN mapping species abundance and distribution and spatial extent of introduced species, focusing on areas of concern such as Estero Americano and Estero de San Antonio. Database will identify potential areas of highest likelihood of invasion.
- B. Ensure compatible database protocols by investigating existing database structures.

**Potential Partners:** PRNS, IGERT Intern Program, NCCOS, Audubon, CDFG, Smithsonian, NMFS, USFWS, CalFed, National Marine Sanctuary Program (NMSP)

**Products:** Spatial Web-based database

**Complementary Strategies:** GFNMS FMP, Wildlife Disturbance, STRATEGY WD-1; Monterey Bay National Marine Sanctuary (MBNMS) FMP, Introduced Species, STRATEGY IS-2

**STRATEGY IS-2:** *In coordination with existing monitoring programs, develop a program to detect introduced species in estuarine environments of the sanctuary.*

**Activity 2.1** Currently, there are no formal introduced species monitoring programs for estuaries in the sanctuary (Bollinas Lagoon, Tomales Bay, Estero de San Antonio, and Estero Americano). Monitoring efforts are taking place in estuarine environments in and around the sanctuary, such as PRNS's all-taxa inventory of Tomales Bay, although not specifically focused on introduced species. GFNMS will work with other agencies and institutions to incorporate introduced species identification and monitoring into existing monitoring programs. Ensuring continuous monitoring in coordination with other agencies will include the following steps:

***Introduced Species Action Plan***  
***GFNMS Management Plan***

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- A. Formalize partnerships with agencies/institutions currently conducting monitoring programs in Tomales Bay and Bolinas Lagoon.
- B. Develop an introduced species monitoring program for Estero Americano and Estero de San Antonio (in conjunction with other sanctuary monitoring programs, such as water quality, to be developed).
- C. Adopt standardized protocols from Smithsonian Environmental Research Center (SERC).
- D. Consult with the sanctuary Introduced Species Technical Advisory Council (see STRATEGY IS-6) for advice on frequency of monitoring. Also, conduct random characterization on rotational basis.
- E. Feed data into sanctuary's centralized database (STRATEGY WD-1), as well as other regional and national databases.

**Potential Partners:** PRNS, Point Reyes National Seashore Association (PRNSA), SERC, BML

**Complementary Strategies:** GFNMS FMP, Wildlife Disturbance, STRATEGY WD-1; Introduced Species, STRATEGY IS-1, STRATEGY IS-6; Fishing Activities, STRATEGY FA-1; MBNMS FMP, Introduced Species, STRATEGY IS-4; Conservation Science STRATEGY CS-2, CS-5, CS-6; Northern Management Area Transition STRATEGY XNRM-1

**Activity 2.2** Develop guidelines for new estuarine monitoring programs for introduced species, such as:

- A. Target known invasives, new invasives, and those with likelihood of being established.
- B. Conduct an annual survey of representative areas, high profile areas (high visibility), and conservation areas.
- C. Track other areas in the region to identify potential future introduced species.
- D. Understand the life history and tolerances of already introduced species in the region.

**Potential Partners:** PRNS, IGERT Intern Program, NCCOS, Audubon, CDFG, Smithsonian, NMFS, SERC, USFWS, CalFed, GGNRA, Marin Open Space, BML

**Complementary Strategies:** GFNMS FMP, Water Quality, STRATEGY WQ-2, STRATEGY WQ-6; Education, STRATEGY ED-4

**STRATEGY IS-3: *Develop a monitoring program to detect and monitor introduced species in the rocky intertidal areas of the sanctuary.***

**Activity 3.1** Ongoing since 1992 (with the exception of two years), the GFNMS' rocky intertidal monitoring program's goals are to: (1) monitor trends in population dynamics of selected indicator organisms; (2) determine normal levels of variation; (3) discover abnormal conditions; and (4) measure the effects of management actions. Data indicate changes from natural events such as El Nino on the study species, the varied distribution of species, and the influences that habitat has on the abundance of species. The study includes island and mainland sites. GFNMS' rocky intertidal monitoring program can be modified to identify and track introduced species as follows:

- A. Identify additional representative coastal sites to be monitored for introduced species.
- B. Adopt standardized protocols from SERC and Partnership for Interdisciplinary Studies of Coastal Oceans (PISCO) for monitoring introduced species.
- C. Consult with sanctuary Introduced Species Technical Advisory Council for advice on frequency of monitoring. Also, conduct random characterization on rotational basis.
- D. Feed data into the sanctuary's centralized database, as well as other regional and national databases.

**Activity 3.2** In adding onto GFNMS' existing intertidal monitoring program to look for introduced species, and in coordinating with other agencies' rocky intertidal monitoring programs, the following steps will be taken:

- A. Target known invasives, new invasives, and those with the likelihood of being established.
- B. Conduct an annual survey of representative areas, high profile areas, and conservation areas.
- C. Track other areas in the region to see what is being introduced, and what to start watching for as possible new introductions into the sanctuary.
- D. Understand the life history and tolerances of already introduced species in the region.
- E. Identify the top ten introduced species the sanctuary would like other intertidal monitoring programs to target.
- F. Coordinate with other agencies on protocols.

**Potential Partners:** GGNRA (Slide Ranch), PISCO (looking at key indicators), PRNS, BML, California Academy of Sciences, Berkeley Herbarium, MBNMS Sanctuary Integrated Monitoring Network (SIMoN), MMS (MARINE)

**Complementary Strategies:** GFNMS FMP, Education, STRATEGY ED-4; MBNMS FMP, Introduced Species, STRATEGY IS-4; Conservation Science, STRATEGY CS-4, CS-5; Northern Management Area Transition STRATEGY XNRM-1

***STRATEGY IS-4: Develop a monitoring program to detect and monitor introduced species in the pelagic environment of the sanctuary.***

**Activity 4.1** Introduced plankton species entering San Francisco Bay (and potentially adjacent areas) may already be present in the open ocean (presumably, primarily from ballast water). Although this does not necessarily mean that plankton present in the open water will establish itself in the bay (as some species are benthic while others pelagic), it may provide an indication of the presence of an introduced species. One component of the GFNMS' Sanctuary Ecosystem Assessment Surveys (SEA Surveys) is to assess biological productivity (chlorophyll-a; phytoplankton species inventory; euphausiid abundance and distribution; distribution/ abundance of jellyfish; assessment of drift algae). Without any additional effort by the sanctuary, SEA's plankton tows and Harmful Algal Bloom assessments will be used to sample for introduced species.

- A. Since plankton samples are already being collected, detection of introduced species would not require modifications to the sampling protocol, but would require additional analysis to identify introduced species within the sample. GFNMS will coordinate with San Francisco State University's (SFSU) Romberg Tiburon lab to analyze plankton samples and identify introduced species.

**Potential Partners:** NMFS, SFSU Romberg Tiburon Center, State Department of Health Services, Monterey Bay Aquarium Research Institute (MBARI), PRNS, Farallon National Wildlife Refuge, BML, SERC, Cordell Bank National Marine Sanctuary (CBNMS), NMSP Regional Monitoring (Channel Islands National Marine Sanctuary [CINMS]), Olympic Coast National Marine Sanctuary [OCNMS], MBNMS)

**Complementary Strategies:** GFNMS FMP, Ecosystem Protection, STRATEGY FA-1; MBNMS FMP, Introduced Species, STRATEGY IS-4; Conservation Science STRATEGY CS-4, CS-5; Northern Management Area Transition STRATEGY XNRM-1

***STRATEGY IS-5: Develop an outreach and monitoring program to improve early detection of introduced species.***

**Activity 5.1** Since most introduced species are accidental finds, GFNMS will develop an early detection program to widely disseminate information about introduced species to local citizens and visitors who frequent areas of the sanctuary where invaders could become established.

Using Elkhorn Slough National Estuarine Research Reserve's (ESNERR) *Least Wanted Aquatic Invaders Programs* model, the sanctuary will partner with other agencies to develop a similar program. Steps to develop this program include:

- A. Identify other agencies with which to develop a cooperative partnership.
- B. Identify two dozen "least wanted" invaders. These are species that are not yet present in GFNMS, but have successfully invaded other coastal regions; are colonizing and increasing in abundance; and are spreading rapidly. Species will be chosen based on significance of size and obvious characteristics that provide the ability for them to be easily identified by non-experts.
- C. Develop outreach materials with clear messaging and photos or illustrations for easy identification of the top twelve potential invaders.
- D. Develop agency staff training program so outreach and field personnel may effectively engage the public in early detection of introduced species.

**Potential Partners:** NMFS, CDFG, Sea Grant, GGNRA, PRNS, ESNERR, San Francisco Bay National Estuarine Research Reserve (SFBNERR), SERC, NCCOS, UCCE

**Complementary Strategies:** GFNMS FMP, Education, STRATEGY ED-7; Introduced Species, STRATEGY IS-1, STRATEGY IS-2, STRATEGY IS-3; MBNMS FMP, Introduced Species, STRATEGY IS-4; Conservation Science, STRATEGY CS-5, Northern Management Area Transition STRATEGY XNRM-1

**STRATEGY IS-6:** *Develop partnerships with other agencies and organizations that are involved in issues related to introduced species to advise the sanctuary.*

**Activity 6.1** Develop a Technical Advisory Council of experts on introduced species issues. This group would meet on an as needed basis and may coordinate with the research working group on many issues.

**Potential Partners:** NMFS, CDFG, Sea Grant, USFWS, ESNERR, SWRCB, Regional Water Quality Control Board (RWQCB), Marin Open Space, National Park Service (NPS), California Coastal Conservancy, University of California Davis (UCD), California State Lands Commission (CSLC)

**Complementary Strategies:** GFNMS FMP, Introduced Species, STRATEGY IS-1, STRATEGY IS-2, STRATEGY IS-3, STRATEGY IS-4, STRATEGY IS-5, STRATEGY IS-7, STRATEGY IS-8

**Activity 6.2** A regional representative of the California sanctuaries (GFNMS, CBNMS, MBNMS, CINMS) should sit on CalFed's Non-native Invasive Species Advisory Committee (NISAC). The regional representative's role is to communicate the sanctuaries' interests, needs, and efforts in addressing introduced species issues. The representative will also be in attendance to listen and learn from experts in the field of introduced species and identify potential partners.

**Potential Partners:** CalFed, CBNMS, MBNMS, CINMS

**STRATEGY IS-7:** *Develop a rapid response plan and streamlined permit process in order to respond in a timely manner to necessary eradication or control efforts in the sanctuary.*

**Activity 7.1** Take the lead in coordinating with other agencies in the development of a rapid response plan to eradicate or control existing or new introductions in, or in areas adjacent to, the sanctuary.

- A. Examine existing models such as the Western Regional Plan or Southern California Caulerpa Action Team (SCCAT) to use as a template for developing a rapid response plan.
- B. Establish a rapid response team consisting of agency representatives actually responsible for responding in an emergency situation.
- C. Develop and execute mock training exercises.
- D. Develop a manual that outlines a rapid response fire alarm approach.
  - 1. Identify twelve new likely invaders (habitats, pathways, probable sites)
  - 2. Develop a separate response plan for each species
  - 3. Test the notification scheme (phone tree)
  - 4. Clarify and have approval on the “authority to act” agency ownership
  - 5. Identify stakeholder team, how will they be engaged, and who will notify them
  - 6. Identify the pool of experts (needs to be large), who, where, what kind of availability and expertise (eradication, management, biology, habitats, etc.)
  - 7. Formalize each part of the plan as a document and identify lead agency
  - 8. Form intervention team to carry out eradication or control effort in the field
- E. Review relevant laws, regulations, and policies to determine necessary permits that might be required in order to perform.
- F. Test all components of the rapid response plan.

**Potential Partners:** NMFS, CDFG, Sea Grant, USFWS, ESNERR, SWRCB, RWQCB, SERC, Marin Open Spaces, NPS, California Coastal Conservancy, UCD (BML), SFSU, U. S. Environmental Protection Agency (EPA), United States Coast Guard (USCG), experts in the field

**Complementary Strategies:** GFNMS FMP, Introduced Species, STRATEGY IS-6; MBNMS FMP, Introduced Species, STRATEGY IS-4

**STRATEGY IS-8: *Take action to control new introductions of introduced species.***

**Activity 8.1** Work with the State Water Resource Quality Board to include in the definition for “impaired waters” those areas where introduced species have been identified. Section 303(d) of the Clean Water Act requires the states submit to EPA a list of water bodies that do not meet water quality standards for specific pollutants (i.e., are “impaired”).

**Activity 8.2** Require the reporting of all research activities in the sanctuary to determine: (1) the types of activities taking place that might accidentally introduce invasive species; and (2) understand who may be doing research or monitoring of introduced species.

**STRATEGY IS-9: *Through outreach efforts, inform targeted audiences and industry about pathways through which introduced species may enter the sanctuary and educate those targeted audiences on prevention methods.***

**Activity 9.1** Develop a targeted prevention program (other than the shipping industry, as ballast water is already being targeted).

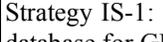
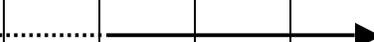
- A. Identify and categorize potential vectors associated with introductions within and adjacent to the sanctuary.
- B. Identify audiences including: recreational and commercial boat users and fishermen; landscapers; adjacent residential homeowners; restaurants; aquarium stores; aquaculture industry; and bait shops.
- C. Identify and incorporate applicable features of existing outreach programs (e.g., Great Lakes Sea Grant) into the development of a program for the sanctuary.
- D. Develop messaging and method of delivery and integrate into other sanctuary outreach materials and education programs.

**Potential Partners:** NMS, CDFG, Sea Grant, USFWS, UCCE

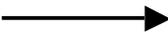
**Complementary Strategies:** GFNMS FMP, Education, STRATEGY ED-6, STRATEGY ED-7, STRATEGY ED-8, STRATEGY ED-9

GFNMS INTRODUCED SPECIES

**Timeline**

Introduced Species Strategy	Year 1	Year 2	Year 3	Year 4	Year 5
Strategy IS-1: Develop a native and introduced species inventory and database for GFNMS.					
Strategy IS-2: Develop a program to detect introduced species in estuarine environments of the sanctuary.					
Strategy IS-3: Develop a monitoring program to detect and monitor introduced species in the rocky intertidal areas of the sanctuary.					
Strategy IS-4: Develop a monitoring program to detect and monitor introduced species in the pelagic environment of the sanctuary.					
Strategy IS-5: Develop an outreach and monitoring program to improve early detection of introduced species.					
Strategy IS-6: Develop partnerships with other agencies and organizations involved in introduced species management.					
Strategy IS-7: Develop a rapid response plan and streamlined permit process.					
Strategy IS-9: Outreach to targeted audiences and industries about how to prevent new introductions.					

**Legend:**

-  Ongoing Activity
-  Planning Stage
-  Completed Activity

GFNMS INTRODUCED SPECIES

**Budget**

Strategy	Estimated Annual Cost (1000's)*					Total Est. 5-Year Cost (1000's)
	YR 1	YR 2	YR 3	YR 4	YR 5	
<b>STRATEGY IS-1: Develop a native and introduced species inventory and database for the sanctuary</b>	\$9.5	\$14.5	\$7	\$14.5	\$7	\$49.5
<b>STRATEGY IS-2: Develop a program to detect introduced species in <u>estuarine</u> environments of the sanctuary</b>	\$0	\$0	\$18	\$14	\$17	\$49
<b>STRATEGY IS-3: Develop a monitoring program to detect and monitor introduced species in the <u>rocky intertidal</u> areas of the sanctuary</b>	\$0	\$70.5	\$55	\$57	\$66	\$248.5
<b>STRATEGY IS-4: Develop a monitoring program to detect and monitor <u>introduced species</u> in the pelagic environment of the sanctuary</b>	\$0	\$0	\$0	\$0	\$0	\$0
<b>STRATEGY IS-5: Develop an outreach and monitoring program to improve early detection of introduced species</b>	\$0	\$0	\$22.5	\$46	\$48	\$116.5
<b>STRATEGY IS-6: Develop partnerships with other agencies and organizations that are involved in introduced species management</b>	\$0	\$0	\$16	\$16	\$16	\$48
<b>STRATEGY IS-7: Develop a rapid response plan and streamlined permit process</b>	\$0	\$0	\$0	\$32	\$29	\$61
<b>STRATEGY IS-8: Take regulatory action to control new introductions</b>	\$2	\$2	\$2	\$2	\$2	\$10
<b>STRATEGY IS-9: Outreach to targeted audiences and industry about pathways to prevent methods</b>	\$0	\$0	\$31	\$27	\$31	\$89
<b>Total Estimated Annual Cost</b>	\$12	\$87	\$151.5	\$208.5	\$216	\$675

The sanctuary's base budget is available each year from appropriated funds.

There is both availability of and opportunity to receive additional funding from appropriated

***Introduced Species Action Plan***  
***GFNMS Management Plan***

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funds.
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The estimates do not take into account increasing personnel costs each year or inflation.
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The estimates do not take into account unexpected events or emergencies or unforeseen projects.
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GFNMS INTRODUCED SPECIES

## Performance Measures

Strategy Title(s)	Performance Goal	Desired Outcome (Objective)	Outcome Measure	How Measured	Who Measures	Output Measure
STRATEGY IS-1: Develop a native and introduced species inventory.	Maintain an abundance and diversity of native marine/estuarine species: Detect, manage, and where feasible, eradicate new and established introduced species in the sanctuary.	Understand the current extent of introduced species in GFNMS.	To develop a spatial distribution of native species and introduced marine and estuarine species.	1) Complete native and introduced species inventory. 2) Maintain a database on the extent of introduced species in and adjacent to GFNMS. 3) Effectively use inventory as management decision-making tool to control further introductions.	Research Coordinator, Sanctuary Superintendent, Ecosystem Protection Coordinator	1) Native species inventory and introduced species inventory 2) Spatial Web-based database and GIS map of invasives
STRATEGY IS-2: Develop a program to detect introduced species in estuarine environments of the sanctuary. STRATEGY IS-3: Develop a monitoring program to detect introduced species in the rocky intertidal areas of the sanctuary. STRATEGY IS-4: Develop a monitoring program to detect introduced species in the pelagic environment of the sanctuary.	Maintain an abundance and diversity of native marine/estuarine species: Detect, manage, and where feasible, eradicate new and established introduced species in the sanctuary.	Create a new program and/or coordinate with existing programs to detect and monitor new introductions.	To detect, and thus improve ability to prevent, colonization or spatial expansion of introduced species.	Incorporate identification and monitoring of introduced species into existing monitoring programs, particularly in representative or high profile areas and targeting: known invasives, new species, and those with a likelihood of being established.	Research Coordinator, Education Coordinator, Ecosystem Protection Coordinator	1) Triennial summary reports of monitoring programs 2) GIS map of invasives

***Introduced Species Action Plan  
GFNMS Management Plan***

<b>Strategy Title(s)</b>	<b>Performance Goal</b>	<b>Desired Outcome (Objective)</b>	<b>Outcome Measure</b>	<b>How Measured</b>	<b>Who Measures</b>	<b>Output Measure</b>
STRATEGY IS-7: Develop a rapid response plan and streamlined permit process to respond to eradication or control of introduced species.	Maintain an abundance and diversity of native marine/estuarine species: To detect, manage, and where feasible, eradicate new and established introduced species in the sanctuary.	Develop management actions to eradicate and/or control existing and new introductions.	1) Improve ability to rapidly respond to, and eradicate or control existing or new introductions in the sanctuary or areas adjacent to the sanctuary. 2) Effective rapid response should prevent the establishment or spread of introduced species.	1) Establish a rapid response plan with partner agencies and institutions, including preparedness training. 2) In coordination with other agencies, participate in a streamlined permit process.	Ecosystem Protection Coordinator, partners	1) Rapid response plan manual 2) Permits for pre-approved plans
STRATEGY IS-9: Outreach to targeted audiences on prevention methods.	Maintain an abundance and diversity of native marine/estuarine species: To prevent future introductions of introduced species in the sanctuary.	Identify and control current and potential pathways to prevent new introductions.	1) Decrease the number of pathways for, and sources of introduced species. 2) Control spreading of already established introduced species.	1) Develop a targeted prevention program directed at user groups and industry in and around sanctuary waters. 2) Through monitoring programs track numbers of new introduced species to determine effectiveness of outreach efforts. See Performance Measures for IS-1-4.	Ecosystem Protection Coordinator, Education Coordinator	1) Outreach materials 2) Best management practices identified in GFNMS special permit conditions



SITE-SPECIFIC ISSUE  
**ECOSYSTEM PROTECTION: IMPACTS FROM FISHING  
ACTIVITIES  
ACTION PLAN**

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## **ISSUE STATEMENT**

Although fishing activities may have impacts on living marine resources, habitats, and ecosystem dynamics, specific impacts to Gulf of the Farallones National Marine Sanctuary (GFNMS) from fishing activities in and around sanctuary waters are not well understood.

Some of the issues related to fishing or harvesting activities to be explored include: (1) impacts on trophic interactions from krill harvesting; (2) impacts from trampling and harvesting of invertebrates in the intertidal; (3) gear impacts on habitats and living resources; (4) impacts on trophic levels from localized depletion of bait fish; and (5) region-wide declines in fish populations.

## **ISSUE DESCRIPTION**

The diversity and abundance of fish and invertebrate species within the sanctuary are largely due to the variety of habitats, including intertidal mudflats, estuaries, rocky shorelines and deeper subtidal areas. The intertidal mudflats support large concentrations of burrowing organisms such as clams, snails, and crabs. Eelgrass beds occur on the more extensive flats of Tomales Bay, Bolinas Lagoon, and within the Esteros. Pacific herring and invertebrates depend on eelgrass beds in Tomales Bay to spawn and feed. The shallow, protected waters of the bays and estuaries are critical habitat for salmon and several species of perch and flatfish. In their journey from the ocean through Tomales Bay and into Lagunitas Creek, the federally listed, threatened coho salmon depend on clear water, riparian vegetative cover, and a certain size gravel to complete their reproductive process. Accurate characterizations of the deeper subtidal habitats of the sanctuary are limited. Rocky banks in deep water are inhabited by large populations of rockfish, more than fifty species of which occur in the sanctuary. Sablefish and flatfish such as sole, sandab, and halibut are found on offshore soft-bottom habitats. Concentrations of sardines, northern anchovies, krill, and Pacific herring are also found in the sanctuary.

King salmon and rockfish have been the primary target species for sport fishing in GFNMS. On some weekend days, more than 1,000 clam diggers harvest gaper, geoduck, Washington and littleneck clams. The most important commercial harvests have included Pacific herring, salmon, rockfish, and Dungeness crab. Prawn and shrimp harvesting also take place in the area. Most of the commercial catches harvested in GFNMS are landed in San Francisco, Bodega Bay, Oakland, Half Moon Bay, and Sausalito. The tidal community includes a wide variety of invertebrates such as barnacles, limpets, black turban snails, mussels, sea anemones, abalone,

and urchins, which may be harvested as well. Gear types used in the GFNMS include hook and line, long lines, gill nets, seines, traps, bottom trawlers, and mid-water trawlers.

Management of commercial and recreational fisheries in California is the responsibility of the California Department of Fish and Game (CDFG) in state waters (0-3 nautical miles), and National Oceanic and Atmospheric Administration (NOAA) Fisheries in federal waters (3 to 200 miles), although fisheries management plans may cover both state and federal waters. In contrast, the National Marine Sanctuary Program (NMSP) does not manage fisheries, but it does have a mandate to protect the entire sanctuary ecosystem and has authority to manage human uses that may impact sanctuary wildlife and habitats.

## **JURISDICTIONAL SETTING**

### **Restricted Access Fisheries**

Restricted access programs in fisheries limit the quantity of persons, vessels, or fishing gear that may be engaged in the take of a given species of fish or shell fish. Restricted access may also limit the catch allocated to each fishery participant through harvest rights such as individual or community quotas. A primary purpose of restricted access programs is to balance the level of effort in a fishery with the health of the fishery resources. In most situations, except harvest rights, this involves setting an appropriate fishery capacity goal.<sup>2</sup>

### **California's Restricted Access Program**

In 1977, California focused its first limited access program on the abalone fishery, followed in 1979 with legislation requiring salmon limited entry permits. In the 1990s, industry began to demand more restricted access programs, so the California Department of Fish and Game (CDFG) began to address restricted access in a comprehensive manner. In 1996, a limited entry review committee was formed to develop a standard restricted access policy for the Fish and Game Commission. The commission approved the restricted access policy in June 1999.<sup>3</sup>

Since the passage of the Marine Life Protection Act (MLPA) of 1998 and the commission's adoption of the restricted access policy in 1999, more restricted access program responsibility has shifted from the legislature to the commission and CDFG. The CDFG works closely with constituent advisory committees and task forces to carefully design and evaluate restricted access plans for submission to the commission. The commission then conducts hearings for further public input. The plan is then returned to the CDFG and advisory groups for any necessary revisions before going to the commission for final approval. The legislature is involved and informed with fisheries that require legislation to implement restricted areas.<sup>3</sup>

### **Marine Life Management Act**

The Marine Life Management Act (MLMA) requires the CDFG and Fish and Game Commission to evaluate existing restricted access programs every five years. These evaluations and increase in restricted access programs will require the CDFG to expand capabilities to collect and analyze

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<sup>2</sup> California Department of Fish and Game. December 2001; *California's Living Marine Resources: A Status Report*, Sacramento, California

economic and social data related to fisheries. Socioeconomic data and biological data about fisheries resources are key components in developing and evaluating restricted access policy alternatives.

### **Marine Life Protection Act (MLPA)**

State legislation requires that the CDFG develop a plan for establishing networks of marine protected areas in California waters to protect habitats and preserve ecosystem integrity. The master plan requires that recommendations be made for a preferred alternative network of MPAs with “an improved marine life reserve component.” The MLPA further states that “it is necessary to modify the existing collection of marine protected areas (MPAs) to ensure that they are designed and managed according to clear, conservation-based guidelines that take full advantage of the multiple benefits that can be derived from the establishment of marine life reserves.”

### **Magnuson-Stevens Fishery Conservation and Management Act**

The implementation of the Magnuson-Stevens Fishery Conservation and Management Act virtually eliminated all foreign fishing vessels by extending the United States jurisdiction and control over all marine fisheries resources within 200 miles of the U.S. coast. The act required the establishment of eight regional fishery management councils composed of federal and state fishery management officials and industry representatives. The councils have responsibility to develop, monitor, and revise fishery management plans for each fishery within the Exclusive Economic Zone (EEZ) that requires management. Every fishery management plan must be approved by the Secretary of Commerce before it can be implemented by NOAA Fisheries.

The Pacific Fishery Management Council (PFMC) is one of eight regional councils established pursuant to the MSFCMA, and manages the fisheries in federal waters off California, Oregon, and Washington. The Pacific Council manages four major West Coast fisheries: (1) coastal pelagic species fishery (e.g., sardines); (2) marine salmon fishery; (3) Pacific coast groundfish fishery (including more than eighty species); and (4) West coast highly migratory species fishery (e.g., tunas and sharks).

## **ECOSYSTEM PROTECTION: FISHING ACTIVITIES GOALS**

Maintain an abundance and diversity of native marine/estuarine/intertidal species:

1. Better understand the impacts from fishing activities on sanctuary ecosystems.
2. Allow for fishing that is compatible with sanctuary goals and ecosystem protection.

## **ECOSYSTEM PROTECTION: FISHING ACTIVITIES OBJECTIVES**

1. Based on the best available scientific and socioeconomic information, the sanctuary will facilitate the evaluation of the status and trends in marine populations (and their causes) in sanctuary waters; and identify and evaluate impacts on sanctuary ecosystems from fishing activities.

2. The sanctuary will seek to facilitate the management of fisheries resources within its boundaries in order to protect cultural resources; to protect sanctuary wildlife and habitat; and to maintain native biodiversity and the health and balance of the sanctuary ecosystem.
3. The sanctuary will identify and develop appropriate actions to address any negative impacts from fishing activities on sanctuary ecosystems.

## **ECOSYSTEM PROTECTION: FISHING ACTIVITIES ACTION PLAN**

**STRATEGY FA-1:** *Develop an ecosystem characterization of the sanctuary to better understand types and distributions of habitats, species, and processes.*

**Activity 1.1** Modify the Sanctuary Ecosystem Assessment Survey-Pelagic Habitat (SEA Surveys, formerly known as Ecosystem Dynamic Study) and develop additional research components as necessary to build a baseline characterization and regional monitoring of the sanctuary including habitat, physical, and biological characteristics.

- A. The SEA Surveys will systematically survey and assess the distribution and abundance of marine birds, sea turtles and marine mammals. The primary region of interest is within GFNMS, north to the Russian River and west to the Farallon Escarpment. The study will simultaneously assess ocean habitat, and biological productivity. Additional components will include:
  1. Habitat characterization including mapping substrate type/bathymetry (static)
  2. Biological characterization including species abundance and distribution, spatial and temporal
  3. Physical characterization including oceanographic features (spatial and temporal) and pelagic (dynamic)
- B. Use GIS as a tool to characterize sanctuary habitats, species, and processes.

**Potential Partners:** National Marine Fisheries Service (NMFS), Minerals Management Service (MMS), United States Geological Survey (USGS), CDFG, Central California Ocean Observing Systems (CeNCOOS), Partnership for Interdisciplinary Studies of Coastal Oceans (PISCO), Moss Landing Marine Laboratories (MLML), National Oceanographic Data Center (NODC), Sanctuaries Hazardous Incident Emergency Logistics Database System (SHIELDS), Office of Enforcement (OE), Ford Consulting Inc., H. T. Harvey Consulting

**Complementary Strategies:** GFNMS Final Management Plan (FMP), Introduced Species, STRATEGY IS-2; Ecosystem Protection, STRATEGY FA-3, STRATEGY FA-4, STRATEGY EP-1, STRATEGY EP-3; Vessel Spills, STRATEGY VS-8; Conservation Science, STRATEGY CS-3, CS-5

**Activity 1.2** Conduct monitoring needs assessment workshops for West Coast national marine sanctuaries.

**Activity 1.3** Conduct workshops to develop a coordinated plan for regional monitoring and ocean observing system activities to supplement the NMFS five-year surveys (per recommendations developed during the marine mammal/seabird workshop in December 2002). These workshops will develop a plan to expand appropriate methodologies for monthly and annual ocean observing and trophic structure surveys across all five West Coast sanctuaries.

**Activity 1.4** Based upon available ship time, facilitate expansion of California Cooperative Oceanic Fisheries Investigations (CalCOFI) transect lines through the five West Coast sanctuaries.

**Potential Partners:** NMFS, MMS, United States Geological Survey (USGS), CDFG, CeNCOOS, PISCO, MLML, NODC, SHIELDS, OE, Ford Consulting Inc., H. T. Harvey Consulting

**Complementary Strategies:** GFNMS FMP, Introduced Species, STRATEGY IS-2; Ecosystem Protection, STRATEGY FA-3, STRATEGY FA-4, STRATEGY EP-1, STRATEGY EP-3; Vessel Spills, STRATEGY VS-8

**STRATEGY FA-2: *Develop a socioeconomic profile of fishing activities and communities in and adjacent to the sanctuary.***

**Activity 2.1** Hire a contractor to profile the history and evolution of fishing activities occurring in and adjacent to the sanctuary. Profile should include information on actual numbers of boats actively engaged in each fishery; areas where the fishery is taking place; gear types; catch levels; a socioeconomic profile of the harbors and marinas accessing the sanctuary; and an understanding of markets, changing gear types, and changing fisheries management regulations that influence this profile and the community. Information exchange with mariners will provide important input to the profile.

**Potential Partners:** Fishing community, NMFS, NOAA, The National Centers for Coastal Ocean Science (NCOS), CDFG, California Species of Special Concern (CSC)

**Products:** Publication, database

**Complementary Strategies:** GFNMS FMP, Ecosystem Protection, STRATEGY FA-1, STRATEGY FA-5

**STRATEGY FA-3: *Evaluate impacts from fishing activities on sanctuary resources.***

**Activity 3.1** Develop a definition for “compatible use.” The “compatible use” definition will establish a threshold for maximum allowable impacts on sanctuary resources from fishing and other activities. The “compatible use” definition will set a standard for the compatibility index (see Activity 3.2 below).

**Activity 3.2** Develop a “compatibility index” to rank and evaluate types and levels of impacts from fishing activities. The compatibility index will be based on a model similar to the *Severity*

*Ranking of Collateral Impacts*<sup>1</sup> model for fishing gear types and will include consideration and rankings for different types and levels of impacts such as:

1. Habitat impacts (physical)
2. Habitat impacts (biological)
3. Levels of by-catch (shellfish and crabs, finfish, sharks, marine mammals, seabirds and sea turtles, juvenile life stages)
4. Impacts associated with species' life history (such as aggregated behavior during spawning)

**Potential Partners:** NMFS, sanctuary advisory council (SAC), stakeholder representatives, agency representatives, interest groups

**Product:** Compatibility index

**Complementary Strategies:** GFNMS FMP, Ecosystem Protection, STRATEGY FA-1, STRATEGY FA-4, STRATEGY EP-1; Monterey Bay National Marine Sanctuary (MBNMS) FMP, Benthic Habitats, STRATEGY BH-2, Fishing Education and Research, STRATEGY FER-3

**STRATEGY FA-4: *Develop policy recommendations or management action(s) to address impacts from fishing activities on sanctuary resources.***

**Activity 4.1** If the compatibility index indicates significant negative impacts on sanctuary resources from fishing activities, as appropriate, a stakeholder-based, issue-specific working group of the sanctuary advisory council will be developed to evaluate and make recommendations on actions the sanctuary should take to address impacts from specific activities.

- A. A stakeholder-based working group (issue-specific) may include: resource management agencies, interest groups, user groups, fishermen representing different gear types, and the scientific community.
- B. The working group will make recommendations to the SAC based on best available scientific and socioeconomic data.

**Potential Partners:** NMFS, SAC, stakeholder representatives, agency representatives, interest groups, PFMC, CDFG

**Complementary Strategies:** GFNMS FMP, Ecosystem Protection, STRATEGY FA-3, STRATEGY EP-1; MBNMS FMP, Benthic Habitats, STRATEGY BH-2, Fishing Education and Research, STRATEGY FER-3

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<sup>1</sup> Morgan L. and R. Chuenpagdee. 2003; *Shifting Gears: Addressing the collateral impacts of fishing methods used in U.S. waters*. Island Press, Washington DC (42 pp.)

**Activity 4.2** Develop a series of management categories (policy responses) based on relative level of impact from a fishing activity, as determined by the compatibility index.

- A. Management responses or recommendations to other appropriate management agencies may include a range of recommendations such as:
  - 1. Using less ecologically damaging types of gear
  - 2. Changing fishing practices using appropriate incentives
  - 3. Promoting innovations in fishing gear and technology
  - 4. Establishing area-based restrictions
  - 5. Supporting future studies, including assessment of social and economic effects of policy actions on fishing activities
  - 6. Using tools such as adaptive management to reintroduce closed fisheries
- B. Develop a timeline and mechanism(s) for implementation of recommendations, establishing protocols and procedures for working with other agencies.

**Potential Partners:** Fishing community, PFMC, NMFS, CDFG, MBNMS, Channel Islands National Marine Sanctuary (CINMS), Cordell Bank National Marine Sanctuary (CBNMS), Sea Grant

**Products:** Response categories and mechanisms for implementation

**Complementary Strategies:** GFNMS FMP, Ecosystem Protection, STRATEGY FA-3

**STRATEGY FA-5:** *Develop public awareness about the value and importance of the historical and cultural significance of maritime communities and their relationship and reliance on healthy sanctuary waters.*

**Activity 5.1** Develop a maritime heritage and fishing community model.

- A. Identify an appropriate marina or harbor to profile as a living maritime community.
  - B. Work together with the fishing community, businesses, chambers of commerce and local government to develop a marketing and outreach plan to profile the fishing community, the associated working harbor, and their relationship to the sanctuary and its healthy marine resources. The plan may include workshops, signage, kiosks, events, attractions, and activities. The plan will also articulate clear and consistent messages.
  - C. Educate the community about sustainable fishing practices and the role of consumers. Work with the fishing community to promote compatible fishing practices in the sanctuary.
- Potential Partners:** Fishing community, visitors bureau, tourism industry and business community, Farallones Marine Sanctuary Association (FMSA)

**Complementary Strategies:** GFNMS FMP, Ecosystem Protection, STRATEGY FA-2; MBNMS FMP, Benthic Habitats, STRATEGY BH-1; Fishing Related Education and Outreach, STRATEGY FER-4

**STRATEGY FA-6:** *Establish consistent and coordinated region-wide sanctuary representation at the Pacific Fishery Management Council and Fish and Game Commission meetings.*

**Activity 6.1** Select regional sanctuary representative to attend Pacific Fishery Management Council (PFMC) and Fish and Game Commission (FGC) meetings and participate as appropriate.

- A. The West Coast sanctuaries (Olympic Coast, Cordell Bank, Gulf of the Farallones, Monterey Bay, and Channel Islands) need a single point of contact that will consistently represent all five sanctuaries to inform and update the council and commission on current activities and emerging fishing issues in the sanctuaries. The sanctuaries also need to listen and track issues PFMC and FGC are addressing.
- B. Create semi-annual, or as appropriate, briefing packets for the council and commission on sanctuary activities.

**Potential Partners:** NMSP, Olympic Coast National Marine Sanctuary (OCNMS), CBNMS, MBNMS, CINMS

**Complementary Strategies:** CBNMS FMP, Ecosystem Protection, STRATEGY FA-1; MBNMS FMP, Fishing Education and Research, STRATEGY FER-1

**STRATEGY FA-7:** *Work with Cordell Bank and Monterey Bay national marine sanctuaries and the PFMC to address impacts on marine ecosystems in and around sanctuary waters from krill harvesting.*

**Activity 7.1** Krill are a critical component of the marine ecosystem. These species are preyed upon by almost all commercially important fish species and by whales and seabirds. Krill are currently not harvested within the sanctuary, however, the potential exists for this fishery to develop in the future due to an increasing need for aquaculture feed. A krill fishery could not only severely impact the integrity of the marine ecosystem, but could adversely affect commercial and recreational fisheries of all kinds as most targeted species are directly or indirectly dependent on this resource.

To address this issue, the fishing activities working group recommended that the sanctuary superintendent work with the PFMC and NMFS to take action on a total, permanent ban on krill harvesting in West Coast sanctuaries off of Washington, Oregon and California.

- A. GFNMS will work with CBNMS, MBNMS, the PFMC, and NMFS to monitor the implementation of the Coastal Pelagic Species Fishery Management Plan, which includes a preferred alternative for a permanent ban on krill harvesting.

**Potential Partners:** CBNMS, MBNMS, PFMC, NMFS, CDFG, FGC

**Complementary Strategies:** CBNMS FMP, Ecosystem Protection, STRATEGY FA-5

## ECOSYSTEM PROTECTION ACTION PLAN

**STRATEGY EP-1:** *Develop a resource protection plan (policy) to minimize user conflicts and provide special areas of protection for sensitive habitats, living resources, and other unique sanctuary features.*

**Activity 1.1** Determine the need for using tools such as zoning (e.g., marine reserves, research reserves, no motor zones) to take a proactive approach and address specific ecosystem management issues. This plan will be built in consideration of other management strategies, both temporary and permanent. This plan is not specifically directed at fishing activities, but rather ecosystem protection, and it may apply to many ecosystem management issues.

- A. Characterize and map the wildlife and habitats of the sanctuary to identify and link species distribution with critical areas/phases of their life history (see STRATEGY FA-1).
- B. Overlay socioeconomic profile of human activities taking place in the sanctuary (see STRATEGY FA-2.1).
- C. Use stakeholder-based group and scientific expertise to review data to determine possible indicators of “special areas of concern” and/or “species of concern.”
- D. Based on the above information, the working group will work with the sanctuary superintendent to identify if and where a zonal plans would be appropriate in the sanctuary.

**Potential Partners:** PFMC, CDFG, FGC, NMFS, California Department of Boating and Waterways (CDBW), PRBO Conservation Science (Point Reyes Bird Observatory) (PRBO), MPA Center, Center for Integrated Marine Technology (CIMT), CBNMS, Naval Postgraduate School (NPS), National Park Service (NPS), various marine laboratories and research institutions, commercial and recreational fishing interests, conservation community

**Products:** The product will consist of a potential network of zonal designations within sanctuary waters that will enable managers to minimize space-use conflicts, determine the appropriate level or type of human use in each area, and avoid adverse interactions between scientific research, public enjoyment of the sanctuary, and the maintenance of ecosystem integrity in compliance with the National Marine Sanctuaries Act (NMSA)

**Complementary Strategies:** GFNMS FMP, Wildlife Disturbance, STRATEGY WD-7, Ecosystem Protection, STRATEGY FA-3, STRATEGY FA-4, STRATEGY EP-2; MBNMS FMP, Marine Protected Areas, STRATEGY MPA-2

**STRATEGY EP-2: Create a standing “Living Resource and Habitat Protection” working group to provide advice to the sanctuary on ecosystem protection issues.**

**Activity 2.1** Develop a permanent standing working group of the sanctuary advisory council to address ecosystem protection issues in the sanctuary.

**Potential Partners:** Fishing community, stakeholders, interest groups and research community

**Complementary Strategies:** GFNMS FMP, Ecosystem Protection, STRATEGY EP-1, STRATEGY FA-3, STRATEGY FA-4, STRATEGY FA-6; MBNMS FMP, Benthic Habitats, STRATEGY BH-1

**STRATEGY EP-3: Develop strategy to protect habitats that are known to be “special areas of concern.”**

**Activity 3.1** Through a community-based process, make a determination on special status for Estero Americano and Estero de San Antonio to protect and restore habitat for marine life. Estero Americano and Estero de San Antonio lie within the boundaries of GFNMS and are also part of the United Nations Educational Scientific and Cultural Organization (UNESCO) Golden Gate Biosphere Reserve. Estero Americano and Estero de San Antonio are part of a unique habitat category, in that most of the significant estuaries along the California coast have been dredged, diked, or filled. These two estuaries serve as critical food sources and nursery areas for the marine life within GFNMS. Their estuarine environment provides habitat for the tidewater goby, a federally endangered species, and both estuaries represent historically important salmon and steelhead trout habitat that is in need of restoration. Threats to sanctuary resources within Estero Americano and Estero de San Antonio are multi-faceted and ongoing. The following steps will be taken to determine the appropriate level of protection for Estero Americano and Estero de San Antonio.

- A. GFNMS, in conjunction with local landowners, the Students and Teachers Restoring a Watershed (STRAW) Project, the Sonoma Land Trust, the California Coastal Conservancy, the Regional Water Quality Control Board (RWQCB), and California’s Critical Coastal Areas (CCA) Program, will initiate a consultative process (MLPA) to coordinate with the relevant MLPA stakeholder group of the CDFG, as appropriate, to achieve designation of the Estero Americano and Estero de San Antonio as state marine protected areas.
- B. The sanctuary will serve as the “lead agency” by requesting a working group of the sanctuary advisory council to pursue a multi-stakeholder effort that will involve the fishing industry, agricultural landowners, the STRAW Project, Friends of the Esteros, Environmental Action Committee of West Marin, the Sonoma Land Trust, the Marin Agricultural Land Trust (MALT), the CDFG, the California Coastal Conservancy, the RWQCB, and the CCA Program.
- C. Work with agriculture industry and other user groups to pursue the implementation of best management practices (BMPs) in the Esteros.

**Potential Partners:** Fishing industry, agricultural landowners, the STRAW Project, Friends of the Esteros, Environmental Action Committee of West Marin, the Sonoma Land Trust, MALT, the California Coastal Conservancy, the RWQCB, and the CCA Program, CDFG

**Product/ Outcome:** An enhanced level of protection, in the form of a state marine protected area, that will preclude any municipal effluent discharges to sanctuary waters, and will result in a cooperative effort to improve water quality in the Esteros by diminishing non-point polluted runoff into these waterways. Protection of the endangered tidewater goby and the potential restoration of salmon and steelhead runs are also priorities.

**Complementary Strategies:** GFNMS FMP, Ecosystem Protection, STRATEGY FA-1, STRATEGY FA-2, STRATEGY EP-2; Water Quality, STRATEGY WQ-1, STRATEGY WQ-2, STRATEGY WQ-5; Introduced Species, STRATEGY IS-1, STRATEGY IS-2

**GFNMS IMPACTS FROM FISHING ACTIVITIES**

**Timeline**

<b>Impacts From Fishing Activities Strategy</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>
Strategy FA-1: Develop a resource characterization to understand types and distributions of habitats, species, and processes.	—————▶				
Strategy FA-2: Develop a socioeconomic profile of fishing activities and communities in and adjacent to the sanctuary.	—————◆				
Strategy FA-3: Evaluate impacts from fishing activities on sanctuary resources.	—————▶				
Strategy FA-4: Develop management action(s) to address impacts from fishing activities on sanctuary resources.	—————▶				
Strategy FA-5: Bring public awareness to the relationship between maritime communities and healthy sanctuary waters.	.....▶	—————▶			
Strategy FA-6: Establish sanctuary representation at the PFMC and FGC meetings		.....▶	—————▶		
Strategy FA-7: Work with CBNMS and MBNMS to address impacts in the sanctuary from krill harvesting.	—————◆				
<b>Ecosystem Protection Timeline</b>					
Strategy EP-1: Develop a resource protection plan (policy) to protect sensitive habitats, living resources and other unique sanctuary features.	.....▶	—————▶			
Strategy EP-2: Create a standing "Living Resource and Habitat Protection" working group.	—————▶				
Strategy EP-3: Protect habitats that are known to be "special areas of concern."	.....▶	.....▶	.....▶	—————▶	

**Legend:**

- ▶ **Ongoing Activity**
- .....▶ **Planning Stage**
- ◆ **Completed Activity**

GFNMS IMPACTS FROM FISHING ACTIVITIES

## Budget

Strategy	Estimated Annual Cost (1000's)*					Total Est. 5-Year Cost (1000's)
	YR 1	YR 2	YR 3	YR 4	YR 5	
<b>Strategy FA-1: Develop a resource characterization to understand types and distributions of habitats, species and processes</b>	\$396	\$209	\$250	\$226	\$280	\$1,361
<b>Strategy FA-2: Develop a socioeconomic profile of fishing activities and communities in and adjacent to the sanctuary</b>	\$110	\$0	\$0	\$0	\$0	\$110
<b>Strategy FA-3: Evaluate impacts from fishing activities on sanctuary resources</b>	\$4	\$4	\$4	\$4	\$4	\$20
<b>Strategy FA-4: Develop management action(s) to address impacts from fishing activities on sanctuary resources</b>	\$85	\$30	\$0	\$0	\$0	\$105
<b>Strategy FA-5: Bring public awareness to the relationship between maritime communities and healthy sanctuary waters</b>	\$25	\$25	\$25	\$25	\$25	\$125
<b>Strategy FA-6: Establish sanctuary representation at the PFMC and FGC meetings</b>	\$15	\$10	\$4	\$4	\$10	\$25
<b>Strategy FA-7: Work with CBNMS and MBNMS to address impacts in the sanctuary from krill harvesting</b>	\$10	\$0	\$0	\$0	\$0	\$10
<b>ECOSYSTEM PROTECTION</b>						
<b>Strategy EP-1: Develop a resource protection plan (policy) to protect sensitive habitats, living resources and other unique sanctuary features</b>	\$30	\$30	\$30	\$32	\$30	\$152
<b>Strategy EP-2: Create a standing "Living Resource and Habitat Protection" working group</b>	\$4	\$4	\$4	\$5	\$5	\$22

***Ecosystem Protection: Impacts from Fishing Activities Action Plan  
GFNMS Management Plan***

Strategy	Estimated Annual Cost (1000's)*					Total Est. 5-Year Cost (1000's)
	YR 1	YR 2	YR 3	YR 4	YR 5	
<b>Strategy EP-3: Protect habitats that are known to be "special areas of concern"</b>	\$0	\$42	\$44	\$25	\$22	\$133
<b>Total Estimated Annual Cost</b>	\$679	\$354	\$361	\$321	\$375	\$2,090
The sanctuary's base budget is available each year from appropriated funds.						
There is both availability of and opportunity to receive additional funding from appropriated funds.						
The estimates do not take into account increasing personnel costs each year or inflation.						
The estimates do not take into account unexpected events or emergencies or unforeseen projects.						

GFNMS ECOSYSTEM PROTECTION: IMPACTS FROM FISHING ACTIVITIES

## Performance Measures

Strategy Title(s)	Performance Goal	Desired Outcome (Objective)	Outcome Measure	How Measured	Who Measures	Output Measure
STRATEGY FA-1: Develop a resource characterization of the sanctuary to better understand types and distributions of habitats, species and processes.	Maintain an abundance and diversity of native marine/estuarine/intertidal species: 1) Better understand the impacts from fishing activities on sanctuary resources.	Based on the best available scientific and socio-economic information, the sanctuary will: 1) facilitate the evaluation of the status and trends in marine populations (and their causes) in sanctuary waters; and 2) identify and evaluate impacts on sanctuary resources from fishing.	Increase understanding of the habitats and communities of the sanctuary.	Complete site characterization including: detailed oceanographic climatology; clear delineation of habitat types and distribution; and relative abundance and distribution of species.	Sanctuary Superintendent, Research Coordinator, Ecosystem Protection Coordinator	1. Oceanographic climatology report with effective maps and graphics; 2. fine scale bathymetric and habitat maps; 3. technical data summary on species distribution and abundance
STRATEGY FA-2: Develop a socioeconomic profile of fishing activities and communities in and adjacent to the sanctuary.	Maintain an abundance and diversity of native marine/estuarine/intertidal species: 1) Better understand the impacts from fishing activities on sanctuary resources.	Based on the best available scientific and socio-economic information, the sanctuary will: 1) facilitate the evaluation of the status and trends in marine populations (and their causes) in sanctuary waters; and 2) identify and evaluate impacts on sanctuary resources from fishing.	Increase understanding of fishing activities and fishing communities in and around the sanctuary.	Complete socioeconomic profile of fishing communities.	Sanctuary Superintendent, Living Resource and Habitat Protection Working Group and sanctuary advisory council.	Report on socio-economic Profile of Fishing Activities in the sanctuary.

***Ecosystem Protection: Impacts from Fishing Activities Action Plan  
GFNMS Management Plan***

<b>Strategy Title(s)</b>	<b>Performance Goal</b>	<b>Desired Outcome (Objective)</b>	<b>Outcome Measure</b>	<b>How Measured</b>	<b>Who Measures</b>	<b>Output Measure</b>
<p>STRATEGY FA-3: Evaluate impacts from fishing activities on sanctuary resources.</p> <p>STRATEGY FA-4: Develop policy recommendations or management action(s) to address impacts.</p>	<p>Maintain an abundance and diversity of native marine/estuarine/intertidal species:</p> <p>1) Better understand the impacts from fishing activities on sanctuary resources.</p> <p>2) Allow for fishing that is compatible with sanctuary goals and ecosystem protection.</p>	<p>Based on the best available scientific and socioeconomic information, the sanctuary will:</p> <p>1) facilitate the evaluation of the status and trends in marine populations (and their causes) in sanctuary waters;</p> <p>2) identify and evaluate impacts on sanctuary resources from fishing, and</p> <p>3) identify and develop appropriate actions to address any negative impacts from fishing activities on sanctuary resources.</p>	<p>Improved ability to carry out a consistent and systematic evaluation of impacts from fishing activities occurring in the sanctuary.</p>	<p>Complete "compatible use" definition or threshold; complete compatibility index framework; develop series of management or policy response categories</p>	<p>Sanctuary Superintendent, Ecosystem Protection Working Group, sanctuary advisory council</p>	<p>Compatibility index matrix</p>
<p>STRATEGY FA-5: Bring public awareness to the value and importance of maritime communities.</p>	<p>Maintain an abundance and diversity of native marine/estuarine/intertidal species:</p> <p>1) Allow for fishing that is compatible with sanctuary goals and ecosystem protection.</p>	<p>The sanctuary will seek to facilitate the management of fisheries resources within its boundaries in order to protect cultural resources, to protect important natural resources, and to maintain biodiversity and the health and balance of the sanctuary.</p>	<p>Increase understanding of fishing communities in and around the sanctuary.</p>	<p>Complete maritime heritage and fishing community model plan.</p>	<p>Sanctuary Superintendent, Education Coordinator, sanctuary advisory council</p>	<p>Signs, kiosks, workshops, attractions, events and activities</p>

***Ecosystem Protection: Impacts from Fishing Activities Action Plan  
GFNMS Management Plan***

<b>Strategy Title(s)</b>	<b>Performance Goal</b>	<b>Desired Outcome (Objective)</b>	<b>Outcome Measure</b>	<b>How Measured</b>	<b>Who Measures</b>	<b>Output Measure</b>
STRATEGY FA-6: Develop strategy to protect special areas of concern and species of concern.	To maintain an abundance and diversity of native marine/estuarine/intertidal species: 1) Allow for fishing that is compatible with sanctuary goals and ecosystem protection.	The sanctuary will seek to facilitate the management of fisheries resources within its boundary in order to protect cultural resources, to protect important natural resources, and to maintain biodiversity and the health and balance of the sanctuary.	Increase protection for Estero Americano and Estero de San Antonio.	Complete community-based recommendation on protection measures for the Esteros.	Sanctuary Superintendent and Ecosystem Protection Coordinator	
STRATEGY EP-1: Develop a Resource Protection Plan to minimize user conflicts and provide special areas of protection.	Maintain an abundance and diversity of native marine/estuarine/intertidal species: 1) Better understand the impacts from fishing activities on sanctuary resources. 2) Allow for fishing that is compatible with sanctuary goals and ecosystem protection.	Based on the best available scientific and socioeconomic information, the sanctuary will: 1) facilitate the evaluation of the status and trends in marine populations (and their causes) in sanctuary waters, and 2) identify and evaluate impacts on sanctuary resources from fishing.	Minimize user conflicts and increase protection for unique sanctuary resources.	Complete evaluation and recommendations, as appropriate, for zonal management plan.	Sanctuary Superintendent, Ecosystem Protection Coordinator, Living Resource and Habitat Protection Working Group, sanctuary advisory council	





SITE-SPECIFIC ISSUE  
**IMPACTS FROM VESSEL SPILLS  
ACTION PLAN**

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## **ISSUE STATEMENT**

There is a continuing risk of vessel spills that could impact marine mammals, seabirds and other natural resources in and around Gulf of the Farallones National Marine Sanctuary (GFNMS). Recognizing that spills can occur from any transiting vessel as they all carry crude oil, bunker fuel, and/or other hazardous material, GFNMS will take every opportunity to enhance prevention and improve response efforts to offset impacts from potential cumulative and catastrophic events.

## **ISSUE DESCRIPTION**

Over 6,000 commercial vessels (excluding domestic fishing craft) enter and exit the San Francisco Bay every year. Approximately half of these vessels transit south off the coast of California, while the other half transit north or west of San Francisco. Less than 25 percent of the vessels are tankers of intermediate size (draft <50 feet) and about 5 percent are large vessels (draft >50 feet). Other vessels that transit between San Francisco and Los Angeles include: container ships, bulk carriers, chemical carriers, military vessels, research vessels, cruise ships, and tugs.

Historically, the total number of spills from transiting vessels is small, but the potential impacts are enormous, given the number and volume of vessels and the hazardous cargo lane's proximity to the Farallon Islands and major seabird and marine mammal populations. During recent years, approximately 2,000 commercial vessels have been reported using the southern approach shipping lane.

Large commercial vessels (LCVs) are of particular concern for spills because they can carry up to 1 million gallons of bunker fuel, a heavy, viscous fluid similar to crude oil, which they use for fuel. According to the 2006 CA Energy Commission Staff Report, California produces approximately 250 million barrels and refines 675 million barrels of oil annually. There is considerable risk of vessel spills from oil tankers carrying Alaskan, Californian, and International oil up and down the California coast.

Large cruise ships can also be a source of vessel discharge. Cruise ships are regulated by state and federal laws and regulations aimed at reducing air pollution, graywater, sewage, sewage sludge, and hazardous waste. However, despite these laws and regulations, cruise ships are currently still able to discharge large volumes of untreated sewage and untreated graywater into the Sanctuary.

## **SIGNIFICANT RESOURCES AND IMPACTS FROM VESSEL SPILLS**

GFNMS was designated in 1981 to protect significant concentrations of the following marine resources: seabirds and aquatic birds; marine mammals (pinnipeds and cetaceans); fish; marine flora (algae); benthic fauna; and estuarine environments.

The sanctuary has diverse biological communities in close proximity to one another. Habitats within the sanctuary include rocky intertidal, sandy beach, estuarine, pelagic (open ocean), benthic (sea floor), and islands. The variety and size of habitats support a high diversity and abundance of species. The sanctuary's habitats are home to a number of species that are federally listed as endangered or threatened. The list includes highly recognized species such as blue and humpback whales, Marbled Murrelets, and coho and chinook salmon, as well as lesser-known species such as the tidewater goby and Short-tailed Albatross. Of particular concern to the sanctuary are impacts on seabirds and marine mammals from vessel spills.

### **Seabirds**

The nesting seabird population is a significant natural resource of the sanctuary. The Farallon Islands support the largest concentration of breeding seabirds in the contiguous United States. These birds forage in the Gulf of the Farallones, and are highly dependant on the productive waters of the sanctuary. Eleven of the sixteen species of seabirds known to breed along the U.S. Pacific Coast have breeding colonies on the Farallon Islands and feed in the sanctuary. These include Ashy and Leach's Storm-Petrels; Brandt's, Pelagic, and Double-crested Cormorants, Western Gulls; Common Murres; Pigeon Guillemots; Cassin's Auklets; and Rhinoceros Auklets. Black Oystercatchers, a shorebird, also breed on the Farallon Islands.

Floating oil from vessel spills affects seabirds through ingestion, inhalation, the fouling of feathers, and causing irritation of eyes and membranes. Feather contamination is the primary cause of immediate mortality because of the resulting inability to fly, avoid predators, and forage underwater; it also lowers body temperature due to loss of insulation. Birds may also ingest oil while preening or grooming contaminated feathers. Vulnerability of different species of birds to surface oil is based on several factors, including their likeliness to dive in the water and flock on the surface. To some extent, all marine birds that breed in large colonies are vulnerable to contact with floating oil during the nesting season due to their large congregations.

### **Marine Mammals**

#### **Pinnipeds**

Thirty-six species of marine mammals have been observed in GFNMS, including six species of pinnipeds (seals and sea lions). Many of these animals occur in large concentrations and are dependent on the productive and secluded habitats for breeding, pupping, feeding, hauling-out, and resting during migration. The Farallon Islands provide habitat for breeding populations of five species of pinnipeds, and support one of the largest concentrations of California sea lions and northern elephant seals within the sanctuary.

Harbor seals breed on the Farallon Islands and in mainland rookeries. The Gulf of the Farallones region contains one-fifth of the California population of harbor seals, which was estimated at 28,000 in 2003. A small colony of six to twenty northern fur seals has recently resumed breeding on the South Farallon Islands during the summer. Prior to 1997, fur seals had not been known to breed on the Farallon Islands for over 170 years. From November to June, thousands of female and immature fur seals migrate through the western edge of the sanctuary along the continental shelf. Of all the marine mammals in the sanctuary, fur seals are the most sensitive to oil spills because they depend largely on their fur for insulation.

Threatened Steller sea lions occur year-round in the sanctuary. This population has decreased dramatically in the southern part of its range, which includes the Farallon Islands. The decline throughout the Gulf of the Farallones and California has amounted to 80 percent over the past thirty years. The California sea lion is the most conspicuous and widely distributed pinniped in the sanctuary. It is found year-round in the Gulf with the population increasing at about 8 percent each year. The northern elephant seal is the largest pinniped species in the sanctuary, with a total breeding population in the sanctuary of about 1,500 individuals.

Impacts to pinnipeds from floating oil include inhalation, fouling of fur, ingestion, and irritation of eyes and membranes. Particularly detrimental to pinnipeds is the contamination of fur that may cause loss of buoyancy and impairment of normal thermal regulation.

#### Cetaceans

Twelve cetacean species are seen regularly in the sanctuary, and of these, the minke whale, harbor porpoise, Dall's porpoise, and Pacific white-sided dolphin are considered year-round residents. The harbor porpoise is the most abundant small cetacean in the Gulf of the Farallones, with 4,000 to 5,000 residents.

Gray whales and other large baleen and toothed whales migrate from Alaska southward through the sanctuary. The northward migration of gray whales begins at the end of February and peaks in March. A few gray whales remain in the sanctuary during the summer. An increasing number of other species have been seen feeding in the sanctuary between April and November, including humpback and blue whales, representing one of the largest congregations of whales in the Northern Hemisphere.

Although the effects of oil on cetaceans are not well understood, it is believed the oil could cause both short- and long-term impacts. For example, because baleen whales are filter feeders, they are susceptible to direct ingestion of oil, oil-covered substances, and oil spill remediation chemicals such as dispersants and bioremediation agents. It is also thought that oil may irritate the eyes of whales and possibly interfere with breathing. Some whales, such as grey whales, have been seen avoiding slicks, while others have been found with oiled baleen.

#### **Socioeconomic Impacts**

The diversity and abundance of fish and invertebrate species within the sanctuary are largely due to the variety of habitats, including intertidal mudflats, estuaries, rocky reefs and deeper subtidal areas. The intertidal mudflats support large concentrations of burrowing organisms such as

clams, snails, and crabs. Seagrass beds occur on the more extensive flats of Tomales Bay, Bolinas Lagoon and also within the Esteros. Pacific herring and invertebrates depend on seagrass beds in the Bay to spawn and feed. The shallow, protected waters of the bays and estuaries are critical habitat for salmon and several species of perch and flatfish. In their journey from the ocean through Tomales Bay and into Lagunitas Creek, the federally listed, threatened coho salmon depend on clear water, riparian vegetative cover, and a certain size gravel to complete their reproductive process.

Accurate characterizations of the various habitats of the sanctuary are limited. Rocky banks in deep water are inhabited for the most part by large populations of rockfish, more than fifty species of which occur in the sanctuary. Sablefish and flatfish such as sole, sandab, and halibut are found on offshore soft-bottom habitats. Concentrations of sardines, Northern anchovies and Pacific herring are also found in the sanctuary. King salmon and rockfish are the primary target species for sport fishing in GFNMS. On some weekend days, more than 1,000 clam diggers harvest gaper, geoduck, Washington and littleneck clams. The most important commercial harvests include Pacific herring, salmon, rockfish, and Dungeness crab. Prawn and shrimp harvesting also take place in the area. Most of the commercial catches harvested in GFNMS are landed in San Francisco, Bodega Bay, Oakland, Half Moon Bay, and Sausalito. The tidal community includes a wide variety of invertebrates and marine plants and algae, such as barnacles, limpets, black turban snails, mussels, sea anemones, abalone, and urchins, which may be harvested as well.

The intertidal zone is an important breeding ground, spawning and feeding area for many marine organisms. Impacts from oil in the intertidal zone may include smothering of benthic biota, and fouling or poisoning of organisms.

A large oil spill in or near valuable fishing areas could pose a potentially serious threat to commercial and recreational industries such as fishing and wildlife viewing/tourism. The type and extent of impacts depend on timing with respect to spawning season, migration patterns, oil type (solubility or toxicity), and prevailing weather conditions. A spill resulting in a surface slick could affect upper water biota such as squid, Northern anchovy, jack mackerel, and the pelagic portion of the planktonic food chain. Heavier oils that sink could affect shellfish such as crabs or lobster and finfish such as flounders and sole.

## **JURISDICTIONAL SETTING**

### **Oil Pollution Act**

The Oil Spill Prevention Act (OPA) regulates discharges of oil or oily mixtures from vessels. Except for discharges from machinery space bilges, tankers subject to the OPA may not discharge oil or oily mixtures unless they are 50 nautical miles from the nearest land and the total quantity of oil discharged cannot exceed 1/15,000 of the total cargo capacity. In addition, a discharge by any vessel regulated by the OPA must be made while the vessel is en route. The instantaneous discharge rate must not exceed 60 liters per mile.

## **U.S. Coast Guard (USCG)**

The USCG is the federal government's primary maritime law enforcement agency. The USCG's missions include maritime law enforcement, national security, maritime safety, and marine environmental protection. For ocean and coastal activities, the USCG manages maritime transportation activities in order to minimize loss of life and damage to the environment. The USCG has historically held the primary responsibility for ensuring cleanup of any oil spill or other pollutants in the marine environment. To avert oil spills and promote safety, the USCG inspects vessels carrying oil and other hazardous materials. The USCG requires vessels to have approved response plans detailing owner and operator response to an oil spill and ensuring proper response activities. Pursuant to OPA, which defines ground rules for dealing with oil pollution events and recommends pollution prevention measures, the USCG has responsibility for preparing most of the regulations necessary to implement OPA. Additionally, the USCG must be consulted in the development of oil spill contingency plans for marine oil and gas facilities and terminals. OPA also allows for natural resource damage recovery and restoration by federal and state resource trustees.

## **Ports and Waterways Safety Act**

The Ports and Waterways Safety Act (PWSA) is designed to promote navigation and vessel safety and the protection of the marine environment. The PWSA authorizes the USCG to establish vessel traffic services and systems for ports, harbors, and other waters subject to congested vessel traffic. The San Francisco Vessel Traffic Separation Schemes (VTSS) consist of two mile-wide inbound and outbound vessel traffic lanes with a separations zone located in between. The lanes are designed to prevent vessel collisions by separating vessels going in opposite directions. Outside the traffic lanes, vessels may proceed in any direction consistent with good seamanship.

## **Department of Boating and Waterways**

The California Department of Boating and Waterways (DBW) programs are designed to fulfill the needs of California's boating community including funding for local waterway law enforcement programs, assisting in beach erosion control projects, licensing yacht and ship brokers, and funding the development of public-access boating facility projects. The DBW provides grants to cities, counties, and districts for developing small craft harbors/marinas, as well as loans to private recreational marinas.

## **Office of Spill Prevention and Response (OSPR)**

OSPR was created within the California Department of Fish and Game (CDFG) by the OPA to be the lead state agency charged with oil spill prevention and response. The OSPR Administrator has substantial authority to direct spill response, cleanup, and natural resource assessment activities. Although OSPR is the lead state agency for oil spill prevention and response, this responsibility is shared with twenty-two agencies represented on the State Interagency Oil Committee. OSPR is involved in a variety of programs to prevent spills in the marine environment. One of the most important prevention programs is the harbor safety committee process established to reduce risk of marine vessel accidents within or on approach to

the major harbor facilities. In conjunction with navigation safety, OSPR is also working with the USCG regarding evaluation of vessel traffic routing and other safety measures to reduce pollution incidents off the coast of California.

### **Sanctuary Regulations**

The sanctuary site-specific regulations addressing vessel spills in the GFNMS were under revision as a part of the management plan review. The draft regulations were available for review as a part of the Draft Management Plan/Environmental Impact Statement. The final regulations are included in the Final Management Plan and Final Environmental Impact Statement (FMP/FEIS).

## **VESSEL SPILLS IN THE GULF OF THE FARALLONES**

1971	2 vessels collide under Golden Gate Bridge (840,000 gallons of Bunker C oil)
1984	<i>T/V PUERTO RICAN</i> (1.4 million gallons of oil, stern sunk with 8,500 barrels of bunker fuel, estimated 2,873 birds killed, including 1,856 Common Murres)
1986	<i>T/V APEX HOUSTON</i> (oil barge, 20,000 gallons of oil between San Francisco and Long Beach, 9,000 birds including 6,000 Common Murres killed)
1990	Spill from San Francisco to Monterey County
1996	R/V <i>TEMPEST</i> (65' yacht off Dillon Beach)
1996	<i>SS CAPE MOHICAN</i> (estimated 96,000 gallons of oil, 7,000 birds killed)
1997-8	<i>SS JACOB LUCKENBACH</i> / Point Reyes Tarball Incident (oil washes onto beaches from Salmon Creek to Pillar Point; sunk in 1952), later determined to be part of the <i>S/S JACOB LUCKENBACH</i> oil spill
1998	<i>T/V COMMAND</i> (3,000 gallons heavy crude or bunker oil, estimated 11,193 birds killed, 75 percent of which were Common Murres)
1990-2005	<i>SS JACOB LUCKENBACH</i> , clean up and removal of approximately 20 million gallons, occurred summer of 2002
2007	<i>C/V COSCO BUSAN</i> (53,000 gallon bunker oil spill in San Francisco Bay that spread into the sanctuary.)

## **VESSEL SPILLS GOAL**

1. Minimize the risk to GFNMS' natural resources from spills, while allowing for the continuation of safe, efficient, and environmentally sound transportation.

## **VESSEL SPILLS OBJECTIVES**

1. Assess level of risk from vessel traffic and determine whether improvements can be made to reduce risk.
2. Develop long-term monitoring programs within GFNMS to identify trends and take proactive measures to reduce risk from vessel spills.
3. Review current response programs and identify areas of improvement, focusing on GFNMS resources at risk.
4. Develop outreach program for maritime industry, fishing, and recreational boating communities based on risk assessment and long-term monitoring results.
5. Provide for continuous evaluation and leverage opportunities for improvement in coordination with partners.

## **VESSEL SPILLS ACTION PLAN**

### **STRATEGY VS-1: *Expand Monterey Bay National Marine Sanctuary (MBNMS) drift analysis model to include Point Arena and Mendocino.***

**Activity 1.1** Expand MBNMS drift analysis model north to Point Arena/Mendocino using existing data. The current model of vessel drift rates and tug response times only extends as far north as San Francisco Bay. Seasonal variability and coverage north to Mendocino is necessary to protect GFNMS.

- A. Work with the Naval Postgraduate School (NPS) in Monterey (producers of the current model) and investigate feasibility of extending the model north and including seasonal variability.

**Potential Partners:** NPS, MBNMS, USCG, Fleet Numerical, National Oceanic and Atmospheric Administration (NOAA) modelers/Hazardous Materials Response Division (HAZMAT), National Ocean Service (NOS) charting

**Products:** Updated drift analysis model

**Complementary Strategies:** GFNMS Final management Plan (FMP), Vessel Spills, STRATEGY VS-2, STRATEGY VS-3, STRATEGY VS-4

### **STRATEGY VS-2: *Refine oceanographic data used in existing spill and drift model to increase accuracy of risk assessments.***

**Activity 2.1** Revise existing oceanographic circulation model to reflect the unique fine-scale features of the Gulf of the Farallones. There are currently three models of the GFNMS region, however, none of them capture the fine-scale oceanographic processes.

- A. Increase the number of Coastal Ocean Dynamic Applications Radar (CODAR) receiving stations around the Gulf of the Farallones. CODAR allows for the real

time observation of the evolution of surface currents. Work with partners to determine sites and data management.

- B. Analyze historical data including satellite images and circulatory patterns on a fine scale. Conduct gap analysis and mine data for fine-scale (seasonal, monthly, weekly, 3-5 period) oceanographic model. Data should include:
  - 1. Surface currents adjacent to ports
  - 2. Fine-scale bathymetry of the continental shelf and slope, and
  - 3. Satellite imagery for biological productivity (upwelling index, sea surface temperature, chlorophyll a)
- C. Analyze Sea-viewing Wide Field of Vision (SeaWiF) satellite acquired ocean-color data indicating sea surface temperature and associated phytoplankton pigment (biological productivity).
- D. Integrate all data into a comprehensive Web-based database with geographic information systems (GIS) capability (Sanctuaries Hazardous Incident Emergency Logistics Database System [SHIELDS]).
- E. Integrate new fine-scale oceanographic circulation model into spill and drift model and use as a decision-making tool for HAZMAT and the Area Contingency Plan (ACP).

**Potential Partners:** Research institutions such as Moss Landing Marine Laboratories (MLML), Bodega Marine Laboratory (BML), San Francisco State University (SFSU), United States Geological Survey (USGS), California Coastal Conservancy, Coastal Services Center, Cordell Bank National Marine Sanctuary (CBNMS), National Marine Sanctuary Program (NMSP), NOAA HAZMAT, Monterey Bay Aquarium Research Institute (MBARI), Scripps Institute of Oceanography, Central California Ocean Observing Systems (CeNCOOS), NOAA Scientific Support Coordinator, Ford Consulting Inc., The National Centers for Coastal Ocean Science (NCCOS)

**Products:** Improved Spill and Drift Analysis Model, Web-based GIS

**Complementary Strategies:** GFNMS FMP, Vessel Spills, STRATEGY VS-1, STRATEGY VS-3, STRATEGY VS-4; Conservation Science, STRATEGY CS-4, CS-5, CS-6

**STRATEGY VS-3:** *Evaluate vessel activities in GFNMS as a first step to assessing the risk of spills in the sanctuary.*

**Activity 3.1** Profile vessel activities within the Gulf of the Farallones.

- A. Hire a contractor to collect and compile data on types of vessels, traffic patterns, and last/next port of call for vessels transiting through GFNMS. Investigate use of San Francisco VTS data.
- B. Use data and report from vessel activities profile for risk assessment study.

**Potential Partners:** USCG, Marine Exchange, Port of Oakland, Port of San Francisco, California Department of Boating and Waterways (CDBW) (licensing info), MBNMS

**Products:** Report A (Vessel Activities Profile)

**Complementary Strategies:** GFNMS FMP, Vessel Spills, STRATEGY VS-1, STRATEGY VS-2, STRATEGY VS-3; Water Quality, STRATEGY WQ-4

**Activity 3.2** Based on existing vessel traffic and risk assessment reports, determine potential risks to GFNMS and develop report.

- A. Identify relevant studies, including:
  - 1. Drift groundings
  - 2. Power groundings
  - 3. Collisions
  - 4. Discharge (bilge or ballast) locations and frequency of use
  - 5. Wildlife harassment
- B. Look at causal chain of events and evaluate based on Gulf of the Farallones qualities.
- C. Build upon Profile of Vessel Activities Report (Report A- see STRATEGY VS-3.1).
- D. Use Volpe's risk analysis for Puget Sound as a model.

**Potential Partners:** SF Harbor Safety Committee, California Coastal Commission (CCC), OSPR, USCG, HAZMAT, MBNMS, Farallones Marine Sanctuary Association (FMSA), National Marine Fisheries Service (NMFS) Marine Mammal Commission

**Products:** Report B (Risk Assessment)

**Complementary Strategies:** GFNMS FMP, Vessel Spills, STRATEGY VS-1, STRATEGY VS-2, STRATEGY VS-3; Water Quality, STRATEGY WQ-4; Conservation Science STRATEGY CS-4

**STRATEGY VS-4: *Evaluate recent vessel routing changes related to MBNMS vessel traffic study.***

**Activity 4.1** Evaluate how the vessel routing adjustments have affected GFNMS, what lessons have been learned, and what improvements could be made.

- A. Collect historic data from MBNMS to use as baseline data.
- B. Examine current Vessel Traffic System (VTS) data from USCG, collect information from Automated Identification System (AIS) if available, and partner with Olympic Coast National Marine Sanctuary (OCNMS) or Washington State Coast Guard to analyze. Determine if revised lanes are being used correctly and, if not, then determine if a correction needs to occur (i.e., education, send information to Port Access Route Studies [PARS]).
- C. Using data, determine if there is increased risk to islands as a result of the VTS routing changes.
- D. Make recommendations to USCG based on findings of the evaluation prior to port access route studies.

**Potential Partners:** MBNMS, USCG, Fleet Numerical

**Product:** Evaluation Report

**Complementary Strategies:** GFNMS FMP, Vessel Spills, STRATEGY VS-1

**STRATEGY VS-5: *Track distribution and numbers of species of concern and habitats in relation to probable spill trajectories.***

**Activity 5.1** Refine resources-at-risk model analysis for Gulf of the Farallones. The resources-at-risk model tracks the distribution and numbers of sensitive species and habitats in relation to probable spill trajectories.

- A. The (Office of) Oil Spill Prevention and Response (OSPR) and United States Fish and Wildlife Service's (USFWS) contractor will integrate products from spill and drift analysis (see STRATEGY VS-3) into an updated resources-at-risk model.
- B. Use updated resources-at-risk model as a decision-making tool for improving response activities by integrating data into SHIELDS system.

**Potential Partners:** NOAA HAZMAT, OSPR, PRBO Conservation Science (Point Reyes Bird Observatory) (PRBO), The Marine Mammal Center (TMMC), CDFG, Glen Ford Consulting, NOAA Scientific Support Coordinator, USFWS, CBNMS, MBNMS, CeNCOOS, BML, SFSU, NOAA Office of Response and Restoration (ORR)

**Products:** Updated model, Report C

**Complementary Strategies:** GFNMS FMP, Vessel Spills, STRATEGY VS-2, STRATEGY VS-3, STRATEGY VS-7, STRATEGY VS-8

**Activity 5.2** Modify the Sanctuary Ecosystem Assessment Surveys (SEA Surveys) and develop additional research components as necessary to build a baseline characterization and to monitor sanctuary habitats and physical and biological characteristics. This information will also be used for natural resource damage assessment and restoration of pelagic species, including trophic levels, spill response and the use (applicability) of dispersants and in-situ burning.

- A. SEA Surveys will: (1) systematically survey and assess the distribution and abundance of marine birds, mammals, and krill. The primary region of interest is within GFNMS, north to the Russian River and west to the Farallon Escarpment; (2) simultaneously assess ocean habitat; and (3) simultaneously assess biological productivity. Additional components to include:
1. Habitat characterization including mapping substrate type/bathymetry (static)
  2. Biological characterization including species abundance and distribution, spatial and temporal
  3. Physical characterization including oceanographic (spatial and temporal), and pelagic (dynamic) features
  4. Monitoring to detect changes in spatial and temporal oceanographic features and biological sentinel species for historic comparison with damage assessment

**Potential Partners:** NMFS, Minerals Management Service (MMS), USGS, CDFG, Center for Integrated Marine Technology (CIMT), National Oceanographic Data Center (NODC), SHIELDS, OCNMS, CBNMS, Channel Islands National Marine Sanctuary (CINMS), PRBO, NMSP, CeNCOOS

**Complementary Strategies:** GFNMS FMP, Ecosystem Protection, STRATEGY FA-1, STRATEGY FA-3, STRATEGY FA-4; Introduced Species, STRATEGY IS-2; Vessel Spills, STRATEGY VS-2, STRATEGY VS-4, STRATEGY VS-6, STRATEGY VS-7, STRATEGY VS-8, Conservation Science, STRATEGY CS-1, CS-4

**STRATEGY VS-6: *Participate in Area Contingency Planning to address risks to sanctuary resources.***

**Activity 6.1** Review Regional Response Plan (RRP) and Area Contingency Plan (ACP), including location of Oil Spill Response Organization (OSRO) pre-positioned response equipment.

- A. Participate in SF Bay Area Contingency Meeting and Wildlife Operations meetings.

**Potential Partners:** CCC, OSPR, NOAA HAZMAT

**Products:** Improved RRP and ACP

**Complementary Strategies:** GFNMS FMP, Vessel Spills, STRATEGY VS-1, STRATEGY VS-2, STRATEGY VS-4, STRATEGY VS-5, STRATEGY VS-8; Conservation Science, STRATEGY CS-1, CS-4, CS-6

**STRATEGY VS-7: *Revise GFNMS in-house emergency response plan.***

**Activity 7.1** Revise tasks and responsibilities for GFNMS in the event of a vessel spill in the sanctuary (also see Administration recommendations).

- A. Participate in ACP drills and test in-house communication and response equipment including database connections and mapping GIS capabilities.

**Potential Partners:** CBNMS, MBNMS

**Products:** Updated in-house emergency response plan

**Complementary Strategies:** GFNMS FMP, Vessel Spills, STRATEGY VS-1, STRATEGY VS-2, STRATEGY VS-4, STRATEGY VS-5

**STRATEGY VS-8: *Continue to improve integration of GFNMS Beach Watch and SEA Survey data into Area Contingency Plan.***

**Activity 8.1** Enhance Integration of Beach Watch and SEA Survey data into the ACP. The ACP is currently based on five- to ten- year-old data. Regularly integrate Beach Watch results to strengthen the ACP and allow for more accurate decision making by incident command.

- A. GFNMS will participate in ACP meetings including meetings of the Wildlife Operations and Planning sub-committees.
- B. Link Beach Watch and SEA Survey data to incident command on a real-time basis to inform decision making. Ideally, data would be available by Web-based GIS.
- C. Link Beach Watch and SEA Surveys with SHIELDS to provide real-time data and mapping of sensitive resources to incident command and unified command.

**Potential Partners:** FMSA, OSPR, California Academy of Sciences (CAS), TMMC, USCG, MBNMS, Oiled Wildlife Care Network, NODC, MBNMS/Sanctuary Integrated Monitoring Network (SIMoN), SHIELDS, Ford Consulting Inc., NPS, CeNCOOS/CIMT, CBNMS

**Products:** Web-based GIS with online data entry

**Complementary Strategies:** GFNMS FMP, Vessel Spills, STRATEGY VS-6, STRATEGY VS-5, STRATEGY VS-7

**STRATEGY VS-9: *Conduct outreach to mariners to increase stewardship of the sanctuary, including voluntary compliance with Vessel Traffic System (VTS) and sanctuary regulations.***

**Activity 9.1** Develop outreach plan based on results of vessel activities profile, risk assessment, and resources-at-risk assessment (see STRATEGIES VS-3, VS-4, and VS-6) to increase

voluntary compliance with VTS and sanctuary regulations (container ships, bulk carriers, chemical carriers, military vessels, research vessels, cruise ships, and tugs).

- A. Ensure GFNMS regulations are listed accurately in the *Coast Pilot*. Update as needed.
- B. Review vessel activities profile, risk assessment, and resources-at-risk assessment and identify high-risk vessels and circumstances (target audiences).
- C. Identify pathways for reaching target audiences.
- D. Develop and distribute appropriate materials and programs.

**Potential Partners:** MBNMS, USCG, California Department of Boating and Waterways (CDBW), Coast Guard Auxiliary

**Products:** Sanctuary regulations in *Coast Pilot*, fliers, bulletins

**Complementary Strategies:** GFNMS FMP, Vessel Spills, STRATEGY VS-3, STRATEGY VS-4, STRATEGY VS-6, STRATEGY VS-11, STRATEGY VS-12; Water Quality, STRATEGY WQ-2

**Activity 9.2** Provide information about the sanctuary to maritime industry, fishing and recreational boating communities. Mariners may not be familiar with the attributes of GFNMS and providing mariners with information on the sanctuary will allow them to be informed and make good decisions, increasing compliance with sanctuary regulations and ultimately reducing impacts to sanctuary resources.

- A. Work with Coast Survey and NOAA Marine Protected Areas Center to publish information about the sanctuary in the *Coast Pilot*.
- B. Develop Web-based, shore-side, real-time kiosk with information about the sanctuary as well as links to weather conditions and advisories.
- C. Give presentations specifically targeted to mariner groups.

**Potential Partners:** Coast Survey (lead), NOS MPA Center

**Products:** Sanctuary regulations in *Coast Pilot*, fliers, bulletins

**Complementary Strategies:** GFNMS FMP, Introduced Species, STRATEGY IS-9, Vessel Spills, STRATEGY VS-10, STRATEGY VS-12; Water Quality, STRATEGY WQ-2

**STRATEGY VS-10: Increase regular communication between GFNMS and maritime trade industry.**

**Activity 10.1** Recruit maritime trade industry member for GFNMS Sanctuary Advisory Council. The maritime trade council member would represent the industry's interest at the sanctuary advisory council meetings and report sanctuary activities to the industry.

**Potential Partners:** Maritime trade industry

**Complementary Strategies:** GFNMS FMP, Vessel Spills, STRATEGY VS-9, STRATEGY VS-11

**STRATEGY VS-11:** *Select a sanctuary representative to participate in regional forums for addressing vessel traffic issues.*

**Activity 11.1** A sanctuary representative will attend regional meetings, including the area committee meetings, harbor safety meetings, and ad hoc panels. Sanctuary participation will include, but not be limited to:

- A. Provide information for the geographic response plans.
- B. Participate in discussion on use of dispersants.
- C. Develop a strategy diagram for all sensitive areas as a part of SHIELDS and regional monitoring programs such as SEA Surveys.

**Potential Partners:** Regional Response Team, Area Committee, Harbor Safety Committee

**Complementary Strategies:** GFNMS FMP, Vessel Spills, STRATEGY VS-10, STRATEGY VS-12

**STRATEGY VS-12:** *Create a standing vessel spills working group to advise the sanctuary on implementation of proposed action plans.*

**Activity 12.1** Create a vessel spills working group of the sanctuary advisory council.

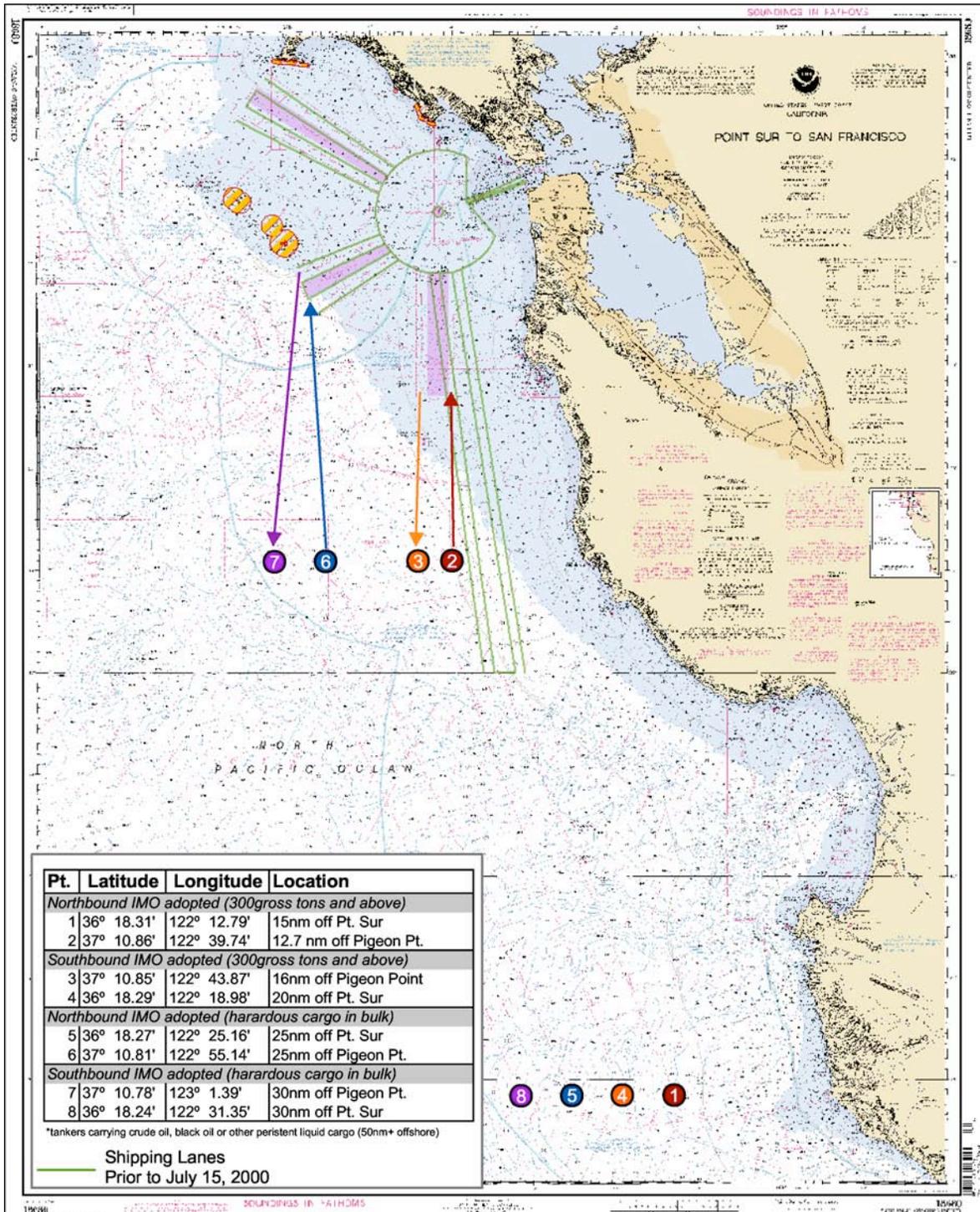
- A. Recommend to council that a vessel spills working group be created. If sanctuary advisory council supports this recommendation, the sanctuary will support creation of the group by providing staff time and support.
- B. The vessel spills working group will make recommendations on implementation of proposed action plans, review effectiveness, advise on future direction, and report findings to the sanctuary advisory council.

**Potential Partners:** USCG, NOAA Scientific Support Coordinator, OSPR, NOS (NOAA Regional Representative), oceanographers, non-governmental organizations (NGOs), NPS, maritime Industry, fishing Industry

**Products:** Annual Report to sanctuary advisory council (SAC)

**Complementary Strategies:** GFNMS FMP, Vessel Spills, STRATEGY VS-9, STRATEGY VS-10, STRATEGY VS-11, Ecosystem Monitoring, STRATEGY XEM-4.

# Vessel Traffic Recommended Lanes Map





GFNMS IMPACTS FROM VESSEL SPILLS FIVE-YEAR

## Timeline

Impacts From Vessel Spills Strategy	Year 1	Year 2	Year 3	Year 4	Year 5
STRATEGY VS-1: Expand MBNMS drift analysis model up to Point Arena and Mendocino.	—◆				
STRATEGY VS-2: Refine spill and drift model to increase accuracy of risk assessments.		—▶			
STRATEGY VS-3: Evaluate vessel activities in the GFNMS as a first step to assessing the risk of spills.		—▶			
STRATEGY VS-4: Evaluate recent vessel routing changes related to the MBNMS vessel traffic study.		—◆			
STRATEGY VS-5: Track distribution and numbers of species of concern and habitats in relation to probable spill trajectories.	—▶				
STRATEGY VS-6: Participate on regional response team to address risks to sanctuary resources.	—▶				
STRATEGY VS-7: Revise GFNMS in-house emergency response plan.	—◆				
STRATEGY VS-8: Continue to improve integration of GFNMS Beach Watch and Sanctuary Ecosystem Assessment Surveys (SEA Surveys) data into Area Contingency Plan.	.....▶				
STRATEGY VS-9: Outreach to mariners to increase stewardship of the sanctuary, including voluntary compliance with Vessel Traffic System (VTS) and sanctuary regulations.		.....▶			
STRATEGY VS-10: Provide better communication between GFNMS and maritime trade industry.	—▶				
STRATEGY VS-11: A sanctuary representative should participate in regional forums for addressing vessel traffic issues.		.....▶			
STRATEGY VS-12: Create a standing vessel spills working group.	.....▶				

**Legend:**

- ▶ **Ongoing Activity**
- .....▶ **Planning Stage**
- ◆ **Completed Activity**

GFNMS IMPACTS FROM VESSEL SPILLS

**Budget**

Strategy	Estimated Annual Cost (1000's)*					Total Est. 5-Year Cost (1000's)
	YR 1	YR 2	YR 3	YR 4	YR 5	
<b>STRATEGY VS-1: Expand MBNMS drift analysis model</b>	\$0	\$10	\$0	\$0	\$0	\$10
<b>STRATEGY VS-2: Improve spill and drift model to increase accuracy of risk assessments</b>	\$0	\$0	\$0	\$14	\$14	\$28
<b>STRATEGY VS-3: Evaluate vessel activities in the GFNMS as a first step to assessing the risk of spills in the sanctuary</b>	\$0	\$72	\$76	\$56	\$56	\$260
<b>STRATEGY VS-4: Evaluate recent vessel routing changes related to the MBNMS vessel traffic study</b>	\$0	\$10	\$0	\$0	\$0	\$10
<b>STRATEGY VS-5: Track distribution and numbers of species of concern and habitats in relation to probable spill trajectories</b>	\$0	\$0	\$0	\$0	\$0	\$0
<b>STRATEGY VS-6: Participate on regional response team</b>	\$6.5	\$6.5	\$6.5	\$6.5	\$6.5	\$32.5
<b>STRATEGY VS-7: Revise GFNMS in-house emergency response plan</b>	\$10.5	\$0.5	\$0.5	\$0.5	\$0.5	\$12.5
<b>STRATEGY VS-8: Integration of Beach Watch and SEA Surveys data into Area Contingency Plan</b>	\$99	\$88	\$84	\$118	\$84	\$473
<b>STRATEGY VS-9: Outreach to mariners to increase stewardship of the sanctuary</b>	\$15	\$15	\$15	\$15	\$15	\$75
<b>STRATEGY VS-10: Better communication between GFNMS and maritime trade industry</b>	\$0	\$5	\$0	\$0	\$0	\$5
<b>STRATEGY VS-11: Participate in regional forums for addressing vessel traffic issues</b>	\$10	\$7	\$5	\$5	\$5	\$32

*Impacts from Vessel Spills Action Plan  
GFNMS Management Plan*

Strategy	Estimated Annual Cost (1000's)*					Total Est. 5-Year Cost (1000's)
	YR 1	YR 2	YR 3	YR 4	YR 5	
<b>STRATEGY VS-12: Vessel spills working group</b>	\$4	\$4	\$4	\$4	\$4	\$20
<b>Total Estimated Annual Cost</b>	\$145	\$218	\$191	\$219	\$185	\$958

The sanctuary's base budget is available each year from appropriated funds.

There is both availability of and opportunity to receive additional funding from appropriated funds.

The estimates do not take into account increasing personnel costs each year or inflation.

The estimates do not take into account unexpected events or emergencies or unforeseen projects.

**Impacts from Vessel Spills Action Plan  
GFNMS Management Plan**

GFNMS IMPACTS FROM VESSEL SPILLS

**Performance Measures**

Strategy Title(s)	Performance Goal	Desired Outcome (Objective)	Outcome Measure	How Measured	Who Measures	Output Measure
STRATEGY VS-2: Refine spill and drift model to increase accuracy of risk assessments. STRATEGY VS-3: Evaluate vessel activities in the GFNMS as a first step to assessing the risk of spills.	Minimize the risk to GFNMS' natural resources from spills, while allowing for the continuation of safe, efficient and environmentally sound transportation.	Assess level of risk and determine whether improvements can be made to reduce risk.	Increase understanding of worse case scenario in the event of a vessel collision or grounding, based on understanding oceanographic processes and response time.	1) Complete evaluation of potential risks to GFNMS from transiting vessels by understanding: a) Vessel activity profile b) Causal events c) Spill and drift model. 2) Use risk analysis as a management decision making tool to take action to minimize risk and potential impacts on sanctuary resources.	Sanctuary Superintendent, Ecosystem Protection Coordinator, Research Coordinator	1) Updated drift analysis model 2) Vessel activities profile 3) Risk assessment report
STRATEGY VS-5: Track distribution and numbers of species of concern and habitat in relation to probable spill trajectories.	Minimize the risk to GFNMS' natural resources from spills, while allowing for the continuation of safe, efficient and environmentally sound transportation.	Develop long-term monitoring programs within GFNMS to identify trends and take proactive measures to reduce risk from vessel spills.	Increase understanding of sensitive habitats and species to receive priority protective measures during a vessel spill event. Assess impacts from low level chronic oil pollution.	Continually update Resources at Risk Model for GFNMS and integrate information into Area Contingency Plan as revised every five years.	Sanctuary Superintendent, Research Coordinator, Ecosystem Protection Coordinator	1) Update model, and Report C 2) Monthly map depicting distribution and abundance of sentinel species and vessel type and activity

*Impacts from Vessel Spills Action Plan  
GFNMS Management Plan*

<b>Strategy Title(s)</b>	<b>Performance Goal</b>	<b>Desired Outcome (Objective)</b>	<b>Outcome Measure</b>	<b>How Measured</b>	<b>Who Measures</b>	<b>Output Measure</b>
<p>STRATEGY VS-6: Participate on regional response team to address risks to sanctuary resources.</p> <p>STRATEGY VS-7: Revise GFNMS in-house emergency response plan.</p> <p>STRATEGY VS-8: Continue to improve integration of Beach Watch and SEA Surveys data into Area Contingency Plan.</p>	<p>Minimize the risk to GFNMS' natural resources from spills, while allowing for the continuation of safe, efficient and environmentally sound transportation.</p>	<p>Review current response programs and identify areas of improvement, focusing on GFNMS resources at risk.</p>	<p>Increase effectiveness in responding to an emergency spill in order to reduce impacts on sanctuary resources.</p>	<p>1) Build into the Area Contingency Plan specific strategies to increase probability of protection of sanctuary resources during a catastrophic event. On an annual basis review, and as appropriate, revise plan.</p> <p>2) Provide on-going training and practice drills for staff.</p>	<p>Sanctuary Superintendent, Research Coordinator, Ecosystem Protection Coordinator</p>	<p>1) Technical data summary 2) Peer reviewed articles 3) ACP post-drill report</p>





## **PROGRAM AREA ACTION PLANS**

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# **GFNMS MANAGEMENT PLAN**

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- I. Education and Outreach**
- II. Conservation Science**
- III. Resource Protection**
- IV. Administration**





PROGRAM AREA  
**EDUCATION AND OUTREACH  
ACTION PLAN**

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**PROGRAM STATEMENT**

Gulf of the Farallones National Marine Sanctuary (GFNMS) requires a long-term strategy to fulfill the education vision of the sanctuary, which is: “to educate and engage residents and visitors in the Gulf of the Farallones National Marine Sanctuary watersheds about their connection to the sanctuary and to develop a sense of personal responsibility to protect the marine environment.”

**PROGRAM DESCRIPTION**

Education programs are designed to enhance public awareness, understanding and appreciation of the sanctuary and its resources, and build stewards to take on the responsibility of protecting these special places. The development of effective and coordinated education programs is a priority for all national marine sanctuaries. GFNMS has developed a long-term education strategy to raise the public’s awareness of the local and regional marine environment and how they can become involved in the sanctuaries. These education programs complement the sanctuary’s broad-based community outreach efforts by focusing on targeted audiences such as students, teachers, and summer camp programs for youths and multicultural audiences. GFNMS and Cordell Bank National Marine Sanctuary (CBNMS) will collaborate to service common audiences.

The Farallones Marine Sanctuary Association (FMSA) works collaboratively with GFNMS to implement education, interpretation, and monitoring programs. GFNMS, in cooperation with FMSA, sponsors student summits, lectures, teacher trainings, summer camps, and other education programs. FMSA and GFNMS are developing and implementing a Coastal Ecosystem Education Program for high school students and multicultural programs with the San Francisco Recreation and Parks Department. GFNMS will expand its partnerships and develop additional working relationships with other government agencies, institutions, and organizations.

GFNMS uses education as a resource management tool to address specific priority ecosystem protection issues identified during the management plan review process. Education is essential to achieving many of the sanctuary’s management objectives. In addition, education is used to both complement and promote other sanctuary programs such as research, monitoring, and enforcement by communicating information about these programs.

## **EDUCATION AND OUTREACH GOALS**

1. Use education as a management tool to help protect the sanctuary's habitats, wildlife and cultural resources.
2. Ensure that education complements and promotes other sanctuary programs such as research, monitoring, enforcement and resource protection.
3. Continually reach broader audiences to create an ocean literate, informed and connected public.

## **EDUCATION AND OUTREACH OBJECTIVES**

1. Structure programs to educate along an environmental literacy continuum including developing awareness, building a knowledge base, changing behavior, and building stewardship.
2. Increase communication and coordination among sanctuary programs and partners.
3. Develop programs to target content builders, user/impact groups, influencers, and decision makers.
4. Target diverse audiences including various multicultural, socioeconomic, age, and gender groups.

## **EDUCATION AND OUTREACH ACTION PLAN**

**SCHOOL PROGRAMS - To connect the next generation of scientists, managers, educators and leaders with the ocean's influence on them and their influence on the ocean**

**STRATEGY ED-1: *Educate K-8 students about the sanctuary through visitor center, classroom, and field activities.***

**Activity 1.1** Update K-8 visitor center programs to align with state and national science standards. Expand to include pre- and post-visit activities, lending kits, and presentations. Develop activities that incorporate emerging marine issues and correlate to school curricula.

- A. Develop theme-based programs for each grade level that correlate to ocean literacy principles and science standards.
- B. Develop and distribute materials, such as lending trunks, which include activities and fact sheets on themes that complement the Coastal Ecosystem Curriculum for use before and after group visits to the visitor center.
- C. Develop outreach programs targeting a diverse cross section of elementary schools. These programs will incorporate curricula and teachers' needs as well as the potential use for volunteers.

**Potential Partners:** FMSA

**Products:** Curriculum, lending trunks, elementary school outreach plan

**Complementary Strategies:** GFNMS Final Management Plan (FMP), Education, STRATEGY ED-5, STRATEGY ED-9, STRATEGY ED-10, STRATEGY ED-11

**STRATEGY ED-2: *Educate high school students and teachers about the sanctuary through classroom and field activities.***

**Activity 2.1** Expand Coastal Ecosystem Education Program to a four-tiered program including curriculum, student monitoring, stewardship projects, and teacher professional development.

- A. Continue high school sandy beach monitoring program; continue exploration of demoic acid and other chemical levels in sand crabs as a water quality indicator.
- B. Expand high school program to include a stewardship component in which students volunteer for the sanctuary as a part of Education STRATEGY ED-5.
- C. Expand high school program to incorporate the rocky intertidal habitat. Standardize intertidal monitoring protocols by modifying current protocol to match Long-term Monitoring Program and Experiential Training for Students (LiMPETS) protocols.
- D. Develop a water quality and/or introduced species component, in collaboration with other West Coast sanctuaries, and include curricula and monitoring.
- E. Increase enrollment to reach a broader, more diverse audience. Target San Francisco Unified School District.

**Potential Partners:** FMSA

**Products:** Curriculum, website, database, workshops, outreach materials, slideshows, teacher lending kits

**Complementary Strategies:** GFNMS FMP, Education, STRATEGY ED-4, STRATEGY ED-11, STRATEGY ED-12; Water Quality, STRATEGY WQ-2; Introduced Species, STRATEGY IS-3, STRATEGY IS-9

**STRATEGY ED-3: *Educate culturally diverse inner city children about the sanctuary through summer camp experiences that are highly experiential and field based.***

**Activity 3.1** Expand Sanctuary Explorers Camp to reach a broader audience.

- A. Increase capacity and duration of the camp program. Incrementally expand camp to six weeks with simultaneous sessions to reach a broader audience.
- B. Adapt curriculum to increase stewardship ethic.

***Education and Outreach Action Plan  
GFNMS Management Plan***

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- C. Include high school Coastal Ecosystem Education Program students as camp counselors.
- D. Incorporate Crissy Field Center summer program into Sanctuary Explorers camp and vice versa.

**Potential Partners:** FMSA, Crissy Field Center, San Francisco Recreation and Parks Department

**Products:** Curriculum, outreach materials

**Complementary Strategies:** GFNMS FMP, Education, STRATEGY ED-5

***STRATEGY ED-4: Educate teachers about the resources and programs of the sanctuary by providing professional development programs.***

**Activity 4.1** As a component of the Coastal Ecosystem Education Program, develop a set of professional development programs for teachers.

- A. Invite teachers to biannual research symposium to learn about sanctuary research activities.
- B. Participate in local, regional and national teacher development venues. Develop a series of K-12 teacher workshops that provide teachers with classroom activities and introduce them to sanctuary programs. Possible venues include: The Presidio Teachers Night; County Math and Science Council conferences; CSTA (California Science Teachers Association); NSTA (National Science Teachers Association); NMEA (National Marine Educators Association); NAEE (National Association of Environmental Education); NAI (National Association of Interpretation).
- C. Use volunteers to maintain GFNMS resource center and make accessible to sanctuary constituents such as teachers, volunteers, students, staff, and partners. Resource center contents include classroom lending kits, marine-related books, slide shows, videos, and research library. Develop marketing plan and check-out system.

**Potential Partners:** FMSA, CBNMS, teachers, local research institutions, Marine Activities, Resources, and Education (MARE), other Bay Area marine science education organizations, Bay Area Science Alliance (BASA), Southwest Marine and Aquatic Educator's Association (SWMEA), Environmental Education Council of Marin (EECOM), Bay Area schools

**Products:** research symposium proceedings, student posters; Bay Area science education presentation, handouts; resource center, check out and tracking system

**Complementary Strategies:** GFNMS FMP, Conservation Science, Strategy CS-3

**STEWARDSHIP – To involve the community in understanding their relationship to the ocean and in caring for its future**

**STRATEGY ED-5: *Provide stewardship opportunities for high school students.***

**Activity 5.1** Develop GFNMS high school internship program.

- A. Recruit students in grades 10-12 from the high school Coastal Ecosystem Education Program and other high schools to intern for summer camp, the visitor center, field research, the Sanctuary Naturalist program, and other opportunities.

**Potential Partners:** FMSA

**Products:** Training materials

**Complementary Strategies:** GFNMS FMP, Education, STRATEGY ED-2, STRATEGY ED-7

**STRATEGY ED-6: *Create stewards of the GFNMS by engaging middle and high school students in a large-scale, long-term monitoring project.***

**Activity 6.1** Participate in LiMPETS, a collaborative program of the West Coast sanctuaries to work with teachers and students to learn how to collect long-term monitoring data while increasing awareness of the sanctuaries.

- A. Implement teacher workshops. Collaborate with Cordell Bank and Monterey Bay National Marine Sanctuaries.
- B. Maintain network of teachers and support their monitoring efforts.
- C. Maintain online databases.
- D. Expand monitoring program to include other key species and/or habitats.

**Potential Partners:** CBNMS, Olympic Coast National Marine Sanctuary (OCNMS), MBNMS, Channel Islands National Marine Sanctuary (CINMS), FMSA, University of California Santa Cruz (UCSC), Bodega Marine Laboratory (BML)

**Products:** Website, training workshops, databases, reports, training manuals, teacher kits, curriculum, logos

**Complementary Strategies:** GFNMS FMP, Education, STRATEGY ED-2; Introduced Species, STRATEGY IS-3, STRATEGY IS-9; Water Quality, STRATEGY WQ-2; MBNMS FMP, Tidepool Protection, STRATEGY TP-1

**VOLUNTEER PROGRAMS – To offer experiences to inspire an ocean conservation ethic**

**STRATEGY ED-7:** *Expand the reach of GFNMS education and outreach programs by expanding Sanctuary Naturalist Corps program to deploy trained volunteers to educate about the sanctuary at various events and locations.*

**Activity 7.1** Under the Sanctuary Naturalist Corps, recruit, train, and manage a diverse team of volunteers to engage, educate, and outreach about the sanctuary at visitor center, summer camp, in the field at high use areas, schools, and outreach events (lectures, fairs).

- A. Reassess goals and accomplishments of the Sanctuary Education Awareness and Long-term Stewardship (SEALS) volunteer program and modify as appropriate for current management needs.
- B. Develop program for training volunteer naturalists to lead sanctuary programs at the visitor center and schools.
- C. Develop a Rocky Intertidal Docents program to interpret intertidal habitat, reduce trampling, and to teach responsible wildlife viewing techniques.
- D. Develop a speakers' bureau to provide speakers for schools and community groups.
- E. Develop program for training volunteers to represent the sanctuary at outreach fairs and events.
- F. Train staff and docents to work successfully with multicultural and other diverse audiences.

**Potential Partners:** CBNMS, FMSA

**Products:** Outreach materials, training materials, website, slideshows, brochure of volunteer opportunities at GFNMS

**Complementary Strategies:** GFNMS FMP, Introduced Species, STRATEGY IS-2, STRATEGY IS-3, STRATEGY IS-5; Education, STRATEGY ED-5; CBNMS FMP, Education, STRATEGY ED-2; MBNMS FMP, Operations and Administration, STRATEGY OA-2, STRATEGY OA-4; Beach Closures, STRATEGY BC-2; Tidepool Protection, STRATEGY TP-2

**Activity 7.2** Develop GFNMS naturalist certification program to train volunteers and professional naturalists about the sanctuary and to present basic sanctuary information.

- A. Develop plan to train professional naturalists on sanctuary-specific information and certify them as GFNMS Certified Naturalists.
- B. Develop plan to train and certify volunteers and staff of other marine interpretation organizations as GFNMS Certified Naturalists.

**Potential Partners:** CBNMS, FMSA, other marine interpretation organizations (Point Reyes National Seashore [PRNS], Golden Gate National Recreation Area

[GGNRA], Pacifica Chamber of Commerce Visitor Center, Audubon Canyon Ranch [ACR], Stewards of the Coast and Redwoods)

**PUBLIC PROGRAMS – To instill greater public understanding and appreciation of the sanctuary and our dependence upon a healthy ocean ecosystem**

**STRATEGY ED-8: *Increase awareness and knowledge of the sanctuary through a lecture series.***

**Activity 8.1** Raise the profile of and expand the GFNMS lecture series to target new audiences and increase attendance.

- A. Increase collaboration with partners.
- B. Increase effective use of media and press.
- C. Hold lectures in inland communities and diverse communities not already reached (i.e., East Bay, South Bay).
- D. Investigate sponsorship.

**Potential Partners:** FMSA, California Academy of Sciences (CAS), Randall Museum, MBNMS, CBNMS

**Products:** Outreach materials, website

**Complementary Strategies:** GFNMS FMP, CBNMS FMP, Education, STRATEGY ED-6; MBNMS FMP, Sanctuary Integrated Monitoring Network (SIMoN), STRATEGY SI-3

**STRATEGY ED-9: *Increase awareness and build knowledge of the sanctuary through educational programs and exhibits at the visitor center.***

**Activity 9.1** Maintain engaging educational exhibits and activities at the GFNMS Crissy Field visitor center.

- A. Improve and expand visitor center exhibits. This will include renovating existing exhibits and creating new exhibits and activities on sanctuary cultural resources, habitats and wildlife, and ecosystem protection.
- B. Develop scheduled drop-in programs such as “Creature Feature” to attract new and return visitors. These programs will be scheduled during high visitation periods (summer, holidays).

***Education and Outreach Action Plan  
GFNMS Management Plan***

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- C. Increase attendance at the visitor center by marketing its programs and services. Cross market programs with Crissy Field Environmental Center and coordinate scheduling of drop in visitor activities.

**Potential Partners:** FMSA, Aquarium of the Bay, Crissy Field Environmental Center, CBNMS, MBNMS, PRNS

**Products:** Exhibits, touch tanks, outreach materials

**Complementary Strategies:** GFNMS FMP, Education, STRATEGY ED-1, STRATEGY ED-11

**STRATEGY ED-10:** *Increase awareness of the sanctuary and reach a large audience through production and distribution of videos on the sanctuary and its resources.*

**Activity 10.1** Complete production of a general video and distribute to appropriate audiences.

- A. Finalize script(s) and explore possibility of generating two cuts—one targeted to a general audience (8th grade and above), and one for children (7th grade and below).
- B. Develop distribution and marketing plan to reach desired audiences such as environmental education centers and county offices of education.

**Potential Partners:** FMSA, California Academy of Sciences, Aquarium of the Bay

**Products:** Video, marketing materials

**Complementary Strategies:** GFNMS FMP, Education, STRATEGY ED-1, STRATEGY ED-7

**STRATEGY ED-11:** *Increase awareness of GFNMS by using effective media and marketing techniques.*

**Activity 11.1** Implement awareness campaign to raise the profile and recognition of the GFNMS.

- A. Internally develop new image, messages, and target audiences. Target wide and diverse audiences. Designate a media/public affairs point of contact.
- B. Utilize marketing in television, radio, and print media.
- C. Establish relationships with key local reporters (collaboratively with MBNMS and CBNMS, where media markets overlap) and develop pitches for press releases so that media will write articles.
- D. Identify key publications for sanctuary articles.
- E. Develop media plan and release schedule.

- F. Ensure logo and web site are on all publications and printed materials.
- G. Develop shared outreach materials/products/programs with CBNMS and MBNMS based on established priorities that inspire stewardship.

**Potential Partners:** FMSA, Sanctuary Advisory Council, Oceanic Society, PRNSA, city visitor centers, chambers of commerce, Convention Bureau, explore possibility of partnering with TV, radio, print media

**Products:** Partner package of brochures, public service announcements, press releases, logo wear, press kit, ad campaigns, update sanctuary brochure

**Complementary Strategies:** GFNMS FMP, Water Quality, STRATEGY WQ-1; Wildlife Disturbance, STRATEGY WD-6, STRATEGY WD-7; Introduced Species, STRATEGY IS-9; Impacts from Vessel Spills, STRATEGY VS-13; MBNMS FMP, Operations and Administration, STRATEGY OA-4; CBNMS FMP, Education, STRATEGY ED-3.3

**Activity 11.2** Increase reach and success of all sanctuary programs by increasing distribution of GFNMS education and outreach messages through other environmental education groups.

- A. Increase GFNMS brochure and flyer distribution list to include local visitor centers and public information kiosks, education libraries and teacher resource venues, and specific groups including: Students and Teachers Restoring a Watershed (STRAW), Marine Activities, Resources, and Education (MARE), Point Reyes National Seashore Association (PRNSA), Point Reyes National Seashore (PRNS) Life Boat Station, The Marine Mammal Center (TMMC) Whale Bus, Crissy Field Environmental Center, Headlands Institute, GGNRA North District, and the Headlands YMCA.
- B. Work individually with partners (including those listed above) to incorporate sanctuary messages into their materials/programs and vice versa. Prioritize organizations and aim for two collaborations per year.

**Potential Partners:** See above, CBNMS, MBNMS

**Products:** Outreach materials

**Activity 11.3** Increase reach and success of all sanctuary programs by effectively marketing, distributing, and evaluating all sanctuary programs and products.

- A. Develop strategy for marketing, distributing, and evaluating existing and new programs and products.

**Potential Partners:** FMSA, Sanctuary Advisory Council, partners for each project

**Products:** Marketing and evaluation materials, program reports

**STRATEGY ED-12: *Increase audience by building a larger visitor center with increased exhibits, programs, and opportunities to learn about and support GFNMS.***

**Activity 12.1** Create a new visitor center that showcases the National Marine Sanctuary Program (NMSP) with exhibits, lecture hall, and classroom/lab facilities, providing a gateway to the GFNMS and beyond. The center will be a destination for greater ocean literacy and community stewardship in the 21<sup>st</sup> century.

- A. Develop a plan to expand current visitor center by constructing a new Ocean Exploration Center. Special features of the center might include interactive programs, permanent exhibits, traveling exhibits, institutes, lecture series, daily programs, and a telepresence center.
- B. Develop telepresence to bring wildlife at Southeast Farallon Island to the visitor center by live camera uplink. Incorporate outreach into Coastal Ecosystem Education Program and utilize facilities at the Ocean Exploration Center.

**Potential Partners:** FMSA, The Presidio Trust, CAS, National Park Service (NPS), California Department of Fish and Game (CDFG), SF Bay Conservation and Development Commission, Ocean Conservancy, PRBO Conservation Science (Point Reyes Bird Observatory) (PRBO), United States Fish and Wildlife Service (USFWS)

**Products:** Visitor center (Ocean Exploration Center), exhibits, programs, telepresence

**STRATEGY ED-13: *Increase awareness of the sanctuary through interpretive signage and exhibits at strategic locations.***

**Activity 13.1** Develop a coordinated network of signs and exhibits throughout the sanctuary.

- A. Install and maintain interpretive signs at strategic locations along the coast including sites of high traffic and high educational value.
- B. Incorporate sanctuary exhibits into visitor centers and museums along the coast.
- C. Develop a sanctuary multi-use and/or vehicular trail along the coast linking signs, wayside exhibits, museum exhibits, and interactive kiosks.
- D. Coordinate and collaborate with CBNMS and MBNMS on sanctuary-sponsored signage and visitor center displays along the coast.

**Potential Partners:** FMR, MBNMS, NPS, state parks, PRNS, county Parks, California Coastal Trail, Green Belt Alliance, Coastal Conservancy, Oakland Museum, BML, Maritime Museum, Aquarium of the Bay, California Academy of Science, The Bay Model

**Products:** Signage, brochures, trail map, exhibits, kiosks, outreach materials

**Complementary Strategies:** GFNMS FMP, Wildlife Disturbance, STRATEGY WD-7; Administration, STRATEGY AD-1; MBNMS FMP, Interpretive Facilities, STRATEGY IF-2; CBNMS FMP, Education, STRATEGY ED-5

**STRATEGY ED-14:** *Outreach to residents and visitors in inland areas of the GFNMS watersheds and educate them about their connection with the sanctuary.*

**Activity 14.1** Develop a traveling exhibit on sanctuary watersheds to bring the sanctuary to inland communities.

- A. Develop storyboard and exhibit plan featuring the connection between inhabitants of watersheds and the GFNMS. Contact potential venues for guidance on sizes and content (including curriculum needs). Potential venues include schools, libraries, and community locations in the Bay Area and Central Valley.
- B. Develop curriculum and/or activities related to exhibit and link to Coastal Ecosystem Education Programs water quality unit.
- C. Build and circulate exhibit and curriculum around the Bay Area. Particular focus may be placed on the exhibit during Oceans week.

**Potential Partners:** Libraries, community centers, schools, local museums

**Products:** Exhibit, activities/curriculum

**Complementary Strategies:** GFNMS FMP, Education, STRATEGY ED-2; MBNMS FMP, Fishing Related Education and Research, FRER-7

## **ISSUE SPECIFIC EDUCATION STRATEGIES**

*Note: These strategies are cross-referenced from the issue-based action plans to show the entire suite of Education and Outreach strategies to be implemented by Education and Outreach sanctuary staff.*

## **WATER QUALITY STRATEGIES**

**STRATEGY WQ-2:** *Address sources of anthropogenic pathogens and pollutants from recreational and commercial boating activities and marinas.*

*For the full strategy text, please see page 55.*

**STRATEGY WQ-9:** *Educate local decision makers on land-based water quality impacts in the sanctuary.*

*For the full strategy text, please see page 61.*

## **WILDLIFE DISTURBANCE STRATEGIES**

**STRATEGY WD-2:** *Through the use of volunteer monitoring programs, observe and record impacts from human activities on marine life and key habitats such as the rocky intertidal.*

*For the full strategy text, please see page 75.*

**STRATEGY WD-4: *Through interpretive enforcement and law enforcement efforts, address human behavior that may adversely impact wildlife.***

*For the full strategy text, please see page 77.*

**STRATEGY WD-5: *Develop wildlife viewing guidelines to reduce disturbance to wildlife from human interactions.***

*For the full strategy text, please see page 79*

**STRATEGY WD-6: *Maximize media venues to augment directed outreach efforts and increase public awareness of wildlife disturbance issues.***

*For the full strategy text, please see page 80.*

## **INTRODUCED SPECIES STRATEGIES**

**STRATEGY IS-5: *Develop a volunteer-based outreach and monitoring program to improve early detection of introduced species.***

*For the full strategy text, please see page 96.*

**STRATEGY IS-9: *Through outreach efforts, inform targeted audiences and industry about pathways through which introduced species may enter the sanctuary and educate those targeted audiences on prevention methods.***

*For the full strategy text, please see page 99*

## **IMPACTS FROM FISHING ACTIVITIES STRATEGIES**

**STRATEGY FA-5: *Bring public awareness to the value and importance of the historical and cultural significance of maritime communities and their relationship and reliance on healthy sanctuary waters.***

*For the full strategy text, please see page 111.*

## **VESSEL SPILLS STRATEGIES**

**STRATEGY VS-9: *Outreach to mariners to increase stewardship of the sanctuary, including voluntary compliance with Vessel Traffic System (VTS) and sanctuary regulations.***

*For the full strategy text, please see page 134.*

GFNMS EDUCATION AND OUTREACH

## Timeline

Education and Outreach Strategy	Year 1	Year 2	Year 3	Year 4	Year 5
STRATEGY ED-1: Educate K-8 students about the sanctuary through visitor center, classroom, and field activities.	—————▶				
STRATEGY ED-2: Educate high school students and teachers about the sanctuary through classroom and field activities.	—————▶				
STRATEGY ED-3: Educate diverse inner city children about the sanctuary through summer camp experiences.	—————▶				
STRATEGY ED-4: Educate teachers about the resources and programs of the sanctuary.	—————▶				
STRATEGY ED-5: Develop high school internship program for high school students.	.....▶				
STRATEGY ED-6: Create stewards of the GFNMS by engaging middle and high school students in LiMPETS.	—————▶				
STRATEGY ED-7: Expand the reach of GFNMS education and outreach by expanding Sanctuary Naturalist Corps program.	—————▶				
Action 7.1 A SEALS program	—————◆				
Action 7.1 B Volunteer Naturalist Training Program	.....▶				
Action 7.1 C Rocky intertidal roving docents	.....▶				
Action 7.1 D Speakers' bureau	.....▶				
Action 7.1 E Outreach fair volunteers	—————▶				
Action 7.1 F Diversity training for staff and volunteers	—————▶				
STRATEGY ED-8: Increase awareness and knowledge of the sanctuary through a lecture series.	—————▶				
STRATEGY ED-9: Increase awareness and build knowledge of the sanctuary through visitor center.	—————▶				
STRATEGY ED-10: Increase awareness of the sanctuary through production and distribution of videos on the sanctuary and its resources.	—————▶				
STRATEGY ED-11: Increase awareness of GFNMS by using effective media and advertising techniques.	—————▶				
STRATEGY ED-12: Increase audience by building a larger visitor center.	.....▶				
STRATEGY ED-13: Increase awareness of the sanctuary through interpretive signage and exhibits at strategic locations.	—————▶				
STRATEGY ED-14: Outreach to inland areas of the GFNMS watersheds about connection with sanctuary.	.....▶				

**Legend:**

- ▶ **Ongoing Activity**
- .....▶ **Planning Stage**
- ◆ **Completed Activity**

GFNMS EDUCATION AND OUTREACH

**Budget**

Strategy	Estimated Annual Cost (1000's)*					Total Est. 5-Year Cost (1000's)
	YR 1	YR 2	YR 3	YR 4	YR 5	
<b>STRATEGY ED-1: Educate K-8 students about the sanctuary through visitor center, classroom, and field activities</b>	\$136	\$136	\$143	\$1143	\$143	\$700
<b>STRATEGY ED-2: Educate high school students and teachers about the sanctuary through classroom and field activities</b>	\$148	\$155	\$154	\$164	\$168	\$788
<b>STRATEGY ED-3: Educate culturally diverse inner city children about the sanctuary through summer camp experiences</b>	\$16	\$16	\$21	\$21	\$31	\$106
<b>STRATEGY ED-4: Educate teachers about the resources and programs of the sanctuary</b>	\$4	\$4	\$6	\$13	\$8	\$34
<b>STRATEGY ED-5: Develop high school internship program for high school students</b>	\$1	\$1	\$1	\$1	\$18	\$21
<b>STRATEGY ED-6: Create stewards of the GFNMS by engaging middle and high school students in LiMPETS</b>	\$8	\$8	\$8	\$10	\$10	\$43
<b>STRATEGY ED-7: Sanctuary Naturalist Corps program</b>	\$0	\$0	\$0	\$0	\$0	\$0
<b>ACTIVITY 7.1A: SEALS program</b>	\$11	\$0	\$0	\$0	\$0	\$11
<b>ACTIVITY 7.1B: Volunteer naturalist training program</b>	\$130	\$138	\$145	\$149	\$153	\$714
<b>ACTIVITY 7.1C: Rocky intertidal roving docents</b>	\$123	\$13	\$10	\$10	\$10	\$165
<b>ACTIVITY 7.1D: Speakers' bureau</b>	\$0	\$0	\$0	\$0	\$6	\$6
<b>ACTIVITY 7.1E: Outreach fair volunteers</b>	\$46	\$34	\$34	\$34	\$34	\$181
<b>ACTIVITY 7.1F: Diversity training for staff &amp; docents</b>	\$6	\$6	\$6	\$6	\$6	\$31

*Education and Outreach Action Plan  
GFNMS Management Plan*

Strategy	Estimated Annual Cost (1000's)*					Total Est. 5-Year Cost (1000's)
	YR 1	YR 2	YR 3	YR 4	YR 5	
<b>STRATEGY ED-8: Sanctuary lecture series</b>	\$18	\$14	\$14	\$14	\$14	\$73
<b>STRATEGY ED-9: Educational programs and exhibits at the visitor center</b>	\$131	\$94	\$100	\$170	\$95	\$590
<b>STRATEGY ED-10: Production and distribution of videos on the sanctuary</b>	\$15	\$0	\$0	\$0	\$0	\$17
<b>STRATEGY ED-11: Use effective media and marketing techniques</b>	\$89	\$55	\$38	\$38	\$38	\$257
<b>STRATEGY ED-12: Increase audience by building a larger visitor center</b>	\$213	\$213	\$400	\$663	\$538	\$2025
<b>STRATEGY ED-13: Interpretive signage and exhibits at strategic locations</b>	\$144	\$144	\$144	\$144	\$144	\$719
<b>STRATEGY ED-14: Outreach to inland watersheds about connection with the sanctuary</b>	\$0	\$0	\$0	\$0	\$79	\$79
<b>Total Estimated Annual Cost</b>	\$1,237	\$1,029	\$1,223	\$1,578	\$1,492	\$6,559
The sanctuary's base budget is available each year from appropriated funds.						
There is both availability of and opportunity to receive additional funding from appropriated funds.						
The estimates do not take into account increasing personnel costs each year or inflation.						
The estimates do not take into account unexpected events or emergencies or unforeseen projects.						

**Education and Outreach Action Plan  
GFNMS Management Plan**

GFNMS EDUCATION AND OUTREACH

**Performance Measures**

Strategy Title(s)	Performance Goal	Desired Outcome (Objective)	Outcome Measure	How Measured	Who Measures	Output Measure
<p>STRATEGY ED-1: Educate K-8 students about the sanctuary.</p> <p>STRATEGY ED-2: Educate high school students about the sanctuary.</p> <p>STRATEGY ED-3: Educate diverse inner city children about the sanctuary.</p> <p>STRATEGY ED-4: Educate teachers about the sanctuary.</p>	Use education as a tool to help protect the sanctuary's resources.	<p>1) Structure programs to educate along an environmental literacy continuum including developing awareness, building a knowledge base, changing behavior, and building stewardship.</p> <p>2) To target diverse audiences including various multicultural, socio-economic, age, and gender groups.</p>	Increase number and diversity of students and teachers exposed to messages about the sanctuary in an effort to increase awareness about sanctuary resources and issues.	<p>1) Track numbers of children reached in K-8 programs.</p> <p>2) Track number of youth reached in high school programs.</p> <p>3) Track number of children reached through summer camp program. 4) Evaluate increase in students' knowledge about the sanctuary.</p>	Sanctuary Superintendent, Education Coordinator, FMSA	<p>1) K-8 program and resources, elementary school outreach plan</p> <p>2) High school curriculum, website, database, workshops, outreach materials, slide shows, teacher lending kits</p> <p>3) Summer camp curriculum</p> <p>4) Assessment and evaluation</p>
<p>STRATEGY ED-5: Provide stewardship opportunities for high school students.</p> <p>STRATEGY ED-6: Create stewards by engaging middle and high school students in monitoring.</p>	Use education as a tool to help protect the sanctuary's resources.	Structure programs to educate along an environmental literacy continuum including developing awareness, building a knowledge base, changing behavior, and building stewardship.	Increase in effectiveness of high school education programs whereby the literacy continuum is fully realized from awareness building to stewardship building.	<p>1) Track increase in number of high school students participating in internship program.</p> <p>2) Track increase in number of high school students participating in high school monitoring programs.</p> <p>3) Track student-directed stewardship projects implemented.</p>	Sanctuary Superintendent, Education Coordinator, FMSA	<p>1) Formal framework for internship program including training materials, and evaluation standards 2) Case studies of student-directed stewardship projects</p>

**Education and Outreach Action Plan  
GFNMS Management Plan**

Strategy Title(s)	Performance Goal	Desired Outcome (Objective)	Outcome Measure	How Measured	Who Measures	Output Measure
STRATEGY ED-7: Expand the reach of GFNMS education and outreach by creating Sanctuary Naturalist Corps.	Continually reach broader audiences to create an informed and connected public.	Target diverse audiences including various multicultural, socioeconomic, age and gender groups.	Expand outreach programs throughout region, through diverse venues, to increase the general public's awareness about the sanctuary, and increase sanctuary stewardship.	1) Increase in number and diversity of volunteers trained through the Sanctuary Naturalist Corps and actively participating in outreach, monitoring, and restoration efforts (in hours). 2) Measurable increase in types and locations of venues used for delivering sanctuary messages.	Sanctuary Superintendent, Education Coordinator, FMSA	1) Training manual and program for volunteers 2) Outreach materials to be disseminated to public
STRATEGY ED-8: Increase awareness through a lecture series. STRATEGY ED-9: Increase awareness through educational programs and exhibits at the visitor center STRATEGY ED-10: Increase awareness through video. STRATEGY ED-11: Increase awareness through effective media and marketing. STRATEGY ED-12: Increase audience by building larger visitor center. STRATEGY ED-13: Increase awareness through interpretive signage and exhibits.	a) Continually reach broader audiences to create an informed and connected public. b) Ensure education complements and promotes other sanctuary programs such as research, monitoring and resource protection.	a) Target diverse audiences including various multicultural, socioeconomic, age and gender groups. b) To develop programs to target content builders, user/impact groups, influencers, and decision makers.	Target new audiences and increase participation in sanctuary programs in order to raise the profile and recognition of GFNMS within the broader region.	Increase the reach and success of all sanctuary programs by developing an overall marketing strategy, distribution plan, and evaluation of all sanctuary products and programs. Marketing plan directed at: 1) increasing number of tools used to reach different audiences and interest groups. 2) increasing attendance in sanctuary programs 3) increasing press coverage of the sanctuary.	Sanctuary Superintendent, Education Coordinator, FMSA	1) Outreach materials 2) Exhibits, touch tank 3) Video, marketing materials 4) Public service announcements, press releases, ad campaign, outreach materials





PROGRAM AREA  
**CONSERVATION SCIENCE  
ACTION PLAN**

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## **PROGRAM STATEMENT**

Characterization, monitoring, and research assist in the protection of sanctuary wildlife and habitats by increasing the understanding of ecosystem structure and function; detecting environmental problems; tracking ecosystem health and trends of the various habitats and natural resources in the sanctuary; and contributing to solutions to management issues throughout the Gulf of the Farallones National Marine Sanctuary (GFNMS). An updated long-term conservation science plan has been developed to coordinate current and future habitat characterization, ecosystem monitoring, and research efforts. The following three specific areas are the focus of the conservation science plan: (1) baseline and characterization studies for populations and habitats whose presence were critical in the sanctuary's designation, yet whose distributions and other basic characteristics remain poorly understood; (2) directed monitoring studies focusing on indicator species and representative habitats and undertaken jointly with other sanctuaries, research institutions and agencies; and (3) analytical studies aimed at determining the cause of a condition or impacts and predictive studies to understand trends and variability (e.g., in a specific population).

## **PROGRAM DESCRIPTION**

GFNMS is a complex region with high biological diversity; nationally significant wildlife breeding and feeding areas; significant commercial and recreational fishing; estuarine habitats; numerous federally, state, and locally protected marine and estuarine waters; and watershed influences and impacts from the 8 million San Francisco Bay Area residents. Conservation science will help solve specific management problems, enhance resource protection efforts, and assist in bringing scientific information to the general public. The conservation science program will ensure that science activities address management issues and are effectively integrated into the administration, management, education, outreach and resource protection programs of the sanctuary.

## **CONSERVATION SCIENCE GOALS**

1. Increase our knowledge and understanding of the estuarine, nearshore, and offshore ecosystems in GFNMS.
2. Develop monitoring programs to understand long-term status and trends, detect emerging issues, and guide management decisions.

3. Develop research programs to identify and address specific management issues and assess effectiveness of management solutions.

## **CONSERVATION SCIENCE OBJECTIVES**

1. Assess the sanctuary's information base to identify gaps in knowledge that can affect our ability to manage the area.
2. Conduct studies of species or marine communities to identify wildlife and habitats most at risk or in need of management attention.
3. Promote the sanctuary as a site for ecosystem-based management research by providing financial and logistical support for scientific investigations that address critical marine ecosystem protection issues.
4. Design research and monitoring projects that are responsive to management concerns and contribute to improved management of the sanctuary.
5. Make effective use of research and monitoring results by incorporating them into education and resource protection programs.
6. Encourage information exchange and cooperation among all organizations and agencies undertaking ecosystem-based research in the sanctuaries to promote more timely and informed management.

## ***CURRENT CONSERVATION SCIENCE PROGRAM***

The sanctuary's conservation science program consists of several ecosystem monitoring projects, issue specific research projects, and habitat characterization projects. The monitoring programs, Sanctuary Ecosystem Assessment Surveys (SEA Surveys), are a compilation of GFNMS programs that provide biological observations and habitat characterization for the Gulf of the Farallones region. SEA Surveys include several long-term monitoring programs such as Beach Watch, SEA Surveys – Pelagic Habitat, and Rocky Intertidal Monitoring. SEA Surveys will also include future monitoring and exploration programs such as invasive species detection, restoration, and monitoring; estuarine monitoring; water quality monitoring through assessment of indicator species for ecosystem health; and the status and trends of species populations and ranges in the Gulf of the Farallones as indicators of impacts from global climate change.

Dedicated research projects in the past have included efforts to assess wildlife disturbance levels from permitted overflights and advise management on the effectiveness of special conditions required in sanctuary permits. Another example of a past dedicated research project is the assessment of human activities upon three harbor seal haul-outs. This six-year project, called Sanctuary Education, Awareness and Long-term Stewardship (SEALS), categorized and quantified human activities near the seal haul-outs and provided recommendations for approach distances. This information was later incorporated into various outreach products and docent programs, aided National Marine Fisheries Service investigating violations to the Marine Mammal Protection Act, and informed US Fish and Wildlife Service during development of new

refuge boundaries and regulations. Past habitat characterization efforts included the production of the Biogeographic Atlas, a compilation of maps and analyses to identify areas of highest ecological importance in sanctuary offshore areas, side-scan sonar mapping and video-documentation of benthic resources around the South Farallon Islands, Fanny Shoal, and Drakes Bay, and characterization of oceanographic features through the use of thermistor arrays.

Since 1997, Gulf of the Farallones has conducted Sanctuary Ecosystem Assessment Surveys-Pelagic Habitat (SEA Surveys-Pelagic Habitat). This long-term study focuses on krill, a critical building block in the food chain for this area. Through the use of acoustics and sampling, krill and juvenile and schooling fish are located and identified. The parameters influencing their distribution in the water column are investigated. These data are analyzed along with oceanographic parameters, chlorophyll, seabird, and marine mammal sightings to better understand the causes and dynamics of marine life concentrations in particular areas of the sanctuary.

SEA Surveys—Beach Watch volunteers have been monitoring coastal marine life (alive and dead) and human activities along the sanctuary shoreline continuously since 1993. Beach Watch collects baseline data on sanctuary wildlife and maintains a long-term database used by the sanctuary and other natural resource management agencies to answer management questions.

SEA Surveys—rocky intertidal program monitors species abundance and distribution within several locations throughout the sanctuary, and spatial-temporal changes within the rocky intertidal habitat.

Information and products from current and future science programs contribute to the understanding of sanctuary wildlife and habitats and how they are influenced by anthropogenic stressors such as oil pollution, climate change, noise, marine debris, and extraction. Science products also help to predict or model changes from natural phenomenon and human-induced stressors. Information from the Conservation Science program also contributes to outreach and educational materials used in handouts, classroom assignments and web-based products.

## **CONSERVATION SCIENCE STRATEGIES**

**STRATEGY CS-1: *Maintain the Beach Watch program to monitor marine life and human activities on sanctuary beaches, and provide baseline information, and identify ecosystem changes to assist sanctuary management decisions.***

**Activity 1.1** As a part of the Sanctuary Naturalist Corps, maintain Beach Watch volunteer monitoring program to gather baseline information about the resources of the sanctuary.

- A. Beach Watch is a long-term shoreline monitoring program. The Beach Watch program primarily assesses coastal birds, marine mammals, human activities, and oil pollution. The program goals are to: 1) educate the public about the coastal environment; 2) educate the public that they can make a difference in protecting their beaches; 3) assist the Sanctuary in the early detection of natural and human-caused environmental perturbations such as warm or cold water events and oil spills; 4) provide a baseline of information on the average presence of live and

beachcast marine organisms; and 5) develop a network of local experts who can document and discuss the natural changes a specific beach will undergo over a period of several years. Beach Watch and similar west coast sanctuary monitoring programs will be integrated to produce data sets for tracking the health and status of west coast seabird and marine mammal populations.

**Potential Partners:** Beach COMBERS at MBNMS, COASST at OCNMS, CFMP Data Rescue program, NMFS-Marine Mammal Stranding Network

**Complementary Strategies:** Introduced Species Action STRATEGY IS-1, Wildlife Disturbance Action STRATEGY WD-4, Conservation Science STRATEGY CS-4, CS-5, CS-6, Cross-cutting Ecosystem Monitoring Action STRATEGY XEM-1, XEM-2, XEM-3, Northern Management Area Science Action STRATEGIES XNRM-1, XNRM-2, XNRM-3, XNRM-4, XNRM-5

- B. Revise beached bird book to support the efforts of Beach Watch, Support BeachCOMBERS in MBNMS and COASST volunteers in OCNMS by making available the most current information on identification and demographic information of beached birds and mammals.
- C. Integrate Beach Watch data with other biological and physical monitoring data sets such as SEA Surveys-Pelagic Habitat data sets, SEA Stations, SEAS rocky intertidal monitoring, and future monitoring programs (introduced species and water quality). Develop an online data entry system using data structures compatible with other sanctuary shoreline monitoring programs. Make data applicable to and posted on the Sanctuaries Hazardous Incident Emergency Logistics Database System (SHIELDS). Data should be available for access by staff during emergency response.
- D. Integrate Beach Watch data with regional and national Integrated Ocean Observation Efforts (IOOS) and Central and Northern California Ocean Observation System as well as West Coast Regional Monitoring Program and United States Fish and Wildlife Service (USFWS) seabird populations assessment, and harmful algal bloom events.
- E. Upgrade Beach Watch data management and availability by posting data sets on local and regional web sites such as Center for Integrated Marine Technologies (CIMT), (CICORE), the national data base for the Marine Mammal Stranding Network, and the Sanctuary Integrated Monitoring Network (SIMoN).

Improve efficiency of data collection through the use of personal digital assistants (PDA), digital imagery, and other electronic information gathering tools. Tools and programs shall be compatible with those used by other shoreline monitoring programs, emergency response and damage assessment, National Marine Fisheries Service and US Fish and Wildlife Service.

- F. Beach Watch data sets should include reports of incidents and violations documented during Beach Watch surveys.

**Potential Partners:** Farallones Marine Sanctuary Association (FMSA), state parks, Office of Spill Prevention and Response (OSPR), Fitzgerald Marine Reserve (FMR), USFWS, California Department of Fish and Game (CDFG), Monterey Bay National Marine Sanctuary (MBNMS), Moss Landing Marine Laboratories, Olympic Coast National Marine Sanctuary, University of Washington, National Oceanographic Data Center (NODC), Central Observation and Seabird Survey Team (COASST), National Marine Sanctuary Program (NMSP)-SHIELDS, National Marine Fisheries Service (NMFS)

**Products:** Beach Watch Annual Report, collaborative research papers, National Resource Damage Assessment and Restoration (NRDA) data, Web-based database and maps.

**Complementary Strategies:** GFNMS Final management Plan (FMP), Vessel Spills, STRATEGY VS-5, VS-6, STRATEGY VS-8; Introduced Species, STRATEGY IS-1; Impacts from Fishing Activities, STRATEGY FA-1, Water Quality STRATEGY WQ-2, 8, Impacts from Vessel Spills STRATEGY VS-6, Wildlife Disturbance STRATEGY WD- 1, WD-2, WD-3, WD-4 WD-5, Resource Protection STRATEGY RP-7, RP-8, Conservation Science Action STRATEGY CS-4, CS-5, CS-6, Cross-cutting Ecosystem Monitoring Action STRATEGY XEM-1, XEM-2, XEM-3, XEM-4, Northern Management Area Science Action STRATEGIES XNRM-1, XNRM-2, XNRM-3, XNRM-4, XNRM-5

**STRATEGY CS-2:** Conduct research as needed, to guide permit conditions.

**Activity 2.1** Conduct research to guide permit conditions for new white shark viewing and assess effectiveness of new regulations. Following promulgation of new regulations restricting boater interactions with white sharks, conduct research to determine appropriate permit conditions and effectiveness of new regulations in reducing disturbance to white sharks.

- A. Develop and implement a white shark behavioral study to assess the impacts of motorized vessels in the vicinity of feeding and milling sharks. Study will assess shark behavior in relation to numbers of vessels and approach distances during various shark predator-prey interactions. Study analysis shall be targeted to recommend acceptable number of vessels, vessel size(s), and approach distances. Study will be conducted August through January during the seasonal migration of sharks to the Farallon Islands.
- B. Periodically review effectiveness of special permit conditions and revise as appropriate.

**Potential Partners:** PRBO Conservation Science, USFWS

**STRATEGY CS-3: *Host a biennial research workshop to facilitate information exchange in the GFNMS.***

**Activity 3.1** Every other year, the sanctuary will continue to host a conservation science workshop with local researchers and educators to highlight science in and around the sanctuary.

- A. Host workshop every other year. Workshop proceedings will include oral presentations, poster sessions, and publication of proceedings and abstracts.
- B. Compile a comprehensive list of research being conducted in and around GFNMS. Produce map of sampling locations and study areas.
- C. Educate research community how to post monitoring program descriptions and findings on to GFNMS SIMoN, OceanObs, SEAMAP, CICORE and other appropriate web sites.

**Potential Partners:** Cordell Bank National Marine Sanctuary (CBNMS), FMSA, MBNMS-Sanctuary Integrated Monitoring Network (SIMoN), San Francisco State University (SFSU), Duke University, UC Davis, Bodega Marine Laboratory

**Products:** Workshop proceedings, website, SIMoN listing

**Complementary Strategies:** Impacts for Fishing Activities STRATEGY FA-1 Activity 1.2, Conservation Science Action STRATEGY CS-5, CS-6, Cross-cutting Ecosystem Monitoring Action STRATEGY XEM-2, Northern Management Area Science Action STRATEGIES XNRM-1, XNRM-2, XNRM-5

**STRATEGY CS-4: *Develop and implement sanctuary ecosystem assessment and monitoring programs, and integrate with regional ocean observation programs along the west coast and the sanctuary program's System Wide Monitoring guidelines.***

**Activity 4.1** Expand Sanctuary Ecosystem Monitoring Surveys-Pelagic Habitat (SEA Surveys, formerly known as Ecosystem Dynamics Study-EDS).

- A. Conduct long-term monitoring of the macrovertebrates of the sanctuary, seabirds, marine mammals, and sea turtles and their prey species. Monitor the abundance and distribution of species impacted by chronic and acute oil pollution, such as seabirds, marine mammals, and sea turtles, and their trophic relationship and the population dynamics of euphausiid shrimp or krill.
- B. Investigate the relationship between hydrographic conditions, physical features and the distribution and abundance of marine organisms in the vicinity of the Gulf of the Farallones region and the coastal and pelagic region west of Sonoma County.
- C. Link local abundance and distribution data sets with associated habitats, oceanographic features, and occurrence and distribution of human activities, such as vessel activities.

- D. Monitor phytoplankton for detection of harmful algal blooms.
- E. Identify and map specific and trend information for identification of areas of ecological significance and changes of ranges as potential indicators of global warming.

**Potential Partners:** Cordell Bank National Marine Sanctuary (CBNMS), FMSA, MBNMS-Sanctuary Integrated Monitoring Network (SIMoN), San Francisco State University (SFSU), Duke University, PRBO,

**Complementary Strategies:** Water Quality STRATEGY WQ-2 Introduced Species STRATEGY IS-1, IS-2, Impacts from Vessel Spills VS-3, VS-5, VS-6, Wildlife Disturbance STRATEGY WD-2, WD-3, WD-4, WD-7, Conservation Science Action STRATEGY CS-1, CS-2, CS-3, CS-5, CS-6, Cross-cutting Ecosystem Monitoring Action STRATEGY XEM-1, XEM-2, XEM-3, Northern Management Area Science Action STRATEGIES XNRM-1, XNRM-2, XNRM-5

**Activity 4.2** Expand sanctuary's Rocky Intertidal Monitoring Program. The rocky intertidal habitat of the sanctuary is limited to outer coast and island shorelines. Only a small portion, less than 25 percent of the outer coast are rocky intertidal habitat. This habitat is subjected to extraction, trampling impacts from humans and wildlife, smothering and scouring from natural and human-induced erosion factors, permanent destruction from vessel groundings, loss of acreage from non-native species, and impacts from pollutants such as urban run-off and vessel spills. Restoration of the rocky intertidal habitat is difficult and time-consuming, with projects often taking from seven to ten years.

- A. Continue monitoring of the rocky intertidal areas of the Farallon Islands and re-establish long-term monitoring of six mainland monitoring sites: Bodega Head, Pinnacle Rock, Estero Americano, Duxbury Reef, Slide Ranch, Bean Hollow and Pigeon Point. The objectives are to: 1) establish non-destructive, permanent sampling transects, quadrats and density plots within the intertidal areas of the GFNMS; 2) determine native and introduced species inventory in the intertidal communities; 3) determine primary and secondary cover in established quadrats; 4) determine percent cover of sessile organisms; 5) determine density of macroinvertebrates susceptible to oil spill damage; 6) photo-document, collect and archive voucher specimens from the intertidal areas for future reference. Through regular assessment (monitoring) of the condition and health of this sensitive habitat, sanctuary staff can detect acute changes and long-term trends. Monitoring information can also indicate if a management action is effective and having positive results.
- B. Integrate monitoring protocols and data sets with CeNCOOS, West Coast Observations – Sanctuary Ecosystem Assessment Stations, Minerals Management Service, Multi-agency Rocky Intertidal Network (MARINE), Partnership for Interdisciplinary Studies of Coastal Oceans (PISCO), and the National Park Service. Provide data sets and integrated analyses to the State's Marine Life Protection Act Initiative, marine protected areas.

- C. Provide species inventory updates and integrate with introduced species detection programs.

**Potential Partners:** CeNCOOS, CDFG-MLPA program, MBNMS, OCNMS, CINMS, PISCO, NPS, MMS MARINE, OCNMS, Department of Public Health HAB monitoring, UC Davis, IGERT Internship.

**Complementary Strategies:** Introduced Species STRATEGY IS-1, IS-3, IS-5, Wildlife Disturbance STRATEGY WD-2, WD-3, WD-4, Conservation Science Action STRATEGY CS-1, CS-2, CS-3, CS-5, CS-6, Cross-cutting Ecosystem Monitoring Action STRATEGY XEM-1, XEM-2, Northern Management Area Science Action STRATEGIES XNRM-1, XNRM-2, XNRM-4, XNRM-5

**Activity 4.3** Long-term monitoring of sanctuary physical/oceanographic processes

- A. Expand West Coast Obs-Sanctuary Ecosystem Assessment Stations (SEA Stations). SEA Stations are nearshore and near-island buoy-instrumentation, customized for particular locations. SEA Stations measure environmental events that affect marine life. The stations measure physical processes that affect distribution, settlement, growth and reproduction of marine life. Arrays have been placed at areas of water mass convergence, areas of strong upwelling influence and high productivity, and also near rocky intertidal monitoring sites. Interannual and shorter-term upwelling and relaxation events have been shown to drive recruitment and movement of certain fish species. It is also likely that these events affect other wildlife, including keystone species. The GFNMS has three arrays that continuously measure water column temperature, providing information necessary to understand and track water mass movements that affect recruitment of key species to coastal habitats. The stations are located at: Bodega Head, Southeast Farallon Island, and Pigeon Point. A fourth array shall be deployed at Double Point.
- B. Establish Cooperative Agreement with Bodega Bay Marine Lab for long-term maintenance and periodic replacement and upgrades to array hardware; data down loading and web posting; data interpretation and integration with biological assemblage data and ecological areas of significance.

**Potential Partners:** UC Bodega Marine Lab, PISCO, National Park Service, CBNMS, MBNMS, SFSU, CICORE, OCNMS, CINMS, CDFG-MLPA program,

**Complementary Strategies:** Impacts from Vessel Spills VS-2, VS-6, Conservation Science Action STRATEGY CS-1, CS-2, CS-3, CS-5, CS-6, Cross-cutting Ecosystem Monitoring Action STRATEGY XEM-1, XEM-2, XEM-3, Northern Management Area Science Action STRATEGIES XNRM-1, XNRM-2, XNRM-3, XNRM-5

**Activity 4.4** Conduct research and monitoring to assess effectiveness of new eelgrass bed protection zones. Following promulgation of new regulations restricting vessel anchoring in

eelgrass beds within Tomales Bay, conduct research to assess health of eelgrass beds to determine effectiveness of new regulations in reducing damage to eelgrass beds.

- A. Develop and implement an eelgrass status study to assess size, density, health, and species richness of eelgrass beds in Tomales Bay.
- B. Periodically review effectiveness of regulation. Assess size and location of management zones.

**Potential Partners:** Point Reyes National Seashore, California Department of Fish and Game, Tomales Bay Watershed Council

**Complementary Strategies:** Wildlife Disturbance STRATEGY WD-3, Introduced Species STRATEGY IS-2, Conservation Science Action STRATEGY CS-4, CS-5, CS-6

**STRATEGY CS-5: *Complete characterization of sanctuary biological and physical features.***

**Activity 5.1** Map sanctuary habitat types and bottom substrate. A habitat map will provide important baseline information for management including relative proportions of sanctuary habitats; the current state of sanctuary wildlife and habitats as a basis against which to measure future change; unique habitats; identify areas of ecological significance; and extent of damages from anthropogenic stressors.

**Activity 5.2** Identify and map seasonal and year round circulatory patterns for surface and subsurface currents. Relate circulatory patterns to abundance and distribution of flora and fauna. Characterizing and mapping local and regional circulatory patterns and influences is important because the Gulf of the Farallones is located in one of the world's four major upwelling systems. (The other three systems are located along the west coast of South America, Southwest Africa, and Northwest Africa.) The upwelling of nutrient-rich, deep ocean water supports a food-rich environment and promotes the growth of organisms at all levels of the marine food web. The interaction of major currents, wind, topography, and other factors create coastal upwelling in the spring and summer that influences the biological productivity of the sanctuary. This process drives the productivity of the area by bringing cool, nutrient-rich waters from deep offshore to the sunlit inshore surface. Upwelling increases the productivity of surface waters by supporting large plankton blooms, the basis for the abundance of marine life in the sanctuary.

**Activity 5.3** Characterize the soft and hard bottom epifaunal communities. Survey the surface biota and sediment characteristics, quantify estimates of abundance and distribution of epifauna, assess disturbance effects and marine debris, develop species list of invertebrates and epifaunal fish, and characterize cultural resources.

**Activity 5.4** Integrate characterization, mapping and monitoring programs with regional ocean observation programs along the west coast and incorporate the sanctuary program's System Wide Monitoring guidelines.

**Potential Partners:** UC Bodega Marine Lab, PISCO, National Park Service, CBNMS, MBNMS, SFSU, CICORE, OCNMS, CINMS, CDFG-MLPA program, State Coastal Conservancy

**Complementary Strategies:** Water Quality STRATEGY WQ-1, WQ-2, Introduced Species STRATEGY IS-1, 2, 3, 4, 5, Impacts from Vessel Spills VS-2, Wildlife Disturbance STRATEGY WD-2, WD-3, WD-7, Conservation Science Action STRATEGY CS-1, CS-2, CS-3, CS-4, CS-6, Cross-cutting Ecosystem Monitoring Action STRATEGY XEM-1, XEM-2, Northern Management Area Science Action STRATEGIES XNRM-1, XNRM-2, XNRM-3, XNRM-5

**Strategy CS-6: *Work with partners to integrate data integration and infrastructure for SEA Station and Survey programs.***

**Activity 6.1** SEA Station and Survey programs need to be fully integrated with other science programs on a regional basis and need to use new technologies to link data sets from local and regional ecosystem monitoring and characterization programs within the West Coast sanctuaries. As part of an effort to develop a west coast regional observation system to support system-wide monitoring in the five West Coast sanctuaries, the National Marine Sanctuaries Program (NMSP) will partner with researchers and the National Oceanographic Data Center (NODC) National Coastal Data Development Center (NCDDC) and will use new technologies for data and information management.

- A. Partner with local and regional researchers to develop complementary data collection methods and consistent data base structures to improve data exchange and data integration.
- B. Partner with the National Oceanographic Data Center (NODC) National Coastal Data Development Center (NCDDC) for data and information management support. Work with NCDDC to support NMSP efforts to build on SIMoN's existing structure to enhance data input and review, data management, analyses, reporting, archiving and dissemination functions in order to facilitate the use of the SIMoN framework by other sanctuaries. NCDDC will address requirements and needs for data rescue, metadata, federal compliance issues, and data accessibility and delivery. In addition, NCDDC will work with the NMSP to expand the use of the Sanctuary Integrated Monitoring Network (SIMoN) planned for the GFNMS in 2007.
- C. Develop the administrative infrastructure to identify and act on cross-boundary opportunities, collaborate with large-scale initiatives, and interpret the results for natural resource managers and public audiences across the region.
- D. Establish a regional monitoring coordination team. The regional monitoring team shall consist of the site's research coordinator and possibly additional science staff. The team will develop a regional science communication plan to improve coordination, evaluate effectiveness of monitoring programs, develop "state of the sanctuary" reports to help assess the health of the sanctuaries, and develop a regional ecosystem-based science

operating plan in collaboration with each other to meet site, regional and national monitoring needs.

- E. Increase the use of new technologies to enhance data collection, expedite data management, and improve data availability for outreach and ecosystem protection. The sanctuary will automate data collection for near-real time retrieval of uncorrected data by developing on-line data entry and data downloading, and building a multi-sanctuary “real-time” database. The data will be available through CICORE, SEAMAP, SIMoN and IMaST portals and should result in expedited project analyses and findings, the ability to post new findings on the web site, and integrate new findings into exhibits and classroom activities.
- F. Increase the use of the current reference library and integrate the library with the sanctuary’s education and lending library. Provide an on-line data catalog of resources available as reference materials and for lending.

**Potential Partners:** NODC, NCDDC, CeNCOOS, CDFG-MLPA program, NMFS-MMSN, NOAA Damage Assessment, Research and Restoration Programs, CBNMS, MBNMS, OCNMS, CINMS, PISCO, NPS, MMS MARINE, OCNMS, Department of Public Health HAB monitoring, UC Davis, Bodega Marine Lab, San Francisco State University, University of Washington, CICORE, Duke University SEAMAP, CICORE, SIMoN,

**Complementary Strategies:** Water Quality Action STRATEGY WQ-2, 8, Introduced Species Action STRATEGY IS-1, IS-2, Impacts from Vessel Spills VS-2, Wildlife Disturbance Action STRATEGY WD-2, WD-3, Conservation Science Action STRATEGY CS-1, CS-2, CS-3, CS-4, CS-5, Cross-cutting Ecosystem Monitoring Action STRATEGY XEM-1, XEM-2, XEM-3, XEM-4, Northern Management Area Science Action STRATEGIES XNRM-1, XNRM-2, XNRM-3, XNRM-4, XNRM-5

## **CROSS-CUTTING SCIENCE STRATEGIES**

**STRATEGY XEM-1:** *Coordinate Existing Targeted Monitoring Activities to Promote Greater Efficiency and Effectiveness.*

**Complementary Strategies:** Conservation Science Action STRATEGY CS-1, CS-4, CS-5, CS-6

**STRATEGY XEM-2:** *Coordinate and Implement Existing Regional Ecosystem Monitoring Activities.*

**Complementary Strategies:** Conservation Science Action STRATEGY CS-1, CS-4, CS-5, CS-6

**STRATEGY XEM-3:** *Establish a Joint Internal Monitoring Coordination Team.*

**Complementary Strategies:** Conservation Science Action STRATEGY CS-4, CS-5, CS-6

**STRATEGY XEM-4:** *Consider Establishing a Joint Research Activities Panel to Enhance Research and Monitoring Collaborations.*

**Complementary Strategies:** *Water Quality STRATEGY WQ-6:* Develop a standing water quality working group of the sanctuary advisory council, supported by sanctuary staff. *Ecosystem Protection STRATEGY EP-2:* Create a standing “Living Resource and Habitat Protection” working group to provide advice to the sanctuary on ecosystem protection issues. *Vessel Spills STRATEGY VS-12:* Create a standing vessel spills working group to advise the sanctuary on implementation of proposed action plans. *Northern Management Area Transition Action STRATEGY XNRM-3:* Collaborate on Sanctuary Advisory Committees and Working Groups on Research and Monitoring Issues Related to the NMA. Conservation Science Action STRATEGY CS-4, CS-5, CS-6

## **MBNMS NORTHERN MANAGEMENT AREA SCIENCE STRATEGIES**

**STRATEGY XNRM-1:** *Share Information.*

**Complementary Strategies:** Conservation Science Action STRATEGY CS-1, CS-4, CS-5, CS-6

**STRATEGY XNRM-2:** *Coordinate Research and Monitoring Information Dissemination.*

**Complementary Strategies:** Conservation Science Action STRATEGY CS-1, CS-3, CS-4, CS-5, CS-6

**STRATEGY XNRM-3:** *Collaborate on Sanctuary Advisory Committees and Working Groups on Research and Monitoring Issues Related to the NMA.*

**Complementary Strategies:** Conservation Science Action STRATEGY CS-1, CS-4, CS-5, CS-6, Cross-cutting Ecosystem Monitoring Action STRATEGY XEM-4

**STRATEGY XNRM-4:** *Collaborate on Volunteer Monitoring Efforts Related to the NMA*

**Complementary Strategies:** Conservation Science Action STRATEGY CS-1, CS-4, CS-6

**STRATEGY XNRM-5:** *Implement JMPR Site-Specific Research and Monitoring Activities in the NMA.*

**Complementary Strategies:** Conservation Science Action STRATEGY CS-1, CS-3, CS-4, CS-5, CS-6

## **ISSUE SPECIFIC SCIENCE STRATEGIES**

*Note: These strategies are cross-referenced from the issue-based action plans to show the entire suite of conservation science strategies to be implemented by conservation science sanctuary staff.*

### **WATER QUALITY STRATEGIES**

**STRATEGY WQ-8:** *Develop an annotated bibliography of water quality research and monitoring programs in and adjacent to the sanctuary to evaluate data and determine the overall water quality of the sanctuary's ecosystem.*

*For the full strategy text, please see page 60.*

### **WILDLIFE DISTURBANCE STRATEGIES**

**STRATEGY WD-1:** *Create easily accessible centralized Web-based spatial database to house information pertaining to wildlife disturbance.*

*For the full strategy text, please see page 75.*

**STRATEGY WD-2:** *Through the use of volunteer monitoring programs, observe and record impacts from human activities on marine resources and key habitats such as the rocky intertidal.*

*For the full strategy text, please see page 75.*

**STRATEGY WD-3:** *Coordinate with other agencies, institutions and programs to better understand and address anthropogenic noise, light, and visual impacts on wildlife from vessels and low flying aircraft. See WD-3.3*

*For the full strategy text, please see page 76.*

### **INTRODUCED SPECIES STRATEGIES**

**STRATEGY IS-1:** *Develop a native and introduced species inventory and database specifically for GFNMS and areas adjacent to the sanctuary.*

*For the full strategy text, please see page 92.*

**STRATEGY IS-2:** *In coordination with existing monitoring programs, develop a program to detect introduced species in estuarine environments of the sanctuary.*

*For the full strategy text, please see page 93.*

**STRATEGY IS-3:** *Develop a monitoring program to detect and monitor introduced species in the rocky intertidal areas of the sanctuary.*

*For the full strategy text, please see page 95.*

**STRATEGY IS-4:** *Develop a monitoring program to detect and monitor introduced species in the pelagic environment of the sanctuary.*

*For the full strategy text, please see page 96.*

**STRATEGY IS-5:** *Develop a monitoring program to improve early detection of introduced species.*

*For the full strategy text, please see page 96.*

## **IMPACTS FROM FISHING ACTIVITIES STRATEGIES**

**STRATEGY FA-1:** *Develop a resource characterization of the sanctuary to better understand types and distributions of habitats, species, and processes.*

*For the full strategy text, please see page 108.*

## **VESSEL SPILLS STRATEGIES**

**STRATEGY VS-2:** *Refine oceanographic data used in existing spill and drift model to increase accuracy of risk assessments.*

**STRATEGY VS-5:** *Track distribution and numbers of species of concern and habitats in relation to probable spill trajectories.*

*For the full strategy text, please see page 132*

**STRATEGY VS-8:** *Continue to improve integration of GFNMS Beach Watch and SEA Survey data into Area Contingency Plan.*

*For the full strategy text, please see page 134.*

GFNMS CONSERVATION SCIENCE

## Timeline

Conservation Science Strategy	Year 1	Year 2	Year 3	Year 4	Year 5
STRATEGY CS-1: Maintain Beach Watch program to monitor marine life and human activities on sanctuary beaches and provide baseline information to assist sanctuary management decisions.	—————▶				
STRATEGY CS-2: Conduct research to develop permit conditions for white shark viewing and to assess effectiveness of new regulations.	—————◆				
STRATEGY CS-3: Host a biennial research workshop to facilitate information exchange in the GFNMS.	————◆      ———◆      ———◆				
Strategy CS-4 <i>Develop and implement integrated sanctuary ecosystem assessment and monitoring programs</i>	—————▶				
STRATEGY CS-5 <i>Complete characterization of sanctuary biological and physical features.</i>	—————▶				
STRATEGY CS-6 <i>Develop functional integration and infrastructure for SEA Station and Survey programs</i>	—————▶				

**Legend:**

- ▶      **Ongoing Activity**
- .....▶      **Planning Stage**
- ◆      **Completed Activity**

GFNMS CONSERVATION SCIENCE

**Budget**

Strategy	Estimated Annual Cost (1000's)*					Total Est. 5-Year Cost (1000's)
	YR 1	YR 2	YR 3	YR 4	YR 5	
<b>STRATEGY CS-1: Maintain Beach Watch program</b>	\$207	\$230	\$214	\$218	\$256	\$1125
<b>STRATEGY CS-2: Conduct research to develop permit conditions for white shark viewing and to assess effectiveness of new regulations</b>	\$24	\$0	\$0	\$0	\$0	\$24
<b>STRATEGY CS-3: Host a biennial research workshop to facilitate information exchange in the GFNMS</b>	\$36	\$0	\$41	\$0	\$41	\$118
<b>Strategy CS-4 Develop and implement integrated sanctuary ecosystem assessment and monitoring programs</b>	\$568	\$596	\$624	\$652	\$680	\$3120
<b>STRATEGY CS-5 Complete characterization of sanctuary biological and physical features.</b>	\$536	\$199	\$205	\$350	\$210	\$1500
<b>STRATEGY CS-6 Develop functional integration and infrastructure for SEA Station and Survey programs</b>	\$332	\$276	\$290	\$305	\$320	\$1523
<b>Total Estimated Annual Cost</b>	\$1,703	\$1,301	\$1,374	\$1,525	\$1,507	\$7410

The sanctuary's base budget is available each year from appropriated funds.

There is availability and opportunity to receive additional funding from appropriated funds.

The estimates do take into account increasing personnel costs each year or inflation.

The estimates do not take into account unexpected events or emergencies or unforeseen projects.

GFNMS CONSERVATION SCIENCE

## Performance Measures

Strategy Title(s)	Performance Goal	Desired Outcome (Objective)	Outcome Measure	How Measured	Who Measures	Output Measure
STRATEGY CS-1: Maintain Beach Watch program to monitor marine life and human activities on sanctuary beaches.	Develop monitoring programs to establish baselines, understand long-term status and trends, detect emerging issues, and guide management decisions.	Design research and monitoring projects that are responsive to management concerns and contribute to improved management of the sanctuary.	Increase understanding of human-use activities and their impacts on sanctuary resources.	1) Complete baseline data set about the resources of the sanctuary. 2) Expand long-term data set. 3) Integrate data into SHIELDS online ArcView database to be used during emergency response.	Ecosystem Protection Coordinator and Research Coordinator	1) Beach Watch Annual Report 2) Collaborative research papers 3) NRDA data 4) Web-based database
STRATEGY CS-2: Conduct research to develop permit conditions for white shark viewing and to assess effectiveness of new regulations.	Develop monitoring programs to understand long-term status and trends, detect emerging issues, and guide management decisions.	Design research and monitoring projects that are responsive to management concerns and contribute to improved management of the sanctuary.	To determine appropriate permit conditions and effectiveness of new regulations.	1) Complete assessment of white shark behavior in relation to numbers of vessels, at approach distances, during various predator-prey interactions (short term). 2) Sufficient data to make recommendations.	Research Coordinator and Ecosystem Protection Coordinator	Report with recommendations

**Conservation Science Action Plan  
GFNMS Management Plan**

<b>Strategy Title(s)</b>	<b>Performance Goal</b>	<b>Desired Outcome (Objective)</b>	<b>Outcome Measure</b>	<b>How Measured</b>	<b>Who Measures</b>	<b>Output Measure</b>
STRATEGY CS-3: Host a biennial research workshop to facilitate information exchange in the GFNMS.	1) Increase our knowledge and understanding of the estuarine, nearshore and offshore ecosystems in GFNMS. 2) Develop monitoring programs to understand long-term status and trends, detect emerging issues, and guide management decisions. 3) Develop research programs to identify and address specific resource management issues and assess effectiveness of management solutions.	Encourage information exchange and cooperation among all organizations and agencies undertaking management related research in the sanctuaries to promote more timely and informed management.	1) To track data collected on sanctuary wildlife and habitats and qualities as a source of information for managing sanctuary resources. 2) Identify data gaps as they pertain to management needs.	Track increases in number and quality of monitoring and research projects in and around the sanctuary, and their relevance to sanctuary resources management issues.	Sanctuary Superintendent, Research Coordinator, Ecosystem Protection Coordinator	1) Workshop proceedings 2) Website 3) SIMoN listing
STRATEGY CS-4: Develop and implement integrated sanctuary ecosystem assessment and monitoring programs	Develop monitoring programs to establish baselines, understand long-term status and trends, detect emerging issues, and guide management decisions.	Design research and monitoring projects that are responsive to management concerns and contribute to improved management of the sanctuary.	Increase understanding of human-use activities and their impacts on sanctuary wildlife and habitats.	1) Complete baseline data set about the habitats and wildlife of the sanctuary. 2) Expand long-term data set. 3) Integrate data into SHIELDS online ArcView database to be used during emergency response.	Research Coordinator Resource Protection	1) SEAS Biennial Report 2) Rocky intertidal biennial report, 3) Collaborative research papers 4) NRDA data 5) Web-based database

<b>Strategy Title(s)</b>	<b>Performance Goal</b>	<b>Desired Outcome (Objective)</b>	<b>Outcome Measure</b>	<b>How Measured</b>	<b>Who Measures</b>	<b>Output Measure</b>
STRATEGY CS-5 Complete characterization of sanctuary biological and physical features.	Adequately characterize sanctuary resources to establish baselines, understand long-term status and trends, detect emerging issues, and guide management decisions.	Complete site characterization of all sanctuary habitats, key indicator species and oceanographic processes, and physical features of the sanctuary.	Increase understanding of sanctuary wildlife and habitats and physical processes and how the sanctuary effect population health	1) Complete baseline benthic surveys and maps 2) Update species inventory 3) Quantify species distribution 4) Quantify introduced species distribution	Research Coordinator Resource Protection	1) Benthic maps of areas of ecological significance, and species 2) inventory of native species, 3) inventory of introduced species
STRATEGY CS-6 Work with partners functional integration and infrastructure for SEA Station and Survey programs	Effective operations and increased public awareness and information exchange	Automate data collection procedures to expedite data exchange; data summaries and data interpretation on web sites	Increased access and distribution of data	Data are analyzed within one year of collection and summary is posted	Research Coordinator	1) Use of data logging and digital imagery; 2) Methods are used by multiple management and marine researchers; 3) DRAFT data sets are available for emergency response and damage assessment activities within three days of collection





PROGRAM AREA  
**RESOURCE PROTECTION  
ACTION PLAN**

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## **PROGRAM STATEMENT**

Consistent with the purposes and policies of the National Marine Sanctuaries Act (NMSA), NOAA uses an ecosystem approach to managing the marine areas of the sanctuaries. Gulf of the Farallones National Marine Sanctuary's (GFNMS) ecosystems include habitat structure, species assemblages, and ecological processes, as well as the many interactions with humans and their activities. GFNMS is developing a resource protection program to expressly maintain an ecosystem perspective while providing oversight in addressing the multitude of resource protection issues the sanctuary is currently facing, as well as anticipating and planning for new and emerging issues on the horizon.

## **PROGRAM DESCRIPTION**

Pursuant to the NMSA, GFNMS' role is protection of the area's natural resource and ecosystem values by protecting the biodiversity, productivity and aesthetic qualities of the marine environment of the Gulf of the Farallones through ecosystem-based management. There are many successful ecosystem-based management models for the terrestrial environment, but these models don't translate well in a fluid, three-dimensional marine environment which functions under a different spatial and temporal scale. As the sanctuary builds and implements this new management plan, the staff will continue to work with other agencies, stakeholders and national marine sanctuaries to build a more solid model for marine ecosystem management.

Throughout the public scoping process and the entire management plan review, the public and sanctuary advisory council expressed a deep and abiding concern for better, overall ecosystem protection through the use of conservation-based management tools. The suggestions were wide and varied, including the use of:

1. Ecosystem-based management;
2. Precautionary approach;
3. Adaptive management; and
4. Managing for sustainability.

The sanctuary staff examined both the theory and practice of applying different, conservation-based management tools to the building of the framework for this management plan. These

management tools all add greater value to ecosystem protection. Thus, GFNMS has incorporated these principles to strengthen the sanctuary's management plan.

## **RESOURCE PROTECTION GOAL**

Maintain and, where necessary, restore the natural biological and ecological processes in GFNMS by evaluating and addressing adverse impacts from human activities on sanctuary ecosystems.

## **RESOURCE PROTECTION OBJECTIVES**

1. Build a comprehensive and coordinated ecosystem protection plan to ensure protection for the habitats, wildlife, and qualities of GFNMS.
2. Continue to build on partnerships, collaborative efforts, and coordination with other agencies, institutions, and organizations, in taking a comprehensive and effective ecosystem protection approach.

## **RESOURCE PROTECTION ACTION PLAN**

### **NEW AND EMERGING ISSUES**

Although a wide range of issues have been included in the management plan action plans, many other issues are not addressed. These include: (1) issues which are currently considered to have relatively small impacts, but which may grow to have large impacts in the future; (2) activities which may be occurring in similar environments, but not actually in the sanctuary; and/or (3) activities that are based on new technology, and their potential impacts are not well understood. Emerging issues may include activities that are currently unforeseen, but may emerge in the future due to technological advances, changes in operations, changes in market demand, and increased pressures on the coast. The following strategies focus on the development of a framework to identify, prioritize, and address future ecosystem protection issues.

**STRATEGY RP-1:** *Establish a framework for identifying, tracking, and addressing emerging issues on a timely basis.*

**Activity 1.1** Develop an electronic Web-based cataloging system to capture information on new and emerging issues (including sources and references). This system should be easily accessible by sanctuary staff to add and access information.

- A. Information for this system should be gathered from (and be specific to relevant new and emerging issues in the marine environment):
  1. Interactions with other natural resource management agencies
  2. Meetings with GFNMS, Cordell Bank National Marine Sanctuary (CBNMS), and Monterey Bay National Marine Sanctuary (MBNMS) Advisory Councils
  3. Scientific and conservation workshops, conferences, and symposia

4. National Marine Sanctuary Program (NMSP) Daily News Clips
  5. NMSP situation reports
  6. News articles, news services
  7. NMSP Leadership Team calls and meetings
  8. NMSP National Coordinators meetings
- B. A staff person will be assigned to maintain the system and send out reminders to the staff to use the system.
- C. As highly relevant new and emerging issues surface, staff maintaining the system will send out electronic messaging to the staff to inform and exchange information.

**Activity 1.2** Establish an evaluation system for determining if the issue is relevant to the site and identify steps for addressing issues such as:

- A. General description and current status of activity.
- B. Who are the responsible parties or potential user groups involved in the activity?
- C. Have any precedents been set for this type of activity?
- D. Are any other sanctuaries addressing this issue?
- E. Are any other resource management agencies dealing with this issue? If so, how are they addressing the issue?
- F. What are the potential impacts to sanctuary resources?
- G. Might this activity be in violation of GFNMS' regulations?
- H. Are there activities with similar impacts already occurring in the sanctuary for which GFNMS makes an exception, either from a regulatory or permitting standpoint?
- I. If there are similar activities that the sanctuary is already allowing exception for or permitting, are the impacts from this activity less or greater than for the new or emerging issue?
- J. Would GFNMS' current permitting authority allow this activity to be permitted? Under which kind of permit?
- K. Are there other agencies GFNMS should be working with on this issue?
- L. Has NMSP headquarters been involved in addressing this issue?

- M. Does this issue warrant national policy development?
- N. What future implications might there be for other sites?
- O. What are the next steps for addressing this issue (propose regulatory action, develop working group, permit, education, research, etc.)?

**Potential Partners:** CBNMS, MBNMS, Channel Islands National Marine Sanctuary (CINMS), Olympic Coast National Marine Sanctuary (OCNMS), NMSP

**Products:** Electronic Web-based tracking system

**Complementary Strategies:** GFNMS Final management Plan (FMP), Resource Protection, STRATEGY RP-2, STRATEGY RP-3; CBNMS FMP, Administration, AD-7; MBNMS FMP, Emerging Issues, STRATEGY EP-1, STRATEGY EP-2

**STRATEGY RP-2:** *Develop a coordinated communication system among all national marine sanctuaries and other natural resource management agencies to stay informed about new and emerging issues, share information, and provide a forum for exchange and policy discussion.*

**Activity 2.1** The National Oceanic and Atmospheric Administration (NOAA), National Ocean Service (NOS), and the NMSP are addressing new and emerging issues in some capacity every day. Each of these divisions and offices comment on environmental documents from other agencies, provide comment on policy development from within NOAA, and consult on new and emerging issues either on the NMSP site level or from congressional inquiries. A well-organized and maintained electronic communication system would provide opportunity for the following:

- A. A system that flags new and emerging issues of interest and potential importance.
- B. An information source and record of position or policy from within NOAA.
- C. An information exchange forum (conference call/chat room) to share ideas and experiences.

**Activity 2.2** GFNMS will formalize a communication system and leverage opportunities with other natural resource management agencies to exchange ideas on new and emerging issues. Forums for information exchange include:

- A. California Coastal Zone Managers quarterly meetings.
- B. Annual Coastal Zone Managers meeting in Washington, D.C.
- C. Conferences and professional meetings.

**Potential Partners:** NMSP, CBNMS, MBNMS, CINMS, OCNMS, state and federal agencies

**Products:** Conference calls, chat room

**Complementary Strategies:** GFNMS FMP, Resource Protection, STRATEGY RP-1

**STRATEGY RP-3:** *As GFNMS' priorities shift, due to both availability of resources and priority of ecosystem protection issues, all current, new, and emerging issues need to be continually tracked and re-evaluated.*

**Activity 3.1** Due to the sheer number and range of resource management issues that surfaced during the Joint Management Plan Review (JMPR), only the highest priority issues can be addressed in the management plan. There are still many new and emerging issues that need to be tracked and addressed in some capacity over the next five years, including:

- A. **Zonal Management**  
Develop a resource protection plan (policy) to minimize user conflicts and provide special areas of protection for sensitive habitats, living resources, and other unique sanctuary features. Determine the value of using tools such as zoning (e.g., marine reserves, research reserves) to take a proactive approach and address specific resource management issues. This plan will be built in consideration of other management strategies, both temporary and permanent.
  
- B. **Impacts from Sound**  
GFNMS will take an active role in reviewing project proposals that have the potential to introduce harmful levels of sound into the sanctuary environment and will work with project proponents to mitigate impacts and protect sanctuary resources. Impacts on marine resources from noise are of increasing concern with over 6,000 container ships and bulk product carriers passing through the sanctuary on an annual basis; the use of seismic surveys for oil and gas exploration; identification of earthquake faults and activities; and the use of side scan sonar for research. Sound travels approximately five times faster in water than in air, with low frequency sounds traveling the farthest. Low frequency sounds (below 1,000 Hz) are generated by many human activities. Communication by many marine mammals and fish also falls within this range of frequency. Individually and cumulatively, the sound produced by these activities may have significant impacts on the living marine resources of the sanctuary. GFNMS would like to have a better understanding of the long-term and cumulative impacts on marine mammals, fishes and invertebrates.
  
- C. **Marine Bioprospecting**  
Marine bioprospecting is a new issue for GFNMS that has not been clearly defined, nor are the implications clearly understood. GFNMS needs to have a better understanding of the activities associated with, and potential impacts from, marine bioprospecting. The following questions need to be understood before GFNMS can develop a policy statement on marine bioprospecting in sanctuary waters:
  - 1. Does long term extraction threaten biological diversity on the genetic, taxonomic, or ecosystem level?

2. Can the target species be extracted on a sustainable basis, is it possible to determine a threshold?
  3. Who should have access to genetic resources?
  4. What is the best way to establish appropriate benefit sharing provisions for a public resource?
  5. Can a clear distinction be made between scientific research and commercial investigative activities?
- D. Aquaculture/Mariculture: Mariculture operations have been conducted in state-designated lease areas in Tomales Bay since sanctuary designation. These operations rear filter feeders and sessile species that extract ambient nutrients from the water column with no added chemical or feeds. GFNMS will take an active role in reviewing proposals and environmental assessments for expanded or new operations both within and adjacent to the sanctuary.
- E. Global Climate Change: GFNMS will seek to identify and address the effects global climate change will have on habitat, processes and wildlife, recognizing the region as an indicator for ecosystem health. The sanctuary will look toward managing ecosystems for resiliency, with a focus on increasing efforts to protect critical habitats that are identified as the most resilient and that face the greatest threat. GFNMS will work to foster awareness, promote action and advocate solutions to global climate change amongst government agencies, public organizations, private corporations and individuals in order to build ecosystem resilience and sustainability within the sanctuary. GFNMS will explore real global climate change solutions on a local, state and federal level through sustainable administrative facilities, partnerships, research collaborations, outreach and education and policy reform.

**Potential Partners:** NMSP, National Marine Fisheries Service (NMFS), Golden Gate National Recreation Area (GGNRA), sanctuary advisory council (SAC), CBNMS, MBNMS, CINMS, OCNMS, constituents

**Complementary Strategies:** GFNMS FMP, Resource Protection, STRATEGY RP-2

## **REGULATORY DEVELOPMENT**

One of the NMSA's purposes is to facilitate compatible use that is consistent with its primary purpose of ecosystem protection. To this end, each of the national marine sanctuaries has a discreet set of site-specific regulations or prohibitions (15 CFR § 922), and general policy under the NMSA (16 USC § 1431 et seq.).

**STRATEGY RP-4:** *GFNMS will develop a formalized program to consistently and continuously review and evaluate effectiveness of sanctuary regulations.*

**Activity 4.1** Evaluate the appropriateness and effectiveness of current sanctuary regulatory language (prohibitions) in addressing the priority ecosystem protection issues identified through the management plan review process.

- A. Interpret and develop site-specific regulations and amendments.
- B. Provide guidance and understanding of regulations in the NMSA.
- C. Ensure coordination and consistency with other natural resource management agencies regulations and permits.
- D. Track, review, and comment on environmental assessments and environmental impact statements (EIS).

**Potential Partners:** NMSP, General Council Ocean Service (GCOS), SAC, constituents

**Complementary Strategies:** GFNMS FMP, Resource Protection, STRATEGY RP-1, STRATEGY RP-2, STRATEGY RP-3, STRATEGY RP-5, STRATEGY RP-6

## PERMITTING

Generally, permit requests are for research or education purposes. The sanctuary evaluates these requests on a case-by-case basis in detail to determine if the activity is necessary to be conducted in the sanctuary and the extent of the activity's impacts on sanctuary resources or qualities.

**STRATEGY RP-5:** *Develop a formalized permit program as a mechanism to review requests to conduct prohibited activities within the sanctuary, and where possible permit these activities to be conducted in such a way to have negligible effects.*

**Activity 5.1** In order to understand, measure, and control prohibited activities within the sanctuary, and to minimize cumulative impacts from these activities, the permit program will continue to review projects by:

- A. Evaluating permit requests on a case-by-case basis.
- B. Developing permit requirements for applicants on procedures and operations to avoid or reduce impacts to sanctuary wildlife, habitats, or qualities.
- C. Tracking permitted activities to ensure compliance with permit conditions.
- D. Requiring applicants to provide the sanctuary with the data and findings gained through research conducted with research permits and submit findings on SIMoN.
- E. Ensure permits are issued in compliance with national policies, National Environmental Policy Act (NEPA), NMSA, Marine Mammal Protection Act (MMPA), and other environmental protection legislation.
- F. Review all proposed projects with respect to environmental consequences and the level of impact, individually or cumulatively, and make a determination if the

activity is excluded from the requirement to prepare an environmental assessment or environmental impact statement.

**Activity 5.2** Develop a national Web-based permit application and tracking program.

- A. Website will include a section for identified permitting agencies which applicants may consult. It is the applicants' responsibility to know the laws and be certain they have all of the required permits. The website will provide a venue to make it easier for the applicants to find the required permits.

**Activity 5.3** The Ecosystem Protection Coordinator will coordinate with other regulatory agencies issuing permits to ensure consistency with applicable laws.

- A. Coordinate with other regulatory agencies to ensure that other agency permits are consistent with the sanctuary's regulations. Inconsistencies may be rectified by incorporating or referencing the sanctuary's regulations.

**Activity 5.4** Conduct outreach about the sanctuary's permit process to help inform potential applicants and bring them into compliance with the sanctuary's permit process.

- A. Provide sufficient outreach to education and research institutions wishing to conduct prohibited activities within the sanctuary about the permit application process.
- B. Use the SAC as a link to educate the larger community on the sanctuary's permitting process.

**Potential Partners:** NMSP, GCOS, SAC

**Complementary Strategies:** GFNMS FMP, Resource Protection, STRATEGY RP-4, STRATEGY RP-6

## **PROTECTED RESOURCES ENFORCEMENT PLAN**

The objective of this program is to achieve ecosystem protection through compliance with sanctuary regulations and other applicable state and federal statutes. The mission of sanctuary enforcement is to ensure compliance with the NMSA (16 USC § 1431 et seq.) and applicable regulations of the sanctuary (15 CFR § 922). The approach to the enforcement program should be two-fold in nature: (1) the use of interpretive enforcement (such as public outreach) as a tool to inform and encourage voluntary compliance; and (2) the use of patrols and other traditional law enforcement methods to enforce regulations and investigate incidents or suspected prohibited activities. Together, these two programs should result in a regular and ongoing enforcement presence in sanctuary waters and compliance with sanctuary regulations.

**STRATEGY RP-6: *Strive to increase ecosystem protection through compliance with sanctuary regulations and other applicable state and federal statutes.***

**Activity 6.1** Ensure sufficient patrol presence in the sanctuary through the development of partnerships and interagency coordination.

- A. Develop enforcement priorities.
- B. Develop compliance priorities for permitted activities.
- C. Develop patrol schedules.
- D. Develop procedures for documenting violations, boarding procedures and other instructions specific to conduct of day-to-day enforcement.
- E. Develop partnerships with other federal, state and local enforcement agencies in order to provide a strong enforcement presence throughout the sanctuary.
- F. Facilitate communication among enforcement assets to ensure coordination.
- G. Promote training and, as appropriate, cross-deputize law enforcement agencies.
- H. Involve the United States Coast Guard (USCG) and the Civil Aeronautical Patrol (CAP) in presence and patrol in sanctuary waters.
- I. Train law enforcement personnel in interpretive enforcement.

**Activity 6.2** Use interpretive enforcement as a tool to inform and encourage voluntary compliance with sanctuary regulations. Interpretive enforcement may be used to affect behavior and change values as it is generally believed, that once informed, most individuals will choose to comply. Interpretive enforcement efforts will include:

- A. Train law enforcement entities to use interpretive enforcement.
- B. Integrate interpretive enforcement into coast-side signage throughout geographic range of sanctuary.
- C. Work with California Dept. of Motor Vehicles to include informational inserts in boat license renewal packets (to be coordinated with all California national marine sanctuaries).
- D. Give presentations to yacht clubs, the Coast Guard Auxiliary, and other appropriate groups.
- E. Provide follow-up letters to possible violators with “you may be in violation” notices that inform the boater about sanctuary regulations.

**Activity 6.3** Develop a volunteer-based interpretive enforcement program that will use education and outreach to affect behavior and values to achieve voluntary compliance with sanctuary regulations.

- A. Identify major user groups for targeted education and outreach efforts about sanctuary regulations.
- B. Conduct community outreach program to encourage compliance with sanctuary regulations and citizen involvement in reporting violations.
- C. Hold semiannual meetings and workshops to inform user groups and promote voluntary compliance and stewardship.
- D. Train volunteers in interpretive enforcement as a component of the Sanctuary Naturalist Corps.

**Activity 6.4** Develop enforcement tools to ensure effectiveness of the enforcement program.

- A. Provide assistance to General Counsel for Enforcement and Litigation (GCEL) on developing hierarchy of options for addressing minor violations including: warnings, fix-it tickets, and summary settlements/on the scene citations.
- B. Evaluate the effectiveness of technology for surveillance including satellite imagery, drones, wireless cameras and tracking systems.
- C. Provide technical assistance to GCEL on violation assessment.
- D. Comment on national penalty schedule.
- E. Coordinate with Office of Response and Restoration (ORR) on natural resource damage assessment. Secure and utilize reimbursable costs for response, National Resource Damage Assessment and Restoration (NRDA), and restoration funds.

**Potential Partners:** USCG, CAP, GCEL, GCOS, NOAA Enforcement, California Department of Fish and Game (CDFG)

**Complementary Strategies:** GFNMS FMP, Education and Outreach, STRATEGY ED-7; Resource Protection, STRATEGY RP-4, STRATEGY RP-5; Vessel Spills, STRATEGY VS-9

## **EMERGENCY RESPONSE**

Incidents within the sanctuary requiring an emergency response may have the potential to significantly impact sanctuary wildlife, habitat and cultural resources. Incident response may be to a recently occurring catastrophic event (e.g., plane crash or vessel grounding), or the delayed or persistent impacts from incidents that occurred years previously (e.g., dumpsites or historic shipwrecks).

**STRATEGY RP-7: *Review and revise the sanctuary's emergency response plan in order to be prepared to respond to an incident.***

**Activity 7.1** GFNMS will review and revise its emergency response plan, based on the Incident/Unified Command System (ICS) and the USCG's Area Contingency Plan (ACP), to respond to oil spills, hazardous material spills, grounded vessel or natural disasters. The response plan will also be reviewed, evaluated and updated on an annual basis. GFNMS' emergency response plan:

- A. Lays out emergency response notification (including all relevant agencies, user groups, and media) and preparation procedures.
- B. Identifies specific duties for sanctuary staff.
- C. Instructs all sanctuary staff to be trained on an ongoing basis with regular updates and refresher courses, and ready to respond in the case of an emergency. Staff training to include:
  - 1. Understanding ICS.
  - 2. Familiarization with the San Francisco Area Contingency Plan.
  - 3. Assigned emergency response duties.
  - 4. Taking part in emergency response drills.
  - 5. Developing resource damage assessment skills.

**Activity 7.2** Develop tools to ensure a coordinated and timely response to incidents.

- A. Establish a relationship and coordinate with ORR, Hazardous Materials Response Division (HAZMAT), NOAA's Regional Response Coordinator, and the NMSP.
- B. Identify resources at risk, potential high probability threats, available response and information assets, notification contracts, maps, coastal observation systems, and jurisdictional information. This information can be used in area contingency plans, area response plans, and Sanctuaries Hazardous Incident Emergency Logistics Database System (SHIELDS).
- C. Populate SHIELDS, a Web-based interface system that can be used on- and off-line to assist in incident response, facilitating the abilities of sanctuary staff to provide information to a unified command during an incident. Enhance SHIELDS to accept and provide near-real time data collected during response efforts.
- D. Participate in the Resources and Undersea Threats (RUST) database that catalogs submerged resources, threats, and hazards data.
- E. Develop contingency response fund for prompt removal or recovery of abandoned vessels.

**Activity 7.3** Assess levels of potential risk from activities in and adjacent to the sanctuary.

- A. Track distribution and numbers of sensitive species and habitats.
- B. Develop resources-at-risk model analysis for the sanctuary.
- C. Participate in regional response team to address risks to sanctuary resources.
- D. Based on risk assessment, develop outreach program targeting user groups.

**Potential Partners:** ORR, HAZMAT, NMSP

**Products:** SHIELDS, RUST

**Complementary Strategies:** GFNMS FMP, Resource Protection, STRATEGY RP-8; Vessel Spills, STRATEGY VS-2, STRATEGY VS-3, STRATEGY VS-4, STRATEGY VS-6, STRATEGY VS-7, STRATEGY VS-8, STRATEGY VS-9; CBNMS FMP, Administration, AD-7; MBNMS FMP, Introduced Species, STRATEGY IS-4, Operations and Administration, STRATEGY OA-4, Beach Closures, STRATEGY BC-9, Big Sur Coastal Ecosystem Plan, STRATEGY BCP-2

## **DAMAGE ASSESSMENT AND RESTORATION**

Section 312 of the NMSA authorizes NOAA to pursue civil actions to recover response costs and damages for incidents that injure, destroy, or cause the loss of sanctuary resources. Funds collected by NOAA under Section 312 are deposited in the Damage Assessment and Restoration Evolving Fund (DARRF). Section 312 requires that 20 percent of recovered damages, up to a maximum balance of \$750,000, be used to finance response actions and damage assessment. The remaining damages are to be spent, in priority order to: (1) restore, replace, or acquire the equivalent of the injured sanctuary resources; (2) manage and improve the affected sanctuary; and (3) manage and improve any other national marine sanctuary.

**STRATEGY RP-8:** *Formalize plan to respond to incidents that damage sanctuary ecosystems.*

**Activity 8.1** Coordinate with ORR to restore sanctuary wildlife and habitats.

- A. Work with other NOAA offices and agencies to assess natural resource damage and implement ecosystem restoration projects.
- B. Work with ORR on taking legal action as appropriate.
- C. Work with NOS scientists on developing a monitoring program to assess restoration effort effectiveness.

**Potential Partners:** ORR, United States Department of the Interior (DOI), CDFG-(Office of) Oil Spill Prevention and Response (OSPR), other resource trustee agencies

**Complementary Strategies:** GFNMS FMP, Resource Protection, STRATEGY RP-7; Vessel Spills, STRATEGY VS-6, STRATEGY VS-9

## **BOUNDARY MODIFICATIONS**

During the designation process for all national marine sanctuaries, a range of boundary options are proposed, and modified, before a final boundary is chosen. Sanctuaries are designed to protect areas of special significance. Areas of special significance may include unique natural resources and ecological qualities; biogeographic representation; threatened and/or endangered species; or important ecosystem structure features. In addition to protecting areas of special significance, boundaries alternatives take into consideration existing authorities; human-use activities; their impacts on the marine resources; and the added value of sanctuary designation in addressing these issues. These strategies provide the sanctuary with a framework to re-examine, evaluate, and, as appropriate, redefine a sanctuary's boundary based on new information. Areas to the north, south and west of the current GFNMS boundary will be considered.

### **STRATEGY RP-9: *Develop a framework for identifying and analyzing boundary alternatives.***

**Activity 9.1** Through an incremental process gather information, analyze data, and develop a recommendation on boundary options.

- A. Review and analyze the Biogeographic Assessment to make an initial determination if there are particular areas that require immediate attention.
- B. Identify additional data sets not provided by the Biogeographic Assessment that may be needed for further analysis. In particular, identify smaller scale features and refined spatial scales that were either not available, or not analyzed on a fine enough scale by the Biogeographic Assessment.
- C. Conduct a literature search (contract) to identify additional data sets (also see research recommendations).
- D. Identify sanctuary research needs (opportunistic and planned) to answer boundary questions. Data needs to be received by the sanctuary in a format that is usable for answering boundary questions.
- E. Assemble a working group with broad-based stakeholder representation and scientific expertise.
- F. Develop a framework for quantitative analysis and evaluation of data by working group.

- G. Working group should strive to come to consensus on building a recommendation(s) on boundary options.
- H. Working group to forward recommendation to sanctuary advisory council for its review and comments. Sanctuary advisory council then forwards its recommendations to the sanctuary Superintendent.

**Activity 9.2** Develop a framework to evaluate different boundary options. The following recommended criteria will be used:

A boundary change (based on this option) would:

- A. Provide additional comprehensive and coordinated conservation and management of this area.
- B. Ensure the maintenance of the area's natural ecosystem, including its contribution to biological productivity; maintenance of ecosystem structure; maintenance of ecologically or commercially important threatened or endangered species or species assemblages; maintenance of critical habitat of endangered species; and the biogeographic representation of the site.
- C. Increase protection, and where appropriate, restore natural habitats, populations, and ecological processes.
- D. Enhance public awareness, understanding, appreciation, participation, stewardship, and sustainable use of the marine environment, and the natural, historical, cultural, and archeological resources of the marine area.
- E. Enhance coordination of scientific research and long-term monitoring of the resources of the marine area.
- F. Facilitate to the extent compatible with the primary objective of resource protection, public and private uses of the resources of this marine area.

**Potential Partners:** SAC, NMSP, Special Projects Office (SPO), OE, Marine Conservation Biology Institute (MCBI), CBNMS, MBNMS, The National Centers for Coastal Ocean Science (NCCOS)

**Complementary Strategies:** GFNMS FMP, Conservation Science and Impacts from Fishing Activities, STRATEGY FA-1

## **COLLABORATIVE PLANNING AND MANAGEMENT**

Sanctuary program development and planning efforts provide an opportunity for public input in identifying and resolving ecosystem protection issues. These partnerships and public involvement are essential ingredients to successful resolutions and implementation of strategies.

**STRATEGY RP-10: *Continue to build partnerships and leverage opportunities for protecting sanctuary wildlife, habitats, qualities and cultural resources.***

**Activity 10.1** Coordinate development of collaborative processes.

- A. Identify appropriate partners for implementing the management plan.
- B. Coordinate with sanctuary advisory council on multi-stakeholder options for addressing ecosystem protection issues.
- C. Provide coordination, oversight and facilitation, as appropriate, to issue-specific committees addressing targeting issues.

**Activity 10.2** Coordinate with other agency management and restoration plans to enhance and protect the sanctuary.

- A. Coordinate with the National Park Service on the Giacomini Restoration Plan, Environmental Impact Statement and Environmental Impact Report
- B. Coordinate with the Farallon National Wildlife Refuge on the Coordinated Conservation Plan update.
- C. Take an active roll in reviewing project proposals, environmental impact statements and environmental impact reports as needed to protect and restore sanctuary biological and ecological processes.

**Potential Partners:** state and federal agencies, institutions, non-governmental organizations (NGOs)

**Complementary Strategies:** All strategies in Final management plan

## **RADIOACTIVE WASTE DUMP**

The area referred to as the "Farallon Islands Radioactive Waste Dump" (FIRWD) is where approximately 47,800 barrels of low-level radioactive waste were dumped between 1946 and 1970. Although the containers were to be dumped at three designated sites, they are actually strewn over an area of 540 square miles in depths ranging from 300 to more than 6,000 feet within GFNMS. Research results to date are inconclusive on the impacts on the marine ecosystem from radioactive leakage. Significant public fear and uncertainty about the contamination from leaking barrels continue, particularly since major commercial fishing, sport fishing and other recreational activities take place in the area in and above the dump site.

**STRATEGY RP-11: *Evaluate condition of, and actual impacts on sanctuary resources and qualities from the Farallon Islands radioactive waste dump.***

**Activity 11.1** Convene a group of agency scientists to evaluate status of radioactive waste dump and make recommendations on roles and responsibilities for addressing some of the issues associated with FIRWD.

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- A. Identify appropriate agency partners.
- B. Establish target date for the working group to come to conclusions and make recommendations on the status of the FIRWD.
- C. Inventory current research on the FIRWD and identify data gaps.
- D. Determine under whose mandate the issues/impacts will be addressed.

**Activity 11.2** Develop an outreach campaign to inform the public on the status and potential threats of the FIRWD.

- A. Establish stakeholder group to develop communication strategy. Clearly define the message to be communicated to the public about the status of the FIRWD, including actual or potential threats to the living marine resources and humans.
- B. Develop a communications plan to systematically educate the public and target audiences on a routine basis about the status of FIRWD.
- C. Develop a list of audiences, both targeted and general public, on which to focus outreach efforts.
- D. Update nautical charts to show known area with radioactive waste containers.
- E. Identify partners, such as other agencies or institutions, to help develop outreach materials and participate in outreach efforts.

**Potential Partners:** United States Geological Survey (USGS), Environmental Protection Agency (EPA), U.S. Navy, California Department of Transportation (CalTrans), California Department of Health, local non-governmental organizations (NGO's)/non-profits

**Products:** Communications plan, outreach materials, white paper

## **ECOSYSTEM RESTORATION**

In order to restore the natural biological and ecological processes of the sanctuary, it is critical to evaluate and address adverse impacts from human activities on sanctuary wildlife, habitats and qualities. Tomales Bay and Bolinas Lagoon are two places in the sanctuary have been identified as a priority for ecosystem restoration projects. Tomales Bay and Bolinas Lagoon have long been recognized as special places deserving a high level of protection by citizens and local, state and federal agencies. Both areas are significant biological communities that support a diversity of habitats, including eelgrass beds, intertidal sand and mud flats and salt and freshwater marshes. Thousands of species of birds, invertebrates and plants and numerous threatened and endangered species inhabit both of these estuarine ecosystems.

**STRATEGY RP-12:** *In cooperation and coordination with the other ten local, state and federal agencies, develop and implement a comprehensive plan to ensure the protection of water quality, wildlife, habitats and safety in Tomales Bay.*

**Activity 12.1** Develop vessel management guidelines to address moored vessels and moorings that may be impacting sensitive habitats. Ten local, state and federal agencies are collaborating on a plan for Tomales Bay that addresses vessel management, habitat, and water quality issues. GFNMS is taking a lead in proposing both programmatic and regulatory actions to address priority ecosystem protection issues that complement other agencies' actions, and is one of the agencies assisting in the development of a comprehensive plan for Tomales Bay.

- A. Control the number of moored vessels and/or moorings in Tomales Bay.
- B. Identify sensitive areas to be considered as no-mooring zones.
- C. Coordinate between agencies on developing an education program about impacts from moorings and vessel activities in Tomales Bay.

**Activity 12.2** Develop sewage waste disposal and facility guidelines for public and private boating facilities.

- A. Coordinate with existing public and private boating facility operators to develop sewage waste facilities. Agency coordination will include streamlining of permits and providing public funding for construction of sewage waste facilities.
- B. Require new facilities, or facilities with expansion plans, to provide sewage waste management facilities.
- C. Take regulatory action or develop voluntary guidelines to ensure that vessels that are occupied and moored within the Sanctuary have the capacity to manage on-board sewage waste during the extent of their day.
- D. Coordinate with other agencies on developing a targeted outreach program to educate boaters on proper management of sewage waste.
- E. Work with the San Francisco Bay Regional Water Quality Control Board on developing regional standards for sewage disposal facilities for Tomales Bay.

**Activity 12.3** Develop an enforcement plan to address derelict and abandoned vessels and moorings in Tomales Bay.

- A. Develop a plan for removal of derelict and abandoned vessels.
- B. Develop a plan for removal of moorings that are in violation of regulations and/or pose a threat to water quality, marine wildlife and natural benthic habitat, and/or safety of Tomales Bay.

- C. Take regulatory action or programmatic action to prevent placement of unapproved moorings.

**Activity 12.4** Address impacts to sensitive habitats from construction, modifications and additions to docks and piers in Tomales Bay.

- A. Take regulatory action to protect sensitive nearshore and estuarine habitats by preventing further expansion of docks and piers in Tomales Bay

**Potential Partners:** California State Lands Commission (CSLC), California Coastal Commission (CCC), Point Reyes National Seashore (PRNS), Golden Gate National Recreational Area (GGNRA), California State Parks (SP), San Francisco Bay Regional Water Quality Control Board (SFRWQCB), California Department of Boating and Waterways (CDBW), County of Marin, California Department of Public Health (CDPH), and California Department of Fish and Game (DFG).

**Complementary Strategies:** GFNMS FMP, Resource Protection, STRATEGY RP-4, RP-6, RP-10, Water Quality, WQ-1, WQ-2, WQ-3, WQ-6, WQ-9, Wildlife Disturbance, WD-4, Ecosystem Protection, EP-1, EP-3

**STRATEGY RP-13:** *Working in collaboration with federal, state and local agencies, and the local community, restore the natural ecological processes of Bolinas Lagoon.*

**Activity 13.1** Collaborate in the development and implementation of a comprehensive plan to examine actions that would reduce, and possibly reverse, sediment accumulation and habitat shifts caused by human impacts.

- A. Participate as a member of the Bolinas Lagoon Technical Advisory Committee.
- B. Establish a Bolinas Lagoon Working Group to develop a preferred approach to lagoon restoration.
- C. Develop and implement a marine debris removal plan.
- D. Work with partners to develop a joint restoration feasibility report and an Environmental Impact Statement.

**Potential Partners:** United States Army Corps of Engineers, County of Marin, Marin Open Space District, Bolinas Lagoon Technical Advisory Committee

**Complementary Strategies:** STRATEGY RP-4, RP-6, RP-10,

## **ISSUE SPECIFIC RESOURCE PROTECTION STRATEGIES**

*Note: These strategies are cross-referenced from the issue-based action plans to show the entire suite of resource protection strategies to be implemented by resource protection sanctuary staff.*

## WATER QUALITY STRATEGIES

**STRATEGY WQ-1:** *Develop an umbrella program to coordinate partnerships in implementing a comprehensive and integrated water quality monitoring program in order to track impacts on the estuarine and nearshore environment.*

*For the full strategy text, please see page 54.*

**STRATEGY WQ-2:** *Address sources of anthropogenic pathogens and pollutants from recreational and commercial boating activities and marinas.*

*For the full strategy text, please see page 55.*

**STRATEGY WQ-3:** *Coordinate with other agencies to address land-based discharges into the estuarine and nearshore areas of the sanctuary including Areas of Special Biological Significance and Critical Coastal Areas.*

*For the full strategy text, please see page 56.*

**STRATEGY WQ-4:** *Evaluate Areas of Special Biological Significance and make a determination whether to implement a no vessel discharge prohibition within these areas of concern.*

*For the full strategy text, please see page 58.*

**STRATEGY WQ-5:** *Ensure the continuation of the long-term data collection efforts under the Mussel Watch program.*

*For the full strategy text, please see page 59.*

**STRATEGY WQ-6:** *Develop a standing water quality working group supported by sanctuary staff.*

*For the full strategy text, please see page 59.*

**STRATEGY WQ-9:** *Educate local decision makers on land-based water quality impacts in the sanctuary.*

*For the full strategy text, please see page 61.*

## WILDLIFE DISTURBANCE STRATEGIES

**STRATEGY WD-4:** *Through interpretive enforcement and law enforcement efforts, address human behavior that may adversely impact wildlife.*

*For the full strategy text, please see page 77.*

**STRATEGY WD-7:** *Coordinate the Seabird Colony Protection Program by reducing and eliminating human disturbances at seabird breeding and roosting sites from Point Reyes to Point Sur.*

*For the full strategy text, please see page 85.*

## **INTRODUCED SPECIES STRATEGIES**

**STRATEGY IS-6:** *Develop partnerships with other agencies and organizations that are involved in issues related to introduced species to advise the sanctuary.*

*For the full strategy text, please see page 97.*

**STRATEGY IS-7:** *Have in place a rapid response plan and streamlined permit process in order to respond in a timely manner to necessary eradication or control efforts in the sanctuary.*

*For the full strategy text, please see page 98.*

**STRATEGY IS-8:** *Take regulatory action to control new introductions of introduced species.*

*For the full strategy text, please see page 99.*

## **IMPACTS FROM FISHING ACTIVITIES STRATEGIES**

**STRATEGY FA-2:** *Develop a socioeconomic profile of fishing activities and communities in and adjacent to the sanctuary.*

*For the full strategy text, please see page 109.*

**STRATEGY FA-3:** *Evaluate impacts from fishing activities on sanctuary resources.*

*For the full strategy text, please see page 109.*

**STRATEGY FA-4:** *Develop policy recommendations or management action(s) to address impacts from fishing activities on sanctuary resources.*

*For the full strategy text, please see page 110.*

**STRATEGY FA-6:** *Establish consistent and coordinated region-wide sanctuary representation at the Pacific Fisheries Management Council and Fish and Game Commission meetings.*

*For the full strategy text, please see page 112.*

**STRATEGY FA-7:** *Work with Cordell Bank and Monterey Bay national marine sanctuaries to address impacts on marine ecosystems in and around sanctuary waters from krill harvesting.*

*For the full strategy text, please see page 112.*

## **ECOSYSTEM PROTECTION STRATEGIES**

**STRATEGY EP-1:** *Develop a resource protection plan (policy) to minimize user conflicts and provide special areas of protection for sensitive habitats, living resources, and other unique sanctuary features.*

*For the full strategy text, please see page 113.*

**STRATEGY EP-2:** *Create a standing “Living Resource and Habitat Protection” working group to advise the sanctuary on ecosystem protection issues.*

*For the full strategy text, please see page 114.*

**STRATEGY EP-3: *Develop strategy to protect habitats that are known to be “special areas of concern.”***

*For the full strategy text, please see page 114.*

## **VESSEL SPILLS STRATEGIES**

**STRATEGY VS-1: *Expand Monterey Bay National Marine Sanctuary (MBNMS) drift analysis model to include Point Arena and Mendocino.***

*For the full strategy text, please see page 129.*

**STRATEGY VS-2: *Improve data used in existing spill and drift model to increase accuracy of risk assessments.***

*For the full strategy text, please see page 129.*

**STRATEGY VS-3: *Evaluate vessel activities in the GFNMS as a first step to assessing the risk of spills in the sanctuary.***

*For the full strategy text, please see page 130.*

**STRATEGY VS-4: *Evaluate recent vessel routing changes related to the MBNMS vessel traffic study.***

*For the full strategy text, please see page 132.*

**STRATEGY VS-5: *Track distribution and numbers of species of concern and habitats in relation to probable spill trajectories.***

*For the full strategy text, please see page 132.*

**STRATEGY VS-6: *Participate on regional response team to address risks to sanctuary resources.***

*For the full strategy text, please see page 133*

**STRATEGY VS-7: *Revise GFNMS in-house emergency response plan.***

*For the full strategy text, please see page 134.*

**STRATEGY VS-8: *Continue to improve integration of GFNMS Beach Watch and Ecosystem Dynamic Study (EDS) data into Area Contingency Plan.***

*For the full strategy text, please see page 134.*

**STRATEGY VS-10: *Increase regular communication between GFNMS and maritime trade industry.***

*For the full strategy text, please see page 135.*

**STRATEGY VS-11: *Select a sanctuary representative to participate in regional forums for addressing vessel traffic issues.***

*For the full strategy text, please see page 136.*

**STRATEGY VS-12: *Create a standing vessel spills working group to advise the sanctuary on implementation of proposed action plans.***

*For the full strategy text, please see page 136.*



GFNMS RESOURCE PROTECTION

## Timeline

Resource Protection Strategy	Year 1	Year 2	Year 3	Year 4	Year 5
STRATEGY RP-1: Establish a framework for identifying, tracking and addressing emerging issues.		.....	.....	—————	—————▶
STRATEGY RP-2: Develop coordinated communication system among all national marine sanctuaries and natural resource management agencies.			.....	—————	—————▶
STRATEGY RP-3: New and emerging issues need to be continually re-evaluated.	—————	—————	—————	—————	—————▶
STRATEGY RP-4: Evaluate the appropriateness and effectiveness of current sanctuary regulatory language (prohibitions).	—————		◆		
STRATEGY RP-5: Develop a formalized permit program.	.....	.....	.....	.....	.....▶
STRATEGY RP-6: Achieve ecosystem protection through compliance with sanctuary regulations and other applicable state and federal statutes.	—————	—————	—————	—————	—————▶
STRATEGY RP-7: Review and revise the sanctuary’s emergency response plan.	—————	—————	—————	—————	—————▶
STRATEGY RP-8: Formalize plan to respond to incidents that damage sanctuary ecosystems.	.....	.....	.....	.....	.....▶
STRATEGY RP-9: Develop a framework for identifying and analyzing boundary options.				—————	—————▶
STRATEGY RP-10: Continue to culture partnerships and leverage opportunities for protecting sanctuary wildlife, habitats, qualities and cultural resources.	—————	—————	—————	—————	—————▶
STRATEGY RP-11: Evaluate condition of, and actual impacts from the radioactive waste dump.	.....	.....	.....	.....	.....◆
STRATEGY RP-12: Develop and implement a comprehensive plan to ensure the protection of water quality, wildlife, habitats and safety in Tomales Bay.	.....	.....	.....	.....	.....▶
STRATEGY RP-13: Develop and implement a comprehensive plan to restore the natural ecological processes of Bolinas Lagoon.	.....	.....	.....	.....	.....▶

**Legend:**

- ▶    **Ongoing Activity**
- .....▶    **Planning Stage**
- ◆    **Completed Activity**

GFNMS RESOURCE PROTECTION

**Budget**

Strategy	Estimated Annual Cost (1000's)*					Total Est. 5-Year Cost (1000's)
	YR 1	YR 2	YR 3	YR 4	YR 5	
<b>STRATEGY RP-1: Establish a framework for identifying, tracking, and addressing emerging issues on a timely basis</b>	\$10	\$10	\$10	\$10	\$10	\$50
<b>STRATEGY RP-2: Develop a coordinated communication system among all national marine sanctuaries and natural resource management agencies</b>	\$12	\$12	\$12	\$12	\$12	\$60
<b>STRATEGY RP-3: New and emerging issues need to be continually tracked and re-evaluated</b>	\$14	\$6	\$6	\$6	\$6	\$38
<b>STRATEGY RP-4: Evaluate the appropriateness effectiveness of current sanctuary regulatory language (prohibitions).</b>	\$5	\$5	\$5	\$5	\$5	\$25
<b>STRATEGY RP-5: Develop a formalized permit program</b>	\$23	\$23	\$23	\$23	\$23	\$115
<b>STRATEGY RP-6: Achieve ecosystem protection through compliance with sanctuary regulations and other applicable state and federal statutes</b>	\$57	\$57	\$57	\$57	\$57	\$285
<b>STRATEGY RP-7: Review and revise the sanctuary's emergency response plan</b>	\$17	\$7	\$7	\$7	\$7	\$45
<b>STRATEGY RP-8: Formalize plan to respond to incidents that damage sanctuary ecosystems</b>	\$16	\$6	\$6	\$6	\$6	\$40
<b>STRATEGY RP-9: Develop a framework for identifying and analyzing boundary alternatives</b>	\$0	\$0	\$10	\$5	\$5	\$20
<b>STRATEGY RP-10: Continue to culture partnerships and</b>	\$47	\$47	\$47	\$47	\$47	\$235

*Resource Protection Action Plan  
GFNMS Management Plan*

Strategy	Estimated Annual Cost (1000's)*					Total Est. 5-Year Cost (1000's)
	YR 1	YR 2	YR 3	YR 4	YR 5	
<b>leverage opportunities for protecting the sanctuary</b>						
<b>STRATEGY RP-11: Evaluate condition of, and actual impacts from the radioactive waste dump</b>	\$5	\$5	\$24	\$24	\$24	\$82
<b>STRATEGY RP-12: Develop a comprehensive plan to ensure the protection of water quality, wildlife, habitats and safety in Tomales Bay</b>	\$52	\$30	\$150	\$30	\$30	\$292
<b>STRATEGY RP-13: Develop a comprehensive plan to ensure the restoration of Bolinas Lagoon</b>	\$100	\$2,500	\$100	\$100	\$100	\$2,810
<b>Total Estimated Annual Cost</b>	\$268	\$2,708	\$457	\$332	\$332	\$4,097

The sanctuary's base budget is available each year from appropriated funds.

There is both availability of and opportunity to receive additional funding from appropriated funds.

The estimates do not take into account increasing personnel costs each year or inflation.

The estimates do not take into account unexpected events or emergencies or unforeseen projects.

**Resource Protection Action Plan  
GFNMS Management Plan**

GFNMS RESOURCE PROTECTION

**Performance Measures**

Strategy Title(s)	Performance Goal	Desired Outcome (Objective)	Outcome Measure	How Measured	Who Measures	Output Measure
STRATEGY RP-1: Establish framework for identifying, tracking and addressing emerging issues.	Maintain the natural biological and ecological processes in the GFNMS by evaluating and addressing adverse impacts from human activities on sanctuary resources and qualities.	Continue to build on partnerships; collaborative efforts; and coordination with other agencies, institutions and organizations to take a comprehensive and effective ecosystem protection approach.	Increase ability to take a proactive, rather than reactive approach to addressing issues, thus averting significant impacts on sanctuary resources.	1) Develop system to track and flag the most relevant new and emerging issues. 2) Take measures to evaluate, and address as appropriate, new and emerging issues that were identified through the JMPR process. 3) Establish communications system with other agencies and NMSs.	Sanctuary Superintendent, Ecosystem Protection Coordinator	Electronic Web-based tracking system
STRATEGY RP-7: Review and revise the sanctuary's emergency response plan, and be prepared to respond to an incident.	Maintain the natural biological and ecological processes in the GFNMS by evaluating and addressing adverse impacts from human activities on sanctuary resources and qualities.	Continue to build on partnerships; collaborative efforts; and coordination with other agencies, institutions and organizations to take a comprehensive and effective ecosystem protection approach.	Increase the sanctuary's ability to respond in a coordinated and timely manner to catastrophic events, and respond to delayed or persistent impacts to sanctuary resources from previous events.	Conduct regular emergency response drills to evaluate: 1) Emergency response notification system 2) Staff preparedness 3) Effectiveness of SHIELDS and RUST system tools 4) Effectiveness of Area Contingency Plan	Sanctuary Superintendent, Ecosystem Protection Coordinator, staff	1) Emergency response plan 2) SHIELDS 3) RUST
STRATEGY RP-8: Formalize framework for responding to damage to sanctuary resources and qualities from incidents.	Maintain the natural biological and ecological processes in the GFNMS by evaluating and addressing adverse impacts from human activities on sanctuary resources and qualities.	Build a comprehensive and coordinated Resource Protection plan to ensure protection for the resources and qualities of GFNMS.	Increase ability to assess natural resource damage and restore affected habitats and/or living resources.	Implement ecosystem restoration projects and monitor to assess restoration effort effectiveness.	Ecosystem Protection Coordinator, Research Coordinator	



PROGRAM AREA  
ADMINISTRATION  
**ACTION PLAN**

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## **PROGRAM STATEMENT**

In order for Gulf of the Farallones National Marine Sanctuary (GFNMS) to build a management plan that is effective in addressing the priority site-specific and cross-cutting resource management issues, as identified through the management plan review process, GFNMS will need to strengthen its infrastructure by adding staff and financial resources to its base budget. In addition to basic infrastructure needs, some administrative areas that will be addressed include: building partnerships; improving interagency coordination; and addressing regulatory and enforcement issues.

## **PROGRAM DESCRIPTION**

Since 1990, GFNMS has grown from a staff of three with a budget of under \$300,000, to a staff of fourteen and budget of \$1.5 million in 2008. Until 1998, GFNMS' office managed the GFNMS, Cordell Bank National Marine Sanctuary (CBNMS), and the northern portion of Monterey Bay National Marine Sanctuary (MBNMS).

The National Marine Sanctuary Program (NMSP) provides oversight and coordination among the thirteen national marine sanctuaries by developing a framework for resource management, and directing national program and policy development. The sanctuary superintendent oversees site-specific management functions including implementation of the management plan. The management plan makes use of two complementary and strategic tools for ecosystem management: (1) programs, or action plans, carried out through Conservation Science, Education, and Marine Resource Protection programs, and (2) regulations, for controlling or restricting human behavior that is not compatible with cultural resources and ecosystem protection. The sanctuary superintendent establishes who is responsible for implementing specific programs, provides an administrative framework to ensure that all cultural resources and ecosystem protection activities are coordinated, and provides and manages an appropriate infrastructure to meet the goals and objectives of the management plan. The sanctuary superintendent reports directly to the NMSP. In this capacity, the sanctuary superintendent represents the NMSP and is the primary spokesperson for GFNMS.

The NMSP and GFNMS are committed to coordinating with other federal, state, and local agencies in a continuous ecosystem management process. This process is designed to ensure the long-term protection of the unique cultural resources, habitats and wildlife of this region, while considering the demands of multi-use interests. Because of the complexity of managing the activities and protecting cultural resources, habitats and wildlife in the sanctuary, cooperative

efforts are necessary to effectively meet sanctuary goals. Overlapping jurisdictions, different agency mandates and limited resources necessitate the development of a management plan that brings together multiple institutions for the common purpose of ecosystem protection. Achieving the long- and short-term goals for this region requires the development of close and continuing partnerships.

## **ADMINISTRATIVE STRUCTURE**

All thirteen national marine sanctuaries are managed by the NMSP. The NMSP takes responsibility for ensuring that the management plan prepared for each sanctuary is coordinated and consistent with the National Marine Sanctuaries Act (NMSA). On an annual basis, the NMSP reviews and adjusts funding priorities and requirements to reflect ecosystem protection needs at each of the national marine sanctuaries. The NMSP and the site superintendent coordinate efforts to protect and manage sanctuary cultural resources habitats, and wildlife with other federal, state, regional and local agencies.

### **Sanctuary Superintendent**

The GFNMS superintendent recommends to the NMSP priorities for annual allocation of funds for site-specific resource and ecosystem protection needs. The superintendent reports to the NMSP on surveillance and enforcement activities, violations and emergencies, and program activities. The superintendent coordinates with the NMSP on evaluating, processing and issuing of permits; monitors and evaluates Conservation Science, Education, and Resource Protection programs; oversees staffing needs and requirements; coordinates on-site efforts of all parties involved in sanctuary activities including state, federal, regional and local agencies. Finally, the superintendent evaluates overall progress toward the resource and ecosystem protection objectives of the NMSP and prepares regular reports highlighting progress made in realizing these goals.

### **Sanctuary Staff**

Under the direction of the superintendent, the sanctuary staff is directly responsible for implementation of the management plan. Although each staff member is assigned to one of the program areas, collectively the staff is responsible for coordinating their efforts in addressing resource and ecosystem protection issues.

### **Sanctuary Advisory Council**

The sanctuary advisory council (SAC) has been structured in accordance with the NMSP guidelines and procedures. The sanctuary advisory council, with its expertise and broad based representation, offers advice to the sanctuary superintendent on resource and ecosystem protection management issues and decisions. Gulf of the Farallones National Marine Sanctuary Advisory Council representation includes eleven agency and stakeholder representatives and nine alternates. The council is representative of a broad based constituency to ensure that the superintendent has a diverse information base upon which to make management decisions.

## **IMPLEMENTATION OF THE MANAGEMENT PLAN**

Each of GFNMS' program areas (Education and Outreach, Conservation Science, and Resource Protection) has outlined action plans for implementing management plan strategies. These action plans are designed to directly address resource and ecosystem protection issues and guide management of GFNMS over the next five years.

Action plans are purposely designed with only preliminary implementation guidelines as their parameters may change in the future. The action plans presented in the management plan address current resource and ecosystem protection issues identified as priorities by the sanctuary during the management plan review process. The implementation of these action plans is highly dependent on available staffing and financial resource allocation.

Implementation of the new management plan will require: coordination within and between action plans; sharing of staff and financial resources between program areas; and cooperation and coordination among many federal, state and local government agencies, as well as private organizations and individuals.

GFNMS' administration provides an organized structure and support system for implementing management strategies while providing the flexibility and guidance necessary to address changing, new, and emerging resource management issues.

### **Implementation Costs**

Operating funds for sanctuary management come from federal appropriations to the NMSP. These funds cover expenses such as personnel salaries, vessel lease and maintenance, utilities, property rental, equipment, and supplies.

In addition to calculating operating costs, GFNMS will perform an estimated cost analysis for carrying out each of the program areas. This analysis is necessary in order to secure appropriate and adequate funding for implementation of the management plan over the next five years.

Unpredictable and variable funding for staff and program development over the next five years may affect specific aspects of the sanctuary management plan. The scale and scope of certain programs may be modified due to any unforeseeable changes in the level of funding. However, the goals and objectives of the plan will remain unchanged.

## **OTHER MANAGEMENT TOOLS**

With limited staff and financial resources, partnerships are an integral part of successful resource and ecosystem protection of GFNMS. The Gulf of the Farallones sanctuary superintendent may draw from a selection of standard management tools to formalize relationships with other federal, state and local agencies or the private sector

### **Memorandum of Understanding (MOU) / Memorandum of Agreement (MOA)**

MOUs and MOAs establish a formal relationship between two or more entities for general purposes, or for a specific purpose or project, that is expected to continue for an extended period

of time. This mechanism cannot be used to transfer funds, but generally addresses commitment of resources.

### **Letter of Agreement/Letter of Understanding**

Letters of Agreement and/or Understanding are informal mechanisms used to establish a relationship between two or more entities, for a specific project or purpose, for a short period of time. This mechanism cannot be used to transfer funds.

### **Interagency Agreement**

An interagency agreement is used when one agency has expertise, equipment, and/or personnel to perform work more efficiently than another, and it is in the government's interest to do so. Generally, funds are transferred to the agency carrying out the work.

### **Cooperative Agreement**

Cooperative agreements provide funding to a non-federal entity for a project/product that benefits the public. Cooperative agreements are the primary mechanism used for financial assistance. The National Oceanic and Atmospheric Administration (NOAA) must serve as the program officer on the cooperative agreement with financial oversight maintained by the Grants Management Division.

### **Grants**

Grants provide funding to a non-federal entity for a project/product that benefits the public and in which NOAA does not need/want to have substantial involvement. A grant is considered one of the major kinds of financial assistance and must be awarded competitively or include a sole source justification. NOAA must serve as the program officer with financial oversight maintained by the Grants Management Division.

### **Contract**

A contract is a mechanism used by the federal government to procure goods and services. A contract must be awarded competitively or include a sole source justification. The program office has administrative oversight. During the term of the contract, financial oversight is maintained by the Finance Services Division.

## **JURISDICTIONAL SETTING**

### **FEDERAL AGENCIES**

#### **United States Coast Guard (USCG)**

The USCG holds broad responsibility for enforcing all federal laws throughout the sanctuary and assists NOAA in the enforcement of sanctuary regulations. USCG provides on-scene coordination with regional response center facilities under the National Contingency Plan for removal of oil and hazardous substances in the event of a spill that threatens sanctuary resource.

### **National Marine Fisheries Service (NMFS)**

The NMFS has responsibility under the Magnuson-Stevens Fishery Conservation Act (MSFCMA), for approving, implementing and enforcing fishery management plans (FMPs) prepared by regional fishery management councils to ensure protection of fishery resources in the Exclusive Economic Zone. NMFS also shares responsibility with the United States Fish and Wildlife Service (USFWS) for the implementation of the Marine Mammal Protection Act (MMPA) and the Endangered Species Act (ESA) to prevent taking of any endangered, threatened or otherwise depleted species.

### **Environmental Protection Agency (EPA)**

The EPA has regulatory responsibilities with regard to sewage outfalls (under the U. S. Clean Water Act [CWA]) via National Pollutant Discharge Elimination System (NPDES) Permits, and ocean dumping (under Title I of the Marine Protection, Research, and Sanctuaries Act) to protect water quality.

### **Farallon National Wildlife Refuge (FWS)**

The USFWS has responsibility for managing the Farallon National Wildlife Refuge. The refuge includes North, Middle, and Southeast Farallon Islands; Maintop Island; and Noonday Rock. The refuge is operated primarily as a migratory bird refuge to protect murre, auklets, guillemots, puffins, and other birds, and secondarily, to protect seal, sea lion, and other marine mammal assemblages.

### **Golden Gate National Recreation Area (GGNRA)**

The National Park Service (NPS) along with the California Department of Parks and Recreation (CDPR) are responsible for the management of the GGNRA. The GGNRA manages approximately 35,000 of the 79,626 acres within the GGNRA boundary, which includes lands in San Francisco, Marin, and San Mateo counties. Non-federal lands within the GGNRA boundary are managed by other public agencies such as the City and County of San Francisco, California Department of Parks and Recreation, and San Mateo County.

### **Point Reyes National Seashore (PRNS)**

The NPS is responsible for the management of the PRNS. PRNS includes the entire Point Reyes peninsula, with the exception of Inverness, Bolinas and Tomales Bay State Park. In addition, certain tide and submerged lands have been legislatively conveyed by the state to PRNS.

## **STATE AGENCIES**

### **California Coastal Commission**

The California Coastal Commission (CCC) was established under the California Coastal Act, which gives authority to the commission to establish policy for activities in state waters. In addition, seaward of state jurisdiction, federal development and activities directly affecting the

coastal zone must be conducted in a manner consistent with these policies to the maximum extent practicable.

### **California State Lands Commission (SLC)**

The California State Lands Commission (SLC) administers land including the beds of all waterways of the state below ordinary high water mark as well as tidelands (located between the mean high and low tide lines) and submerged lands (located below the mean low tide line and extending 3 nautical miles seaward). These sovereign state lands are held by the state “in trust” for the benefit of the public.

### **California Department of Fish and Game (CDFG)**

The CDFG regulates commercial fishing, including the taking of tidal invertebrates for commercial purposes, under a licensing system. CDFG also regulates sport fishing through license and bag limit systems. A sport fishing license is required for the taking and possession of fish for any non-commercial purpose. CDFG also leases state water bottoms for the purpose of mariculture.

## **ADMINISTRATION GOAL**

1. Build a comprehensive and coordinated administrative plan to provide support for the site in achieving the goals of the management plan, and increase protection for the resources, ecosystem and qualities of GFNMS.

## **ADMINISTRATION OBJECTIVES**

1. Develop an administrative framework to continuously evaluate, maintain, and expand, as necessary, programmatic and administrative operations.
2. Identify appropriate staffing, budget levels, and facility needs to support implementation of the management plan.
3. Continue to build on partnerships, collaborative efforts, and coordination with other agencies, institutions and organizations.

## **ADMINISTRATION ACTION PLAN**

### **OPERATIONS**

The GFNMS headquarters office and visitor center is located at Crissy Field in the Presidio of San Francisco, California. A satellite office is located in Half Moon Bay, California. In addition to these facilities, the sanctuary currently has within its possession various platforms to support an array of research and education program functions. In the future, other satellite offices and visitor centers will be located throughout the region to better serve the San Francisco Bay Area's 8 million population, and its visitors.

**STRATEGY AD-1: *New sanctuary facilities will be developed through various partnerships with both the public and private sector.***

**Activity 1.1** Build a world class icon for marine stewardship in San Francisco.

- A. Develop a long-range Facilities Master Plan to guide development of an iconic site for marine stewardship.
- B. Adopt the recommendations of the Golden Gate National Recreation Area's Fort Point Station Cultural Landscape Report.
- C. Rehabilitate the current main office space to accommodate additional staffing needs and allow for future growth.
- D. Sustainably design the facilities to follow LEED standards.
- E. Showcase sanctuary marine life and cultural heritage.
- F. Serve as a destination for greater ocean literacy.

**Activity 1.2** Continue to maintain the Crissy Field and Pacifica visitors centers.

**Activity 1.3** Increase the sanctuary staff's ability to access the marine waters of the sanctuary by expanding vessel capabilities and contracting more vessel time to support research and monitoring efforts. Currently, the sanctuary's research vessel *a regional asset called the FULMAR*, serves as a day-use platform supporting the three Central and Northern California sanctuary programs and partners.

**Activity 1.4** Complete priorities and implement a facilities plan for visitors centers and outreach venues. GFNMS has identified a number of outreach opportunities that cover the sanctuary's interpretive needs from both geographical and thematic points of view. The proposed plan covers a geographic area from San Mateo to Sonoma County, and includes shared signage with MBNMS and CBNMS. Outreach and interpretive exhibit venues being considered include:

- A. Bear Valley Visitors Center at Point Reyes National Seashore (PRNS) headquarters has offered space to GFNMS and CBNMS for its exhibit needs. The visitors center has 450,000 visitors per year from school children to local and recreational users.
- B. The PRNS lighthouse visitor center has space for a display about the national marine sanctuaries. GFNMS will partner with CBNMS to design an exhibit highlighting the natural history of the two sanctuaries.
- C. Bodega Marine Laboratory (BML) is the marine research arm of UC Davis (UCD), and the center of marine research on the north coast. GFNMS, in partnership with CBNMS, is proposing to update and expand its partnership with BML, including enhancing interpretive panels at the lab.

***Administration Action Plan***  
***GFNMS Management Plan***

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- D. Fort Ross State Park celebrates the Russian presence in northern California in the 19th century during the heyday of the Russian-American Company. It also tells the story of local Native American tribes who fished and hunted in the area. GFNMS and CBNMS are proposing to develop wayside signage themed on wildlife watching, including tide pool etiquette and marine mammal viewing.
- E. Bodega Head State Park is the best vantage for getting a perspective on GFNMS and CBNMS. This is a popular whale and sunset watching location. GFNMS and CBNMS propose to build a permanent whale watching station designed after one under construction at Beach 6, along the Olympic coastline.
- F. Maintain the three-paneled kiosk at Duxbury Reef that provide an interpretation of the intertidal habitats, intertidal etiquette and a description of the GFNMS.
- G. GFNMS will partner with PRNS to rehabilitate existing structures and dock at Sacramento Landing in Tomales Bay for visitor use, support research efforts and provide emergency services by maintaining a vessel at the dock.
- H. GFNMS will develop an exhibit in the Northern California Coast exhibit wing at the California Academy of Sciences (CAS). GFNMS has a rare opportunity to become the focal point of the “new” academy and install a permanent exhibit.
- I. GFNMS will build a premier ocean learning and experiential visitor center at its headquarters location. The visitor center will feature hands-on, interactive exhibits on the marine environment, maritime history features, and exhibits for the NMSP. It will also have a theater for films, lectures, telepresence and seminars, as well as classrooms, library, office space, and improved storage.
- J. GFNMS has received funding for a maritime exhibit at the Aquarium of the Bay. This exhibit will include an interactive kiosk for local weather and an indoor interactive screen linking to NOAA websites highlighting programs in San Francisco Bay and beyond.
- K. GFNMS and MBNMS will install interpretive displays in the Pigeon Point Lighthouse. These displays will highlight the maritime heritage of the area, including shipwrecks and lighthouse keepers. There will also be a panel on watchable wildlife.
- L. GFNMS will work with CBNMS to develop an exhibit and information kiosk for the Oakland Museum. The exhibit will feature CBNMS but will include information about GFNMS.
- M. GFNMS will develop interpretive signs at forty-seven possible locations throughout central and northern California. Much of the signage will be developed in coordination with Cordell Bank and/or Monterey Bay national marine sanctuaries.

**Activity 1.5** Improve, upgrade, maintain, and evolve the information technology infrastructure of the main office and satellite facilities. Continue to innovate technology through dedicated base funds, stable support staff, and strategic partnerships with Silicon Valley and other Bay area information technology leaders. The San Francisco Bay area is recognized as one of the most technologically advanced regions in the world. The GFNMS should tap into these local resources and creative thinking to evolve more efficient, creative, and engaging methods of protecting our marine resources.

**Activity 1.6** Partner with local research and academic institutions to develop facilities and infrastructure to support research and monitoring in the GFNMS.

- A. Partner with USFWS to upgrade the Southeast Farallon Island facility and add a field laboratory to support monitoring and research efforts on the Farallon Islands.
- B. Partner with Bodega Marine Laboratory to provide office and laboratory space to support sanctuary conservation science programs.
- C. Expand the Surface Current Mapping (CODAR) technology to the sanctuary.

## **STAFFING**

Under the direction of the sanctuary superintendent, the sanctuary staff is directly responsible for implementation of the management plan. Although each staff member is assigned to one of the four program areas or administration, collectively the staff is responsible for coordinating their efforts in addressing the priority resource and ecosystem protection issues identified in the management plan.

**STRATEGY AD-2:** *The primary focus of GFNMS is ecosystem protection. Basic staffing requirements must provide support for administration and the program areas of conservation science, education/outreach, and resource management.*

**Activity 2.1** Sanctuary staff skills should collectively represent expertise in policy, marine resource management, education, outreach, volunteer development, research, monitoring, geographic information systems (GIS), communications technology, and administration. The actual number and expertise of staff will depend on budget allocations and the operating priorities of GFNMS. In order to meet the objectives of this management plan, target staffing requirements have been laid out (see staffing chart). Administration will support the following:

- A. Building leadership in the field.
- B. Increasing professional exposure of the staff.

**Activity 2.2** Each staff member must exhibit general knowledge about all GFNMS program areas and the ability to effectively communicate with constituents, other professionals, and the community-at-large. In an effort to attract and maintain a consistent and high caliber staff base, the GFNMS Superintendent will allocate 1.5 percent of the base budget, to encourage staff participation in professional development such as:

- A. Continuous training
- B. Advancement opportunities
- C. Professional development and attendance at professional meetings and workshops
- D. Staff exchanges with other sanctuaries

**Activity 2.3** Collectively, the staff will function as a team supporting each program area, working towards the common goals and objectives of the management plan and increasing protection of sanctuary ecosystems and qualities. Through administration, the following support will be provided:

- A. Team building through on-site activities and off-site retreats.
- B. Define relationship and nature of interactions between staff and management.
- C. Clarify job and program area responsibilities.
- D. Support internal coordination between program areas.
- E. Implement a structured staff performance review process.
- F. Facilitate communication and coordination with other sanctuaries.
- G. Clarify relationship between partners and GFNMS.
- H. Provide oversight on achieving goals and objectives.

**Activity 2.4** Through the administrative framework, the sanctuary will work to create a positive working environment that encourages transparency, trust and accountability.

- A. Hold an all-hands sanctuary meeting with headquarters and site staff to learn other's expertise, and roles, exchange information, and engage in discussion of how to improve communication and productivity between sites and headquarters.
- B. Schedule staff retreats (see above).
- C. Develop clear channels of communication among all staff members, and within program teams.
- D. Hire consultant to assist the site in further developing a positive work environment that encourages trust and team building.
- E. Hold regular, well-planned staff meetings.
- F. Conduct regular meetings between program coordinators to ensure cross-program integration and support.

**Activity 2.5** Work towards developing a strong and favorable public identity.

- A. Develop site communications and media plan.
- B. Offer formal media training for site staff.
- C. Submit articles on a quarterly basis for NOAA publications (NOAA Report, Sanctuary Watch).
- D. Develop PowerPoint presentation for GFNMS and specific programs.
- E. Revamp and refine image library.
- F. Develop series of boilerplate press releases.
- G. Encourage headquarters to highlight GFNMS in press releases and publications.
- H. Improve educational and resource libraries to optimize their use.
- I. Participate in targeted conferences and outreach events.
- J. Improve GFNMS public and GFNMS SIMoN Web offerings.

**PARTNERSHIPS**

With limited staff and financial resources, GFNMS relies on partnerships, outside funding sources and volunteers to assist in the implementation of the management plan. An integrated approach to ecosystem protection requires direct and broad-based participation in resource management by all parties who have a stake in the long-term health of the region.

**STRATEGY AD-3:** *With limited staff and financial resources, GFNMS will develop partnerships and identify outside funding sources and in-kind services to assist in the implementation of the management plan.*

**Activity 3.1** Continue to maintain and build on existing partnerships.

- A. Continue the Cooperative Agreement with the Farallones Marine Sanctuary Association (FMSA) to support GFNMS education and outreach programs and maintain visitor centers.
- B. Continue the Memorandum of Agreement with GGNRA for office space and services. Enter into a long-term occupancy agreement prior to initiating any major building rehabilitation projects.
- C. Revise the Memorandum of Agreement with PRNS for enforcement of sanctuary regulations.

- D. Develop a Memorandum of Agreement with PRNS to renovate the facility and dock at Sacramento Landing in Tomales Bay.
- E. Develop a Memorandum of Agreement with Bodega Marine Laboratory to coordinate on research and monitoring activities and education and outreach opportunities. Explore shared workspace at BML.

**Activity 3.2** Expand informal working relationship with NMFS and United States Geological Survey (USGS). Partnership activities include coordination on research projects, data analysis and cruise operations.

**STRATEGY AD-4:** *As the sanctuary advisory council matures and develops a strong voice within the community, its role in ecosystem protection should be more clearly defined. With experience, the sanctuary advisory council will develop, and can draw on, a historical framework for ongoing community-based decision making as they assume a leading role in providing advice to the sanctuary superintendent.*

**Activity 4.1** In consultation with the sanctuary advisory council, strengthen the structure of the sanctuary advisory council by: evaluating and amending as necessary the sanctuary advisory council charter; evaluating and developing organizational strategies to enhance the sanctuary advisory council's level of participation and effectiveness; evaluating and adjusting as necessary the representation of sanctuary advisory council membership; and providing support to help the advisory council develop a respected voice in the community.

**Activity 4.2** Identify the role of the sanctuary advisory council in addressing ecosystem protection issues by developing a process for assisting in the building of GFNMS policies and procedures.

**Activity 4.3** Provide support, resources, and guidance to help the sanctuary advisory council engage and educate the public about current, new, and emerging ecosystem protection issues in the sanctuary. Develop a strategy to increase public awareness of the advisory council as a way to increase public involvement.

**Activity 4.4** Sanctuary advisory council members will be asked to serve on various advisory council working groups. Working groups will be convened by the sanctuary advisory council to focus on specific issues and to allow for participation by additional stakeholders and community experts.

**Activity 4.5** Review the working group recommendations to add standing working groups and seats to the sanctuary advisory council.

## **INTERAGENCY COORDINATION**

The NMSP and GFNMS are committed to coordinating with other federal, state and local agencies in a continuous ecosystem management process. This process is designed to ensure the long-term protection of the unique ecosystems of this region, while considering the demands of multi-use interests. This requires the cooperation of many institutions that historically have not

focused on the same goals. Because of the complexity of managing the activities and cultural resources in the sanctuary, no single agency or institution can effectively meet all sanctuary goals. Overlapping jurisdictions, different agency mandates, and limited resources necessitate the development of a management plan that brings together multiple institutions for the common purpose of ecosystem protection. Achieving the long- and short-term goals for this region requires the development of a close and continuing partnership among all the agencies.

**STRATEGY AD-5:** *NOAA and GFNMS recognize all other authorities in and around sanctuary waters as important components of effective ecosystem protection. Therefore, GFNMS' regulations complement or supplement, but do not replace, existing authorities. To ensure coordination and cooperation with federal, state, and local jurisdictions within or adjacent to the sanctuary, GFNMS seeks to formalize intra- and interagency efforts.*

**Activity 5.1** GFNMS will engage other agencies in reviewing each other's actions, responding to environmental impact statements (EIS), and participating on sanctuary panels and working groups. Building agency relationships allows for: coordinating the development of policies at the federal, state and local level; the sharing of research and education resources; and the opportunity to work together to identify resource management issues.

**Activity 5.2** Formalize agreements with federal/state co-trustee managers signaling that the cooperative and integrated management approach established for GFNMS has been adopted by other agencies. To formally implement cooperative management of the sanctuary a number of separate types of agreements may be entered into, including: cooperative agreements, Memoranda of Understanding/Agreement, and consultation.

**Activity 5.3** GFNMS seeks to formalize agreements for the following programs: (1) Protected Resources Enforcement Plan (USCG, NMFS), and (2) Emergency Response Plan (local, state and federal emergency response agencies).

## **PLANNING AND EVALUATION**

Evaluating performance as part of the regular cycle of management is a relatively new concept for the NMSP. Periodic reviews have taken place over the course of the sanctuary program's existence, but a process for integrating a system for performance evaluation has not been implemented up to now. As a result, NMSP headquarters staff began working on models for integrating performance measurement into the management plan review process as well as for evaluating overall performance of the sanctuary program. The idea behind these models was simple, but implementing them has been challenging due to the inherent difficulties of performance measurement (developing quantifiable outcome-based targets, projecting outward for results, estimating needs, relying on outputs or products for results reporting, etc.). With the measures in this Final management plan, however, GFNMS is initiating the performance measurement process for the sanctuary and, therefore, beginning to establish a baseline of information that can be used by the NMSP to evaluate effectiveness of both the site and the sanctuary program over time.

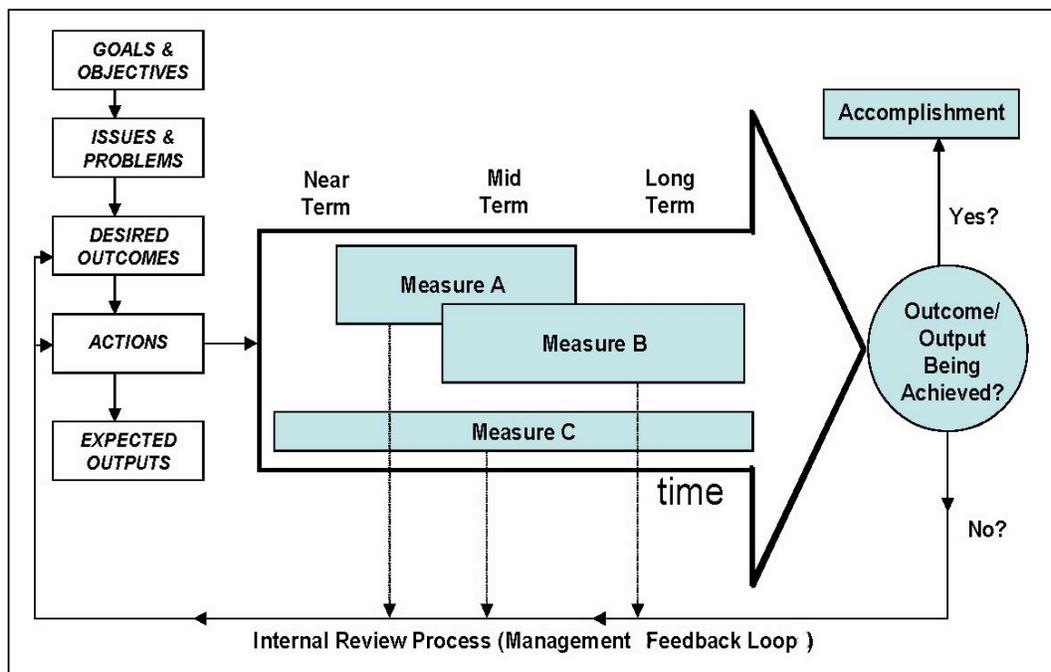
## **DESCRIPTION OF PERFORMANCE EVALUATION**

As part of an effort to improve overall management of sanctuaries, ongoing and routine performance evaluation is a priority for the NMSP. Both site-specific and programmatic efforts are underway to better understand the sanctuary program's ability to meet the objectives outlined in each of the action plans. Performance evaluation has many other benefits, including:

- Highlighting successful (or not so successful) efforts of site management;
- Keeping the public, congress, and other interested parties apprised of sanctuary effectiveness;
- Helping managers identify resource gaps so that they may better manage their sites;
- Improving accountability;
- Improving communication among sites, stakeholders and the general public;
- Fostering the development of clear, concise and, whenever possible, measurable outcomes;
- Providing a means for managers to comprehensively evaluate their sites in both the short- and long-term;
- Fostering an internal focus on problem-solving and improved performance;
- Providing additional support for the resource allocation process; and
- Motivating staff with clear policies and a focused direction.

Throughout the management plan review process, GFNMS staff worked towards developing performance measures for the action plans. The principal objective of these measures is to present a set of performance targets that demonstrate progress towards desired outcomes for each action plan. The NMSP Performance Evaluation Logic Model (below) depicts the basic idea behind this process, which will be implemented in all sanctuaries undergoing management plan review.

NMSP Performance Evaluation Logic Model



Priority resource management issues were identified during the management plan review process relative to GFNMS' goals and objectives. Staff developed desired outcomes (targets based on a desired change in the status quo of the ecosystem, such as the sanctuary's environmental condition or management capacities). Strategies (as identified in each of the action plans) are then grouped under the relevant outcomes. Expected outputs, or products, are also identified. Performance measures are then drafted, which identify the means by which the sanctuary will evaluate its progress towards achievement of the desired outcomes (based on goals and objectives). As represented by the large arrow in the model, measures were developed to provide information on results over time, from the near term (within one year, for example) to the long term (over the span of ten years or more, for example). As these measures are monitored over time, data are collected on progress towards the achievement of outcomes and the production of outputs. Outcomes that are being achieved and outputs that are being produced are reported as accomplishments. The inability to achieve outcomes or produce outputs is also reported, but as areas that are falling short of targets. In these areas, staff will work to identify the obstacles that are preventing management from reaching targets (represented in the model by the arrow that runs along the bottom of the graphic). This internal review is one of the primary benefits of the performance evaluation process as it provides an opportunity for staff to think carefully about why particular strategies in the management plan are not meeting stated targets and how they can be developed to do so.

The GFNMS Ecosystem Protection Implementation Plan matrixes (see Appendix I) are organized around the priority habitats identified in the management plan: estuarine, sandy shore, rocky shore, and open ocean. Each of the strategies in the management plan that address the priority issues (water quality, wildlife disturbance, introduced species, ecosystem protection, vessel spills) and program areas (education and outreach, conservation science, and resource

protection) will be implemented around improving protection of these environments. The Performance Measures matrixes are also organized to track the structure of the action plans in the management plan including: goals, objectives and outcomes.

The information produced by performance measures in sanctuary management plans will be used not only to improve the management of individual sanctuaries, but to inform the sanctuary program's performance evaluation through the NMSP Report Card.

The NMSP Report Card will use action-plan-specific performance information from the site management plans (along with information on headquarters-specific tasks) to evaluate the sanctuary program's performance in a wide variety of functional areas (such as education, research and monitoring, planning and policy, enforcement, and operations). Although this will be an internal process, results will be compiled, synthesized and then reported by the NMSP Director in a public document (such as the State of the Sanctuary Report).

#### **PERFORMANCE EVALUATION GOAL**

1. Ensure that GFNMS' management plan strategies are producing effective results in addressing the priority ecosystem protection issues identified in the management plan.

#### **PERFORMANCE EVALUATION OBJECTIVES**

1. GFNMS will continuously measure and evaluate the successes and challenges of the strategies put forth in the five-year management plan.
2. Based on the outcome of these evaluations, the sanctuary will modify existing programs and make recommendations for the future that best support the sanctuary's primary objective of ecosystem protection.

#### **PERFORMANCE EVALUATION STRATEGY**

**STRATEGY AD-6:** *Develop and make use of performance indicators to measure effectiveness of the management of the sanctuary as a whole, as well as to evaluate specific strategies within the management plan.*

**Activity 6.1:** GFNMS staff will conduct routine performance evaluations to collect and record data on sanctuary performance over time. Using this data, staff will determine the effectiveness of management plan strategies by (a) evaluating progress towards achievement of each action plan's desired outcomes and (b) assessing the role or added value of those outcomes in the overall accomplishment of site goals and objectives.

**Activity 6.2:** Results from performance monitoring will be collected, analyzed and used to populate and inform the NMSP Report Card and, when necessary, National Ocean Service (NOS) or NOAA-wide performance requirements. Performance data may also be presented in a site-specific annual report that would explain each measure, how it was evaluated, the site team that conducted the evaluation, and next steps. Based on this analysis, site staff, in cooperation with the advisory council, will identify accomplishments as well as work to determine those

management actions that need to be changed to better meet their stated targets. The targets themselves may also be analyzed to determine their validity (if, for instance, they are too ambitious or unrealistic given current site capacities).

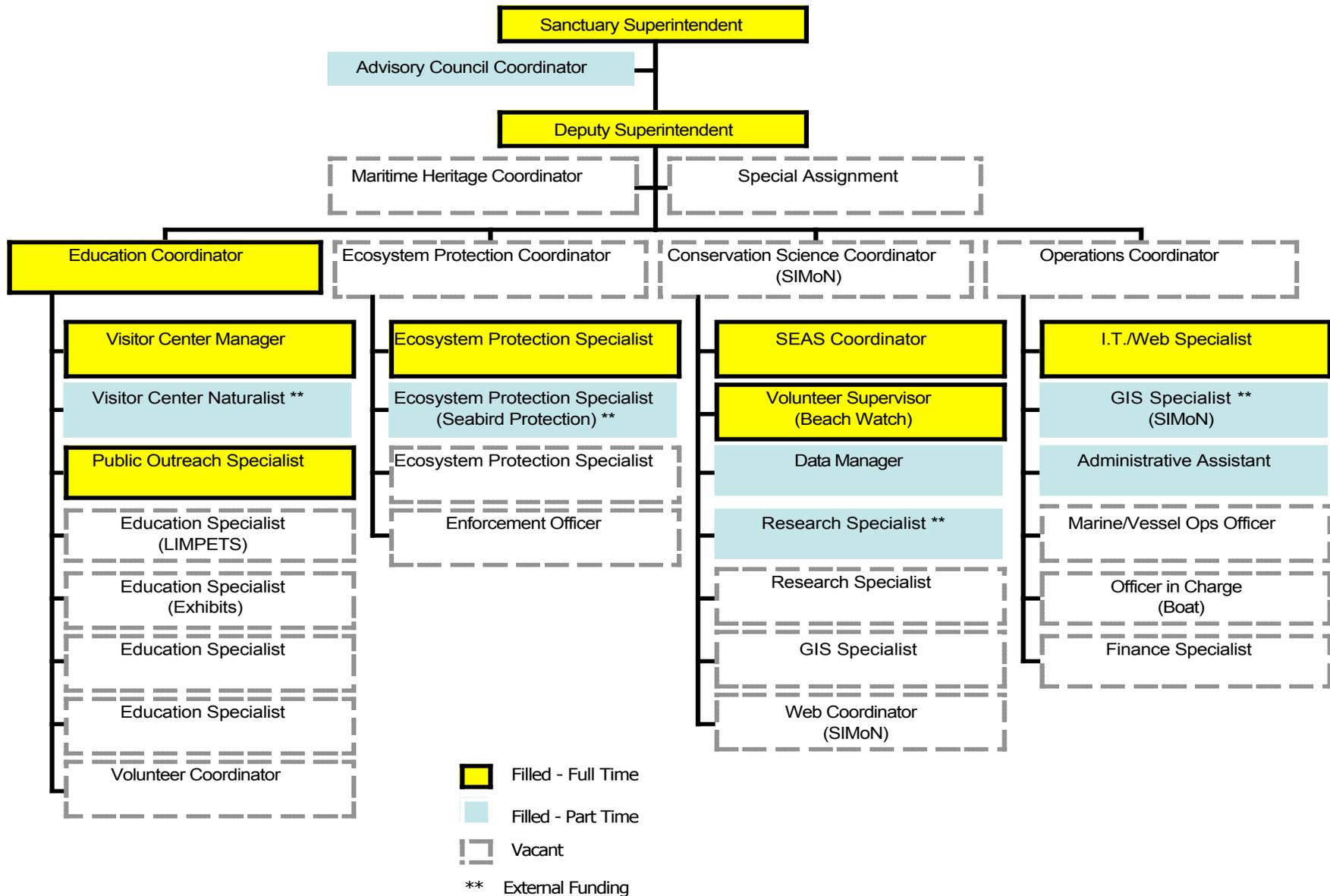
**Activity 6.3:** An annual assessment on the implementation of the GFNMS Management Plan will be conducted. This assessment will be conducted internally by GFNMS staff who will consider the progress and effectiveness of activities implemented over the previous year. In this activity, successes or weaknesses of specific activities will be determined. Activities deemed less than successful in achieving desired outcomes will be addressed to correct or improve the outcomes/outputs. Successful activities will be recognized with application of positive lessons learned to other programs.

**Activity 6.4:** As the NMSP continues to increase the rigor of its internal evaluation process, GFNMS will begin to increase the frequency with which partners collaboratively join with GFNMS in assessing the effectiveness of joint-management actions (those actions conducted primarily in partnership with others). Toward this end, regular evaluation of partner dependent strategies within this management plan is proposed.

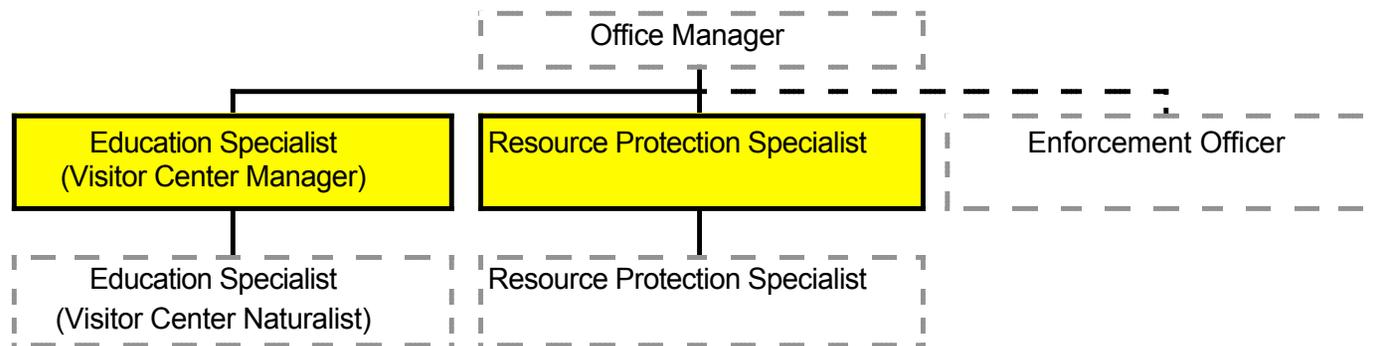
**Potential Partnerships:** NMSP, SAC, strategy partners

**Complementary Strategies:** All strategies

# Staffing Plan: GFNMS



## Staffing Plan: Northern Management Area



GFNMS ADMINISTRATION

**Timeline**

Administration Timeline	Year 1	Year 2	Year 3	Year 4	Year 5
STRATEGY AD-1: Facilities					→
STRATEGY AD-2: Staffing					→
STRATEGY AD-3: With limited staff and financial resources, GFNMS will need to develop partnerships.	.....				→
STRATEGY AD-4: Sanctuary advisory council					→
STRATEGY AD-5: Formalize intra- and interagency efforts.					→
STRATEGY AD-6: Develop and make use of performance indicators to measure performance of the management of the sanctuary.					→

**Legend:**

- Ongoing Activity
- .....→ Planning Stage
- ◆ Completed Activity

GFNMS ADMINISTRATION

## Budget

Strategy	Estimated Annual Cost (1000's)*					Total Est. 5-Year Cost (1000's)
	YR 1	YR 2	YR 3	YR 4	YR 5	
<b>STRATEGY AD-1: New sanctuary facilities will be developed</b>	\$101	\$3,181	\$3,181	\$3,181	\$231	\$9,875
<b>STRATEGY AD-2: Basic staffing requirements must provide support for administration and the program areas</b>	\$200	\$700	\$1000	\$1,250	\$1,450	\$4,600
<b>Action 2.3: Collectively, the staff will function as a team supporting each program area, working towards increasing protection of the sanctuary</b>	\$15	\$15	\$15	\$15	\$15	\$75
<b>Action 2.5: Work towards developing a strong and favorable public identity</b>	\$60	\$10	\$10	\$10	\$10	\$100
<b>STRATEGY AD-3: GFNMS will develop partnerships to assist in the implementation of the management plan</b>	\$36	\$36	\$36	\$36	\$36	\$180
<b>STRATEGY AD-4: The sanctuary advisory council will assume a leading role in providing advice to the sanctuary superintendent</b>	\$85	\$100	\$100	\$100	\$100	\$485
<b>STRATEGY AD-5: Formalize intra- and interagency efforts</b>	\$12	\$12	\$12	\$12	\$12	\$60
<b>STRATEGY AD-6: Develop and make use of performance indicators</b>	\$40	\$40	\$40	\$40	\$40	\$200
<b>Total Estimated Annual Cost</b>	<b>\$549</b>	<b>\$4094</b>	<b>\$4394</b>	<b>\$4644</b>	<b>\$1,894</b>	<b>\$15,575</b>

The sanctuary's base budget is available each year from appropriated funds.

There is both availability and opportunity to receive additional funding from appropriated funds.

The estimates do not take into account increasing personnel costs each year or inflation.

The estimates do not take into account unexpected events or emergencies or unforeseen projects.





## **CROSS-CUTTING ACTION PLAN**

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# **GFNMS MANAGEMENT PLAN**

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- I. Cross-Cutting Introduction**
- II. Administration and Operations**
- III. Community Outreach**
- IV. Ecosystem Monitoring**
- V. Maritime Heritage**
- VI. Northern Management Area  
Transition Plan**



## **CROSS-CUTTING INTRODUCTION**

Cordell Bank, Gulf of the Farallones and Monterey Bay National Marine Sanctuaries (CBNMS), (GFNMS), and (MBNMS) are located adjacent to one another along a 350-mile stretch of the north-central California coast. All three sanctuaries are managed by the National Marine Sanctuary Program (NMSP), share many of the same resources and issues, and have some overlapping interest and user groups. There are many opportunities for these sites to work cooperatively, share assets, and address resource management issues in a coordinated manner.

The three sanctuaries continue to coordinate on many important resource management issues, such as oil spills and volunteer monitoring. However, each site is, for the most part, managed independently of the others. The three sanctuaries have separate administrative staffs, sanctuary advisory councils (SACs), and independent education, research and resource protection programs. As a result, opportunities to maximize collaborations and share resources have not fully been realized.

### **GOALS**

The goal of the cross-cutting action plans is to build upon existing coordination efforts and identify some activities that should be jointly implemented so that these three sites can operate as integrated and complementary sites to better protect the sanctuary resources. This will ensure that scarce program resources are used more efficiently and result in a more consistent and coordinated delivery of programs, products and services to the public. Cross-cutting actions plans were developed to address: Administration and Operations; Northern Management Area; Community Outreach; Maritime Heritage; and Ecosystem Monitoring. Though the implementation of other activities contained in the site-specific plans may also be effectively coordinated, the NMSP determined that the cross-cutting action plans would be jointly developed and implemented jointly across the three sites.

### **IMPLEMENTATION WITHIN THE CONTEXT OF A NEW REGIONAL STRUCTURE**

NMSP efforts to address certain priority issues in a cross-cutting framework was a first step in a larger effort to begin looking at sanctuary resource management issues in a regional or ecosystem-based context. Since the cross-cutting plans were developed, the NMSP has been slowly moving toward adopting a new regional management structure. This new regional structure establishes four regions, including a West Coast region, which will be led by a regional superintendent. The purpose of this new structure is to maximize program integration among the NMSP sites, regions, and national program and to other state and federal programs and partners – across all levels. The regional structure dedicates program leadership and regional staff resources directly towards integrating programs and forging partnerships that supports the National Oceanic and Atmospheric Administration's (NOAA's) evolving ecosystem-based management approach.

***Cross-Cutting Introduction***  
***GFNMS Management Plan***

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The regional superintendent and staff will be based in the region and dedicate their efforts towards addressing priority regional issues and capitalizing on regional opportunities and partnerships. In the case of the Joint Management Plan Review (JMPR), some of their expertise and responsibilities could include working closely with individual sanctuary staff to coordinate the implementation of certain cross-cutting action plans. For example, regional ecosystem monitoring has emerged as a NOAA priority. To be effective, this requires the integration of sanctuary monitoring activities not only across the three sites in the JMPR, but those at partner state and federal agencies and at other marine sanctuaries such as Channel Islands and Olympic Coast. Regional staff could clearly play an important role in helping coordinate and ensure the linkages as the various site or cross-cutting ecosystem monitoring plans are being implemented. Regional staff and resources may also be involved in helping coordinate or implement the community outreach and maritime heritage action plans. However, it may also be appropriate for individual sanctuaries to either share the lead for implementing the cross-cutting action plans or for one site to take the lead. Ultimately, determining who will take the lead on cross-cutting action plan implementation will be worked out after the regional structure and priorities get established, and after full consideration of the staffing and resources available at each of the three sites.



## ADMINISTRATION AND OPERATIONS ACTION PLAN

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### GOALS

The goals of cross-cutting Administration and Operations for the Joint Management Plan Review (JMPR) are to (1) improve coordination and cooperation across the three sanctuaries to better and more efficiently manage and protect sanctuary resources, and (2) for the individual sites to start working and functioning as an integrated team. Fulfilling these goals for the three sanctuaries requires enhancing communication and collaboration among and between managers, program staff and the newly established National Marine Sanctuary Program (NMSP) regions.

### ISSUE DESCRIPTION

During scoping meetings, the NMSP received many comments relating to the need to coordinate various administration and operations across the sites. The three sanctuary advisory councils (SACs) and sanctuary staff identified several of these issues as priority items to address in the management plan review. These include:

- Improve resource management consistency and efficiency
- Expand coordination and communication between sites and to the public
- Evaluate emergency response capabilities in the region, and clarify and coordinate the sanctuary's role in relation to other agencies
- Develop a mechanism to address current and emerging issues between the sites
- Coordinate research/monitoring, education/outreach, and enforcement activities

### ADDRESSING THE ISSUE

Each of the three sanctuaries developed site-specific administration and operations action plans to address staffing and infrastructure needs in order to implement their new management plans. In contrast, this cross-cutting administration and operations plan targets some initial activities that will be implemented by all three sites in order to improve communication and maximize their ability to collaborate and cooperate on many important resource management and program areas.

#### **STRATEGY XAO-1: *Improve Internal Communications Among the Three Sanctuaries.***

Successful collaboration and coordination among sanctuaries is related to the amount and intensity of communication. Though individual sanctuary staff may occasionally communicate by e-mail, telephone or meetings, there is no established mechanism to bring together the

**Administration and Operations Action Plan  
GFNMS Management Plan**

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superintendents or staff to proactively discuss issues that may affect multiple sites. This strategy focuses on improving communications between the sites to ensure there are regular opportunities for the managers, staff and the advisory councils to learn what is happening at each of the three sites and jointly plan regional programs and activities.

**Activity 1.1** Improve communications between the sanctuary superintendents.

Superintendents will engage in more informal (random pick-up-the-phone) and formal (regularly scheduled calls or meetings) communications. They will meet at least three times a year as part of the newly established NMSP regional leadership team to (1) improve communication, (2) conduct Annual Operating Plan (AOP) planning, and/or (3) assess the implementation of AOPs and the JMSP action plans.

**Products:** List of cross-cutting AOP activities and an assessment of AOP/action plan implementation

**Partners:** Superintendents for Cordell Bank National Marine Sanctuary (CBNMS), Gulf of the Farallones National Marine Sanctuary (GFNMS), and the Monterey Bay National Marine Sanctuary (MBNMS)

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	None	None

**Activity 1.2** Sanctuary superintendents will plan and schedule one regional sanctuary update and team building activity per year.

**Products:** Annual team building/coordination meeting to discuss site-specific and cross-cutting projects, staff roles and responsibilities, and identify how staff can help support and complement the other sites' programs and staff.

**Partners:** CBNMS, GFNMS, MBNMS

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	None	None

**Activity 1.3** Create a new employee orientation program that includes information from the three sanctuaries and the NMSP.

The orientation program should include travel to the other sites to meet staff and learn about their programs and activities. These efforts should be coordinated with similar efforts at headquarters.

**Products:** Employee orientation program that includes a reference binder with information from the other sites and headquarters, publications lists, staff bios.

**Partners:** MBNMS, CBNMS, GFNMS and NMSP staff

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>CBNMS</b>	<b>AD-2.1</b>
	<b>GFNMS</b>	<b>AD-2</b>

**Activity 1.4** The program coordinators will meet separately at least once per year to share information and plan joint activities prior to the development of the annual operating plans.

**Products:** Site program coordinators (conservation science, education, resource protection) will develop a list of joint or collaborative activities to include in their respective AOPs.

**Partners:** Program coordinators (conservation science, education, resource protection at CBNMS, GFNMS, MBNMS)

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>None</b>	<b>None</b>

**Activity 1.5** Schedule one joint advisory council chair – sanctuary superintendent meeting to determine whether all three advisory councils should meet annually.

The MBNMS and GFNMS advisory councils currently meet on an annual basis to discuss issues and program activities in the northern management area. This meeting among the advisory council chairs and managers would determine the need for expanding this meeting to include all three sites.

**Products:** Initial joint advisory council chair meeting, possible future annual joint meetings.

**Partners:** CBNMS, GFNMS, MBNMS Advisory Council Chairs and Superintendents

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>GFNMS</b>	<b>AD-4</b>

**Activity 1.6** Encourage and provide opportunities for site staff to give presentations at each other’s SAC Meetings.

**Products:** Briefings at advisory council meetings.

**Partners:** CBNMS, GFNMS, MBNMS

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>CBNMS</b>	<b>PC-2</b>
	<b>GFNMS</b>	<b>AD-4</b>

**STRATEGY XAO-2: *Improve the Efficiency and Cost-Effectiveness of Program Operations.***

Each of the three sanctuaries have been designated for over ten years and during this time have accumulated an inventory of equipment, vessels and resources to support their own research/monitoring, education/outreach, and resource protection programs. This strategy recognizes there are instances in which it is more cost-effective to share resources among the sites and some instances when it may be more appropriate for each site to have their own. The sites must first inventory their existing resources and then jointly develop a needs assessment to document what is required to implement the three management plans. This strategy also calls for the sites to coordinate and provide opportunities to conduct joint field operations and to conduct an assessment in order to better cooperate and share facilities, signage and exhibits.

**Activity 2.1** Develop a list of existing facilities, exhibits, equipment, vessels and resources based on the revised management plans that could be shared between sites.

**Products:** List of existing equipment, vessels and resources.

**Partners:** NMSP, CBNMS, GFNMS, and MBNMS

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>CBNMS</b>	<b>AD-1</b>

**Activity 2.2** Develop a list of needed facilities, exhibits, equipment, vessels and resources based on the revised management plans that could be shared between sites.

**Products:** List of needed equipment, vessels and resources.

**Partners:** NMSP, CBNMS, GFNMS, MBNMS

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>CBNMS</b>	<b>AD-1</b>
	<b>GFNMS</b>	<b>AD-1</b>

**Activity 2.3** Contact and inform the other sites early in the planning stages of field operations to provide opportunities to plan joint missions and to share information and data.

**Products:** List of planned field operations. Shared data and reports.

**Partners:** CBNMS, GFNMS, MBNMS

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>CBNMS</b>	<b>CS-9</b>
	<b>GFNMS</b>	<b>WQ-8, WD-1, IS-1, FA-1</b>

**STRATEGY XAO-3: *Improve the Efficiency and Cost-Effectiveness of Program Administration.***

Currently each sanctuary office is responsible for managing its own administration and information technology functions, including contracts, procurements, time and attendance, travel orders and vouchers, websites, databases, and geographic information systems. Each site employs a varying number of staff or contractors to perform some or all of these tasks. The goal of this strategy is to evaluate the staffing plans at the sites and maximize opportunities to share personnel and implement methods to make routine administrative functions more efficient. The strategy also highlights the importance of building upon existing efforts to share information technology resources.

**Activity 3.1** Review the staffing plans at each sanctuary to determine if collaborations are possible to create efficiencies, fill gaps, share staff resources and complete specific projects.

This review will explore ways to overcome barriers for both contractors and full-time employees to participate.

**Products:** List of opportunities for collaborations between sites.

**Partners:** Managers for CBNMS, GFNMS, and MBNMS

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>CBNMS</b>	<b>AD-2</b>
	<b>GFNMS</b>	<b>AD-2</b>
	<b>MBNMS</b>	<b>OA-1</b>

**Activity 3.2** Based on the review in 3.1, and as opportunities arise, create short-term opportunities for staff exchanges, rotations, details and informal staff loans for specific projects or to fulfill on-going needs across all three sites.

**Products:** Update list of opportunities. Provide administrative, contract and/or financial options that facilitate such collaborations.

**Partners:** Managers for CBNMS, GFNMS, MBNMS, and NMSP

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>GFNMS</b>	<b>AD-2</b>

**Activity 3.3** Participate in each other’s interview panels to review candidates for new and vacant positions, where possible.

**Products:** Recommendations on new hires.

**Partners:** CBNMS, GFNMS, MBNMS

**Administration and Operations Action Plan**  
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	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>CBNMS</b>	<b>AD-2</b>
	<b>GFNMS</b>	<b>AD-2</b>

**STRATEGY XAO-4: Improve the Coordination of Sanctuary Resource Protection Activities and Programs.**

Each of the three site-specific management plans proposes various strategies to address their own resource protection programs (i.e., regulations/permitting, emerging issues, enforcement, emergency response). This strategy is aimed at improving the communication and coordination of resource protection activities across the three sites. The strategy addresses the need to improve internal understanding and awareness of regulatory and permit processes and activities. Secondly, it establishes a process to identify and, when appropriate, jointly address emerging issues in a regional capacity. Third, it recommends the development of a regional sanctuary emergency response plan so that the NMSP is better prepared to address emergencies on a regional scale. Finally, it identifies the need to comprehensively evaluate enforcement needs in relation to the new management plans and develop and implement a regional enforcement plan.

**Activity 4.1** Improve staff awareness and understanding of each site’s regulations.

Establish a basic and consistent understanding of each site’s regulations and ensure that everyone knows where to direct questions relating to specific regulations and permits.

**Products:** Fact sheet summarizing each site’s regulatory and permit authority, and identifies the appropriate person to contact at each site.

**Partners:** NMSP, CBNMS, GFNMS, MBNMS

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>CBNMS</b>	<b>AD-9</b>
	<b>GFNMS</b>	<b>RP-4</b>
	<b>MBNMS</b>	<b>OA-8 and OA-9</b>

**Activity 4.2** Improve staff awareness and understanding of each site’s permits.

Inform the other sites of any new permit applications or other activities that could affect any of the sanctuaries.

**Products:** Share existing permit reports and explore whether a new reporting system is needed to improve coordination.

**Partners:** NMSP, CBNMS, GFNMS, MBNMS

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>CBNMS</b>	<b>AD-9</b>
	<b>GFNMS</b>	<b>RP-5</b>

**MBNMS | OA-8**

**Activity 4.3** Coordinate emerging issues among the three sites.

As the sites identify emerging issues, determine the significance and potential to impact another site, and communicate this to the potentially affected site(s).

**Products:** Analysis of emerging issue(s).

**Partners:** NMSP, CBNMS, GFNMS, MBNMS

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>CBNMS</b>	<b>AD-10</b>
	<b>GFNMS</b>	<b>RP-1, RP-2, RP-3</b>
	<b>MBNMS</b>	<b>EI-1, EI-2</b>

**Activity 4.4** Develop coordinated strategies to address emerging issues.

Jointly determine if a new or emerging issue needs action and identify a strategy and activities to address the issue, depending on whether it is an immediate or long-term threat, what is (or is not) known about it, and if there are adequate resources to address it properly.

**Products:** Recommendation for action, including next steps.

**Partners:** NMSP, CBNMS, GFNMS, MBNMS

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>CBNMS</b>	<b>AD-10</b>
	<b>GFNMS</b>	<b>RP-1, RP-2, RP-3</b>
	<b>MBNMS</b>	<b>EI-1, EI-2</b>

**Activity 4.5** Develop a coordinated sanctuary emergency response plan.

Develop a coordinated sanctuary emergency plan describing how the three sanctuaries will internally coordinate and respond to emergencies including: oil spills, use of dispersants, hazardous material spills, vessel groundings, plane crashes, and natural disasters. The plan should address broad emergency response issues that affect the region, identify NMSP decision-making responsibilities, staffing responsibilities and expertise, and outline how the NMSP will coordinate with existing federal, state and local emergency response agencies in California. The plan will be developed to utilize the existing Incident Command System (ICS), the U.S. Coast Guard (USCG) Area Contingency Plan (ACP).

**Products:** Regional Sanctuary Emergency Response Plan.

**Partners:** NMSP, CBNMS, GFNMS, MBNMS

**Administration and Operations Action Plan**  
**GFNMS Management Plan**

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	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>CBNMS</b>	<b>AD-7</b>
	<b>GFNMS</b>	<b>RP-7, RP-8</b>
	<b>MBNMS</b>	<b>OA-4</b>

**Activity 4.6** Coordinate with the NMSP Damage Assessment Team on populating and making the Sanctuary Hazardous Incident Emergency Logistics Database System (SHIELDS) functional and operative for the three sanctuaries and integrating it with the existing Sanctuary Integrated Monitoring Network (SIMoN) database.

**Products:** SHIELDS for CBNMS, GFNMS and MBNMS.

**Partners:** NMSP, CBNMS, GFNMS, MBNMS and the NOAA Hazardous Materials (HAZMAT)

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>CBNMS</b>	<b>AD-7</b>
	<b>GFNMS</b>	<b>RP-7</b>
	<b>MBNMS</b>	<b>OA-4</b>

**Activity 4.7** Develop a comprehensive enforcement plan for the tri-sanctuary area.

This plan will evaluate enforcement needs to implement this management plan and integrate existing formal and informal enforcement networks across this region. The plan should also include a consistent enforcement penalty schedule and an internal communication strategy.

**Products:** Coordinated enforcement plan for the three-sanctuary area.

**Partners:** CBNMS, GFNMS, MBNMS, General Council Ocean Service (GCOS), General Council Enforcement Litigation (GCE), NOAA-Office of Law Enforcement (OLE), the United States Coast Guard (USCG), National Park Service (NPS), California Parks, CDFG, County Sheriff Departments

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>CBNMS</b>	<b>AD-6</b>
	<b>GFNMS</b>	<b>RP-6</b>

**Activity 4.8** Implement a comprehensive enforcement plan for the tri-sanctuary area.

**Products:** Enforcement activities that implement the comprehensive enforcement plan, including appropriate development of field officers, improved investigation and follow-up actions, and cooperative enforcement agreements with federal, state and local partners.

**Partners:** NMSP, CBNMS, GFNMS, MBNMS

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>CBNMS</b>	<b>AD-6</b>
	<b>GFNMS</b>	<b>RP-6</b>

**TABLE XAO-1: MEASURING PERFORMANCE OF THE CROSS-CUTTING ADMINISTRATION & OPERATIONS ACTION PLAN**

<b>Desired Outcome(s) For This Action Plan:</b>	
Improved communication and coordination among Sanctuary staff resulting in more integrated and coordinated resource protection for Sanctuary resources.	
<b>Performance Measures</b>	<b>Explanation</b>
Increase the number of cross-cutting AOP activities that each site includes in their site-specific AOP by 10% each year.	One of the primary purposes of this action plan is to increase the amount of communication and interaction among the three sites. This action plan identifies specific opportunities for staff to interact, resulting in more coordinated planning and implementation of joint activities that address priority issues. The tangible results of these interactions will be formulated within each site's AOP.

**TABLE XAO-2: CROSS-CUTTING ADMINISTRATION & OPERATIONS ACTION PLAN TIMELINE**

<b>ADMINISTRATION &amp; OPERATIONS ACTION PLAN</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>
Strategy XAO-1: Improve Internal Communications Among the Three Sanctuaries					
Activity 1.1: Improve communications between the Sanctuary Managers & Superintendents.	—————▶				
Activity 1.2: Sanctuary Managers/Superintendents will plan and schedule one regional Sanctuary update and team building activity per year.	—————▶				
Activity 1.3: Create a new employee orientation program that includes information from the three sanctuaries and the NMSP	—————▶				
Activity 1.4: The program coordinators will meet separately at least once per year to share information and plan joint activities prior to the development of the annual operating plans.	—————▶				
Activity 1.5: Schedule one joint Advisory Council Chair – Sanctuary Manager meeting to determine whether all three advisory councils should meet annually.	.....▶				
Activity 1.6: Encourage and provide opportunities for site staff to give presentations at each other's sanctuary advisory council meetings.	—————▶				
Strategy XAO-2: Improve the Efficiency and Cost-Effectiveness of Program Operations					
Activity 2.1: Develop a list of existing facilities, signage, exhibits, equipment, vessels and resources based on the revised management plans that could be shared between sites.		————▶			
Activity 2.2: Develop a list of needed facilities, signage, exhibits, equipment, vessels and resources based on the revised management plans that could be shared between sites.		————▶			

<b>ADMINISTRATION &amp; OPERATIONS ACTION PLAN</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>
<b>Activity 2.3: Contact and inform the other sites early in the planning stages of field operations to provide opportunities to plan joint missions and to share information and data.</b>	—————▶				
Strategy XAO-3: Improve the Efficiency and Cost-Effectiveness of Program Administration					
<b>Activity 3.1: Review the staffing plans at each Sanctuary to determine if collaborations are possible to create efficiencies, fill gaps, share staff resources and complete specific projects.</b>	————▶				
<b>Activity 3.2: Based on the review in 3.1, and as opportunities arise, create short-term opportunities for staff exchanges, rotations, details and informal staff loans for specific projects or to fulfill on-going needs across all three sites.</b>		.....▶			
<b>Activity 3.3: Participate in each other’s interview panels to review candidates for new and vacant positions, where possible.</b>	—————▶				
Strategy XAO-4: Improve the Coordination of Sanctuary Resource Protection Activities and Programs					
<b>Activity 4.1: Improve staff awareness and understanding of each site’s regulations.</b>	—————▶				
<b>Activity 4.2: Improve staff awareness and understanding of each site’s permits.</b>	—————▶				
<b>Activity 4.3: Coordinate emerging issues among the three sites.</b>	—————▶				
<b>Activity 4.4: Develop coordinated strategies to address emerging issues.</b>	—————▶				
<b>Activity 4.5: Develop a coordinated Sanctuary emergency response plan.</b>		————▶			
<b>Activity 4.6: Coordinate with the NMSP Damage Assessment Team on populating and making the Sanctuary Hazardous Incident Emergency Logistics Database System (SHIELDS) functional and operative for the three sanctuaries and integrating it with the existing Sanctuary Integrated Monitoring Network (SIMoN) database.</b>		————▶			
<b>Activity 4.7: Develop a comprehensive enforcement plan for the three-sanctuary area.</b>	————▶				
<b>Activity 4.8: Implement a comprehensive enforcement plan for the three-sanctuary area.</b>		—————▶			

**Legend:**

- ▶ Planned Activity
- .....▶ Proposed Activity, based on internal assessment

**TABLE XAO-3: ESTIMATED COSTS TO IMPLEMENT THE CROSS-CUTTING ADMINISTRATION & OPERATIONS ACTION PLAN**

Strategy	Estimated Annual Cost (1000's)*					Total Est. 5-Year Cost (1000's)
	YR 1	YR 2	YR 3	YR 4	YR 5	
<b>Strategy XAO-1: Improve Internal Communications Among the Three Sanctuaries</b>	\$54.00	\$54.00	\$54.00	\$54.00	\$54.00	\$270.00
<b>Strategy XAO-2: Improve the Efficiency and Cost-Effectiveness of Program Operations</b>	\$36.00	\$36.00	\$36.00	\$36.00	\$36.00	\$180.00
<b>Strategy XAO-3: Improve the Efficiency and Cost-Effectiveness of Program Administration</b>	\$12.00	\$12.00	\$12.00	\$12.00	\$12.00	\$60.00
<b>Strategy XAO-4: Improve Coordination of Sanctuary Resource Protection Activities and Programs</b>	\$186.00	\$174.00	\$162.00	\$162.00	\$162.00	\$846.00
<b>Total Estimated Annual Cost</b>	\$288.00	\$276.00	\$264.00	\$264.00	\$264.00	\$1,356.00

\* Cost estimates are for both “programmatic” and “base” (salaries and overhead) expenses.

\*\* Contributions from outside funding sources also anticipated.

For management planning purposes, the individual site cost to implement cross-cutting strategies can be calculated by dividing the estimated annual cost by three (equal cost). The actual cost to each site may vary according to strategy but will be further refined when sites prepare annual operating plans.



## COMMUNITY OUTREACH ACTION PLAN

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### GOAL

A coordinated, collaborative regional community outreach strategy will build awareness throughout north-central California and beyond about (1) the existence and purpose of the three sanctuaries and the national program; (2) the diverse natural resources and ecosystems of each sanctuary and why they need protection; (3) why their existence is relevant to people; (4) the economic and intrinsic value of the three sanctuaries to coastal and inland communities beyond such direct industries as fishing and ecotourism; (5) how these three sanctuaries are working with constituent groups; and (6) how individuals and groups can be engaged in helping the sanctuaries accomplish their resource protection, research, and education goals.

### ISSUE DESCRIPTION

Under the National Marine Sanctuary Program (NMSP), each sanctuary in the system conducts education and outreach activities to build broad public awareness about the existence and purpose of our nation's marine sanctuaries. The NMSP recognizes a well-informed local, regional, and national constituency greatly enhances the ability of the sanctuaries to protect their natural and cultural resources. Therefore, outreach activities should provide local and state governments, businesses, non-governmental organizations, constituent groups, and the general public with the information necessary to be effective partners in the stewardship of sanctuary resources.

Because of limited resources generally, each site has primarily focused on a select number of audiences within a limited geographic area. As a result, there are several areas where a broad-based public understanding needs to be enhanced. For example, there appears to be a lack of understanding about:

- The unique situation of having three sanctuaries contiguously located in north-central California,
- How these three sanctuaries together can work with other organizations to enhance regional outreach efforts regarding marine ecosystems,
- How individuals and groups can engage effectively with the sanctuary program and best protect sanctuary resources, and
- How businesses, constituent groups, agencies, elected officials and others can provide informed input into decisions regarding sanctuary management and further enhance community awareness of the sanctuaries.

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This action plan identifies appropriate regional audiences and topics, regional outreach strategies, and marketing and media exposure efforts that effectively highlight specific program activities across all three sites as well as the national system. It is also designed to complement each site-specific program and to be flexible enough to incorporate new strategies and topics over time.

Effective community outreach is accomplished through a continuous cycle of ocean and coastal outreach, education, and stewardship. Community outreach expands awareness, knowledge and ultimately changes attitudes and behaviors. By providing information on ocean and coastal resources, and providing stewardship opportunities for people to get involved in the sanctuary, people will begin to have a personal relationship with the sanctuary and may be more likely to become ambassadors helping to protect sanctuary resources. Community outreach involves three strategies tailored to the specific needs and interests of a given audience and may be delivered by members of that audience.

- Outreach provides audiences with sanctuary-related information and materials promoting ocean and coastal stewardship.
- Education provides fundamental scientific understanding, knowledge, training, or professional development on topics relevant to the world's atmosphere, climate, oceans and coastal ecosystems, and resource protection.
- Stewardship is a personal sense of responsibility to take informed action and make caring choices, at home or work, which promote and protect the health of our coasts and oceans.

### ***STRATEGY XCO-1: Build Upon and Expand Existing Ocean and Coastal Outreach***

This strategy is aimed at raising general awareness of marine ecosystems, individual sanctuaries and the sanctuary program, and inspiring stewardship of ocean and coastal resources. Outreach provides audiences with sanctuary-related information and materials based on National Oceanic and Atmospheric Administration (NOAA) science, products, and services that promote ocean and coastal stewardship. These audiences may be: north-central California coastal residents; people who live and work in inland California communities that regularly visit the ocean, such as divers, kayakers, tidepoolers, etc.; those who make their living within the ocean environment, like fishermen, maritime shipping companies, etc.; or people who live outside California that care about the ocean even though they may never visit. These, and others, are important voices in the protection and stewardship of the oceans. Key target audiences and messages should also be closely coordinated with outreach needs identified in the issue-related action plans.

**Activity 1.1** Develop or strengthen coordinated outreach programs and opportunities, such as public service announcements, issue-specific workshops and brochures (e.g., tide pool etiquette), docent programs, signage, learning centers, or exhibits and displays at community events.

**Products:** Priority list of outreach activities based on the priority issues identified in the management plans. Some of these activities include joint outreach programs, volunteer opportunities, website development, signage and interpretive exhibits.

**Partners:** Advisory council members from all three sanctuaries/working groups, Farallones Marine Sanctuary Association (FMSA), Monterey Bay Sanctuary Foundation,

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National Marine Sanctuary Foundation, Channel Islands National Marine Sanctuary (CINMS), Channel Islands Sanctuary Foundation/Association, NOAA Enforcement

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>CB</b>	<b>ED-4, ED-5</b>
	<b>GF</b>	<b>ED-8, ED-9, ED-10, ED-11, ED-12</b>

**Activity 1.2** Plan and conduct regional sanctuary outreach events to promote the importance of monitoring, disseminate monitoring data, and improve understanding of marine conservation and management.

**Products:** Outreach and education materials/curricula to promote awareness of monitoring activities and disseminate monitoring data.

**Partners:** Cordell Bank National Marine Sanctuary (CBNMS), Gulf of the Farallones National Marine Sanctuary (GFNMS), Monterey Bay National Marine Sanctuary (MBNMS), Sanctuary Integrated Monitoring Program (SIMoN), Community Outreach Working Group, Snapshot Day Water Quality Monitoring Event, Long-term Monitoring Program and Experiential Training for Students (LiMPETS), Beach Watch, Beach Coastal Ocean Mammal/Bird Educational and Research Survey (Beach COMBERS), Farallones Marine Sanctuary Association (FMSA), Global Learning and Observation to Benefit the Environment (GLOBE), JASON Foundation for Education (JASON)

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>CB</b>	<b>ED-1</b>
	<b>GF</b>	<b>CS-3</b>

**Activity 1.3** Develop and implement joint media communications plan, e.g., print, radio, TV, Internet.

**Products:** Joint media communications plan, including site points of contact, and key messages from the management plans.

**Partners:** Traditional and electronic media, both coastal and inland, including local weekly papers, community access TV stations

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>CB</b>	<b>ED-3</b>
	<b>GF</b>	<b>ED-11</b>

**Activity 1.4** Identify and partner with external programs to incorporate sanctuary-related messages.

**Products:** External partners' outreach plan, including priority partners, key messages based on priority issues identified in the management plans, outreach materials.

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**Partners:** United States Coast Guard (USCG), National Park Service (NPS), Environmental Protection Agency (EPA), other federal agencies, California State Parks, other state agencies, cities, local parks/recreation departments, pollution prevention programs, chambers of commerce, trade associations for shipping, fishing, tourism, etc., dive clubs/shops, kayak clubs/shops, spot abalone divers, other recreational groups, natural history museums, institutions with community service requirements/marine sciences (high schools, colleges)

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>GF</b>	<b>ED-10, ED-11</b>

**STRATEGY XCO-2: Enhance and Coordinate Ocean and Coastal Education**

This strategy focuses on building community knowledge and fostering caring actions and attitudes targeting priority issues identified in the management plans. The NMSP’s joint ocean and coastal education efforts provide a fundamental scientific understanding, knowledge, training, or professional development to a particular audience on topics identified as important to protect sanctuary resources. There are many possible audiences such as students, teachers, state and local agencies, community leaders, and the general public. Sanctuary-related educational activities are based on NOAA science, systematic in design with clear goals, objectives and measurable outcomes; aligned, where appropriate, with state or national education standards; and designed to facilitate evaluation by a third party.

**Activity 2.1** Collaborate on existing site-specific education programs and products as a means to enhance and expand educational offerings.

Each year, the education staff will jointly meet to identify collaborative projects for inclusion in their respective annual operating plans (AOPs).

**Products:** Joint education implementation strategy based on priority education issues identified in the management plans, incorporating priority list of educational programs and materials needed, potential lecture/symposia themes. Joint online teachers’ database.

**Partners:** West Coast Education Liaison, state/local volunteer programs, Bay Area Sea Kayakers (BASK), high school/college classes doing coastal monitoring, National Science Foundation, other federal agencies (especially for funding), local non-governmental organizations (NGO’s)/non-profits, Association of Monterey Bay Area Governments, Association of (SF) Bay Area Governments

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>CB</b>	<b>ED-4, ED-6, ED-7, ED-8</b>
	<b>GF</b>	<b>ED-2, ED-3, ED-4</b>

**Activity 2.2** Following expansion of the Multicultural Education for Resource Issues Threatening Oceans (MERITO) program, increase multicultural/multilingual efforts based on

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needs assessments to determine other multicultural, socioeconomic, or multilingual communities (Vietnamese, Chinese, Portuguese, Italian, etc.) and their interests.

**Products:** Needs assessments of various multicultural, socioeconomic, and multilingual communities and possible expansion of education efforts.

**Partners:** Multicultural community leaders, bilingual school programs, local NGO's/non-profits

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>CB</b>	<b>CO-10</b>

**Activity 2.3** Identify and implement new education programs that can be developed jointly.

**Products:** Teacher workshops, Volunteer Naturalist Corps program, certification training program for professional naturalists, similar to SBNMS (Stellwagen Bank), natural history guides.

**Partners:** Other national marine sanctuaries (esp. Channel Islands, Olympic Coast and Stellwagen Bank), Elkhorn Slough National Estuarine Research Reserve, state/local volunteer naturalist programs, Marine Advanced Technology Education (MATE), Monterey Bay Aquarium Research Institute (MBARI), Moss Landing Marine Lab (MLML), universities, and Sea Grant institutions, Eco-tourism businesses such as dive and kayak shops, whale-watching companies, local non-governmental organizations/non-profits

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>CB</b>	<b>ED-6, ED-7</b>
	<b>GF</b>	<b>ED-2, ED-7</b>

**STRATEGY XCO-3: Enhance Ocean and Coastal Stewardship**

Marine sanctuary stewardship is a personal sense of responsibility to take informed action and make caring choices, at home or work, which promote and protect the health of our coasts and oceans. A steward develops attitudes, motivations, and commitments that are reflected in informed decisions and responsible actions. Stewards can be individuals, members of groups, or entities that influence others' opinions and actions about the oceans. Stewardship can be demonstrated through a variety of means, including:

- Volunteer for an organized stewardship program,
- Take personal action to protect our ocean sanctuaries,
- Provide informed public input into decisions regarding the sanctuaries, and
- Inform others regarding marine ecosystems and the sanctuary program.

Similar to the audiences for outreach, ocean and coastal stewards may be north-central California coastal residents, people who live and work in inland California communities that regularly visit

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the ocean, those who make their living within the ocean environment, or people who care about the ocean even though they may never visit.

**Activity 3.1** Create, maintain and promote sanctuary and partner volunteer programs to provide opportunities for stewardship as well as expanding resource protection, education, and outreach capabilities of the three sanctuaries.

**Products:** Expanded volunteer programs, volunteer opportunities, and trainings.

**Partners:** NOAA’s Team Ocean Conservation Education Action Network (OCEAN), Elkhorn Slough National Estuarine Research Reserve, Farallones Marine Sanctuary Association (FMSA), Monterey Bay Sanctuary Foundation, Bay Net, Save Our Shores, other NGOs, California State Parks, other state/local resource agencies, Friends of Fitzgerald Marine Reserve, high school service learning programs

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	CB	ED-2

**Activity 3.2** Create new ways to inspire coastal and ocean stewardship in local communities.

The three sites will conduct needs assessments with targeted constituents and audiences to identify innovative and creative methods of engaging people in sanctuary activities. Some examples include working with faith-based or cultural organizations, retired citizens or local art groups.

**Products:** Pilot program or campaign to incorporate non-traditional stewardship activities and partners.

**Partners:** Faith-based groups, Multicultural groups, bilingual school programs, after school programs, art, dance and music programs, service organizations

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	CB	ED-10
	GF	ED-5, ED-6, ED-8

**Activity 3.3** Identify partners to incorporate stewardship messages.

**Products:** Collaborative stewardship campaign.

**Partners:** United States Coast Guard (USCG), National Parks Service (NPS), other federal agencies, California State Parks, other state agencies, cities, local parks/recreation departments, local agencies mandated to have pollution prevention programs (water pollution control, solid waste control), County Sheriffs’ departments, city police, chambers of commerce, trade associations for shipping, fishing, tourism, etc., dive clubs, kayak clubs, other recreational groups, natural history museums, institutions that have community service requirements (high schools, colleges), service organizations

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	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>None</b>	<b>None</b>

**TABLE XCO-1: MEASURING PERFORMANCE OF THE CROSS-CUTTING COMMUNITY OUTREACH ACTION PLAN**

Desired Outcome(s) For This Action Plan:	
Expand joint education and outreach efforts in a manner enhancing protection for Sanctuary resources and the delivery of programs and services to local communities.	
Performance Measures	Explanation
Increase the number of joint education and outreach efforts directed at communities from 1,000 individuals in Year 1 to 5,000 individuals in Year 5.	One of the main purposes of this action plan is to expand general awareness of the three sanctuaries, develop joint education products addressing priority issues, and increase involvement of individuals in the stewardship of the resources in the three sanctuaries. Some of the programs directed at local communities include schools and teachers, volunteers, fairs and festivals, visitor centers, public lecture series, etc.

**TABLE XCO-2: CROSS-CUTTING COMMUNITY OUTREACH ACTION PLAN TIMELINE**

COMMUNITY OUTREACH PLAN	Year 1	Year 2	Year 3	Year 4	Year 5
Cross-cutting Outreach					
Strategy XCO-1: Build Upon and Expand Existing Ocean and Coastal Outreach					
Activity 1.1: Develop or strengthen coordinated outreach programs and opportunities, such as public service announcements, issue-specific workshops and brochures (e.g., tidepool etiquette), docent programs, signage, learning centers, or exhibits and displays at community events.	.....	—————	—————	—————	—————▶
Activity 1.2: Plan and conduct regional Sanctuary outreach events to promote the importance of monitoring, disseminate monitoring data, and improve understanding of marine conservation and management.	.....	—————	—————	—————	—————▶
Activity 1.3: Develop and implement joint media communications plan (print, radio, TV, Internet, etc.).		—————	—————	—————	—————▶
Activity 1.4: Identify and partner with external programs to incorporate Sanctuary-related messages.	—————	—————	—————	—————	—————▶
Cross-cutting Education					
Strategy XCO-2: Enhance and Coordinate Ocean and Coastal Education					
Activity 2.1: Collaborate on existing site-specific education programs and products as a means to enhance and expand educational offerings.	.....	—————	—————	—————	—————▶
Activity 2.2: Increase multicultural/multilingual efforts based on needs assessments to determine other multicultural, socioeconomic, or multilingual communities (Vietnamese, Chinese, Portuguese, Italian, etc.) and their interests.			—————	—————	—————▶

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COMMUNITY OUTREACH PLAN	Year 1	Year 2	Year 3	Year 4	Year 5
Activity 2.3: Identify and implement new education programs that can be developed jointly.	.....	—————	—————	—————	—————▶
Cross-cutting Stewardship					
Strategy XCO-3: Enhance Ocean and Coastal Stewardship					
Activity 3.1: Create, maintain, and promote sanctuary and partner volunteer programs to provide opportunities for stewardship as well as expanding resource protection, education, and outreach capabilities of the three sanctuaries.	—————	—————	—————	—————	—————▶
Activity 3.2: Create new ways to inspire coastal and ocean stewardship in local communities.			—————	—————	—————▶
Activity 3.3: Identify partners to incorporate stewardship messages.	—————	—————	—————	—————	—————▶

**Legend:**

- ▶ Planned Activity
- .....▶ Proposed Activity, based on internal assessment

**TABLE XCO-3: ESTIMATED COSTS TO IMPLEMENT THE CROSS-CUTTING COMMUNITY OUTREACH ACTION PLAN**

Strategy	Estimated Annual Cost (1000's)*					Total Est. 5-Year Cost (1000's)
	YR 1	YR 2	YR 3	YR 4	YR 5	
Strategy XCO-1: Build Upon and Expand Existing Ocean and Coastal Outreach	\$34.50	\$46.50	\$46.50	\$46.50	\$58.50	\$232.50
Strategy XCO-2: Enhance and Coordinate Ocean and Coastal Education	\$57.00	\$69.00	\$69.00	\$69.00	\$81.00	\$345.00
Strategy XCO-3: Enhance Ocean and Coastal Stewardship	\$52.50	\$64.50	\$64.50	\$64.50	\$76.50	\$322.50
<b>Total Estimated Annual Cost</b>	<b>\$144.00</b>	<b>\$180.00</b>	<b>\$180.00</b>	<b>\$180.00</b>	<b>\$216.00</b>	<b>\$900.00</b>

\* Cost estimates are for both “programmatic” and “base” (salaries and overhead) expenses.

\*\* Contributions from outside funding sources also anticipated.

For management planning purposes, the individual site cost to implement cross-cutting strategies can be calculated by dividing the estimated annual cost by three (equal cost). The actual cost to each site may vary according to strategy but will be further refined when sites prepare annual operating plans.





## ECOSYSTEM MONITORING ACTION PLAN

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### GOALS

The goals of ecosystem monitoring for the northern-central California sanctuaries are to (1) determine the current and anticipate the future status of sanctuary resources; (2) understand the limits of variation in resources; (3) detect temporal and spatial changes in resources; (4) identify potential agents of change; and (5) provide scientific information that can guide management decisions on priority issues.

### INTRODUCTION

One of the express purposes and policies of the National Marine Sanctuaries Act is that long-term monitoring of sanctuary resources be supported, promoted, and coordinated (16 U.S.C. 1431). Sanctuaries also promote data collection to assess resource or environmental change with respect to implemented management actions. The suite of monitoring information required by sanctuary management includes data from within the sanctuary and from areas outside the boundaries that influence sanctuary waters.

For the most part, individual sanctuaries work independently to develop monitoring programs and partnerships to inform their management concerns. These programs typically rely on substantial support from other government, private, and academic institutions at the federal, state, and local levels. The program designs are often only indirectly influenced by sanctuary management responsibilities.

Undertaking ecosystem monitoring requires long-term comprehensive assessments and broad scale integration of data collected in a wide variety of habitats (e.g., coastal interface, subtidal, continental shelf, shelf break, and deep water) and in areas that directly influence them (e.g., watershed, estuaries, coastal currents). Such assessments and integration can only be achieved through coordination with multiple partners focused on a variety of resources and geographic scales. Because the three sanctuaries of Cordell Bank, Gulf of the Farallones, and Monterey Bay have contiguous boundaries, they protect and manage many of the same habitats types and living resources, some of which range throughout the combined area. As such, the sanctuaries should consider each other as primary partners in monitoring efforts to evaluate the status and trends of these shared resources. Coordination among the three sanctuaries to promote, conduct, integrate, and synthesize data from ecosystem monitoring activities is the most effective and efficient means to improve availability of information for resource conservation and management across the region.

The combined areas of the Cordell Bank National Marine Sanctuary (CBNMS), Gulf of the Farallones National Marine Sanctuary (GFNMS) and Monterey Bay National Marine Sanctuary (MBNMS) also represent a substantial portion of California coastal waters. Regional sanctuary monitoring coordination across this extensive area will help promote sanctuary management concerns as a driver for large-scale monitoring initiatives and partnerships. The data collected from coordinated efforts will be useful at the local and regional scale, with the potential for influencing resource management actions throughout a substantial portion of the West Coast.

## **ADDRESSING THE ISSUE**

With the exception of Cordell Bank and Gulf of the Farallones, most of the monitoring data that informs sanctuary management are not financed, collected, or analyzed by the sanctuaries. Instead, sanctuaries support and promote these activities indirectly by providing vessel time, staff support, and equipment, and coordinating the interests and information of outside agencies and partners. They also assist to secure outside funding that can be directed toward projects that address sanctuary information needs such as the Sanctuary Integrated Monitoring Network (SIMoN).

Such indirect support is appropriate to the mandate and capacities of the sanctuary program. Sanctuaries do not have the expertise or the personnel resources to collect and analyze the variety of information required for all of their management needs. Such expertise is accessible through partnerships with various research institutions. However, effective resource management requires a holistic view, which sanctuaries are uniquely positioned to achieve. To meet their resource management mandate, sanctuaries must synthesize and integrate information from disparate research and monitoring projects. They have the further responsibility of interpreting and applying available scientific knowledge for resource managers and the public. Thus, coordination of ecosystem monitoring efforts requires strategic action on various sanctuary-specific programmatic levels.

Recommended strategies focus on coordinating existing activities, identifying opportunities for additional coordination, and establishing the administrative infrastructure, advisory panels, and oversight mechanisms required to support, direct, and evaluate coordinated monitoring across the three sanctuaries. Because many of the monitoring requirements common to the three sanctuaries undergoing the Joint Management Plan Review (JMPR) overlap with the interests of Channel Islands National Marine Sanctuary (CINMS) and the Olympic Coast National Marine Sanctuary (OCNMS), the strategies recommended in this proposed action plan should serve as a model for expanded coordination of appropriate monitoring activities across all five of the West Coast sanctuaries. The strategies are also consistent with efforts of the System Wide Monitoring Program (SWiM) to improve collection, evaluation, and interpretation of monitoring information throughout the sanctuaries. Thus, these activities promote system and regional integration across the program as well as improving ecosystem conservation and management in the combined area of the three sanctuaries.

**STRATEGY XEM-1: *Coordinate Existing Targeted Monitoring Activities to Promote Greater Efficiency and Effectiveness.***

Priority activities for initiation of joint ecosystem monitoring within the region should be focused on the coordination of existing sanctuary-specific monitoring programs that assess similar ecosystems in at least two of the three sanctuaries. This includes coordinating targeted programs that monitor conditions in the coastal interface and the pelagic/offshore systems.

These priorities are based on the need to establish common ecological monitoring efforts throughout the region and the priority issue areas identified in the management plan review that could best be addressed through a coordinated approach among the sanctuaries. Some of the priority habitats that have been identified for joint monitoring include: rocky intertidal, benthic, and pelagic/open ocean. The coordination channels and activities established to support these targeted efforts could serve as a model for additional monitoring coordination in the future. Other existing or newly emerging monitoring activities, not identified in this action plan, represent potential opportunities for additional coordination. Assessment of such opportunities is addressed in Strategies XEM-2 and XEM-3.

**Activity 1.1** Coordinate individual sanctuary rocky intertidal monitoring programs and investigate opportunities to collaborate with other large-scale rocky intertidal monitoring efforts.

**Products:** Regional sanctuary rocky intertidal monitoring plan.

**Partners:** MBNMS, GFNMS, Partnership for Interdisciplinary Studies of Coastal Oceans (PISCO), Multi-Agency Rocky Intertidal Network (MARINE), National Park Service (NPS), Southern California Coastal Water Research Project Authority (SCCWRP), Bodega Marine Laboratory (BML), Tenera Inc., Minerals Management Service (MMS), Kinetic Labs, Inc.

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>GF</b>	<b>WD-2, IS-3</b>

**Activity 1.2** Conduct a workshop to coordinate data collection protocols for Beach Coastal/Marine Bird Education Research Surveys (Beach COMBERS) and Beach Watch Programs that indirectly assess the health of the pelagic/offshore ecosystem.

**Partners:** CBNMS, GFNMS, MBNMS, SIMoN, NMSP, Coastal Observation and Seabird Survey Team (COASST)

**Products:** Coordination document for joint reporting; volunteer training, coordination, and enrichment opportunities; data collection, management and metadata standards; coordinated revision and reprinting of the field guide; plan for shared study skin collection.

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>GF</b>	<b>CS-1</b>

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**Activity 1.3** Develop an integrated sanctuary marine mammal and seabird survey monitoring plan for the three sanctuaries to coordinate and supplement the National Oceanic and Atmospheric Administration (NOAA) Fisheries five-year surveys.

**Products:** Plan to coordinate and supplement ongoing NOAA Fisheries five-year sanctuary marine mammal/seabird monitoring surveys (per recommendations developed during the Marine Mammal/Seabird Workshop in December 2002). Joint ship-time requests or contracts to ensure consistent availability of appropriate survey platforms. Joint NOAA ship McArthur II cruises.

**Partners:** NOAA Fisheries, CBNMS, GFNMS, MBNMS, CINMS, Olympic Coast National Marine Sanctuary (OCNMS), Center for Integrated Marine Technology (CIMT), NPS, Point Reyes Bird Observatory (PRBO), SIMoN

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>CB</b>	<b>CS-7</b>
	<b>GF</b>	<b>FA-1</b>

**Activity 1.4** Explore the potential for the expansion of existing fish surveys, such as the California Cooperative Oceanic Fisheries Investigations (CalCOFI) transect lines through Gulf of the Farallones and Cordell Bank, and continuation in Monterey Bay.

**Products:** Assessment for expansion of CalCOFI transects in Cordell Bank and Gulf of the Farallones.

**Partners:** CBNMS, GFNMS, MBNMS, California Cooperative Oceanic Fisheries Investigations (CalCOFI), Monterey Bay Aquarium Research Institute (MBARI), NOAA Fisheries, Alliance for California Current Ecosystem Observation (ACCEO), NOAA-National Centers for Coastal Ocean Service (NCCOS), SIMoN, University of California-Santa Cruz (UCSC)

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>CB</b>	<b>CS-8</b>

**Activity 1.5** Jointly developed research cruise plans and standards for sampling and reporting results for benthic habitat survey work.

**Products:** Research plans such as that developed for the Delta submarine that detail the annual survey work, and a report that summarizes the annual findings and results.

**Partners:** CBNMS, GFNMS, MBNMS, NOAA Fisheries, California Department of Fish and Game (CDFG), U.S. Geological Survey (USGS)

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>CB</b>	<b>CS-2, CS-3, CS-4</b>

**Activity 1.6** Augment the benthic habitat survey work with new technologies such as ROV surveys.

**Products:** Additional research cruises that use remotely operated vehicles (ROVs) and other technologies. Cruise reports that summarize the mission’s findings and results.

**Partners:** CBNMS, MBNMS, NOAA Fisheries, CDFG, USGS

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>CB</b>	<b>CS-2, CS-3, CS-4</b>

**STRATEGY XEM-2: *Coordinate and Implement Existing Regional Ecosystem Monitoring Activities.***

Over the last decade, many federal and state agencies have actively participated in collaborative efforts to develop and implement integrated coastal and ocean observing and data management systems. To further these efforts, the NMSP, and many individual sanctuaries, has been working closely with its partners to build upon and integrate existing site monitoring programs into regional ecosystem monitoring programs. The following activities have been identified as pilot programs within the NMSP to test the concept of integrating observation data and making it available to resource managers and the public.

**Activity 2.1** Implement the West Coast Observation Project at CBNMS, GFNMS and MBNMS.

The West Coast Observation Project (also known as Sanctuary Ecosystem Assessment Stations) integrates ocean observation data collected at OCNMS, CBNMS, GFNMS, MBNMS, and CINMS. The project will focus on data streams collected at numerous new instrument moorings that will be installed at specific locations within each of the five sanctuaries. Some of these instrument moorings will be maintained and operated by PISCO in the MBNMS and CINMS. The project intends to make the monitoring data accessible via the Internet in an Integrated Ocean Observing System (IOOS) compatible format. The data from this project will be shared with managers and the public through the Sanctuary Integrated Monitoring Network (SIMoN) website.

**Products:** Data buoys deployed, data management system, on-line access to data.

**Partners:** CBNMS, GFNMS, MBNMS, CINMS, OCNMS, SIMoN, NMSP, PISCO, NCCOS, NOAA-National Coastal Data Development Center (NCDDC), NOAA-National Oceanographic Data Center (NODC), National Data Buoy Center (NDBC), NOAA National Environmental Satellite Data Information Service (NESDIS), NOAA Fisheries, Central California Ocean Observing System (CenCOOS)

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>None</b>	<b>None</b>

**Activity 2.2** Develop and implement an integrated NMSP’s System-Wide Monitoring (SWiM) program for CBNMS, GFNMS and MBNMS.

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The primary purpose of the System-Wide Monitoring (SWiM) program is to monitor specific ecological parameters of the sanctuary and ensure the timely flow of data and information to those responsible for managing and protecting resources in the ocean and coastal zone, and to those that use, depend on, and study the ecosystems encompassed by the sanctuaries. It does this by enabling marine sanctuaries to develop effective ecosystem-based monitoring programs that address management information needs. SWiM provides a design process to decide what parameters to sample and how to sample them in a way that can be applied consistently at multiple spatial scales and to multiple resource types. It also provides a reporting strategy to enable the evaluation of status and trends in protected resources and activities that affect them. Finally, SWiM provides a method to share information for broader issues and scales, and contribute to multi-site, regional and national research and monitoring activities. These efforts will be integrated with SIMoN, which implements the monitoring, coordinates with partners, and provides geographic information systems (GIS), Web and other products that allow for local and regional information sharing.

**Products:** Integrated and tailored SWiM program developed at CBNMS, GFNMS & MBNMS.

**Partners:** CBNMS, GFNMS, MBNMS, SIMoN, NMSP, PISCO, NCCOS, NDBC, NESDIS, NOAA Fisheries, NOAA National Estuarine Research Reserve System (NERRS), U.S. Environmental Protection Agency (EPA), NPS, U.S. Fish and Wildlife Service (USFWS), Mineral Management Service (MMS), USGS, Ocean-US, State of California

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>CB</b>	<b>CS-7, CS-9</b>
	<b>GF</b>	<b>WD-2, IS-3, IS-4, IS-5</b>

**Activity 2.3** Conduct a needs assessment and develop a site implementation plan for expanding the Sanctuary Integrated Monitoring Network (SIMoN) to GFNMS and CBNMS.

As part of the process to establish SIMoN, the MBNMS completed a comprehensive assessment of monitoring activities and priorities. Similar assessments have been conducted for CBNMS and GFNMS as part of the management plan review. Collectively, these assessments have identified priority research and monitoring needs for each site based on the issues addressed in the management plan. Some of the common research and monitoring needs include baseline ecosystem characterization and observation; invasive species; water quality; and assessing the various types of human disturbance and impacts from such activities as sound, light, physical disturbance, and fishing. The next step is to compare the assessments, develop a list of shared priorities and data gaps, integrate the existing information into a common database, and implement joint monitoring activities. SIMoN will be the primary mechanism to coordinate data and information among the sites. This network will be expanded from MBNMS to both CBNMS and GFNMS.

**Products:** CBNMS and GFNMS SIMoN needs assessment and implementation plan(s) that compares research and monitoring needs identified in the management plans.

**Partners:** NMSP, SIMoN, MBNMS, GFNMS, and CBNMS

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>None</b>	<b>None</b>

**Activity 2.4** Explore opportunities to integrate SIMoN with other regional monitoring efforts such as West Coast Observations and other IOOS projects.

**Products:** Updated SIMoN database consistent with IOOS protocols and standards.

**Partners:** NMSP, SIMoN, MBNMS, GFNMS, CBNMS, National Oceanographic Data Center (NODC), Southeast Area Monitoring and Assessment Program (SEAMAP), IOOS

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>CB</b>	<b>CS-7</b>

**Activity 2.5** Evaluate and identify ongoing funding opportunities to support regional and larger scale ongoing monitoring activities.

**Products:** Identification of new partnerships and funding mechanisms to support regional monitoring efforts.

**Partners:** CBNMS, GFNMS, MBNMS, SIMoN, NMSP, NCCOS, NMFS, Farallones Marine Sanctuary Association (FMSA), Monterey Bay Sanctuary Foundation (MBSF)

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>None</b>	<b>None</b>

**STRATEGY XEM-3: *Establish a Joint Internal Monitoring Coordination Team.***

Coordination of monitoring activities among the sanctuaries requires an administrative infrastructure to identify and act on cross-boundary opportunities, collaborate with large-scale initiatives, and interpret the results for resource managers and public audiences across the region.

**Activity 3.1** Establish a monitoring coordination team.

The internal monitoring coordination team could be composed of the entire science staff of the three sanctuaries or, at a minimum, the research coordinators.

**Products:** Integrated Ecosystem Monitoring Team, biannual meetings to develop integrated monitoring plans and proposals, joint reports.

**Partners:** CBNMS, GFNMS, MBNMS, NMSP, SIMoN

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>None</b>	<b>None</b>

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**Activity 3.2** Develop a research and monitoring communication plan to improve coordination among the sanctuaries’ research staffs and partners.

**Products:** Research a communication plan, sanctuary list serve, and development of joint projects, research plans and proposals.

**Partners:** CBNMS, GFNMS, MBNMS, SIMoN

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>None</b>	<b>None</b>

**Activity 3.3** Evaluate and provide recommendations on the reporting of monitoring activities through periodic “state of the sanctuaries” reports for cross-cutting monitoring activities among the three sanctuaries.

**Products:** State of the sanctuaries report.

**Partners:** SIMoN, SWiM, NMSP, NODC

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>None</b>	<b>None</b>

**Activity 3.4** Develop annual ecosystem-based research and monitoring operating plans in collaboration with each other to meet site, regional, and national monitoring needs.

**Products:** Development and implementation of site-specific monitoring programs for each site that integrate regional ecosystem monitoring requirements and needs.

**Partners:** CBNMS, GFNMS, MBNMS, NMSP, SIMoN

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>None</b>	<b>None</b>

**STRATEGY XEM-4: *Consider Establishing a Joint Research Activities Panel to Enhance Research and Monitoring Collaborations.***

Research staff and interests at all three sites should discuss the need to establish a formal or informal joint research advisory panel (JRAP) consisting of representatives from the site research activity panels (RAPs) to assist with ongoing coordination of existing activities and identification of emerging opportunities.

**Activity 4.1** Evaluate the need and feasibility of establishing a CBNMS RAP or a GFNMS RAP as a permanent sanctuary advisory council (SAC) working group and the need to create an ad-hoc or standing JRAP to advise and identify opportunities for coordinated monitoring activities.

**Products:** Evaluation on need to establish a CBNMS RAP, GFNMS RAP and a JRAP.

**Partners:** CBNMS, GFNMS, MBNMS, NMSP, advisory councils

	<u>Sanctuary</u>	<u>Management Plan Strategy Reference</u>
Cross-Reference:	<b>None</b>	<b>None</b>

**Activity 4.2** Based upon the evaluation in 4.1, establish a JRAP.

**Products:** CBNMS RAP; GFNMS RAP, JRAP formed by advisory councils.

**Partners:** CBNMS, GFNMS, MBNMS, NMSP, advisory councils, MBNMS RAP

	<u>Sanctuary</u>	<u>Management Plan Strategy Reference</u>
Cross-Reference:	<b>None</b>	<b>None</b>

**Activity 4.3** Establish communication protocols among the RAPs for posting agendas and minutes for sanctuary-specific and joint meetings.

**Products:** RAP list serve.

**Partners:** CBNMS, GFNMS, MBNMS, SIMoN, advisory councils, MBNMS RAP

	<u>Sanctuary</u>	<u>Management Plan Strategy Reference</u>
Cross-Reference:	<b>None</b>	<b>None</b>

**Activity 4.4** Institute annual meetings for a subgroup of (~10) representatives from all three sanctuary RAPs (or research partners if a RAP does not exist) to coordinate research and monitoring activities in the region.

This meeting could be conducted in coordination with an existing annual or biennial science symposium or information transfer meeting. The meeting would be planned and organized by the monitoring coordination team members.

**Products:** Meeting summaries, recommendations, joint proposals and research plans.

**Partners:** CBNMS, GFNMS, MBNMS, NMSP, advisory councils, NCCOS

	<u>Sanctuary</u>	<u>Management Plan Strategy Reference</u>
Cross-Reference:	<b>None</b>	<b>None</b>

**TABLE XEM-1: MEASURING PERFORMANCE OF THE CROSS-CUTTING ECOSYSTEM MONITORING ACTION PLAN**

<b>Desired Outcome(s) For This Action Plan:</b>	
<b>Increased collaboration among, capacity of, and productivity of the three sanctuary monitoring programs in order to enhance our understanding of the ecosystem(s) in this region and those natural and human factors affecting them.</b>	
<b>Performance Measures</b>	<b>Explanation</b>
<p><b>1. Increase the number of cooperative research and monitoring activities from two in Year 1 to six in Year 5.</b></p> <p><b>2. Extend the geographic range of SIMoN to include Cordell Bank and Gulf of the Farallones and expand its infrastructure so that it can be integrated with other coastal and ocean observation systems along the West Coast by Year 5.</b></p> <p><b>3. Design and implement coordinated monitoring programs consistent with the NMSP System Wide Monitoring Framework (SWiM) at each site by 2010.</b></p>	<p>1. Research staff from the three sanctuaries currently engage in limited joint research and monitoring activities. However, to improve our knowledge and understanding about the broader ecosystem in this region, the three sites need to coordinate and systematically plan and implement joint research and monitoring activities with each other and other partners. These new joint research and monitoring activities will be reflected in each sites' Annual Operating Plan (AOP).</p> <p>2. SIMoN is rapidly evolving into a system-wide tool for organizing and displaying research and monitoring related information. SIMoN was developed as a prototype at the MBNMS and could be expanded to include the neighboring CBNMS and GFNMS. In addition, SIMoN should evolve so that other regional coastal and ocean observation systems could be integrated within SIMoN.</p> <p>3. The NMSP has been working for several years to develop a System Wide Monitoring (SWiM) Program Framework. The prototype of the program is underway, and once evaluated, will be ready to implement at other sites, including the three Jmpr sanctuaries.</p>

**TABLE XEM-2: CROSS-CUTTING ECOSYSTEM MONITORING ACTION PLAN TIMELINE**

ECOSYSTEM MONITORING ACTION PLAN	Year 1	Year 2	Year 3	Year 4	Year 5
Strategy XEM-1: Coordinate Existing Targeted Monitoring Activities to Promote Greater Efficiency and Effectiveness					
Activity 1.1: Coordinate individual sanctuary rocky intertidal monitoring programs and investigate opportunities to collaborate with other large-scale rocky intertidal monitoring efforts.	—————▶				
Activity 1.2: Conduct a workshop coordinate data collection protocols for Beach COMBERS and Beach Watch Programs that indirectly assess the health of the pelagic/offshore ecosystem.	▶				
Activity 1.3: Develop an integrated sanctuary marine mammal and seabird survey monitoring plan for the three sanctuaries to coordinate and supplement the NOAA Fisheries 5-year surveys.		▶			
Activity 1.4: Explore the potential for the expansion of existing fish surveys, such as the CalCOFI transect lines through Gulf of the Farallones and Cordell Bank, and continuation in Monterey Bay.		▶			
Activity 1.5: Jointly developed research cruise plans and standards for sampling and reporting results for benthic habitat survey work.	—————▶				
Activity 1.6: Augment the benthic habitat survey work with new technologies such as ROV surveys.	—————▶				
Strategy XEM-2: Coordinate and Implement Existing Regional Ecosystem Monitoring Activities					
Activity 2.1: Implement the West Coast Observation Project at CBNMS, GFNMS and MBNMS.	—————▶				
Activity 2.2: Develop and implement an integrated NMSP's System-Wide Monitoring (SWiM) program for CBNMS, GFNMS and MBNMS.		—————▶			
Activity 2.3: Conduct a needs assessment and develop a site implementation plan for expanding SIMoN to the Gulf of the Farallones and Cordell Bank sanctuaries.	▶				
Activity 2.4: Explore opportunities to integrate SIMoN with other regional monitoring efforts such as West Coast Observations and other IOOS projects.	—————▶				
Activity 2.5: Evaluate and identify ongoing funding opportunities to support regional and larger scale ongoing monitoring activities.	—————▶				
Strategy XEM-3: Establish a Joint Internal Monitoring Coordination Team					
Activity 3.1: Establish a Monitoring Coordination Team.	▶				
Activity 3.2: Develop a research and monitoring communication plan to improve coordination among the sanctuaries' research staffs and partners.	▶				
Activity 3.3: Evaluate and provide recommendations on the joint reporting of monitoring activities through periodic "state of the sanctuaries" reports for cross-cutting monitoring activities among the three sanctuaries.			—————▶		
Activity 3.4: Develop annual ecosystem-based research and monitoring operating plans in collaboration with each other to meet site, regional, and national monitoring needs.	—————▶				

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<b>ECOSYSTEM MONITORING ACTION PLAN</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>
Strategy XEM-4: Consider Establishing Additional Site-Specific or a Joint Research Activities Panel to Enhance Research and Monitoring Collaborations					
Activity 4.1: Evaluate the need and feasibility of establishing a CBNMS Research Activity Panel (RAP) or a GFNMS RAP as a permanent SAC working group and the need to create an ad-hoc or standing joint research activities panel (JRAP) to advise and identify opportunities for coordinated monitoring activities.		→	.....→		
Activity 4.2: Based upon the evaluation in 5.1, establish a Cordell Bank RAP, Gulf of the Farallones RAP and/or a Joint RAP.			→		
Activity 4.3: Establish communication protocols among the RAPs for posting agendas and minutes for sanctuary-specific and joint meetings.			→		
Activity 4.4: Institute annual meetings for a subgroup of (~10) representatives from all three sanctuary RAPs (or research partners if a RAP does not exist) to coordinate research and monitoring activities in the region.				→	

**Legend:**

- Planned Activity
- .....→ Proposed Activity, based on internal assessment

**TABLE XEM-3: ESTIMATED COSTS TO IMPLEMENT THE CROSS-CUTTING ECOSYSTEM MONITORING ACTION PLAN**

Strategy	Estimated Annual Cost (1000's)*					Total Est. 5-Year Cost (1000's)
	YR 1	YR 2	YR 3	YR 4	YR 5	
<b>Strategy XEM-1: Coordinate Existing Targeted Monitoring Activities to Promote Greater Efficiency and Effectiveness</b>	\$183	\$183	\$183	\$183	\$183	\$915.00
<b>Strategy XEM-2: Coordinate and Implement Existing Regional Ecosystem Monitoring Activities</b>	\$172	\$258	\$294	\$282	\$246	\$1252.00
<b>Strategy XEM-3: Establish a Joint Internal Monitoring Coordination Team</b>	\$24	\$72	\$78	\$51	\$27	\$252.00
<b>Strategy XEM-4: Consider Establishing a Joint Research Activities Panel to Enhance Research and Monitoring Collaborations</b>	\$0	\$12	\$12	\$15	\$15	\$54.00
<b>Total Estimated Annual Cost</b>	\$381	\$525	\$567	\$531	\$471	\$2475.00
* Cost estimates are for both “programmatic” and “base” (salaries and overhead) expenses.						
** Contributions from outside funding sources also anticipated.						
For management planning purposes, the individual site cost to implement cross-cutting strategies can be calculated by dividing the estimated annual cost by three (equal cost). The actual cost to each site may vary according to strategy but will be further refined when sites prepare annual operating plans.						





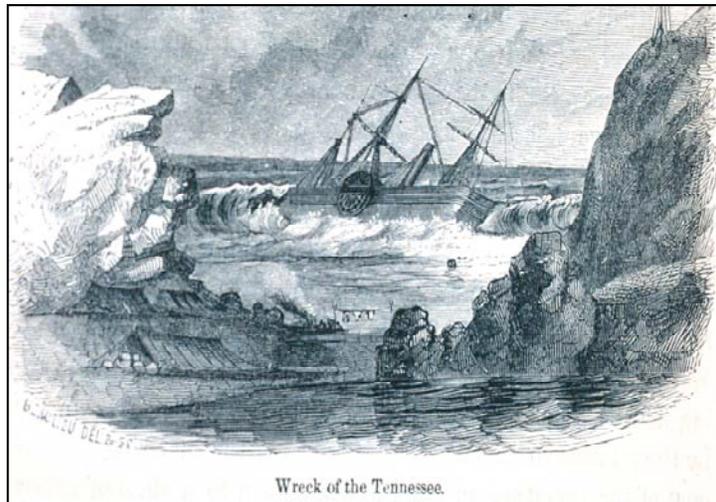
## MARITIME HERITAGE ACTION PLAN

### GOALS

The National Marine Sanctuary Program (NMSP) is developing a new program aimed to identify, protect and raise awareness of the cultural and historical resources in the three sanctuaries. Program efforts include conducting paleo-ecological and archaeological studies; inventorying, locating, and monitoring both historic shipwrecks and those that pose an environmental threat to sanctuary marine resources; and characterizing and protecting maritime heritage resources.

This plan provides the framework for a Maritime Heritage Resources Program that addresses historic and cultural underwater sites, as well as traditional heritage resources such as Native American and fishing communities, commercial marine transport of passengers and cargo, and recreational activities like diving, surfing, and boating. Although the NMSP only has authority to protect sanctuary cultural and historic resources, the program recognizes that traditional user and ocean-dependent groups are interconnected with the sanctuaries and are an integral part of their history.

*Figure MH-1: The passenger-cargo steamer Tennessee runs aground near Point Bonita*



### ISSUE DESCRIPTION

The National Marine Sanctuaries Act (NMSA) and site regulations mandate the management and protection of sanctuary cultural and historical resources. Cultural resources are defined as any historical or cultural feature, including archaeological sites, historic structures, shipwrecks, and artifacts. *Historical resources* are defined as any resources possessing historical, cultural, archaeological or paleontological significance, including sites, contextual information, structures, districts, and objects significantly associated with or representative of earlier people, cultures, maritime heritage, and human activities and events. Historical resources include “submerged cultural resources,” and also include “historical properties,” as defined in the National Historic Preservation Act (NHPA), as amended, and its implementing regulations, as amended.

The area encompassed by Cordell Bank National Marine Sanctuary (CBNMS), Gulf of the Farallones National Marine Sanctuary (GFNMS), and Monterey Bay National Marine Sanctuary (MBNMS) is rich in cultural and historical resources, and has a long and interesting maritime history. The sea floor preserves remnants of the sites where people lived and of the vessels in which they conducted trade and fought wars. Ships, boats, wharves, lighthouses, lifesaving stations, whaling stations, prehistoric sites, and a myriad of other heritage treasures lie covered by water, sand, and time.

The history of California's central coast is predominantly a maritime one. From the days of the early Ohlone inhabitants to the exploration and settlement of California to the present, coastal waterways remain a main route of travel, subsistence, and supply. Ocean-based commerce and industries (e.g., fisheries, shipping, military, recreation, tourism, extractive industries, exploration, research, and aesthetics) are important to the maritime history, the modern economy, and the social character of this region. These constantly changing human uses define the maritime heritage of these sanctuaries and help interpret our evolving relationship with the sanctuary resources. Ports such as San Francisco and Monterey, and smaller coastal harbor towns, developed through fishing, shipping, and economic exchange. Today these have become major urban areas, bringing millions of people in proximity to national marine sanctuaries. Many of these people are connected to the sanctuaries through commercial and recreational activities such as surfing, boating, and diving.

Records indicate that 430 vessel and aircraft losses were documented between 1595 and 1950 along California's central coast from Cambria north to Bodega Head, including the Farallones Islands. Specifically, 173 in the GFNMS, 257 in the MBNMS, and none documented within the CBNMS. Some sites have been located and inventoried by the National Oceanic and Atmospheric Administration (NOAA) and the National Park Service (NPS) in the GFNMS region. GFNMS and MBNMS have also collaborated with state and federal agencies, and the private sector to gather resource documentation and to create opportunities to locate and record submerged archaeological resources. MBNMS recently completed a shipwreck inventory from established shipwreck databases, and review of primary and secondary source documentation. These studies provide a foundation for an inventory of the historic resources in the sanctuaries.

GFNMS and MBNMS, and possibly CBNMS, are also faced with the challenge of identifying and monitoring historic and non-historic shipwrecks posing environmental threats to sanctuary marine resources. Lurking in the deep are the hazardous cargoes, abandoned fuel, and unexploded ordnance inside sunken vessels that are slowly deteriorating in a corrosive marine environment. Shipwrecks already identified as a concern are the oil tanker USS *Montebello* (near the MBNMS) that may retain over three million gallons of unrefined crude oil and the C-3 freighter *Jacob Luckenbach* (GFNMS), containing Bunker-C fuel oil. In 2002, the U.S. Coast Guard contracted the removal of 85,000 gallons of Bunker-C fuel from the *Jacob Luckenbach*.

### **Submerged Site Inventory and Assessment Initiative**

NMSP regulations mandate that archaeological resources are managed consistently with the Federal Archaeological Program. The NMSP's Marine Heritage Program (MHP) and NOAA Maritime Archeological Center (MAC) were established in 2002 and 2004 respectively to emphasize the need for research, education, outreach, and protection of maritime heritage

resources. Issues to be addressed regarding the protection of submerged archaeological resources include site protection, permitting, and shipwrecks as environmental threats. GFNMS and MBNMS will partner with the Channel Island National Marine Sanctuary (CINMS) on its Shipwreck Reconnaissance Program (SRP) in California waters to record submerged sites using vocational archaeologists, remotely operated vehicles (ROV), and manned submersibles. The SRP develops underwater site maps and archaeological reports, conducts annual site monitoring, and recommends appropriate sites for inclusion in the National Register of Historic Places.

### **Shipwrecks as Environmental Threats**

GFNMS and MBNMS both coordinate with the Damage Assessment Restoration Fund and other relevant agencies. GFNMS and MBNMS will work with CINMS to expand their efforts to identify shipwrecks that may pose environmental threats and will provide pertinent information to NOAA's Hazardous Materials (HAZMAT) division and the NMSP for development of the Sanctuaries Hazardous Incident Emergency Logistics Database System (SHIELDS) and the Resources and Under Sea Threats (RUST) Geographic Information Systems (GIS) database systems.

### **Site Protection**

As submerged shipwreck sites are inventoried in CBNMS, GFNMS, and MBNMS and become more visible to the public, they are also more at risk from divers wishing to remove artifacts. CBNMS, GFNMS, and MBNMS will consider enhancing visitor usage while mitigating damage to heritage resources by providing the sport and commercial diving communities and visitors to shoreline sites with interpretive information about archaeological sites and their protection. Sanctuary and California state regulations prohibit the un-permitted disturbance of submerged archaeological and historical resources. The NMSP and California State Lands Commission (CSLC) have an archaeological resource recovery permit system in place. Protection and monitoring of these sites will become a more pronounced responsibility in the sanctuaries' heritage resources management program. Partnerships will be established with local law enforcement agencies for site monitoring and compliance of public access to submerged sites. The sanctuaries will designate a contact person(s) to coordinate with the California State Historic Preservation Office (SHPO) to ensure that permit guidelines, under the Archaeological Resources Protection Act, are followed.

### **Traditional User and Ocean-Dependent Groups**

There is the potential to cultivate partnerships with local, state, and federal programs (e.g., American Folk Life Center, universities, Department of the Interior) and the identified communities. These partnerships could aid in the design and implementation of studies of living maritime heritage and folk life to help educate the public about traditional cultures and practices including Native Americans, other ethnic residents, fishermen and economic activities reflecting historic human interaction with the ocean.

**Education and Outreach**

CBNMS, GFNMS, and MBNMS have partnered with CINMS in the development of the West Coast Shipwreck Database online curriculum. The database serves to inform the public about the historical significance of shipwrecks, including those posing environmental threats to sanctuary marine resources, e.g., the *Jacob Luckenbach* story. The database is being expanded to include living journals assisting families searching for information about shipwrecked vessels their relatives may once have served on as crewmembers or passengers. Family members are encouraged to share with the public their living journals associated with the shipwreck histories for dissemination. CBNMS, GFNMS, and MBNMS will identify partners to explore exhibit development at maritime or regional museums and learning centers that focus on the areas’ maritime heritage history; shipwrecks, exploration, fishing, and fisheries; vessel trades, routes and nationalities; and shoreline structures such as lighthouses, lifesaving stations, canneries, whaling facilities, surfing, and boating.

**STRATEGY XMHR-1: *Establish Maritime Heritage Resources Program.***

The NMSP is placing increasing emphasis on the development of maritime heritage resources programs to identify and protect submerged archaeological sites, and to increase public awareness about the maritime history associated with individual sanctuaries. A well-coordinated program will be required to identify and assess documented shipwrecks, some of which may pose significant environmental hazards; to protect sites from unauthorized disturbance; and to develop heritage partnerships and education programs.

**Activity 1.1** Develop the foundation and infrastructure of a MHR Program.

**Products:** Maritime Heritage Resource (MHR) program plan and infrastructure to implement it.

**Partners:** CBNMS, GFNMS, MBNMS, NMSP-MHP, CINMS, Submerged Cultural Resources Program (SCRCP), NPS

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>None</b>	<b>None</b>

**Activity 1.2** Identify potential maritime heritage partners and sources of funding.

**Products:** Database of partners and funding sources.

**Partners:** CBNMS, GFNMS, MBNMS, CINMS

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>None</b>	<b>None</b>

**STRATEGY XMHR-2: *Inventory and Assess Submerged Sites.***

CBNMS, GFNMS, and MBNMS, in conjunction with the West Coast Cultural Resources Coordinator, will collaborate with state and federal agencies and the private sector to gather resource documentation and to create opportunities to locate and record submerged archaeological resources. MBNMS recently completed such an inventory; GFNMS will pursue funding to update its previous inventory (done jointly with the NPS). This effort will also be coordinated with NOAA’s MHP.

**Activity 2.1** Establish external partnerships to inventory potential shipwreck sites with other federal, state, and local agencies as well as vocational archaeologists, commercial divers and fishermen, and recreational divers.

**Products:** Updated inventory of potential shipwreck sites in the three sanctuaries that includes site characterizations and shipwreck assessments.

**Partners:** CBNMS, GFNMS, MBNMS, CINMS, MHP, National Park Service (NPS), California State Historic Preservation Office (SHPO), Office of Exploration

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>None</b>	<b>None</b>

**Activity 2.2** Conduct systematic research and survey methods for archaeological sites, including the remains of prehistoric, as well as historic sites, representing ship and aircraft losses.

This effort would be focused on geographic regions with a high probability of cultural and historic remains established by conducting remote sensing surveys and/or diver investigations of target sites as part of larger research cruises across the three sanctuaries. Such surveys would include the development of education materials and curriculum, a project website, a site assessment report, corrosion study, and a comparison with previous surveys.

**Products:** Surveys such as MBNMS survey of the USS Macon and continuing efforts to survey the Lukenbach and Montebello.

**Partners:** CBNMS, GFNMS, MBNMS, CINMS, MHP, NPS, SHPO, Office of Exploration

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>None</b>	<b>None</b>

**Activity 2.3** Establish a shipwreck reconnaissance and site monitoring program.

Use a model similar to CINMS to record and monitor submerged sites and to document new artifact discoveries and evaluation of human site disturbance. Record site positions in NOAA’s ARCH geographic information systems (GIS) database.

**Products:** Expanded site information in NOAA’s ARCH.

**Partners:** CBNMS, GFNMS, MBNMS, CINMS, MHP

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	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>None</b>	<b>None</b>

**Activity 2.4** Assess and Nominate Appropriate Submerged Archaeological Sites for Inclusion in the National Register of Historic Places.

**Products:** Applications for site inclusion in the National Register of Historic Places.

**Partners:** CBNMS, GFNMS, MBNMS, CINMS, MHP, NPS, SHPO

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>None</b>	<b>None</b>

**STRATEGY XMHR-3: *Assess Shipwrecks and Submerged Structures for Hazards.***

GFNMS and MBNMS, and possibly CBNMS, are faced with the challenge of identifying and monitoring historic and non-historic shipwrecks that may pose environmental threats to sanctuary marine resources. Information pertaining to shipwrecks as environmental threats is provided to NOAA’s HAZMAT division and the National Marine Sanctuaries for the development of the SHIELDS and RUST database systems. The sanctuaries will develop a plan to address this issue since there are many shipwrecks that pose threats in the near future.

**Activity 3.1** Establish an inventory of shipwrecks, inside and outside of sanctuary boundaries, posing environmental threats to sanctuary marine resources.

This inventory is based upon primary and secondary source documentation from established shipwreck databases, interviews with commercial divers and fishermen, and recreational divers who frequently visit submerged shipwrecks. The sanctuaries will also collaborate with other organizations doing similar research. As the sanctuaries compile information regarding sites that may pose environmental threats, this information will be coordinated with NOAA’s HAZMAT division and the National Marine Sanctuaries for the development of the SHIELDS and RUST database systems.

**Products:** Inventory of sites that may pose environmental threats, including a priority listing of shipwreck sites to be located via reconnaissance dives. Evaluation reports on sites submitted to federal and state trustee agencies for potential remediation.

**Partners:** CBNMS, GFNMS, MBNMS, CINMS, MHP, NOAA HAZMAT, NOAA Office of Response and Restoration (ORR), NPS, SHPO

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>None</b>	<b>None</b>

**Activity 3.2** Establish a monitoring program for shipwreck sites.

Develop protocols for site evaluation, including timelines for long-term monitoring. Direct efforts to monitor sites that have been located and are considered a threat to sanctuary marine resources based on the monitoring work at such sites as the *Jacob Luckenbach* and the *Montebello*.

**Products:** A shipwreck monitoring plan.

**Partners:** CBNMS, GFNMS, MBNMS, CINMS, MHP, NPS, SHPO

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>None</b>	<b>None</b>

**Activity 3.3** Coordinate with partners to reduce threats from shipwrecks.

GFNMS and MBNMS will work with NMSP to expand efforts to identify shipwrecks that may pose environmental threats and will provide pertinent information to NOAA’s HAZMAT division and the NMSP for the development of the SHIELDS and RUST GIS database systems. Shipwrecks identified as a potential threat to leak or spill hazardous waste will be regularly monitored, and NMSP will work with other trustee agencies to develop a plan to prevent, reduce, and respond to environmental threats from these vessels.

**Products:** A threat mitigation plan.

**Partners:** CBNMS, GFNMS, MBNMS, CINMS, MHP, NOAA HAZMAT, NOAA ORR, NPS, SHPO

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>None</b>	<b>None</b>

**Activity 3.4** For historic shipwrecks, ensure compliance under Section 106 of the National Historic Preservation Act (NHPA) and the National Marine Sanctuary Act (NMSA).

**Products:** Final Reports of Post Site Disturbance Documentation and/or Archaeological Site Reports submitted to the SHPO.

**Partners:** CBNMS, GFNMS, MBNMS, CINMS, MAC, NOAA HAZMAT, NOAA ORR, NPS, SHPO

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>None</b>	<b>None</b>

**STRATEGY XMHR-4: *Protect and Manage Submerged Archaeological Resources.***

The NMSP regulations mandate that archaeological resources be managed consistent with the Federal Archaeological Program. The NMSP’s MHP and MAC were established in 2002 and 2004 respectively to emphasize the need for research, education, outreach, and protection of

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heritage resources. Issues to be addressed by GFNMS, MBNMS, and possibly CBNMS, regarding the protection of submerged archaeological resources include:

- Permitting
- Site protection through enforcement and education
- Shipwrecks as environmental threats

**Activity 4.1** Jointly develop uniform protocol to manage, monitor, and protect submerged sites within the three sanctuaries in partnership with appropriate local law enforcement agencies.

**Products:** Monitoring and permitting protocols, enforcement surveillance and inspection program as appropriate, mooring system plan if needed at dive sites.

**Partners:** CBNMS, GFNMS, MBNMS, CINMS, MAC, NPS, SHPO, NOAA Office of Law Enforcement (OLE)

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>None</b>	<b>None</b>

**Activity 4.2** Provide training to sanctuary staff and facilitate training for partners.

The training will focus on the importance of submerged archaeological resources and the need and tools to manage and protect them.

**Products:** A comprehensive training program.

**Partners:** CBNMS, GFNMS, MBNMS, CINMS, MHP, NPS, SHPO, NOAA Office of Law Enforcement (OLE)

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>None</b>	<b>None</b>

**Activity 4.3** Identify archaeological and historic resources currently outside sanctuary boundaries that may be of significant historic interest or may pose a threat to sanctuary resources.

Explore the appropriateness, feasibility and need to (1) consider expanding existing boundaries to protect site(s) as maritime heritage resources or (2) work with the state to establish a state marine cultural preservation area (e.g., the USS *Montebello*, 1.6 nautical miles south of the MBNMS near Cambria, others to be determined).

**Products:** Site assessments and recommendations for preservation and/or protection.

**Partners:** CBNMS, GFNMS, MBNMS, MHP, NPS, SHPO

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>None</b>	<b>None</b>

**STRATEGY XMHR-5: *Conduct Public Outreach with Traditional User and Ocean-Dependent Groups and Communities.***

A key aspect of the CBNMS, GFNMS, and MBNMS maritime heritage program will be to educate the public about traditional maritime cultures and practices including Native Americans; exploration; settlement; ethnic groups; whalers; historic and present-day fishermen; recreational uses; and traditional shipping, shipbuilding, canneries, and other economic activities reflecting historic human interaction with the ocean. Although sanctuary protection status is given only to cultural and historical resources, the program recognizes that traditional user and ocean-dependent groups are interconnected with the sanctuaries and are an integral part of their history. Therefore, this program will also acknowledge those traditional maritime heritage activities and practices consistent with the NMSA’s primary goal of resource protection.

**Activity 5.1** Identify traditional user and ocean-dependent groups.

Solicit and document the range of traditional user and ocean-dependent groups’ ideas, values, etc. Conduct a literature search to gather resource documentation on traditional users and ocean-dependent groups and communities. Use this information to prioritize appropriate aspects of their maritime heritage.

**Products:** Sanctuary user groups and community historic analysis.

**Partners:** CBNMS, GFNMS, MBNMS, CINMS, MHP

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	<b>CB</b>	<b>FA-6</b>
	<b>GF</b>	<b>FA-2</b>

**Activity 5.2** Develop collaborative programs and initiatives.

GFNMS will initiate a partnership with the fishing community at Pillar Point Harbor to enhance relationships and jointly develop ways to educate the public on the interconnections with the three sanctuaries.

**Products:** Pillar Point maritime heritage community demonstration initiative. Develop collaborative programs such as sustainable seafood events, adopt-a-boat classroom programs (e.g., SEA Grant-Marine program), historic re-enactments at harbors, Native American village sites.

**Partners:** CBNMS, GFNMS, MBNMS, San Mateo County Harbor District – Pillar Point, Half Moon Bay Fishermen’s Association, CA Sea Grant

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	<b>None</b>	<b>None</b>

**Activity 5.3** Create an inventory of historic and present maritime heritage communities.

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Focus on traditionally associated people to support mapping and interpretive programs. Assess and nominate appropriate sites for the National Register of Historic Places.

**Products:** Database inventory of maritime heritage communities and sites; nominations for the National Register of Historic Places.

**Partners:** CBNMS, GFNMS, MBNMS, MHP, NPS, SHPO

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>CB</b>	<b>FA-6</b>
	<b>GF</b>	<b>FA-2</b>

**Activity 5.4** Map and document traditional communities and sites.

These communities and sites may include fishing and whaling sites; shipping/commercial marine transport of passengers and cargo; lighthouses and life-saving stations; tribes (coastal); and recreational uses such as surfing and diving.

**Products:** Tri-sanctuary map of traditional communities and sites.

**Partners:** CBNMS, GFNMS, MBNMS, MHP, NPS, SHPO

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>GF</b>	<b>FA-2</b>

**STRATEGY XMHR-6: *Establish Maritime Heritage Focused Education and Outreach Programs.***

Maritime Heritage provides a unifying theme to educate and inform people along the California coast and throughout the country about the historic human interaction with the ocean. Through websites, museum exhibits, and other tools, the sanctuaries will provide information on:

- Programs by and about traditional cultures and practices including Native Americans, ethnic groups, fishermen, and economic activities
- Shipwrecks, exploration, fishing and fisheries; trade vessels, routes and nationalities
- Shoreline structures such as lighthouses, life-saving stations, canneries, whaling facilities
- Traditional recreational activities such as diving, surfing, and boating
- Stewardship of our cultural and historic maritime resources

**Activity 6.1** Improve information sharing and dialogue.

Hold an annual maritime heritage event to highlight specific cultural and historic resources that the sites are mandated to protect, such as archeological sites, shipwrecks, etc., and link to adjacent communities and human uses.

**Products:** Annual community event focusing on maritime heritage resources.

**Partners:** CBNMS, GFNMS, MBNMS, MHP, NPS, SHPO, local maritime museums and historic parks

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>None</b>	<b>None</b>

**Activity 6.2** Create, expand and populate individual sanctuary websites and/or the West Coast Shipwreck Database.

The websites should include specific information about maritime heritage resources, such as living journals of traditional users and ocean-dependent groups as well as shipwreck survivors, archaeological project updates, potential environmental threats, and maps.

**Products:** Expanded maritime heritage Web-based information.

**Partners:** CBNMS, GFNMS, MBNMS

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>None</b>	<b>None</b>

**Activity 6.3** Develop and implement education and outreach programs and materials for the MHP.

Incorporate traditional users/ocean-dependent groups and submerged archaeological resources into existing and new education/outreach programs.

**Products:** Maritime heritage programs, brochures, posters, etc.

**Partners:** CBNMS, GFNMS, MBNMS, MHP, NPS, SHPO, local maritime museums and historic parks.

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>None</b>	<b>None</b>

**Activity 6.4** Collaborate on maritime heritage resource exhibits and signage.

GFNMS and MBNMS are currently collaborating on a joint interpretive exhibit at Pigeon Point Lighthouse in San Mateo County. The three sites will incorporate maritime heritage themes and messages as part of the California Statewide Signage, Exhibits, and Facilities plan.

**Products:** Joint interpretive exhibits at Pigeon Point Lighthouse and other locations, joint signage, and joint public lecture series.

**Partners:** CBNMS, GFNMS, MBNMS, MHP, NPS, SHPO, local maritime museums and historic parks

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	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>GF</b>	<b>ED-9, ED-12, ED-13</b>

**TABLE XMHR-1: MEASURING PERFORMANCE OF THE CROSS-CUTTING MARITIME HERITAGE RESOURCES ACTION PLAN**

Desired Outcome(s) For This Action Plan:	
Establish a well-coordinated joint maritime heritage program that identifies and assesses documented shipwrecks and associated environmental hazards; protects sites from unauthorized disturbance; and develops heritage partnerships and education programs.	
Performance Measures	Explanation
By Year 5, the Maritime Heritage program will identify and characterize all historical and cultural resources in these three sanctuaries in a Web database and, when appropriate, develop plans to protect these resources from threats. In the case of ships that pose a threat from oil spills, plans will be developed to mitigate harmful effects on natural resources.	The specific maritime heritage activities identified in this plan build upon existing site efforts and collectively establish a new joint maritime heritage program for this region. The program will allow these sites to be responsive to the NMSA mandate to identify and protect cultural and historic resources. Implementation of these strategies will better streamline and coordinate overall NMSP efforts to protect maritime heritage resources and expand awareness of the importance of these resources to the public.

**TABLE XMHR-2: CROSS-CUTTING MARITIME HERITAGE RESOURCES ACTION PLAN TIMELINE**

MARITIME HERITAGE RESOURCES	Year 1	Year 2	Year 3	Year 4	Year 5
Program Establishment					
Strategy XMHR-1: Establish Maritime Heritage Resources Program					
<b>Activity 1.1: Develop the foundation and infrastructure of a MHR program.</b>	.....	→			
<b>Activity 1.2: Identify and assist partners doing maritime heritage related work to obtain funding and resources.</b>		→	→	→	→
Resources Assessment and Protection					
Strategy XMHR-2: Inventory and Assess Submerged Sites					
<b>Activity 2.1: Establish external partnerships to inventory potential shipwreck sites with other federal, state, and local agencies as well as vocational archaeologists, commercial divers and fishermen, and recreational divers.</b>			→	→	→
<b>Activity 2.2: Conduct systematic research and survey for archaeological sites, including the remains of prehistoric sites, as well as historic sites that represent ship and aircraft losses.</b>	.....	→	→	→	→
<b>Activity 2.3: Establish a Shipwreck Reconnaissance and Site-Monitoring Program.</b>			→	→	→
<b>Activity 2.4: Assess and nominate appropriate submerged archaeological sites for inclusion in the National Register of Historic Places.</b>				→	→
Strategy XMHR-3: Assess Shipwrecks and Submerged Structures for Hazards					

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<b>MARITIME HERITAGE RESOURCES</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>
<b>Activity 3.1: Establish an inventory of shipwrecks, inside and outside of sanctuary boundaries, that may pose environmental threats to sanctuary marine resources.</b>			—————▶		
<b>Activity 3.2: Establish a monitoring program for shipwreck sites.</b>			—————▶		
<b>Activity 3.3: Coordinate with partners to reduce threats.</b>			—————▶		
<b>Activity 3.4: For historic shipwrecks, ensure compliance under Section 106 of the National Historic Preservation Act (NHPA) and the National Marine Sanctuary Act (NMSA).</b>			—————▶		
<b>Strategy XMHR-4: Protect and Manage Submerged Archaeological Resources</b>					
<b>Activity 4.1: Jointly develop uniform protocol to manage, monitor, and protect submerged sites within the three sanctuaries in partnership with appropriate local law enforcement agencies.</b>				—————▶	
<b>Activity 4.2: Provide training to sanctuary staff and facilitate training for partners.</b>				—————▶	
<b>Activity 4.3: Identify archaeological and historic resources currently outside sanctuary boundaries that may be of significant historic interest or may pose a threat to sanctuary resources.</b>				—————▶	
<b>Partnerships, Education and Outreach</b>					
<b>Strategy XMHR-5: Conduct Public Outreach with Traditional User and Ocean-Dependent Groups and Communities</b>					
<b>Activity 5.1: Identify traditional user and ocean-dependent groups.</b>		—————▶			
<b>Activity 5.2: Develop collaborative programs and initiatives.</b>		—————▶			
<b>Activity 5.3: Create an inventory of historic and present maritime heritage communities.</b>		—————▶			
<b>Activity 5.4: Map and document traditional communities and sites.</b>			—————▶		
<b>Strategy XMHR-6: Establish Maritime Heritage Focused Education and Outreach Programs</b>					
<b>Activity 6.1: Improve information sharing and dialogue.</b>	.....▶	—————▶			
<b>Activity 6.2: Create, expand and populate individual sanctuary websites and/or the West Coast Shipwreck Database.</b>		.....▶	—————▶		
<b>Activity 6.3: Develop and implement education and outreach programs and materials for the Maritime Heritage Program.</b>	.....▶	—————▶			
<b>Activity 6.4: Collaborate on maritime heritage resource exhibits and signage.</b>	.....▶	—————▶			

**Legend:**

- ▶ Planned Activity
- .....▶ Proposed Activity, based on internal assessment

**TABLE XMHR-3: ESTIMATED COSTS TO IMPLEMENT THE CROSS-CUTTING MARITIME HERITAGE RESOURCES ACTION PLAN**

Strategy	Estimated Annual Cost (1000's)*					Total Est. 5-Year Cost (1000's)
	YR 1	YR 2	YR 3	YR 4	YR 5	
Strategy XMHR-1: Establish Maritime Heritage Resources Program	\$55.5	\$55.5	\$0	\$0	\$0	\$111
Strategy XMHR-2: Inventory and Assess Submerged Sites	\$81	\$81	\$72	\$72	\$72	\$378
Strategy XMHR-3: Assess Shipwrecks and Submerged Structures for Hazards	\$0	\$0	\$51	\$51	\$51	\$153
Strategy XMHR-4: Protect and Manage Submerged Archaeological Resources	\$0	\$0	\$0	\$24	\$24	\$48
Strategy XMHR-5: Conduct Public Outreach with Traditional User and Ocean-Dependent Groups and Communities	\$39	\$39	\$58.5	\$58.5	\$58.5	\$253.5
Strategy XMHR-6: Establish Maritime Heritage Focused Education and Outreach Programs	\$61.5	\$61.5	\$64.5	\$64.5	\$64.5	\$316.5
<b>Total Estimated Annual Cost</b>	<b>\$237</b>	<b>\$237</b>	<b>\$246</b>	<b>\$270</b>	<b>\$270</b>	<b>\$1,260</b>
* Cost estimates are for both “programmatic” and “base” (salaries and overhead) expenses.						
** Contributions from outside funding sources also anticipated.						
For management planning purposes, the individual site cost to implement cross-cutting strategies can be calculated by dividing the estimated annual cost by three (equal cost). The actual cost to each site may vary according to strategy but will be further refined when sites prepare annual operating plans.						





## NORTHERN MANAGEMENT AREA TRANSITION PLAN ACTION PLAN

### GOAL

The goal of the Northern Management Area (NMA) Transition Plan is to identify specific strategies and activities that would implement a National Marine Sanctuary Program (NMSP) decision to transfer administrative and management authority in the northern management area of the Monterey Bay National Marine Sanctuary (MBNMS) to the Gulf of the Farallones National Marine Sanctuary (GFNMS).

### ISSUE DESCRIPTION

The NMA Transition Plan is the outcome of a process to resolve the “MBNMS-GFNMS boundary” issue. Resolution of this shared boundary issue was identified as a priority within the Joint Management Plan Review (JMPR) public scoping meetings and the sanctuary advisory council (SAC) prioritization process. The NMSP established an internal working group to develop recommendations on how to address this issue. The NMSP solicited public comments and held a joint advisory council meeting to discuss the recommendation. At the conclusion, the NMSP determined that the Gulf of the Farallones would assume full administrative and management responsibilities of the area extending from the San Mateo/Santa Cruz County line northward to the existing boundary between the MBNMS and GFNMS, though the existing legal sanctuary boundaries remain the same. For convenience, this area is informally referred to as the Northern Management Area (NMA) (see Figure 1).

### NORTHERN MANAGEMENT AREA (NMA) ADMINISTRATION & OPERATIONS

Administration and operations are the specific staffing, facilities, vessels, and procedural elements that are needed to effectively manage a site or area. Most of the specific activities associated with transferring the office administration, expanding the existing office, and hiring new staff have already been completed and are not included here.

#### **STRATEGY XNAO-1: *Create a Multi-Functional Half Moon Bay (HMB) Regional Office.***

**Activity 1.1** Expand the existing Half Moon Bay office, or

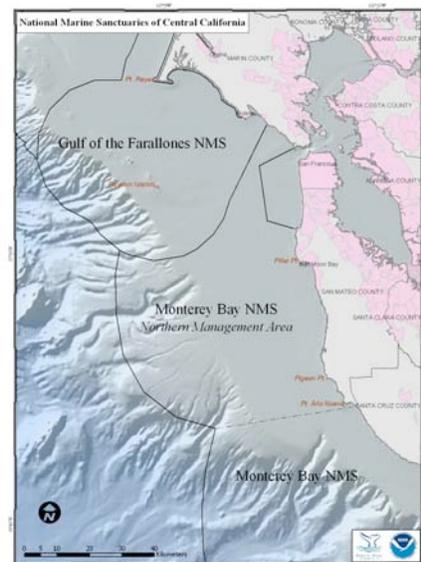


Figure 1: Northern Management Area

relocate to a new location.

**Products:** New multi-purpose office, ideally along Pillar Point Harbor to provide a multi-purpose facility (district staff office, space for volunteers/interns, accessible and visible visitor center, public meeting space).

**Partners:** GFNMS, MBNMS, San Mateo Harbor District

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>None</b>	<b>None</b>

**STRATEGY XNAO-2: *Evaluate the Delivery and Success of NMSP Programs and Services in the NMA.***

**Activity 2.1** Conduct an evaluation of the delivery and success of NMSP programs and services to local communities in the NMA.

**Products:** Analysis of success using performance measures that have been established to measure the delivery and effectiveness of NMSP programs and services to local communities in the NMA.

**Partners:** Transition Team, GFNMS, MBNMS and headquarters staff

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>GF</b>	<b>AD-6.2, AD-6.3</b>

**NORTHERN MANAGEMENT AREA (NMA) RESOURCE PROTECTION**

Resource protection encompasses several program areas and includes a diverse range of management issues. The overall goal for resource protection in the NMA is to maintain a high level of protection for sanctuary resources in this area by creating a resource protection team that works collaboratively and capitalizes on the strengths and expertise of individual staff, regardless of which site they are located in. GFNMS staff will take the lead on most resource protection issues originating in the NMA, except for water quality issues, which will continue to be overseen by MBNMS. However, the MBNMS regulations will continue to apply in this area and any policy development, permits, authorizations or other significant actions must be closely coordinated with appropriate MBNMS staff. Though the actual issue and expertise of staff will factor into who ultimately works on an issue, the following protocol provides a general guideline:

- Issue primarily located in MBNMS and straddles NMA (e.g., Shoreline Armoring): MBNMS staff takes the lead and coordinates with GFNMS staff.
- Issue primarily located in GFNMS and straddles NMA (e.g., Lukenbach Spill/Clean-up): GFNMS staff takes the lead and coordinates with MBNMS staff.
- Issue only located in NMA (e.g., Mavericks Tow-in Surfing): GFNMS staff takes the lead and coordinates with MBNMS staff.

When addressing specific resource protection issues, sanctuary superintendents often seek advice and recommendations from their respective advisory councils. The following protocols provide general guidance as to how the advisory councils will be involved on issues affecting the NMA.

- Primarily in the MBNMS and straddles the NMA: Issue first goes to the MBNMS Advisory Council for action. Their recommendations are forwarded to the GFNMS Advisory Council for comment and action.
- Primarily in the GFNMS and straddles the NMA: Issue first goes to the GFNMS Advisory Council for action. Their recommendations are forwarded to the MBNMS Advisory Council for comment and action.
- Only in the NMA: Issue first goes to the GFNMS Advisory Council for action. Their recommendations are forwarded to the MBNMS Advisory Council for comment and action.

If there are fundamental differences in the recommendations between the advisory councils, a joint working group will be formed to resolve the differences. If no resolution can be reached, the separate recommendations from the advisory councils will be forwarded to the sanctuary superintendents, who will consider both recommendations before making a decision.

**STRATEGY XNRP-1: *GFNMS Will Be Responsible for Permit Activities in the NMA.***

**Activity 1.1** GFNMS will process permits within the NMA, except for water quality permits, which will continue to be overseen by MBNMS.

**Products:** Permit review, processing and issuance in the NMA.

**Partners:** GFNMS and MBNMS resource protection staff

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>GF</b>	<b>RP-5</b>

**Activity 1.2** GFNMS staff will take the lead in considering the development of protocols for a Special Use Permit for tow-in surfing at Mavericks as envisioned in the MBNMS revised management plan and coordinate such proposed actions with MBNMS staff.

**Products:** Consideration and development of a Special Use Permit program for Mavericks, education materials and training program, and enforcement strategy.

**Partners:** GFNMS and MBNMS resource protection staff

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>GF</b>	<b>RP-5</b>
	<b>MB</b>	<b>OA-9, MPWC-3, MPWC-4, MPWC-5</b>

**STRATEGY XNRP-2: GFNMS Will Be Responsible for Regulatory Activities in the NMA While Maintaining Maximum Consistency and Protection to Sanctuary Resources.**

**Activity 2.1** GFNMS staff will take the lead in evaluating a potential new dredge disposal site for Pillar Point Harbor should a detailed site proposal be developed by the San Mateo County Harbor District for submission to federal and state agencies.

Such an action would require changing the MBNMS regulations and designation document and require coordination with the MBNMS staff, and approval from the MBNMS superintendent.

**Products:** Assessment and recommendation regarding any new dredge disposal site proposal; possible change to the MBNMS regulations and designation document.

**Partners:** GFNMS & MBNMS resource protection staff

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>MB</b>	<b>HDD-2.3, OA-11.1(c)</b>

**Activity 2.2** GFNMS staff will facilitate a public process in the next five years to consider whether the San Francisco Exemption Area (a.k.a. “the donut hole”) should be incorporated into the MBNMS.

Such an action would require changing the MBNMS regulations and designation document and require coordination with MBNMS staff, and approval from the MBNMS Superintendent.

**Products:** Assessment and recommendation on whether to include this area in the MBNMS. This could result in a change to the MBNMS regulations and designation document.

**Partners:** GFNMS and MBNMS resource protection staff

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>None</b>	<b>None</b>

**Activity 2.3** The GFNMS and MBNMS Resource Protection Teams will closely coordinate on any future proposed regulatory changes that could impact the NMA or the other sanctuaries.

**Products:** Potential regulatory modifications.

**Partners:** GFNMS and MBNMS resource protection staff

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>GF</b>	<b>RP-4</b>
	<b>MB</b>	<b>OA-12</b>

**STRATEGY XNRP-3: *GFNMS Staff will Coordinate Existing and Emerging Resource Protection Issues in the NMA.***

**Activity 3.1** GFNMS staff will lead efforts to coordinate and implement Jmpr site-specific activities to support resource protection and stewardship in the NMA and the delivery of services and programs to local communities.

**Products:** Implement Jmpr resource protection strategies and activities.

**Partners:** GFNMS and MBNMS resource protection staff

Cross-Reference:

- Coastal Development
  - Dredge Disposal MB (HDD-1, HDD-3 to HDD-5)
  - Desalination MB (DESAL-1 to DESAL-5)
  - Coastal Armoring MB (CA-1 to CA-4)
  - Submerged Cables MB (SC-1 & SC-2)
- Benthic Habitats MB (BH-1 to BH-7)
- Fishing Activities
  - Impacts from fishing activities GF (FA-1 to FA-6)
  - Fishing related research and education MB (FER-1 to FER-7)
  - Krill Harvest MB (KH-1 to KH-3) & GF (GF-7)
- Emerging Issues MB (EI-1 to EI-3); GF (RP-1 to RP-5, XAO 4.3)
- Maritime Heritage XMHR-3, XMHR-4
- Introduced Species MB (IS-1 to IS-5) & GF (IS-1 to IS-9)
- Special Marine Protected Areas MB (SMPA-1 to SMPA-11)
- Ecosystem Protection Plan GF (EP-1 to EP-3)
- Wildlife Disturbance
  - Marine Mammals, Seabirds and Turtles MB (MMST-1 to MMST-4) & GF (WD-1 to WD-6)
  - Motorized Personal Watercraft MB (MPWC-1 to MPWC-4)
  - Tidepools MB (TP-1 to TP-7) & GF (WD-2)

**Activity 3.2** GFNMS staff will lead efforts to consult and coordinate on resource protection issues with other local, state and federal resource management agencies in the NMA.

Staff will also work with these agencies and other partners to implement specific resource protection strategies and activities identified in the Jmpr.

**Products:** Implemented Jmpr resource protection strategies and activities.

**Partners:** GFNMS and MBNMS resource protection staff

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	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>GF</b>	<b>AD-5, RP-4, RP-5</b>
	<b>MB</b>	<b>OA-12</b>

**STRATEGY XNRP-4: *GFNMS Staff will Coordinate Enforcement Activities in the NMA.***

**Activity 4.1** GFNMS staff will provide assistance as appropriate in the planning and implementation of NMA enforcement activities in the NMA and will coordinate with MBNMS to ensure consistency across the sites.

**Products:** Enforcement cases investigated. Surveillance activities. Updated Enforcement plan.

**Partners:** GFNMS & MBNMS resource protection staff, MBNMS Enforcement Officer and the National Oceanic and Atmospheric Administration-Office of Law Enforcement (NOAA-OLE)

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>GF</b>	<b>PR-6 and scattered throughout GFNMS Management Plan (MP)</b>

**STRATEGY XNRP-5: *GFNMS Staff will Coordinate NMA Emergency Response Activities in the NMA.***

**Activity 5.1** GFNMS staff will lead and closely coordinate efforts to respond to emergencies in the NMA to ensure maximum resource protection to sanctuary resources.

**Products:** Communication strategy that recognizes site-specific and regional emergency response plans.

**Partners:** GFNMS and MBNMS resource protection staff

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>GF</b>	<b>RP-7, RP-8, VS-7, VS-8</b>
	<b>MB</b>	<b>OA-5 &amp; XAO-4.3 (scattered throughout JMPP)</b>

**STRATEGY XNRP-6: *MBNMS Water Quality Protection Program Staff Will Continue to Coordinate Water Quality Activities in the NMA.***

**Activity 6.1** Implement existing Water Quality Protection Program (WQPP) activities.

MBNMS WQPP staff will continue to implement water quality activities (planning, implementation of management measures, partnership and stakeholder coordination, monitoring and outreach) in the NMA and regularly communicate with GFNMS staff to enhance understanding of the activities underway.

**Products:** WQPP Plans implemented in the NMA. New GFNMS WQPP assessment completed.

**Partners:** MBNMS WQPP staff and GFNMS resource protection staff

Cross-Reference:

- Water Quality
  - Beach Closures MB (BC-1 to BC-10)
  - Cruise Ship Discharge MB (CS-1 to CS-4)
- Vessel Spills GF (VS-1 to VS-13)
  - WQPP Memorandum of Agreement MB (MOA-1 to MOA-3)
  - WQPP Implementation MB (WQPP-1 to WQPP-23)
  - GF Water Quality (WQ-2, WQ-3, WQ-5, WQ-6, WQ-9)

**Activity 6.2** Conduct site water quality needs assessment.

MBNMS has hired a new regional WQPP specialist who will be assigned to work with GFNMS staff (and other west coast sanctuary staff) on their specific needs and threats, and assess how existing MBNMS water quality programs or processes could be translated or modified to meet those needs, or whether new programs should be developed. Once these assessments are done, the new WQPP regional specialist will assist the sites in designing the appropriate plans and building site capacity for implementation, drawing on individual MBNMS subject matter staff where possible. Note that this new water quality position is not focused on the NMA specifically, but on providing assistance to all west coast sanctuaries, including GFNMS. However, opportunities for regional approaches that could benefit the NMA will also be pursued.

**Products:** New Regional WQPP staff member. Site-by-site needs assessment.

**Partners:** MBNMS WQPP staff and GFNMS resource protection staff

Cross-Reference: (see Cross-Reference in 6.1)

**Activity 6.3** Review and issue water quality authorizations.

MBNMS staff will continue to review water quality permits in the NMA, and issue authorizations with appropriate conditions to minimize impacts as outlined in the MBNMS water quality memorandum of agreement (MOA). MBNMS staff will coordinate with and seek input from GFNMS staff in reviewing these permits.

**Products:** Permit and authorization review and issuance.

**Partners:** MBNMS WQPP staff and GFNMS resource protection staff

	<u>Sanctuary</u>	<u>Management Plan Strategy Reference</u>
Cross-Reference:	<b>MB</b>	<b>MOA-1 to MOA-3, XNRP-1</b>

## **NORTHERN MANAGEMENT AREA (NMA) CONSERVATION SCIENCE PLAN**

The GFNMS research coordinator will be the lead on most research and monitoring projects and programs in the NMA. The research coordinator will work closely with the MBNMS and CBNMS research coordinators to ensure that the projects are integrated and coordinated. One of the overall goals for research and monitoring in the NMA, and more broadly across the region, is to capitalize on the strengths and expertise of individual staff regardless of their site location. As such, staff from either site may be requested to consult or work on research and monitoring projects in the NMA based on their area of expertise. For example, if a proposed research project in the NMA involves rocky intertidal issues, then those MBNMS staff with expertise and experience on these issues would be involved. Likewise, if there were an issue where GFNMS staff had more experience (e.g., seabirds or marine mammals) then they would be involved. There are many research and monitoring projects already being implemented by both sites in the NMA and many more issue-based projects that could be jointly or separately implemented. The research staff from the two sites will continue to discuss opportunities for collaborative implementation of these programs and activities. Though the actual issue and expertise of staff will factor into who ultimately works on a research and monitoring issue, the following protocol provides a general guideline:

- Issue primarily located in MBNMS and straddles the NMA (e.g., SIMoN): the MBNMS staff takes the lead and coordinates with the GFNMS staff.
- Issue primarily located in GFNMS and straddles the NMA (e.g., seabird monitoring): the GFNMS staff takes the lead and coordinates with the MBNMS staff.
- Issue only located in the NMA (e.g., wildlife disturbance monitoring near Pillar Point): the GFNMS staff takes the lead and coordinates with the MBNMS staff.

When addressing some research and monitoring issues, sanctuary superintendents may seek advice and recommendations from their respective advisory councils. The following protocols provide general guidance as to how the advisory councils will be involved on research and monitoring issues affecting the NMA.

- Primarily in the MBNMS and straddles the NMA: Issue first goes to the MBNMS Advisory Council for action. Their recommendations are forwarded to the GFNMS Advisory Council for comment and action.
- Primarily in the GFNMS and straddles the NMA: Issue first goes to the GFNMS Advisory Council for action. Their recommendations are forwarded to the MBNMS Advisory Council for comment and action.
- Only in the NMA: Issue first goes to the GFNMS Advisory Council for action. Their recommendations are forwarded to the MBNMS Advisory Council for comment and action.

If there are fundamental differences in the recommendations between the advisory councils, a joint working group will be formed to resolve the differences. If no resolution can be reached, the separate recommendations from the advisory councils will be forwarded to the sanctuary superintendents, who will consider both recommendations before making a decision.

**STRATEGY XNRM-1: *Share Information.***

**Activity 1.1** Develop and implement procedures for sharing information on existing research and monitoring projects and coordinate on future projects.

**Products:**

- Briefings on select existing projects, for example:
  - Rocky intertidal monitoring
  - Beached bird survey
  - SIMoN
  - Ecosystem dynamics study/pelagic monitoring
  - Trustee restoration projects (Rhinoceros Auklet)
  - Black abalone withering foot study
  - Elephant seal database
- Conduct an annual coordinators’ meeting to identify and plan joint research projects among the sites. These should be included in each site’s Annual Operating Plan (AOP).
- Develop a Research & Monitoring Communication Plan.

**Partners:** CBNMS), GFNMS, MBNMS, & Sanctuary Integrated Monitoring Network (SIMoN) Research Personnel

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:		<b>XEM-1 to XEM-3, XAO-1.2, XAO-2.1, XAO-2.2</b>

**STRATEGY XNRM-2: *Coordinate Research and Monitoring Information Dissemination.***

**Activity 2.1** Update, cross-link, and develop Web products for GFNMS, MBNMS and SIMoN websites.

**Products:** Update site characterization, research and monitoring content on website, cross-link existing studies, maps, and data that apply to the NMA.

**Partners:** GFNMS & MBNMS Research and IT Personnel

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:		<b>XEM-1 to XEM-3, XNEO-3</b>

**STRATEGY XNRM-3: *Collaborate on Sanctuary Advisory Committees and Working Groups on Research and Monitoring Issues Related to the NMA.***

**Activity 3.1** Assess current and future NMSP participation on technical advisory committees or working groups in the NMA (such as Fitzgerald Marine Reserve, MBNMS Research Activity Panel (RAP)).

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Based upon the technical needs of the group, determine who is the most appropriate staff person to participate in the group. There may be instances when it is appropriate to have more than one NMSP research staff on the committee, depending upon the needed expertise.

**Products:** Inventory of staff participation in external research and monitoring technical advisory panels. As necessary, update staff expertise and assignment inventory.

**Partners:** CBNMS, GFNMS & MBNMS Research Personnel

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:		<b>XEM-1</b>

**STRATEGY XNRM-4: *Collaborate on Volunteer Monitoring Efforts Related to the NMA***

**Activity 4.1** Continue efforts to coordinate and collaborate Beach Watch and Beach Coastal Ocean/Marine Bird Education Research Surveys (COMBERS) volunteer monitoring programs.

**Products:** Continue to share annual reports. Continue to communicate unusual mortality and oil/HAZMAT incidences.

**Partners:** CBNMS, GFNMS & MBNMS research personnel and volunteer coordinators

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>GF</b>	<b>RE-1, WD-2, IS-5</b>
	<b>MB</b>	<b>OA-4</b>

**STRATEGY XNRM-5: *Implement JMPR Site-Specific Research and Monitoring Activities in the NMA.***

**Activity 5.1** The GFNMS and MBNMS research teams will coordinate on the implementation of JMPR site-specific and cross-cutting ecosystem research and monitoring activities in the NMA.

**Products:** Coordinate efforts to implement specific research and monitoring projects based on a Joint Research and Monitoring Annual Operating Plan.

**Partners:** GFNMS and MBNMS research staff

Cross-Reference:

- Coastal Development
  - Coastal Armoring MB (CA-1, CA-2)
  - Desalination MB (DESAL-2, DESAL-4)
  - Harbors and Dredge Disposal MB (HDD-2, HDD-3 to HDD-5)
  - Submerged Cables MB (SC-1, SC-2)
- Ecosystem Protection
  - Impact from Bottom Trawling GF (FA-1 to FA-6) & MB (BH-2 to BH-5)
- Ecosystem Monitoring CB (RE-7 to RE-9), GF (FA-1), XEM-1 to XEM-3
- Emerging Issues MB (EI-1, EI-2)

- Introduced Species GF (IS-1 to IS-5), MB (IS-1 to IS-3)
- Maritime Heritage XMHR-2
- Special Marine Protected Areas (MPA-2, MPA-3, MPA-5, MPA-6, MPA-9)
- Species Distribution GF (VS-5)
- Volunteer Monitoring GF (RE-1), MB (OA-2), XNRM-4
- Fishing Related Research MB (FER-2, FER-3, FER-5, FER-7)
- SIMoN/Databases CB (RE-10), GF (VS-8), MB (SI-2, SI-3, SI-5, SI-6)
- Water Quality Issues
  - Assessment and status GF (WQ-8)
  - Beach Closure and Contamination MB (BC-1 to BC-4)
  - Water Quality Protection Program Implementation MB (WQPP-8, WQPP-9, WQPP-19)
- Wildlife Disturbance GF (RE-2, WD-1 to WD-3), MB (MMST-2, MMST-4 to MMST-7)
- Tidepool Protection MB (TP-1)

## **NORTHERN MANAGEMENT AREA (NMA) EDUCATION AND OUTREACH**

GFNMS education staff will be the lead on education programs in the NMA and will ensure that the MBNMS education coordinator is informed about all education activities taking place in the NMA. One of the overall goals for education and outreach in the NMA, and more broadly across the region, is to capitalize on the strengths and expertise of individual staff regardless of their site location. As such, staff from either site may be requested to consult on projects in the NMA based on their area of expertise. There are many education, outreach and volunteer programs already being implemented by both sites in the NMA and many more issue-based programs that could be jointly or separately implemented. The education staff from the two sites will continue to discuss opportunities for collaborative implementation of these programs and activities. Though the actual issue and expertise of staff will factor into who ultimately works on an education or outreach issue, the following protocol provides a general guideline:

- Issue primarily located in the MBNMS and straddles the NMA (e.g., Multicultural Education for Resource Issues Threatening Oceans (MERITO) multicultural education): the MBNMS staff takes the lead and coordinates with the GFNMS staff.
- Issue primarily located in the GFNMS and straddles the NMA (e.g., Sanctuary Explorers Summer Camp): the GFNMS staff takes the lead and coordinates with the MBNMS staff.
- Issue only located in the NMA (e.g., Pillar Point outreach): the GFNMS staff takes the lead and coordinates with the MBNMS staff.

When addressing some education and outreach issues, sanctuary superintendents may seek advice and recommendations from their respective advisory councils. The following protocols provide general guidance as to how the advisory councils will be involved on education and outreach issues affecting the NMA.

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- Primarily in the MBNMS and straddles the NMA: Issue first goes to the MBNMS Advisory Council for action. Their recommendations are forwarded to the GFNMS Advisory Council for comment and action.
- Primarily in the GFNMS and straddles the NMA: Issue first goes to the GFNMS Advisory Council for action. Their recommendations are forwarded to the MBNMS Advisory Council for comment and action.
- Only in the NMA: Issue first goes to GFNMS Advisory Council for action. Their recommendations are forwarded to the MBNMS Advisory Council for comment and action.

If there are fundamental differences in the recommendations between the advisory councils, a joint working group will be formed to resolve the differences. If no resolution can be reached, the separate recommendations from the advisory councils will be forwarded to the sanctuary superintendents, who will consider both recommendations before making a decision.

**STRATEGY XNEO-1: *Transfer, Establish and Implement School Programs in the NMA.***

**Activity 1.1** Coordinate and implement both GFNMS and MBNMS classroom activities (i.e., Oceans Week, etc.) to promote a greater awareness of the sanctuaries in schools.

**Products:** Six classroom presentations per year.

**Partners:** GFNMS, MBNMS, Farallones Marine Sanctuary Association (FMSA) education staff, Cabrillo School District, Pescadero School District, other San Mateo County schools

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>GF</b>	<b>ED-1 to ED-6 &amp; XCO-3</b>
	<b>MB</b>	<b>OA-5, MERITO-1 to MERITO-3, others within various issues</b>

**Activity 1.2** Establish a sanctuary education group comprised of teachers and other marine educators/communicators to share information and ideas.

**Products:** A periodic compilation of suggestions for new/expanded school programming.

**Partners:** GFNMS, MBNMS, CBNMS education staff, San Mateo, San Francisco, Marin, and Sonoma County schools, advisory council members, informal marine educators

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>GF</b>	<b>ED-1 &amp; ED-4</b>
	<b>MB</b>	<b>MB OA-3.2, MERITO-2</b>

**Activity 1.3** Expand the Long-term Monitoring Program and Experiential Training for Students (LiMPETS) student monitoring program by identifying more potential locations along the NMA coastline and providing training to teachers and students.

**Products:** Student monitoring data – rocky intertidal, sand crab.

**Partners:** GFNMS, MBNMS, FMSA education staff, Cabrillo School District, Pescadero School District, other San Mateo County Schools

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>GF</b>	<b>ED-1 to ED-6, WD-2</b>
	<b>MB</b>	<b>OA-4, TP-2</b>

**Activity 1.4** Identify and pursue partnerships and funding opportunities to expand the MBNMS MERITO Program to the NMA.

**Products:** Watershed Activity Guide, Marine Conservation Kits, train-the-trainers workshops, weekly outings for after school programs, kayak days, tidepool days, hiking days, PSA (Spanish/English), Web page updates.

**Partners:** GFNMS, FMSA education staff, MBNMS MERITO staff, Cabrillo School District, Pescadero School District, other San Mateo County schools, Pescadero Conservation Alliance, Boys & Girls Club, California State Parks

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>MB</b>	<b>MERITO-1 to MERITO-6</b>

**STRATEGY XNEO-2: *Develop and Implement Community Outreach and Stewardship Programs.***

**Activity 2.1** Represent the NMSP at local fairs and community events.

**Products:** Joint traveling displays at such events as the Half Moon Bay Dream Machines (Fly-In) Bay Area Paddle Fest, Toast to the Coast, and the Pigeon Point Lighthouse annual lighting celebration for GFNMS, MBNMS, and CBNMS.

**Partners:** NMSP, GFNMS, MBNMS and CBNMS education staff

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>GF</b>	<b>ED-7</b>

**Activity 2.2** Develop and implement a lecture series for the NMA, consistent with lecture offerings in GFNMS and MBNMS.

The initial series may focus on lighthouses of the sanctuaries and historic maritime commerce of the coast.

**Products:** Six lectures per year.

**Partners:** GFNMS/MBNMS/CBNMS education staff, FMSA, other resource agencies

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	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>GF</b>	<b>ED-8</b>

**Activity 2.3** Coordinate and enhance citizen volunteer opportunities, including Beach Watch and Snapshot Day/First Flush to support resource protection objectives.

**Products:** Volunteer cross-trainings; expansion of NMA volunteer opportunities.

**Partners:** GFNMS, MBNMS, CBNMS education staff, FMSA, other resource agencies

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>GF</b>	<b>ED-7, IS-5, WD-2, WD-4</b>
	<b>MB</b>	<b>OA-4</b>

**STRATEGY XNEO-3: *Develop and Disseminate Outreach Materials in the NMA.***

**Activity 3.1** Disseminate existing GFNMS and MBNMS materials throughout the NMA.

**Products:** Distribution of existing education and outreach materials at select locations throughout the NMA.

**Partners:** GFNMS, MBNMS education staff

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>GF</b>	<b>ED-10 to ED-14</b>
	<b>MB</b>	<b>varies by issue</b>

**Activity 3.2** Prepare and submit periodic articles on NMA issues for local and regional newsletters and other sanctuary publications.

**Products:** Four-six articles per year.

**Partners:** GFNMS, MBNMS education staff

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>GF</b>	<b>WD-6, ED-11</b>
	<b>MB</b>	<b>OA-5.11</b>

**Activity 3.3** Coordinate the development of maps for use by GFNMS, MBNMS and CBNMS, including a bathymetric map of the north-central California sanctuaries and a geographic information systems (GIS) map of the three with all sanctuary offices, anchorages/safe harbors and wildlife viewing.

**Products:** Bathymetric map and GIS map of CBNMS/GFNMS/MBNMS.

**Partners:** GFNMS, MBNMS, CBNMS staff, FMSA, MBSF

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>GF</b>	<b>ED-11</b>
	<b>MB</b>	<b>OA-5.10</b>

**Activity 3.4** Engage the community and user groups on how best to involve and inform them about issue-specific resource management issues (i.e., Mavericks, water quality, SF exemption area).

**Products:** Community workshops, brochures, displays, website content.

**Partners:** GFNMS, MBNMS subject matter staff

Cross-Reference: Varies by issue and site

**Activity 3.5** Develop NMA-related links between GFNMS and MBNMS websites. Explore options for Internet collaboration beyond the NMA to strengthen relationships with the San Francisco Bay Area population.

**Products:** GFNMS and MBNMS websites that contain information and links to the NMA; expanded joint Web products.

**Partners:** GFNMS, NMSP, MBNMS Web staff

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>GF</b>	<b>ED-11), XNRM-2 &amp; NMA Decision Document</b>
	<b>MB</b>	<b>OA-5.10</b>

**STRATEGY XNEO-4: *Implement JMPR Site-Specific Education and Outreach Activities in the NMA***

**Activity 4.1** The GFNMS and MBNMS Education Teams will coordinate on the implementation of JMPR site-specific education and outreach activities in the NMA.

This will be accomplished by exploring opportunities to work proactively with local communities and tapping into existing education and outreach networks (civic groups, environmental organizations, etc.). The teams will link the NMA with efforts to increase awareness of the sanctuaries to communities throughout the greater San Francisco Bay region.

**Products:** Implementation of JMPR education and outreach strategies and activities within the NMA, the greater SF Bay area, and beyond.

**Partners:** GFNMS and MBNMS education staff

Cross-Reference:

- Coastal Development
- Coastal Armoring MB (CA-3)

- Harbors and Dredge Disposal (HDD-5)
- Community Outreach and Awareness
  - Lecture Series & Field Seminars CB (ED-6, ED-8), GF (ED-8), MB (OA-6), XNEO-2, XCO-1
  - Videos, Brochures, websites GF (ED-10, VS-9) & MB (OA-6), XNEO-3, XCO-1
- Ecosystem Protection
  - Benthic Habitats MB (BH-7)
  - Introduced Species GF (IS-5, IS-9) & MB (IS-2)
  - Special Marine Protected Areas MB (MPA-8)
- Education for Students and Teachers CB (ED-7), GF (ED-1 to ED-6), XNEO-1, XCO-2
- Fishing Related Education MB (FER-1 to FER-5)
- Interpretive Enforcement GF (WD-4)
- Interpretive Facilities, Signage, Exhibits CB (ED-4, ED-5), GF (ED-1, ED-9, ED-12, ED-13), MB (IF-1, IF-3, IF-4), XNEO-5
- Maritime Heritage GF (FA-5), XMHR-5, MMHR-6
- Media Outreach CB (Ed-3, PC-3), GF (ED-11), XCO-1
- Multicultural Outreach MB (MERITO-1 to MERITO-7) & XCO-2
- Regulation and Permit Awareness MB (OA-10, OA-11)
- Water Quality
  - Beach Closures and Contamination MB (BC-3, BC-4, BC-6, BC-7)
  - Cruise Ship Discharge MB (CS-2, CS-4)
  - Water Quality Protection Program GF (WQ-2, WQ-9, ED-14), MB (WQPP-1 to WQPP-3, WQPP-6 to WQPP-11, WQPP-13, WQPP-15, WQPP-16, WQPP-18 to WQPP-21)
- Wildlife Disturbance
  - Marine Mammal, Seabird, and Turtle GF (WD-5, WD-6) & MB (MMST-1 to MMST-8)
  - Motorized Personal Watercraft MB (MPWC-3)
  - Tidepool/Rocky Intertidal Protection GF (WD-2) & MB (TP-1, TP-2, TP-5)
- Vessel Traffic GF (VS-9)
- Volunteers/Stewardship in Education and Outreach CB (ED-2), GF (ED-7, WD-2), MB (OA-2), XCO-3

***STRATEGY XNEO-5: Pursue Collaborative Opportunities for Interpretive Signage and Facilities in the NMA***

**Activity 5.1** Develop collaborative partnerships to create and install interpretive signage in the NMA as part of the long-range California-wide sanctuaries interpretive signage plan.

**Products:** 12 trailside signs, 6-8 rail/post mounted signs, 2 large kiosks.

**Partners:** GFNMS, MBNMS education staff, California State Parks, San Mateo Coast Natural History Association, San Mateo County Harbor District, San Mateo County Parks, Half Moon Bay Parks and Recreation

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>GF</b>	<b>ED-9, ED-12, ED-13</b>
	<b>MB</b>	<b>IF-1 to IF-3</b>

**Activity 5.2** Complete development, fabrication, and installation of collaborative interpretive exhibit at Pigeon Point Light Station in partnership with California State Parks, MBNMS, and the San Mateo Coast Natural History Association.

Key themes for interpretation include the maritime history of the area, the establishment of the lighthouse, life and commerce along the coast, and the natural history of sanctuary waters and resources.

**Products:** Interpretive exhibits on the lighthouse, sanctuaries, and natural history of the area.

**Partners:** GFNMS/MBNMS/CBNMS education staff, California State Parks, San Mateo Coast Natural History Association, Pigeon Point Hostel, Pigeon Point Environmental Education Program

	<b>Sanctuary</b>	<b>Management Plan Strategy Reference</b>
Cross-Reference:	<b>GF</b>	<b>ED-13</b>
	<b>MB</b>	<b>IF-1.6</b>

**TABLE XN-1: MEASURING PERFORMANCE OF THE CROSS-CUTTING NORTHERN MANAGEMENT AREA TRANSITION PLAN**

<b>Desired Outcome(s) For This Action Plan:</b>	
<b>Transfer management responsibilities in the NMA from MBNMS to GFNMS in a manner that enhances protection for sanctuary resources and the delivery of programs and services to local communities.</b>	
<b>Performance Measures</b>	<b>Explanation</b>
<p>1. <b>By Year 5, 100% of the resource protection, education and research activities identified in this plan are fully implemented.</b></p> <p>2. <b>Increase the number of education and outreach programming efforts directed at communities in the NMA from 1,000 individuals in Year 1 to 5,000 individuals in Year 5.</b></p>	<p>1. The transfer of management responsibilities from MBNMS to GFNMS in the NMA will be accomplished in a manner that builds upon existing resource protection efforts in this area. Implementation of the strategies in this action plan will clarify each of the sites roles and responsibilities, increase coordination, resource and expertise sharing, and ultimately enhance resource protection and outreach efforts to local communities.</p> <p>2. One of the main purposes of this action plan is to ensure that the delivery of products, services and programs to communities in the NMA is increased. Implementation of this action plans targets outreach to local communities in the NMA. Some of the activities include schools and teachers, volunteers, fairs and festivals, visitor centers, public lecture series, etc.</p>

**TABLE XN-2: CROSS-CUTTING NORTHERN MANAGEMENT TRANSITION PLAN TIMELINE**

<b>NORTHERN MANAGEMENT AREA TRANSITION PLAN</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>
NMA Administration and Operations					
Strategy XNAO-1: Create a Multi-Functional HMB Regional Office					
<b>Activity 1.1: Expand the existing Half Moon Bay (HMB) office, or relocate to a new location.</b>			→		
Strategy XNAO-2: Evaluate the Delivery and Success of NMSP Programs and Services in the NMA					
<b>Activity 2.1: Conduct an evaluation of the delivery and success of NMSP programs and services to local communities in the NMA.</b>	→	→	→	→	→
NMA Resource Protection					
Strategy XNRP-1: GFNMS will be Responsible for Permit Activities in the NMA					
<b>Activity 1.1: GFNMS will process permits within the NMA, except for water quality permits, which will continue to be overseen by MBNMS.</b>	→	→	→	→	→

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<b>NORTHERN MANAGEMENT AREA TRANSITION PLAN</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>
<b>Activity 1.2:</b> GFNMS staff will take the lead in considering the development of protocols for a Special Use Permit for tow-in surfing at Mavericks as envisioned in the MBNMS revised management plan and coordinate such proposed actions with MBNMS staff.	—————▶				
Strategy XNRP-2: GFNMS will be Responsible for Regulatory Activities in the NMA While Maintaining Maximum Consistency and Protection to Sanctuary Resources					
<b>Activity 2.1:</b> GFNMS staff will take the lead in evaluating a potential new dredge disposal site for Pillar Point Harbor should a detailed site proposal be developed by the San Mateo County Harbor District for submission to federal and state agencies.		—————▶			
<b>Activity 2.2:</b> GFNMS staff will facilitate a public process in the next five years to consider whether the San Francisco Exemption Area (“the donut hole”) should be included in the MBNMS.			—————▶		
<b>Activity 2.3:</b> The GFNMS and MBNMS Resource Protection Teams will closely coordinate on any future proposed regulatory changes that could impact the NMA or the other sanctuaries.	—————▶				
Strategy XNRP-3: GFNMS Staff Will Coordinate Existing and Emerging Resource Protection Issues in the NMA					
<b>Activity 3.1:</b> GFNMS staff will lead efforts to coordinate and implement JMPR site-specific activities to support resource protection and stewardship in the NMA and the delivery of services and programs to local communities.	—————▶				
<b>Activity 3.2:</b> GFNMS staff will lead efforts to consult and coordinate on resource protection issues with other local, state and federal resource management agencies in the NMA.	—————▶				
Strategy XNRP-4: GFNMS Staff Will Coordinate Enforcement Activities in the NMA					
<b>Activity 4.1:</b> GFNMS staff will oversee the planning and implementation of all NMA enforcement activities in the NMA and will coordinate with MBNMS to ensure consistency across the sites.	—————▶				
Strategy XNRP-5: GFNMS Staff Will Coordinate NMA Emergency Response Activities in the NMA					
<b>Activity 5.1:</b> GFNMS staff will lead and closely coordinate efforts to respond to emergencies in the NMA to ensure maximum resource protection to sanctuary resources.	—————▶				
Strategy XNRP-6: MBNMS Water Quality Protection Program Staff Will Continue to Coordinate Water Quality Activities in the NMA					
<b>Activity 6.1:</b> Implement existing WQPP Activities.	—————▶				
<b>Activity 6.2:</b> Conduct Site Water Quality Needs Assessment.	—————▶				
<b>Activity 6.3:</b> Review and issue water quality authorizations.	—————▶				
NMA Research & Monitoring					
Strategy XNRM-1: Share Information					
<b>Activity 1.1:</b> Develop and implement procedures for sharing information on existing research and monitoring projects and coordinate on future projects.	—————▶				
Strategy XNRM-2: Coordinate Research and Monitoring Information Dissemination					
<b>Activity 2.1:</b> Update, cross-link, and develop Web products for GFNMS, MBNMS and SIMoN websites.	—————▶				

*Northern Management Area Transition Action Plan  
GFNMS Management Plan*

<b>NORTHERN MANAGEMENT AREA TRANSITION PLAN</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>
Strategy XNRM-3: Collaborate on Sanctuary Advisory Committees and Working Groups on Research and Monitoring Issues Related to the NMA					
<b>Activity 3.1: Assess current and future NMSP participation on technical advisory committees or working groups in the NMA (such as Fitzgerald Marine Reserve, MBNMS RAP).</b>	→				
Strategy XNRM-4: Collaborate on Volunteer Monitoring Efforts Related to the NMA					
<b>Activity 4.1: Continue efforts to coordinate and collaborate Beach Watch and Beach COMBERS volunteer monitoring programs.</b>	→				
Strategy XNRM-5: Implement JMPR Site-Specific Research and Monitoring Activities in the NMA					
<b>Activity 5.1: The GFNMS and MBNMS Research Teams will coordinate on the implementation of JMPR site-specific and cross-cutting ecosystem research and monitoring activities in the NMA.</b>	→				
NMA Education & Outreach					
Strategy XNEO-1: Transfer, Establish and Implement School Programs for the NMA					
<b>Activity 1.1: Coordinate and implement both GFNMS and MBNMS classroom activities (i.e., Oceans Week, etc.) to promote a greater awareness of the sanctuaries in schools.</b>	→				
<b>Activity 1.2: Establish a sanctuary education group comprised of teachers and other marine educators/communicators to share information and ideas.</b>	→				
<b>Activity 1.3: Expand the LiMPETS student monitoring program by identifying more potential locations along the NMA coastline and providing training to teachers and students.</b>	→		.....	→	
<b>Activity 1.4: Identify and pursue partnerships and funding opportunities to expand the MBNMS MERITO Program to the NMA.</b>			→	→	
Strategy XNEO-2: Develop and Implement Community Outreach and Stewardship Programs					
<b>Activity 2.1: Represent the NMSP at local fairs and community events.</b>	→				
<b>Activity 2.2: Develop and implement a lecture series for the NMA, consistent with lecture offerings in GFNMS and MBNMS.</b>	→				
<b>Activity 2.3: Coordinate and enhance citizen volunteer opportunities, including Beach Watch and Snapshot Day/First Flush to support resource protection objectives.</b>	→				
Strategy XNEO-3: Develop and Disseminate Outreach Materials in the NMA					
<b>Activity 3.1: Disseminate existing GFNMS and MBNMS materials throughout the NMA.</b>	→				
<b>Activity 3.2: Prepare and submit periodic articles on NMA issues for local and regional newsletters and other sanctuary publications.</b>	→				
<b>Activity 3.3: Coordinate the development of maps for use by GFNMS, MBNMS and CBNMS, including a bathymetric map of the north-central California sanctuaries and a GIS map of the three with all sanctuary offices, anchorages/safe harbors and wildlife viewing.</b>	→				
<b>Activity 3.4: Engage the community and user groups on how best to inform them about issue-specific resource management issues (i.e., Mavericks, water quality, SF exemption area).</b>	→				

*Northern Management Area Transition Action Plan  
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<b>NORTHERN MANAGEMENT AREA TRANSITION PLAN</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>
<b>Activity 3.5: Develop NMA-related links between GFNMS and MBNMS websites. Explore options for Web collaboration beyond the NMA to strengthen relationships with the Internet-savvy San Francisco Bay Area population.</b>					→
Strategy XNEO-4: Implement JMPR Site-Specific Education and Outreach Activities in the NMA					
<b>Activity 4.1: The GFNMS and MBNMS Education Teams will coordinate on the implementation of JMPR site-specific education and outreach activities in the NMA.</b>					→
Strategy XNEO-5: Pursue Collaborative Opportunities for Interpretive Signage and Facilities in the NMA					
<b>Activity 5.1: Develop collaborative partnerships to create and install interpretive signage in the NMA as part of the long-range California-wide Sanctuaries Interpretive Signage Plan.</b>					→
<b>Activity 5.2: Complete development, fabrication, and installation of collaborative interpretive exhibit at Pigeon Point Light Station in partnership with California State Parks, MBNMS, and the San Mateo Coast Natural History Association.</b>		→			

**Legend:**

-  Planned Activity
-  Proposed Activity, based on internal assessment

**TABLE XN-3: ESTIMATED COSTS TO IMPLEMENT THE CROSS-CUTTING NORTHERN MANAGEMENT AREA TRANSITION PLAN**

**\*\*All costs for this action plan are for GFNMS only except where noted for MBNMS\*\***

Strategy	Estimated Annual Cost (1000's)*					Total Est. 5-Year Cost (1000's)
	YR 1	YR 2	YR 3	YR 4	YR 5	
<b>NMA Administration &amp; Operations</b>						
<b>Strategy XNAO-1: Create a Multi-Functional HMB Regional Office</b>	\$33	\$33	\$48	\$48	\$33	\$195
<b>Strategy XNAO-2: Evaluate the Delivery and Success of the NMSP Programs and Services to the NMA</b>	\$8	\$8	\$8	\$8	\$8	\$40
<b>NMA Resource Protection</b>						
<b>Strategy XNRP-1: GFNMS Will Be Responsible for Permit Activities in the NMA</b>	\$60	\$52	\$52	\$40	\$40	\$244
<b>Strategy XNRP-2: GFNMS Will Be Responsible for Regulatory Activities in the NMA While Maintaining Maximum Consistency and Protection to Sanctuary Resources</b>	\$18	\$18	\$18	\$109.5	\$112	\$275.5
<b>Strategy XNRP-3: GFNMS Staff Will Coordinate Existing and Emerging Resource Protection Issues in the NMA</b>	\$60	\$60	\$60	\$60	\$60	\$300
<b>Strategy XNRP-4: GFNMS Staff Will Coordinate Enforcement Activities in the NMA</b>	\$135	\$135	\$135	\$135	\$135	\$675
<b>Strategy XNRP-5: GFNMS Staff Will Coordinate NMA Emergency Response Activities in the NMA</b>	\$10	\$10	\$10	\$10	\$10	\$50
<b>Strategy XNRP-6: MBNMS Water Quality Protection Program Staff Will continue to coordinate Water Quality Activities in the NMA</b>	(\$50)	(\$50)	(\$50)	(\$50)	(\$50)	(\$250)
<b>NMA Conservation Science</b>						
<b>Strategy XNRM-1: Share Information</b>	\$26	\$28	\$30	\$32	\$34	\$160
<b>Strategy XNRM-2: Coordinate Research and Monitoring Information Dissemination</b>	\$25	\$27	\$29	\$31	\$33	\$145
<b>Strategy XNRM-3: Collaborate on Sanctuary Advisory Committees and Working Groups on Research and Monitoring Issues Related to the NMA</b>	\$9	\$9	\$9	\$9	\$9	\$45
<b>Strategy XNRM-4: Collaborate on Volunteer Monitoring Efforts Related to the NMA</b>	\$8	\$8	\$8	\$8	\$8	\$40

*Northern Management Area Transition Action Plan  
GFNMS Management Plan*

Strategy	Estimated Annual Cost (1000's)*					Total Est. 5-Year Cost (1000's)
	YR 1	YR 2	YR 3	YR 4	YR 5	
<b>Strategy XNRM-5: Implement JMPR Site-Specific Research and Monitoring Activities in the NMA</b>	\$14	\$16	\$18	\$20	\$22	\$92
<b>NMA Education &amp; Outreach</b>						
<b>Strategy XNEO-1: Transfer, Establish and Implement School programs for the NMA</b>	\$38	\$38	\$163	\$163	\$163	\$563
<b>Strategy XNEO-2: Develop and Implement Community Outreach and Stewardship Programs</b>	\$25	\$25	\$25	\$25	\$25	\$125
<b>Strategy XNEO-3: Develop and Disseminate Outreach Materials in the NMA</b>	\$38	\$38	\$38	\$38	\$38	\$150
<b>Strategy XNEO-4: Implement JMPR Site-Specific Education and Outreach Activities in the NMA</b>	\$25	\$25	\$25	\$25	\$25	\$125
<b>Strategy XNEO-5: Pursue Collaborative Opportunities for Interpretive Signage and Facilities in the NMA</b>	\$50	\$50	\$1,250	\$100	\$100	\$1550
<b>Total Estimated Annual Cost</b>	\$526	\$518	\$613	\$692.5	\$680	\$3,029.5
<b>* Cost estimates are for both “programmatic” and “base” (salaries and overhead) expenses.</b>						
<b>** Contributions from outside funding sources also anticipated.</b>						
<b>**All costs for this action plan are for GFNMS only except where noted in parentheses for MBNMS. The total estimated cost does not include MBNMS expenses.</b>						





## **APPENDIX I: ECOSYSTEM PROTECTION IMPLEMENTATION PLAN**

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### **GFNMS MANAGEMENT PLAN**

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- A. Estuarine Habitat**
- B. Open Ocean Habitat**
- C. Rocky Shores Habitat**
- D. Sandy Shores Habitat**



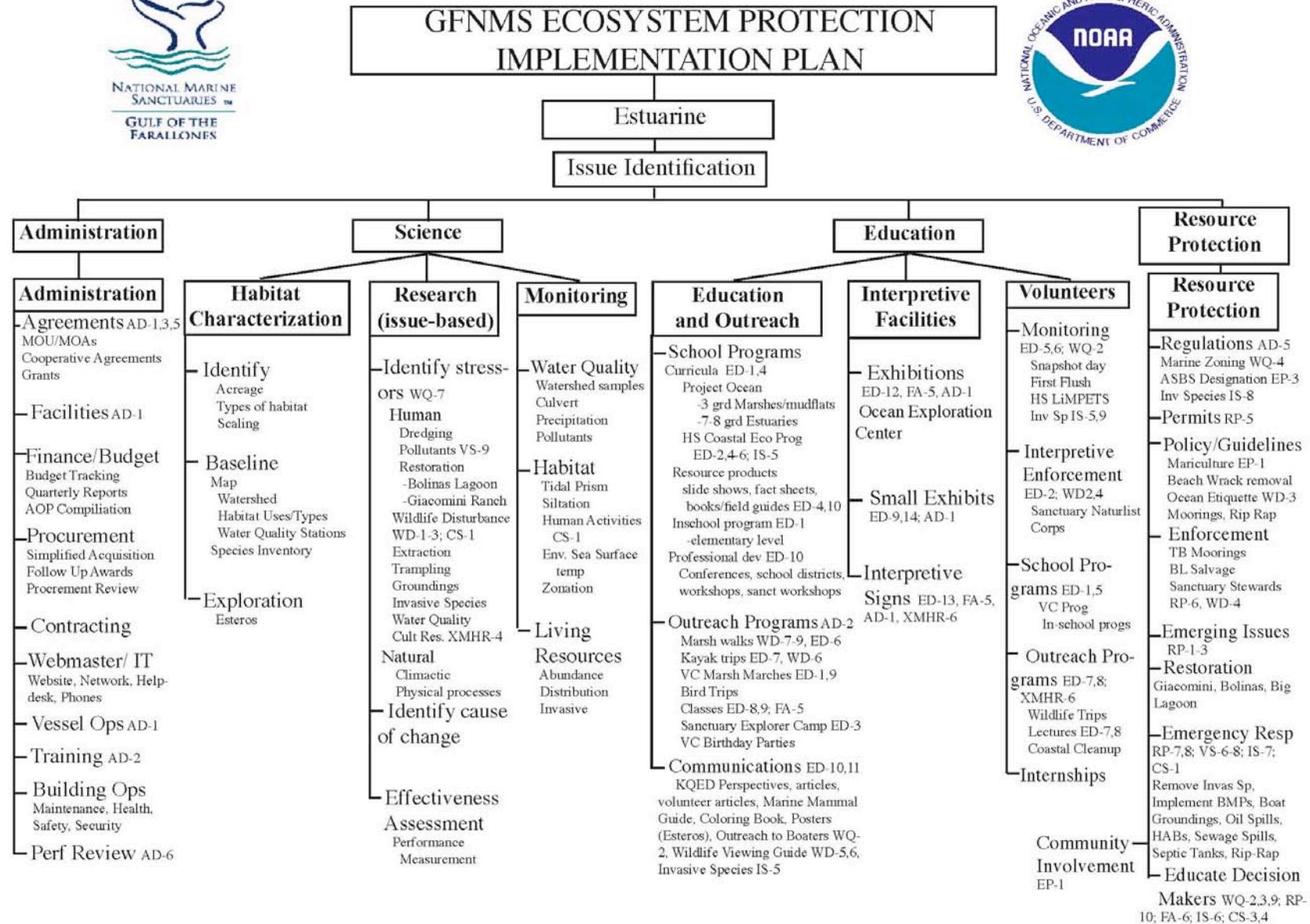
# Ecosystem Protection Implementation Plan

## Introduction

The following Ecosystem Protection Implementation Plan presents the strategies from the Management Plan organized into four key habitats of the sanctuary: estuarine, rocky shores, sandy shores, and open ocean. This organizational chart prioritizes the implementation of strategies to ensure that the sanctuary adequately addresses the priority resource management issues within each key habitat. This chart allows sanctuary staff to identify opportunities to collaborate between program areas focused around priority sanctuary habitats. These charts are organized by the sanctuary's programmatic organizational structure, within the context of the four priority sanctuary habitats. A lead staff member will oversee each habitat team to ensure coordination across program areas and protection for each habitat. Additionally, since Gulf of the Farallones and Monterey Bay sanctuaries share joint management authority over the geographic area between the Marin Headlands in the north and Ano Nuevo in the south, strategies from the Monterey Bay Sanctuary Management Plan that address issues in the four priority habitats within the shared area are noted in the Ecosystem Protection Implementation Plan.



# Appendix IA: Estuarine Habitat





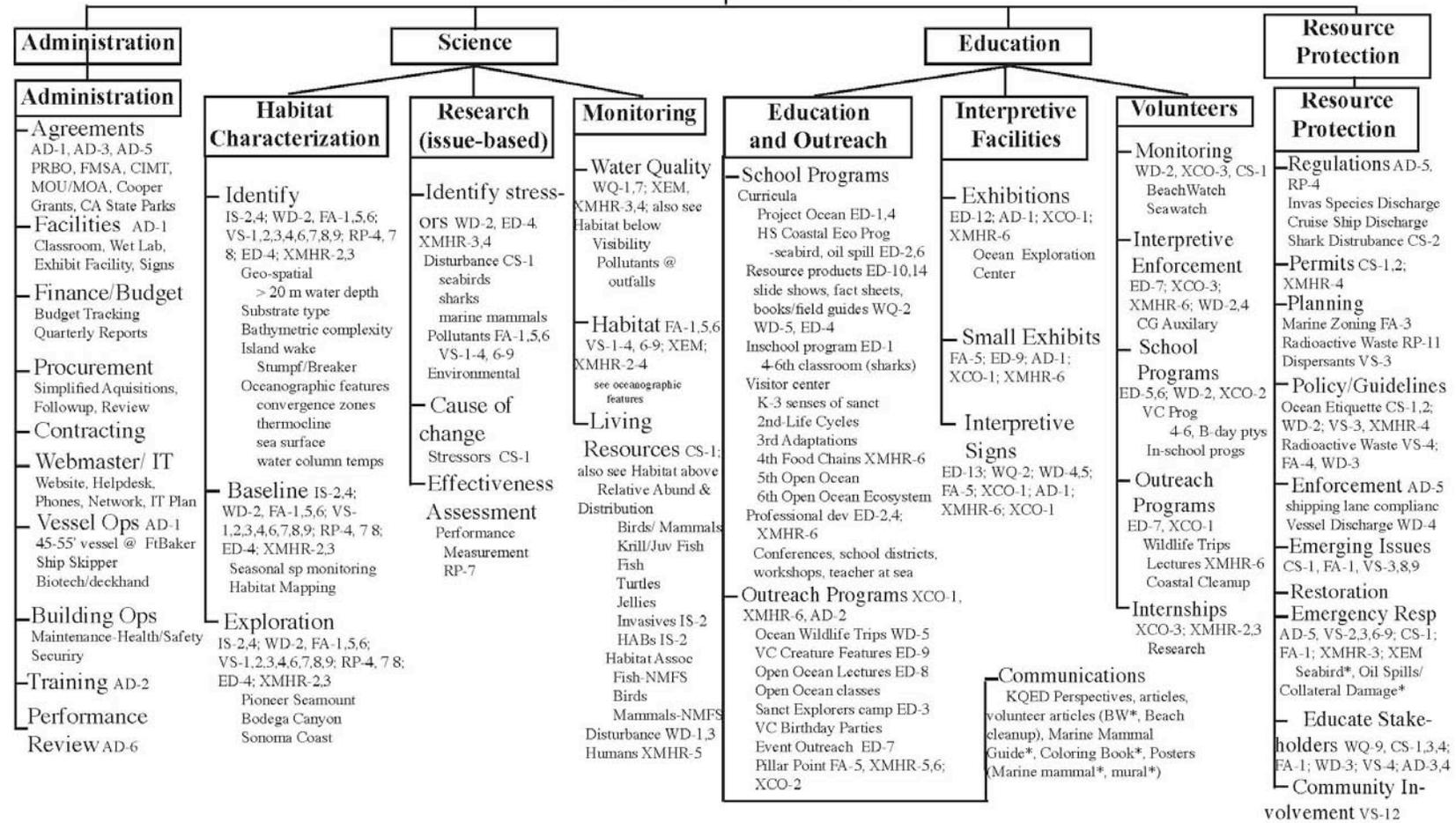
# Appendix IB: Open Ocean Habitat



## GFNMS ECOSYSTEM PROTECTION IMPLEMENTATION PLAN



### Open Ocean Issue Identification





# Appendix IC: Rocky Shores Habitat

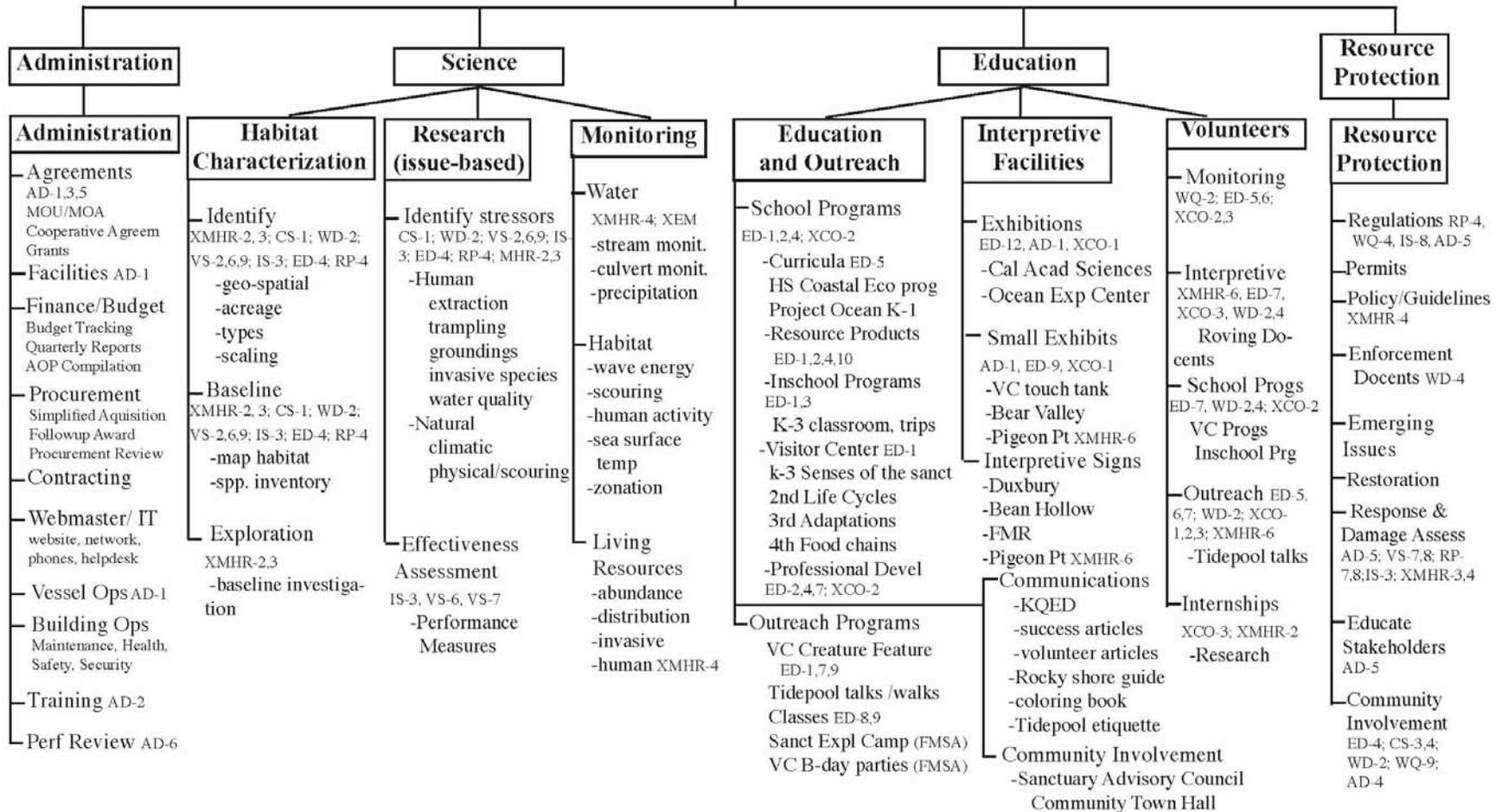


## GFNMS ECOSYSTEM PROTECTION IMPLEMENTATION PLAN



### Rocky Shores

### Issue Identification





# Appendix ID: Sandy Shores Habitat

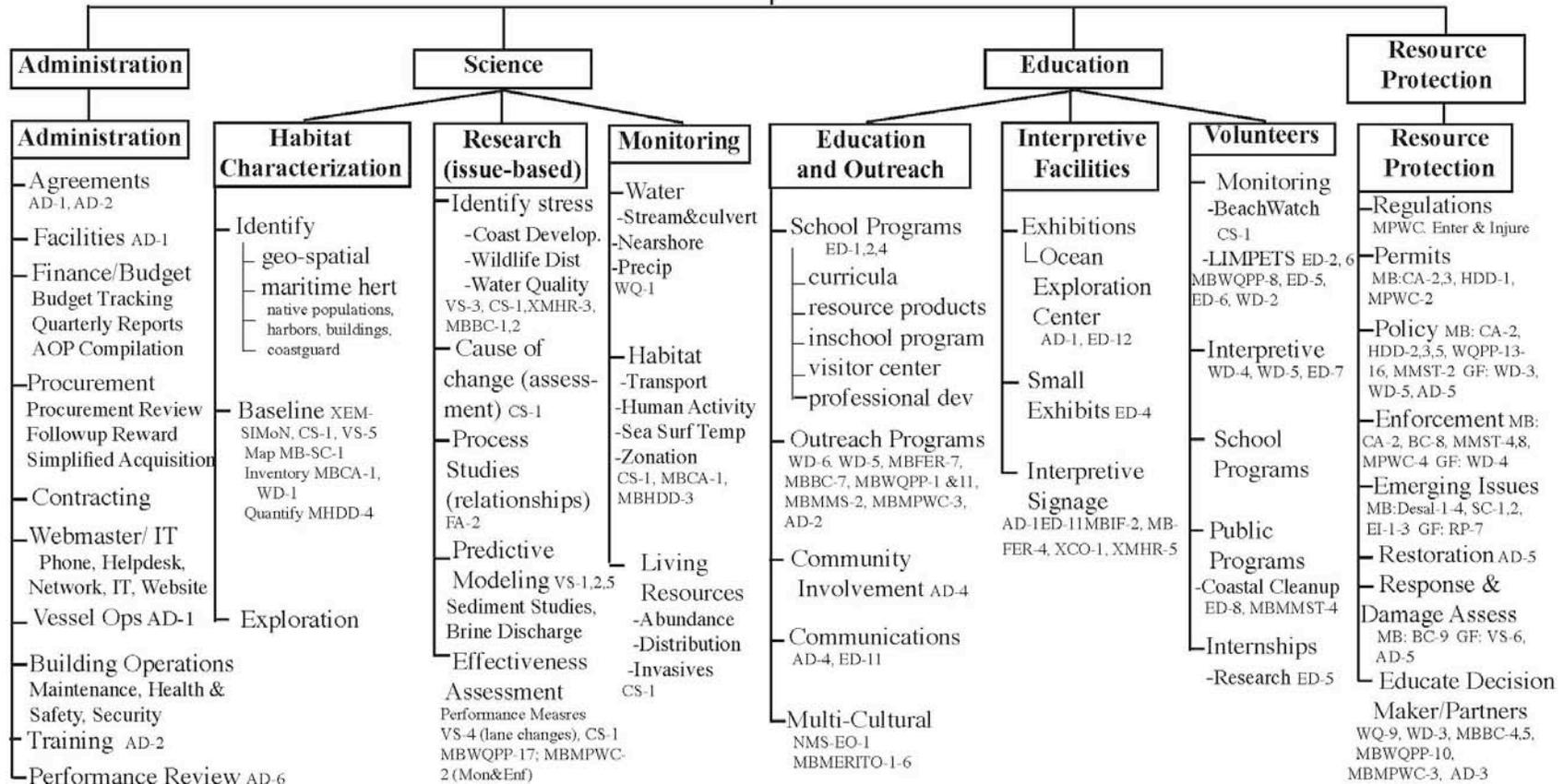


## GFNMS ECOSYSTEM PROTECTION IMPLEMENTATION PLAN



### Sandy Shores

### Issue Identification







## **APPENDIX II: PROGRAM AREA SUMMARY TABLES**

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### **GFNMS MANAGEMENT PLAN**

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- A. Education and Outreach**
- B. Conservation Science**
- C. Resource Protection**
- D. Administration**



**OVERVIEW OF STRATEGIES:**

## Appendix IIA: Education and Outreach

Education and Outreach Strategy	Activity	Program Area Objective(s) Addressed	Complementary Strategies
STRATEGY ED-1: Educate K-8 students about the sanctuary through visitor center, classroom, and field activities.	Activity 1.1 Update K-8 visitor center programs to align with state and national science standards. Expand to include pre- and post-visit activities, lending kits, and presentations.	<u>Objective 1</u> To structure programs to educate along an environmental literacy continuum including developing awareness, building a knowledge base, changing behavior, and building stewardship. <u>Objective 3</u> To develop programs to target content builders, user/impact groups, influencers, and decision makers.	<u>GFNMS FMP</u> Education, STRATEGY ED-5, STRATEGY ED-9, STRATEGY ED-10, STRATEGY ED-12
STRATEGY ED-2: Educate high school students and teachers about the sanctuary through classroom and field activities.	Activity 2.1 Expand Coastal Ecosystem Education Program to a four-tiered program including curriculum, student monitoring, stewardship projects and teacher professional development.	<u>Objective 1</u> To structure programs to educate along an environmental literacy continuum including developing awareness, building a knowledge base, changing behavior, and building stewardship. <u>Objective 3</u> To develop programs to target content builders, user/impact groups, influencers, and decision makers.	<u>GFNMS FMP</u> Education, STRATEGY ED-4, STRATEGY ED-11, STRATEGY ED-12; Water Quality, STRATEGY WQ-2; Introduced Species, STRATEGY IS-3, STRATEGY IS-9
STRATEGY ED-3: Educate diverse inner city children about the sanctuary through summer camp experiences.	Activity 3.1 Expand Sanctuary Explorers Camp to reach a broader audience.	<u>Objective 1</u> To structure programs to educate along an environmental literacy continuum including developing awareness, building a knowledge base, changing behavior, and building stewardship. <u>Objective 2</u> To increase communication and coordination among sanctuary programs and partners. <u>Objective 3</u> To develop programs to target content builders, user/impact groups, influencers, and decision makers. <u>Objective 4</u> To target diverse audiences including various multicultural, socio-economic, age, and gender groups.	<u>GFNMS FMP</u> Education, STRATEGY ED-5
STRATEGY ED-4: Educate teachers about the resources and programs of the sanctuary by providing professional development programs.	Activity 4.1 As a component of the Coastal Ecosystem Education Program, develop a set of professional development programs.	<u>Objective 1</u> To structure programs to educate along an environmental literacy continuum including developing awareness, building a knowledge base, changing behavior, and building stewardship. <u>Objective 2</u> To increase communication and coordination among sanctuary programs and partners. <u>Objective 3</u> To develop programs to target content builders, user/impact groups, influencers, and decision makers. <u>Objective 4</u> To target diverse audiences including various multicultural, socio-economic, age, and gender groups.	<u>GFNMS FMP</u> Conservation Science, STRATEGY CS-3
STRATEGY ED-5: Provide stewardship opportunities for high school students.	Activity 5.1 Develop GFNMS high school internship program.	<u>Objective 1</u> To structure programs to educate along an environmental literacy continuum including developing awareness, building a knowledge base, changing behavior, and building stewardship. <u>Objective 2</u> To increase communication and coordination among sanctuary programs and partners.	<u>GFNMS FMP</u> Education, STRATEGY ED-2, STRATEGY ED-7

**Appendix IIA: Education and Outreach  
GFNMS Management Plan**

Education and Outreach Strategy	Activity	Program Area Objective(s) Addressed	Complementary Strategies
STRATEGY ED-6: Create stewards of the GFNMS by engaging middle and high school students in a large-scale, long-term monitoring project.	Activity 6.1 Participate in LiMPETS (Long-term Monitoring Program & Experimental Training for Students), a collaborative program of the West Coast sanctuaries to work with teachers and students to learn how to collect long-term monitoring data while increasing awareness of the sanctuaries.	<u>Objective 1</u> To structure programs to educate along an environmental literacy continuum including developing awareness, building a knowledge base, changing behavior, and building stewardship. <u>Objective 2</u> To increase communication and coordination among sanctuary programs and partners. <u>Objective 3</u> To develop programs to target content builders, user/impact groups, influencers, and decision makers.	<u>GFNMS FMP</u> Education, STRATEGY ED-2; Introduced Species, STRATEGY IS-3, STRATEGY IS-9; Water Quality, STRATEGY WQ-2; <u>MBNMS FMP</u> STRATEGY TP-1
STRATEGY ED-7: Expand the reach of GFNMS education and outreach programs by expanding Sanctuary Naturalist Corps program to deploy trained volunteers to educate about the sanctuary at various events and locations.	Activity 7.1 As a part of Sanctuary Naturalist Corps, recruit, train, and manage a diverse team of volunteers to engage in, educate, and outreach about the sanctuary.  Activity 7.2 Develop GFNMS naturalist certification program to train volunteers and professional naturalists of the sanctuary and of other organizations to present basic sanctuary information.	<u>Objective 1</u> To structure programs to educate along an environmental literacy continuum including developing awareness, building a knowledge base, changing behavior, and building stewardship. <u>Objective 2</u> To increase communication and coordination among sanctuary programs and partners. <u>Objective 3</u> To develop programs to target content builders, user/impact groups, influencers, and decision makers. <u>Objective 4</u> To target diverse audiences including various multicultural, socio-economic, age, and gender groups.	<u>GFNMS FMP</u> Introduced Species, STRATEGY IS-2, STRATEGY IS-3, STRATEGY IS-5  <u>MBNMS FMP</u> Operations and Administrations, STRATEGY OA-2, STRATEGY OA-4; Beach Closures, STRATEGY BC-2; Tidepool Protection, STRATEGY TP-2
STRATEGY ED-8: Increase awareness and knowledge of the sanctuary through a lecture series.	Activity 8.1 Raise the profile of and expand the GFNMS lecture series to target new audiences and increase attendance.	<u>Objective 1</u> To structure programs to educate along an environmental literacy continuum including developing awareness, building a knowledge base, changing behavior, and building stewardship. <u>Objective 2</u> To increase communication and coordination among sanctuary programs and partners. <u>Objective 3</u> To develop programs to target content builders, user/impact groups, influencers, and decision makers.	<u>CBNMS FMP</u> Education, STRATEGY ED-6  <u>MBNMS FMP</u> SIMoN STRATEGY SI-1
STRATEGY ED-9: Increase awareness and build knowledge of the sanctuary through educational programs and exhibits at the visitor center.	Activity 9.1 Maintain educational and engaging exhibits and activities at the GFNMS Coast Guard Station visitor center.	<u>Objective 1</u> To structure programs to educate along an environmental literacy continuum including developing awareness, building a knowledge base, changing behavior, and building stewardship. <u>Objective 2</u> To increase communication and coordination among sanctuary programs and partners.	<u>GFNMS FMP</u> Education, STRATEGY ED-1, STRATEGY ED-11.
STRATEGY ED-10: Increase awareness of the sanctuary and reach a large audience through production and distribution of videos on the sanctuary and its resources.	Activity 10.1 Complete production of a general video and distribute to appropriate audiences.	<u>Objective 1</u> To structure programs to educate along an environmental literacy continuum including developing awareness, building a knowledge base, changing behavior, and building stewardship.	<u>GFNMS FMP</u> Education, STRATEGY ED-1, STRATEGY ED-7
STRATEGY ED-11: Increase awareness of GFNMS by using effective media and	Activity 11.1 Implement awareness campaign to raise the profile and recognition of the GFNMS.	<u>Objective 1</u> To structure programs to educate along an environmental literacy continuum including developing awareness, building a knowledge base, changing	<u>GNFMS FMP</u> Conservation Science, STRATEGY CS-3; Water Quality,

**Appendix IIA: Education and Outreach  
GFNMS Management Plan**

Education and Outreach Strategy	Activity	Program Area Objective(s) Addressed	Complementary Strategies
advertising techniques.	<p>Activity 11.2 Increase reach and success of all sanctuary programs by increasing distribution of GFNMS education and outreach messages through other environmental education groups.</p> <p>Activity 11.3 Increase reach and success of all sanctuary programs by effectively marketing, distributing, and evaluating all sanctuary programs and products.</p>	<p>behavior, and building stewardship.</p> <p><u>Objective 2</u> To increase communication and coordination among sanctuary programs and partners.</p> <p><u>Objective 3</u> To develop programs to target content builders, user/impact groups, influencers, and decision makers.</p> <p><u>Objective 4</u> To target diverse audiences including various multicultural, socio-economic, age, and gender groups.</p>	<p>STRATEGY WQ-2; Wildlife Disturbance, STRATEGY WD-6; Introduced Species, STRATEGY IS-9; Impacts from Vessel Spills, STRATEGY VS-9; <u>MBNMS FMP</u> Operations and Administration, STRATEGY OA-4 <u>CBNMS FMP</u> Education, STRATEGY ED-3</p>
STRATEGY ED-12: Increase audience by building a larger visitor center with increased exhibits, programs, and opportunities to learn about and support GFNMS.	Activity 12.1 Create a new visitor center that showcases the NMSP with exhibits, lecture hall, and classroom/lab facilities, providing a gateway to GFNMS.	<p><u>Objective 1</u> To structure programs to educate along an environmental literacy continuum including developing awareness, building a knowledge base, changing behavior, and building stewardship.</p> <p><u>Objective 2</u> To increase communication and coordination among sanctuary programs and partners.</p> <p><u>Objective 3</u> To develop programs to target content builders, user/impact groups, influencers, and decision makers.</p> <p><u>Objective 4</u> To target diverse audiences including various multicultural, socio-economic, age, and gender groups.</p>	<p><u>GNFMS FMP</u> Education, STRATEGY ED-2</p>
STRATEGY ED-13: Increase awareness of the sanctuary through interpretive signage and exhibits at strategic locations.	Activity 13.1 Develop a coordinated network of signs and exhibits throughout the sanctuary.	<p><u>Objective 1</u> To structure programs to educate along an environmental literacy continuum including developing awareness, building a knowledge base, changing behavior, and building stewardship.</p> <p><u>Objective 2</u> To increase communication and coordination among sanctuary programs and partners.</p> <p><u>Objective 3</u> To develop programs to target content builders, user/impact groups, influencers, and decision makers.</p>	<p><u>GFNMS FMP</u> Administration, STRATEGY AD-1; <u>MBNMS FMP</u> Interpretive Facilities, STRATEGY IF-2; <u>CBNMS FMP</u> Education, STRATEGY ED-5</p>
STRATEGY ED-14: Outreach to residents and visitors in inland areas of GFNMS watersheds about their connection with the sanctuary.	Activity 14.1 Develop a traveling exhibit on sanctuary watersheds to bring the sanctuary to inland communities.	<p><u>Objective 1</u> To structure programs to educate along an environmental literacy continuum including developing awareness, building a knowledge base, changing behavior, and building stewardship.</p> <p><u>Objective 2</u> To increase communication and coordination among sanctuary programs and partners.</p> <p><u>Objective 3</u> To develop programs to target content builders, user/impact groups, influencers, and decision makers.</p>	<p><u>GFNMS FMP</u> Education, STRATEGY ED-2 <u>MBNMS FMP</u> Fishing Related Education, STRATEGY FRER-7</p>
STRATEGY WQ-2: Address sources of anthropogenic pathogens and pollutants from recreational and commercial boating activities and marinas.	Activity 2.2 Develop a combined outreach program on BMPs and interpretive enforcement for recreational and commercial user groups in and around Tomales and Bodega Bays.	<p><u>Objective 1</u> To develop a regionally-based, cooperative water quality protection plan to address point and non-point source water quality impacts.</p> <p><u>Objective 2</u> To emphasize a watershed/ecosystem approach and address the range of water quality threats from chronic land-based runoff to catastrophic</p>	<p><u>GFNMS FMP</u> Water Quality, STRATEGY WQ-1, STRATEGY WQ-2; Vessel Spills, STRATEGY VS-3; Education, STRATEGY ED-7</p>

**Appendix IIA: Education and Outreach  
GFNMS Management Plan**

Education and Outreach Strategy	Activity	Program Area Objective(s) Addressed	Complementary Strategies
		offshore events.	MBNMS FMP Water Quality, STRATEGY WQPP-1, STRATEGY WQPP-2
STRATEGY WQ-9: Educate local decision makers on land-based water quality impacts in the sanctuary.	Activity 9.1 GFNMS will partner with the California Coastal Commission and other agencies and institutions on Nonpoint Education for Municipal Officials (NEMO) to inform decision makers on the link between development/growth and water quality.	<u>Objective 1</u> To develop a regionally-based, cooperative water quality protection plan to address point and non-point source water quality impacts. <u>Objective 2</u> To emphasize a watershed/ecosystem approach and address the range of water quality threats from chronic land-based runoff to catastrophic offshore events.	GFNMS FMP Water Quality, STRATEGY WQ-3, STRATEGY WQ-6
STRATEGY WD-2: Through the use of volunteer monitoring programs, observe and record impacts from human activities on marine resources and key habitats such as the rocky intertidal.	Activity 2.1 Develop volunteer-based intertidal monitoring program to evaluate human impacts on the intertidal habitat of the sanctuary and measure recovery rates of closed areas. This program will fall under the Sanctuary Naturalist Corps umbrella.	<u>Objective 1</u> To continually evaluate levels and sources of impacts on wildlife and habitats. <u>Objective 2</u> To address human behavior that is impacting wildlife and habitats.	GFNMS FMP Education, STRATEGY ED-7; Introduced Species, STRATEGY IS-3
STRATEGY WD-4: Through interpretive enforcement and law enforcement efforts, address human behavior that may adversely impact wildlife.	Activity 4.1 Under the Sanctuary Naturalist Corps umbrella, develop a coordinated and complementary set of interpretive enforcement efforts to address human behavior and its impacts on sanctuary resources.	<u>Objective 1</u> To continually evaluate levels and sources of impacts on wildlife and habitats. <u>Objective 2</u> To address human behavior that is impacting wildlife and habitats.	GFNMS FMP Wildlife Disturbance, STRATEGY WD-1, STRATEGY WD-3; Education, STRATEGY ED-7
STRATEGY WD-5: Develop wildlife viewing guidelines to reduce disturbance to wildlife from human interactions.	Activity 5.1 Conduct an assessment of target audiences to determine messaging, products and avenues for communicating to wildlife viewers about responsible interactions with wildlife.	<u>Objective 1</u> To continually evaluate levels and sources of impacts on wildlife and habitats. <u>Objective 2</u> To address human behavior that is impacting wildlife and habitats.	GFNMS FMP Education, STRATEGY ED-7, Conservation Science, STRATEGY CS-2
STRATEGY WD-6: Maximize media venues to augment directed outreach efforts and increase public awareness of wildlife disturbance issues.	Activity 6.1 In conjunction with partners, develop a media communications plan to address wildlife disturbance issues.	<u>Objective 1</u> To continually evaluate levels and sources of impacts on wildlife and habitats. <u>Objective 2</u> To address human behavior that is impacting wildlife and habitats.	GFNMS FMP Education, STRATEGY ED-11
STRATEGY IS-5: Develop an outreach and monitoring program to improve early detection of introduced species.	Activity 5.1 Since most introduced species are accidental finds, GFNMS will develop an early detection program to widely disseminate information	<u>Objective 2</u> To create a new program and/or coordinate with existing programs to detect and monitor new introductions.	GFNMS FMP Education, STRATEGY ED-7; Introduced Species, STRATEGY IS-1, STRATEGY IS-2,

*Appendix IIA: Education and Outreach  
GFNMS Management Plan*

Education and Outreach Strategy	Activity	Program Area Objective(s) Addressed	Complementary Strategies
	about introduced species to local citizens and visitors.		STRATEGY IS-3
STRATEGY IS-9: Through outreach efforts, inform targeted audiences and industry about pathways through which introduced species may enter the sanctuary and educate those targeted audiences on prevention methods.	<p>Activity 9.1 Develop a targeted prevention program (other than shipping industry, as ballast water is already being targeted).</p> <p>Activity 9.2 Develop outreach program to target recreational and commercial boaters on BMPs.</p>	<p><u>Objective 3</u> To develop management actions to eradicate and/or control existing and new introductions.</p> <p><u>Objective 4</u> To identify and control current and potential pathways to prevent new introductions.</p>	<p><u>GFNMS FMP</u> Education, STRATEGY ED-6, STRATEGY ED-7, STRATEGY ED-8, STRATEGY ED-9</p> <p><u>GFNMS FMP</u> Education, STRATEGY ED-6, STRATEGY ED-7, STRATEGY ED-8, STRATEGY ED-9; Introduced Species, IS-8</p>
STRATEGY FA-5: Bring public awareness to the value and importance of the historical and cultural significance of maritime communities and their relationship and reliability on healthy sanctuary waters.	Activity 5.1 Develop a maritime heritage and fishing community model.	<u>Objective 2</u> The sanctuary will seek to facilitate the management of fisheries resources within its boundaries in order to protect cultural resources, to protect important natural resources, and to maintain biodiversity and the health and balance of the sanctuary ecosystem.	<p><u>GFNMS FMP</u> Ecosystem Protection, STRATEGY FA-2</p> <p><u>MBNMS FMP</u> Benthic Habitats, STRATEGY BH-1; Fishing Related Research and Education STRATEGY FRER-4</p>
STRATEGY VS-9: Outreach to mariners to increase stewardship of the sanctuary, including voluntary compliance with VTS and sanctuary regulations.	<p>Activity 9.1 Develop outreach plan based on results of Vessel Activities Profile, Risk Assessment, and Resources at Risk Assessment to increase voluntary compliance with VTS and sanctuary regulations</p> <p>Activity 9.2 Provide information about the sanctuary to maritime industry, fishing and recreational boating communities.</p>	<p><u>Objective 4</u> To develop outreach program for maritime industry, fishing, and recreational boating communities based on risk assessment and long-term monitoring results.</p> <p><u>Objective 5</u> To provide for continuous evaluation and leverage opportunities for improvement in coordination with partners.</p>	<p><u>GFNMS FMP</u> Vessel Spills, STRATEGY VS-3, STRATEGY VS-4, STRATEGY VS-6, STRATEGY VS-11, STRATEGY VS-12; Water Quality, STRATEGY WQ-4</p> <p><u>GFNMS FMP</u> Vessel Spills, STRATEGY VS-11, STRATEGY VS-12; Water Quality, STRATEGY WQ-5</p>



**OVERVIEW OF STRATEGIES:**

## Appendix IIB: Conservation Science

Conservation Science Strategy	Activity	Program Area Objective(s) Addressed	Complementary Strategies
STRATEGY CS-1: Maintain Beach Watch program to monitor marine life and human activities on sanctuary beaches and provide baseline information to assist sanctuary management decisions.	Activity 1.1 As a part of the Sanctuary Naturalist Corps, maintain Beach Watch volunteer monitoring program to gather baseline information about the resources of the sanctuary and expand the long-term dataset.	<u>Objective 2</u> To conduct studies of species or marine communities to identify resources most at risk or in need of management attention. <u>Objective 4</u> To design research and monitoring projects that are responsive to management concerns and contribute to improved management of the sanctuary. <u>Objective 5</u> To make effective use of research and monitoring results by incorporating them into Education and Resource Protection programs.	<u>GFNMS FMP</u> Vessel Spills, STRATEGY VS-9, STRATEGY VS-6; Introduced Species, STRATEGY IS-1; Impacts from Fishing Activities, STRATEGY FA-1
STRATEGY CS-2: Conduct research to develop permit conditions for white shark viewing and to assess effectiveness of new regulations.	Activity 2.1 Conduct research to determine appropriate permit conditions and effectiveness of new regulations in reducing disturbance to white sharks.	<u>Objective 4</u> To design research and monitoring projects that are responsive to management concerns and contribute to improved management of the sanctuary. <u>Objective 6</u> To encourage information exchange and cooperation among all organizations and agencies undertaking management-related research in the sanctuaries to promote more timely and informed management.	Regulatory changes
	Activity 2.2 Conduct research to assess effectiveness of new eelgrass bed protection zones. Following promulgation of new regulations restricting vessel anchoring in eelgrass beds within Tomales Bay, conduct research to assess health of current and future eelgrass beds to determine appropriate permit conditions and effectiveness of new regulations in reducing disturbance to eelgrass beds.	<u>Objective 1</u> . Develop and implement an eelgrass status study to assess size, density and species richness of current eelgrass beds within and outside of management zones. Study analyses shall be targeted to recommend acceptable number of vessels and anchoring types that maybe allowed in zones. <u>Objective 2</u> . Periodically review effectiveness of regulation, size and location of management zones and special permit conditions and revise as appropriate.	Regulatory changes Wildlife Disturbance STRATEGY WD-3, Introduced Species STRATEGY IS-2, Conservation Science Action STRATEGY CS-4, CS-5, CS-6

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Conservation Science Strategy	Activity	Program Area Objective(s) Addressed	Complementary Strategies
<p>STRATEGY CS-3: Host a biennial research workshop to facilitate information exchange in the GFNMS.</p>	<p>Activity 3.1 Every other year, the sanctuary will continue to host a conservation science workshop with local researchers and educators to highlight science in and around the sanctuary.</p>	<p><u>Objective 1</u> To assess the sanctuary’s information base to identify gaps in knowledge that can affect our ability to manage the area.  <u>Objective 2</u> To conduct studies of species or marine communities to identify resources most at risk or in need of management attention.  <u>Objective 3</u> To promote the sanctuaries as a site for management-related marine research by providing financial and logistical support for scientific investigations that address critical marine resource protection issues.  <u>Objective 6</u> To encourage information exchange and cooperation among all organizations and agencies undertaking management-related research in the sanctuaries to promote more timely and informed management.  <u>Objective 7</u> Educate research community how to post monitoring program descriptions and findings on to GFNMS SIMoN, OceanObs, SEAMAP, CICORE and other appropriate web sites.</p>	
<p>Strategy CS-4 Develop and implement integrated sanctuary ecosystem assessment and monitoring programs</p>	<p>Activity 4.1 Expand Sanctuary Ecosystem Monitoring Surveys-Pelagic Habitat (SEA Surveys, formerly known as Ecosystem Dynamics Study-EDS).</p>	<p><u>Objective 1</u> Conduct long-term monitoring of the macrovertebrates of the sanctuary, seabirds, marine mammals, and sea turtles and their prey species. Monitor the abundance and distribution of species impacted by chronic and acute oil pollution, such as seabirds, marine mammals, and sea turtles, and their trophic relationship and the population dynamics of euphausiid shrimp or krill.  <u>Objective 2</u> Investigate the relationship between hydrographic conditions, physical features and the distribution and abundance of marine organisms in the vicinity of the Gulf of the Farallones region and the coastal and pelagic region west of Sonoma County.  <u>Objective 3</u> Link local abundance and distribution data sets with associated habitats, oceanographic features, and occurrence and distribution of human activities, such as vessel activities.  <u>Objective 4</u> Monitor phytoplankton for detection of harmful algal blooms and inventory and early detection of pelagic and larval introduced species.</p>	<p>Complementary Strategies:  Water Quality  STRATEGY WQ-2  Introduced Species  STRATEGY IS-1, IS-2,  Impacts from Vessel Spills  VS-3, VS-5, VS-6,  Wildlife Disturbance  STRATEGY WD-2, WD-3, WD-4, WD-7,  Conservation Science  Action STRATEGY CS-1, CS-2, CS-3, CS-5, CS-6,  Cross-cutting Ecosystem  Monitoring Action  STRATEGY XEM-1, XEM-2, XEM-3, Northern  Management Area Science  Action STRATEGIES  XNRM-1, XNRM-2,  XNRM-5</p>

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Conservation Science Strategy	Activity	Program Area Objective(s) Addressed	Complementary Strategies
		<p><u>Objective 5 Map survey specific and trend information for identification of areas of ecological significance.</u></p>	
	<p><u>Activity 4.2</u> Expand sanctuary's Rocky Intertidal Monitoring Program. Long-term monitoring of the rocky intertidal habitats is a priority program for the GFNMS. The rocky intertidal habitat of the sanctuary is limited to outer coast and island shorelines.</p>	<p><u>Objective 1</u> Continue monitoring of the rocky intertidal areas of the Farallon Islands and re-establish long-term monitoring of six mainland monitoring sites: Bodega Head, Pinnacle Rock, Estero Americano, Duxbury Reef, Slide Ranch, Bean Hollow and Pigeon Point. The objectives are to: 1) establish non-destructive, permanent sampling transects, quadrats and density plots within the intertidal areas of the GFNMS; 2) determine native and introduced species inventory in the intertidal communities; 3) determine primary and secondary cover in established quadrats; 4) determine percent cover of sessile organisms; 5) to determine density of macroinvertebrates susceptible to oil spill damage; 6) photograph, collect and archive voucher specimens from the intertidal areas for future reference;. Through regular assessment (monitoring) of the condition and health of this sensitive habitat, sanctuary staff can detect acute changes and long-term trends. Monitoring information can also indicate if a management action is effective and having positive results.</p> <p><u>Objective 2</u> Integrate monitoring protocols and data sets with CeNCOOS, West Coast Observations – Sanctuary</p>	<p><u>Complementary Strategies:</u>  <u>Introduced Species</u>            STRATEGY IS-1, IS-3, IS-5, <u>Wildlife Disturbance</u>            STRATEGY WD-2, WD-3, WD-4, <u>Conservation Science Action</u>            STRATEGY CS-1, CS-2, CS-3, CS-5, CS-6, <u>Cross-cutting Ecosystem</u>  <u>Monitoring Action</u>            STRATEGY XEM-1, XEM-2, <u>Northern Management Area Science</u>  <u>Action STRATEGIES</u>            XNRM-1, XNRM-2, XNRM-4, XNRM-5</p>

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Conservation Science Strategy	Activity	Program Area Objective(s) Addressed	Complementary Strategies
		<p>Ecosystem Assessment Stations, Minerals Management Service, Multi-agency Rocky Intertidal Network (MARINE), Partnership for Interdisciplinary Studies of Coastal Oceans (PISCO), and the National Park Service. Provide data sets and integrated analyses to the State’s Marine Life Protection Act, marine protected areas.</p> <p><u>Objective 3</u> Provide species inventory updates and integrate with introduced species detection programs.</p>	
	<p>Activity 4.3 Long-term monitoring of sanctuary physical/oceanographic processes</p>	<p><u>Objective 1</u> Expand West Coast Obs-Sanctuary Ecosystem Assessment Stations (SEA Stations). SEA Stations are nearshore and near-island buoy-instrumentation, customized for particular locations. SEA Stations measure environmental events that affect living resources, measuring processes conducive to distribution, settlement, growth and reproduction. Arrays have been placed at areas of water mass convergence, areas of strong upwelling influence and high productivity, and also near sites of rocky intertidal monitoring. Interannual and shorter-term upwelling and relaxation events have been shown to drive recruitment and movement of certain fish species. It is also likely that these events affect other resources, including keystone species. The GFNMS has three arrays that continuously measure water column temperature, providing information necessary to understand and track water mass movements that affect recruitment of key species to coastal habitats: Bodega Head, Southeast Farallon Island, and Pigeon Point. A fourth array shall be deployed at Double Point.</p> <p><u>Objective 2</u> Establish Cooperative Agreement with Bodega Bay Marine Lab for long term maintenance and periodic</p>	<p>Complementary Strategies: Impacts from Vessel Spills VS-2, VS-6, Conservation Science Action STRATEGY CS-1, CS-2, CS-3, CS-5, CS-6, Cross-cutting Ecosystem Monitoring Action STRATEGY XEM-1, XEM-2, XEM-3, Northern Management Area Science Action STRATEGIES XNRM-1, XNRM-2, XNRM-3, XNRM-5</p>

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Conservation Science Strategy	Activity	Program Area Objective(s) Addressed	Complementary Strategies
		replacement and upgrades to array hardware; data down loading and web posting; data interpretation and integration with biological assemblages and ecological areas of significance.	
STRATEGY CS-5 Complete characterization of sanctuary biological and physical features.	<u>Activity 5.1</u> Complete mapping the sanctuary's major habitat types and bottom substrate,	<u>Objective 1</u> Provide a habitat map with important baseline information for management including relative proportions of sanctuary habitats; the current state of sanctuary resources as a basis against which to measure future change; unique habitats; identify areas of ecological significance;; and extent of damages from anthropogenic stressors.	Complementary Strategies: Water Quality STRATEGY WQ-1, WQ-2, Introduced Species STRATEGY IS-1, 2, 3, 4, 5, Impacts from Vessel Spills VS-2, Wildlife Disturbance STRATEGY WD-2, WD-3, WD-7, Conservation Science Action STRATEGY CS-1, CS-2, CS-3, CS-4, CS-6, Cross-cutting Ecosystem Monitoring Action STRATEGY XEM-1, XEM-2, Northern Management Area Science Action STRATEGIES XNRM-1, XNRM-2, XNRM-3, XNRM-5

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Conservation Science Strategy	Activity	Program Area Objective(s) Addressed	Complementary Strategies
	<p><u>Activity 5.2</u> Identify and map seasonal and year round circulatory patterns for surface and subsurface currents. Relate these circulatory patterns to abundance and distribution of living resources are primary tasks for the GFNMS.</p>	<p><u>Objective 1</u> Produce maps of seasonal and year round circulatory patterns for surface and subsurface currents.</p> <p><u>Objective 2</u> Relate these circulatory patterns to abundance and distribution of living resources are primary tasks for the GFNMS.</p>	<p>Complementary Strategies: Water Quality STRATEGY WQ-1, WQ-2, Introduced Species STRATEGY IS-1, 2, 3, 4, 5, Impacts from Vessel Spills VS-2, Wildlife Disturbance STRATEGY WD-2, WD-3, WD-7, Conservation Science Action STRATEGY CS-1, CS-2, CS-3, CS-4, CS-6, Cross-cutting Ecosystem Monitoring Action STRATEGY XEM-1, XEM-2, Northern Management Area Science Action STRATEGIES XNRM-1, XNRM-2, XNRM-3, XNRM-5</p>
	<p><u>Activity 5.3</u> Characterize the soft and hard bottom epifaunal communities.</p>	<p><u>Objective 1</u> Survey the surface biota and sediment characteristics.</p> <p><u>Objective 2</u> Quantifying estimates of abundance and distribution of epifauna, assessment of disturbance effects and marine debris, species list of invertebrates and epifaunal fish, and characterization of any cultural resources.</p>	<p>Complementary Strategies: Water Quality STRATEGY WQ-1, WQ-2, Introduced Species STRATEGY IS-1, 2, 3, 4, 5, Impacts from Vessel Spills VS-2, Wildlife Disturbance STRATEGY WD-2, WD-3, WD-7, Conservation Science Action STRATEGY CS-1, CS-2, CS-3, CS-4, CS-6, Cross-cutting Ecosystem Monitoring Action STRATEGY XEM-1, XEM-2, Northern Management Area Science Action STRATEGIES XNRM-1, XNRM-2, XNRM-3, XNRM-5</p>

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Conservation Science Strategy	Activity	Program Area Objective(s) Addressed	Complementary Strategies
	<p><u>Activity 5.4</u> Integrate characterization, mapping and monitoring programs with regional ocean observation programs along the west coast and the sanctuary program's System Wide Monitoring guidelines.</p>	<p><u>Objective 1</u> Produce interactive web pages for mapping and quantification of biological and physical processes.</p> <p><u>Objective 2</u> Produce reports and presentation of interpretation of ecological analyses, provide management with assessment of influences of ecosystem processes and anthropogenic processes on sanctuary resources, and provide management with predictions based on status and trends.</p>	<p>Complementary Strategies: Water Quality STRATEGY WQ-1, WQ-2, Introduced Species STRATEGY IS-1, 2, 3, 4, 5, Impacts from Vessel Spills VS-2, Wildlife Disturbance STRATEGY WD-2, WD-3, WD-7, Conservation Science Action STRATEGY CS-1, CS-2, CS-3, CS-4, CS-6, Cross-cutting Ecosystem Monitoring Action STRATEGY XEM-1, XEM-2, Northern Management Area Science Action STRATEGIES XNRM-1, XNRM-2, XNRM-3, XNRM-5</p>
<p>STRATEGY CS-6 Functional integration and infrastructure for SEA Station and Survey programs</p>	<p><u>Activity 6.1</u> Partner with local and regional researchers to achieve consistent data collection methodologies and consistent data base structures for improved data exchange and data integration opportunities.</p>	<p><u>Objective 1</u> Meet with local and regional researchers to develop consistent methodologies.</p> <p><u>Objective 2</u> As necessary, alter methodologies, data base structure and web postings for regional comparative analyses</p>	<p>Complementary Strategies: Water Quality Action STRATEGY WQ-2, 8, Introduced Species Action STRATEGY IS-1, IS-2, Impacts from Vessel Spills VS-2, Wildlife Disturbance Action STRATEGY WD-2, WD-3, Conservation Science Action STRATEGY CS-1, CS-2, CS-3, CS-4, CS-5, Cross-cutting Ecosystem Monitoring Action STRATEGY XEM-1, XEM-2, XEM-3, XEM-4, Northern Management Area Science Action STRATEGIES XNRM-1, XNRM-2, XNRM-3, XNRM-4, XNRM-5</p>

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Conservation Science Strategy	Activity	Program Area Objective(s) Addressed	Complementary Strategies
	<p><u>Activity 6.2</u> Partner with the National Oceanographic Data Center (NODC) National Coastal Data Development Center (NCDDC) for data and information management support.</p>	<p><u>Objective 1</u> Meet with staff from sanctuary headquarters, West Coast region, NCDDC to address requirements and needs for data rescue, metadata, Federal compliance issues, and data accessibility and delivery.</p> <p><u>Objective 2</u> Expand functionality of the Sanctuary Integrated Monitoring Network (SIMoN) to enhance data input and review, data management, analyses, reporting, archiving and dissemination functions in order to facilitate the transferability of the SIMoN framework to other sanctuaries.</p>	<p>Complementary Strategies: Water Quality Action STRATEGY WQ-2, 8, Introduced Species Action STRATEGY IS-1, IS-2, Impacts from Vessel Spills VS-2, Wildlife Disturbance Action STRATEGY WD-2, WD-3, Conservation Science Action STRATEGY CS-1, CS-2, CS-3, CS-4, CS-5, Cross-cutting Ecosystem Monitoring Action STRATEGY XEM-1, XEM-2, XEM-3, XEM-4, Northern Management Area Science Action STRATEGIES XNRM-1, XNRM-2, XNRM-3, XNRM-4, XNRM-5</p>
	<p><u>Activity 6.3</u> Develop the administrative infrastructure to identify and act on cross-boundary opportunities, collaborate with large-scale initiatives, and interpret the results for resource managers and public audiences across the region.</p>	<p><u>Objective 1</u> Establish a regional monitoring coordination team. The regional monitoring team shall consist of the site’s Research Coordinator and possibly additional science staff.</p> <p><u>Objective 2</u> Produce a regional science communication plan to improve coordination, evaluate effectiveness of monitoring programs, develop “state of the sanctuary” reports to help assess the health of the sanctuaries.</p> <p><u>Objective 3</u> Develop a regional ecosystem-based science operating plan in collaboration with other West Coast NMSs and local researchers to meet site, regional and national monitoring needs.</p>	<p>Complementary Strategies: Water Quality Action STRATEGY WQ-2, 8, Introduced Species Action STRATEGY IS-1, IS-2, Impacts from Vessel Spills VS-2, Wildlife Disturbance Action STRATEGY WD-2, WD-3, Conservation Science Action STRATEGY CS-1, CS-2, CS-3, CS-4, CS-5, Cross-cutting Ecosystem Monitoring Action STRATEGY XEM-1, XEM-2, XEM-3, XEM-4, Northern Management Area Science Action STRATEGIES XNRM-1, XNRM-2, XNRM-3, XNRM-4, XNRM-5</p>

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Conservation Science Strategy	Activity	Program Area Objective(s) Addressed	Complementary Strategies
	<p><u>Activity 6.4</u> Increase the use of new technologies in order to enhance data collection tasks, expedite data management and data improve availability for outreach and resource management interpretation.</p>	<p><u>Objective 1</u> The sanctuary will automate data collection techniques for near-real time retrieval of uncorrected data. Data collection technologies such as telepresence and remote sensing shall be incorporated into site and regional science programs.</p> <p><u>Objective 2</u> Expedite the availability of findings, by development on-line data entry and data downloading, building a multi-sanctuary database for availability in as close to real-time as possible, to be served through CICORE, SEAMAP, SIMoN and IMaST portals.</p> <p><u>Objective 3</u> Improve data interpretation through use of web based data management and data posting.</p>	<p>Complementary Strategies: Water Quality Action STRATEGY WQ-2, 8, Introduced Species Action STRATEGY IS-1, IS-2, Impacts from Vessel Spills VS-2, Wildlife Disturbance Action STRATEGY WD-2, WD-3, Conservation Science Action STRATEGY CS-1, CS-2, CS-3, CS-4, CS-5, Cross-cutting Ecosystem Monitoring Action STRATEGY XEM-1, XEM-2, XEM-3, XEM-4, Northern Management Area Science Action STRATEGIES XNRM-1, XNRM-2, XNRM-3, XNRM-4, XNRM-5</p>
<p>STRATEGY WQ-8: Develop an annotated bibliography of water quality research and monitoring programs in and adjacent to the sanctuary to evaluate data and determine the overall water quality of the sanctuary's ecosystem.</p>	<p>Activity 8.1 Inventory all short and long-term water quality research and monitoring programs to determine status, data gaps and sanctuary needs.</p>	<p>-</p>	<p><u>GFNMS FMP</u> Water Quality, STRATEGY WQ-1, STRATEGY WQ-5</p> <p><u>MBNMS FMP</u> Water Quality, STRATEGY WQPP-8, STRATEGY WQPP-9</p>
<p>STRATEGY WD-1: Create easily accessible centralized Web-based spatial database to house information pertaining to wildlife disturbance.</p>	<p>Activity 1.1 Develop and maintain a well designed information management and dissemination system.</p>	<p><u>Objective 1</u> To continually evaluate levels and sources of impacts on wildlife and habitats.</p>	<p><u>GFNMS FMP</u> Introduced Species, STRATEGY IS-1, STRATEGY IS-2, STRATEGY IS-3; Conservation Science, STRATEGY CS- 1; Water Quality, STRATEGY WQ-2, STRATEGY WQ-8; Fishing Activities, STRATEGY FA-1; Vessel Spills, STRATEGY VS-6, STRATEGY VS-12; Education, STRATEGY ED-2; Administration, STRATEGY AD-2</p>

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Conservation Science Strategy	Activity	Program Area Objective(s) Addressed	Complementary Strategies
<p>STRATEGY WD-2: Through the use of volunteer monitoring programs, observe and record impacts from human activities on marine resources and key habitats such as the rocky intertidal.</p>	<p>Activity 2.1 Develop volunteer-based intertidal monitoring program to evaluate human impacts on the intertidal habitat of the sanctuary and measure recovery rates of closed areas. This program will fall under the Sanctuary Naturalist Corps umbrella.</p>	<p><u>Objective 1</u> To continually evaluate levels and sources of impacts on wildlife and habitats. <u>Objective 2</u> To address human behavior that is impacting wildlife and habitats.</p>	<p><u>GFNMS FMP</u> Education, STRATEGY ED-7; Introduced Species, STRATEGY IS-3 <u>MBNMS FMP</u> Tidepool Protection, STRATEGY TP-1, STRATEGY TP-2</p>
<p>STRATEGY WD-3: Coordinate with other agencies, institutions and programs to better understand and address anthropogenic noise, light, and visual impacts on wildlife from vessels and low flying aircraft.</p>	<p>Activity 3.1 In coordination with partners, modify existing monitoring programs to identify types and frequency of impacts on wildlife from motorized and non-motorized aircraft and vessels.</p>	<p><u>Objective 1</u> To continually evaluate levels and sources of impacts on wildlife and habitats.</p>	<p><u>GFNMS FMP</u> Vessel Spills, STRATEGY VS-3; Administration, STRATEGY AD-3 <u>MBNMS FMP</u> Marine Mammal &amp; Seabird Disturbance, STRATEGY MMST-2</p>
	<p>Activity 3.2 Through the use of permit conditions, reporting requirements and/or tracking system, identify wildlife disturbance related research and monitoring programs and collaborate to collect data on wildlife disturbance in the sanctuary.</p>	<p><u>Objective 1</u> To continually evaluate levels and sources of impacts on wildlife and habitats. <u>Objective 2</u> To address human behavior that is impacting wildlife and habitats.</p>	<p><u>GFNMS FMP</u> Conservation Science, STRATEGY CS-3 <u>MBNMS FMP</u> Marine Mammal &amp; Seabird Disturbance, STRATEGY MMST-2</p>
	<p>Activity 3.3 Evaluate emerging scientific studies delineating the impacts of anthropogenic noise, light and visual disturbance including vessel traffic, seismic surveys for hydrocarbon exploration and other industrial and governmental activities impacting sanctuary resources.</p>	<p><u>Objective 1</u> To continually evaluate levels and sources of impacts on wildlife and habitats.</p>	<p><u>GFNMS FMP</u> Resource Protection STRATEGY RP-2, STRATEGY RP-3 <u>MBNMS FMP</u> Marine Mammal &amp; Seabird Disturbance STRATEGY MMST-2</p>

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Conservation Science Strategy	Activity	Program Area Objective(s) Addressed	Complementary Strategies
STRATEGY IS-1: Develop a native and introduced species inventory and database specifically for GFNMS and areas adjacent to the sanctuary.	<p>Activity 1.1 Profile and maintain a database specifically on the extent of introduced species in and adjacent to the GFNMS.</p> <p>Activity 1.2 Develop an easily accessible and queryable database to be used by sanctuary manager, staff, researchers and other agencies and institutions.</p>	<p><u>Objective 1</u> To understand the current extent of introduced species in GFNMS.</p>	<p>GFNMS FMP Ecosystem Protection, STRATEGY FA-1</p> <p>GFNMS FMP Wildlife Disturbance, STRATEGY WD-2</p> <p>MBNMS FMP Introduced Species, STRATEGY IS-3</p>
STRATEGY IS-2: In coordination with existing monitoring programs, develop a program to detect introduced species in estuarine environments of the sanctuary.	<p>Activity 2.1 GFNMS will work with other agencies and institutions to incorporate introduced species identification and monitoring into existing monitoring programs.</p> <p>Activity 2.2 Develop guidelines for new estuarine monitoring programs for introduced species.</p>	<p><u>Objective 2</u> To create a new program and/or coordinate with existing programs to detect and monitor new introductions.</p>	<p>GFNMS FMP Water Quality, STRATEGY WQ-2, STRATEGY WQ-6; Education, STRATEGY ED-4</p> <p>GFNMS FMP Wildlife Disturbance STRATEGY WD-1, Introduced Species, STRATEGY IS-1, STRATEGY IS-6; Fishing Activities STRATEGY FA-1</p> <p>MBNMS FMP Introduced Species STRATEGY IS-3</p>
STRATEGY IS-3: Develop a monitoring program to detect and monitor introduced species in the rocky intertidal areas of the sanctuary.	<p>Activity 3.1 Continue GFNMS' rocky intertidal monitoring program.</p> <p>Activity 3.2 Add onto GFNMS' existing intertidal monitoring program to look for introduced species, and coordinate with other agencies' rocky intertidal monitoring programs.</p>	<p><u>Objective 2</u> To create a new program and/or coordinate with existing programs to detect and monitor new introductions.</p>	<p>GFNMS FMP Education, STRATEGY ED-4</p> <p>MBNMS FMP Introduced Species, STRATEGY IS-4</p>

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Conservation Science Strategy	Activity	Program Area Objective(s) Addressed	Complementary Strategies
STRATEGY IS-4: Develop a monitoring program to detect and monitor introduced species in the pelagic environment of the sanctuary.	Activity 4.1 SEA Surveys plankton tows and harmful algal bloom assessments will be used to sample for introduced species.	<u>Objective 2</u> To create a new program and/or coordinate with existing programs to detect and monitor new introductions.	GFNMS FMP Ecosystem Protection, STRATEGY FA-1  MBNMS FMP Introduced Species, STRATEGY IS-4
STRATEGY IS-5: Develop an outreach and monitoring program to improve early detection of introduced species.	Activity 5.1 GFNMS will develop an early detection program to widely disseminate information about introduced species to local citizens and visitors	<u>Objective 2</u> To create a new program and/or coordinate with existing programs to detect and monitor new introductions.  <u>Objective 3</u> To develop management actions to eradicate and/or control existing and new introductions.  <u>Objective 4</u> To identify and control current and potential pathways to prevent new introductions.	GFNMS FMP Education, STRATEGY ED-7; Introduced Species, STRATEGY IS-1, STRATEGY IS-2, STRATEGY IS-3  MBNMS FMP Introduced Species, STRATEGY IS-4
STRATEGY FA-1: Develop a resource characterization of the sanctuary to better understand types and distributions of habitats, species and processes.	Activity 1.1 Modify the SEA Surveys and develop additional research components as necessary to build a baseline characterization and regional monitoring of the sanctuary including habitat, physical and biological characteristics.	<u>Objective 1</u> Based on the best available scientific and socioeconomic information, the sanctuary will: 1) facilitate the evaluation of the status and trends in marine populations (and their causes) in sanctuary waters, and 2) identify and evaluate impacts on sanctuary resources from fishing activities.	GFNMS FMP Introduced Species, STRATEGY IS-2; Ecosystem Protection, STRATEGY FA-3, STRATEGY FA-4, STRATEGY FA-5, STRATEGY EP-1, STRATEGY EP-3; Vessel Spills, STRATEGY VS-8
STRATEGY VS-5: Track distribution and numbers of species of concern and habitats in relation to probable spill trajectories.	Activity 5.1 Refine resources-at-risk model analysis for Gulf of the Farallones.  Activity 5.2 Modify the SEA Surveys and develop additional research components as necessary to build a baseline characterization and monitoring of the sanctuary habitats and physical and biological characteristics.	<u>Objective 1</u> To assess level of risk and determine whether improvements can be made to reduce risk.  <u>Objective 2</u> To develop long-term monitoring programs within GFNMS to identify trends and take proactive measures to reduce risk from vessel spills.	GFNMS FMP Vessel Spills, STRATEGY VS-2, STRATEGY VS-3, STRATEGY VS-7, STRATEGY VS-8  GFNMS FMP Ecosystem Protection, STRATEGY FA-1, STRATEGY FA-3, STRATEGY FA-4; Introduced Species, STRATEGY IS-2; Vessel Spills, STRATEGY VS-2, STRATEGY VS-4, STRATEGY VS-6, STRATEGY VS-7, STRATEGY VS-8

**Appendix IIB: Conservation Science  
GFNMS Management Plan**

<b>Conservation Science Strategy</b>	<b>Activity</b>	<b>Program Area Objective(s) Addressed</b>	<b>Complementary Strategies</b>
<p>STRATEGY VS-8: Continue to improve integration of GFNMS Beach Watch and SEA Surveys data into ACP.</p>	<p>Activity 8.1 Increase frequency of integrating Beach Watch and SEA Surveys data into ACP.</p>	<p><u>Objective 1</u> To assess level of risk and determine whether improvements can be made to reduce risk.</p> <p><u>Objective 2</u> To develop long-term monitoring programs within GFNMS to identify trends and take proactive measures to reduce risk from vessel spills.</p> <p><u>Objective 5</u> To provide for continuous evaluation and leverage opportunities for improvement in coordination with partners.</p>	<p><u>GFNMS FMP</u> Vessel Spills, STRATEGY VS-6, STRATEGY VS-7, STRATEGY VS-8</p>



**OVERVIEW OF STRATEGIES:**

## Appendix IIC: Resource Protection

Resource Protection Strategy	Activity	Program Area Objective(s) Addressed	Complementary Strategies
STRATEGY RP-1: Establish a framework for identifying, tracking and addressing emerging issues on a timely basis.	<p>Activity 1.1 Develop an electronic Web-based cataloging system to capture information on new and emerging issues.</p> <p>Activity 1.2 Establish an evaluation system for determining if the issue is relevant to the site and identify steps for addressing issues.</p>	<p><u>Objective 1</u> To build a comprehensive and coordinated resource protection plan to ensure protection for the resources and qualities of GFNMS.</p> <p><u>Objective 2</u> To continue to build on partnerships, collaborative efforts, and coordination with other agencies, institutions, and organizations, in taking a comprehensive and effective ecosystem protection approach.</p>	<p><u>GFNMS FMP</u> Resource Protection, STRATEGY RP-2, STRATEGY RP-3</p> <p><u>CBNMS FMP</u> Administration, STRATEGY AD-7</p> <p><u>MBNMS FMP</u> Emerging Issues, STRATEGY EI-1, STRATEGY EI-2</p>
STRATEGY RP-2: Develop a coordinated communication system amongst all national marine sanctuaries and other resource management agencies to stay informed about new and emerging issues	<p>Activity 2.1 NOAA, National Ocean Service and the NMSP are addressing new and emerging issues in some capacity, every day.</p> <p>Activity 2.2 GFNMS will formalize a communication system and leverage opportunities with other resource management agencies to exchange ideas on new and emerging issues.</p>	<p><u>Objective 1</u> To build a comprehensive and coordinated resource protection plan to ensure protection for the resources and qualities of GFNMS.</p> <p><u>Objective 2</u> To continue to build on partnerships, collaborative efforts, and coordination with other agencies, institutions, and organizations, in taking a comprehensive and effective ecosystem protection approach.</p>	<p><u>GFNMS FMP</u> Wildlife Disturbance, STRATEGY WD-3; Resource Protection, STRATEGY RP-1</p>
STRATEGY RP-3: As GFNMS' priorities shift, due to both availability of resources and priority of ecosystem protection issues, all current, new and emerging issues need to be continually tracked and re-evaluated.	<p>Activity 3.1 There are many new and emerging issues that need to be tracked and addressed in some capacity over the next five years.</p>	<p><u>Objective 1</u> To build a comprehensive and coordinated resource protection plan to ensure protection for the resources and qualities of GFNMS.</p> <p><u>Objective 2</u> To continue to build on partnerships, collaborative efforts, and coordination with other agencies, institutions, and organizations, in taking a comprehensive and effective ecosystem protection approach.</p>	<p><u>GFNMS FMP</u> Wildlife Disturbance, STRATEGY WD-3, STRATEGY WD-7; Resource Protection, STRATEGY RP-2</p>
STRATEGY RP-4: Develop a formalized review program to consistently and continuously review and evaluate effectiveness of sanctuary regulations.	<p>Activity 4.1 Evaluate the appropriateness and effectiveness of current sanctuary regulatory language (prohibitions) in addressing the priority resource management issues.</p>	<p><u>Objective 1</u> To build a comprehensive and coordinated resource protection plan to ensure protection for the resources and qualities of GFNMS.</p>	<p><u>GFNMS FMP</u> Resource Protection, STRATEGY RP-1, STRATEGY RP-2, STRATEGY RP-3, STRATEGY RP-5, STRATEGY RP-6</p>

**Appendix IIC: Resource Protection  
GFNMS Management Plan**

Resource Protection Strategy	Activity	Program Area Objective(s) Addressed	Complementary Strategies
<p>STRATEGY RP-5: Develop a formalized permit program to provide the mechanism to review requests to conduct prohibited activities within the sanctuary</p>	<p>Activity 5.1 The permit program will continue to review projects.</p> <p>Activity 5.2 Develop a Web-based permit application and tracking program.</p> <p>Activity 5.3 Coordinate with other regulatory agencies issuing permits to ensure consistency with applicable laws.</p> <p>Activity 5.4 Outreach efforts about the sanctuary’s permit process will help to inform and bring into compliance with the sanctuary’s permit process those activities.</p>	<p><u>Objective 1</u> To build a comprehensive and coordinated resource protection plan to ensure protection for the resources and qualities of GFNMS.</p> <p><u>Objective 2</u> To continue to build on partnerships, collaborative efforts, and coordination with other agencies, institutions, and organizations, in taking a comprehensive and effective ecosystem protection approach.</p>	<p><u>GFNMS FMP</u> Resource Protection, STRATEGY RP-4, STRATEGY RP-6</p>
<p>STRATEGY RP-6: Strive to increase ecosystem protection through compliance with sanctuary regulations and other applicable state and federal statutes.</p>	<p>Activity 6.1 Ensure sufficient patrol presence in the sanctuary through the development of partnerships and interagency coordination.</p> <p>Activity 6.2 Use interpretive enforcement as a tool to inform and encourage voluntary compliance with sanctuary regulations.</p> <p>Activity 6.3 An interpretive law enforcement program will use education and outreach to affect behavior and values to achieve voluntary compliance with sanctuary regulations.</p> <p>Activity 6.4 Develop enforcement tools to ensure effectiveness of the enforcement program.</p>	<p><u>Objective 1</u> To build a comprehensive and coordinated resource protection plan to ensure protection for the resources and qualities of GFNMS.</p> <p><u>Objective 2</u> To continue to build on partnerships, collaborative efforts, and coordination with other agencies, institutions, and organizations, in taking a comprehensive and effective ecosystem protection approach.</p>	<p><u>GFNMS FMP</u> Resource Protection, STRATEGY RP-4, STRATEGY RP-5; Vessel Spills, STRATEGY VS-9</p>

**Appendix IIC: Resource Protection  
GFNMS Management Plan**

Resource Protection Strategy	Activity	Program Area Objective(s) Addressed	Complementary Strategies
<p>STRATEGY RP-7: Review and revise the sanctuary's emergency response plan, in order to be prepared to respond to an incident.</p>	<p>Activity 7.1 Review and revise emergency response plan, based on ICS and the USCG's ACP.</p> <p>Activity 7.2 Develop tools to ensure a coordinated and timely response to incidents.</p> <p>Activity 7.3 Assess levels of potential risk from activities in and adjacent to the sanctuary.</p>	<p><u>Objective 1</u> To build a comprehensive and coordinated resource protection plan to ensure protection for the resources and qualities of GFNMS.</p> <p><u>Objective 2</u> To continue to build on partnerships, collaborative efforts, and coordination with other agencies, institutions, and organizations, in taking a comprehensive and effective ecosystem protection approach.</p>	<p><u>GFNMS FMP</u> Resource Protection, STRATEGY RP-8; Vessel Spills, STRATEGY VS-2, STRATEGY VS-3, STRATEGY VS-4, STRATEGY VS-6, STRATEGY VS-7, STRATEGY VS-8, STRATEGY VS-9 <u>CBNMS FMP</u> Administration, STRATEGY AD-7  <u>MBNMS FMP</u> Introduced Species, STRATEGY IS-4; Operations &amp; Admin, STRATEGY OA-4; Beach Closures, STRATEGY BC-9</p>
<p>STRATEGY RP-8: Formalize plan to respond to incidents that damage sanctuary ecosystems.</p>	<p>Activity 8.1 Coordinate with the Office of Response and Restoration to restore sanctuary wildlife and habitats.</p>	<p><u>Objective 1</u> To build a comprehensive and coordinated resource protection plan to ensure protection for the resources and qualities of GFNMS.</p> <p><u>Objective 2</u> To continue to build on partnerships, collaborative efforts, and coordination with other agencies, institutions, and organizations, in taking a comprehensive and effective ecosystem protection approach.</p>	<p><u>GFNMS FMP</u> Resource Protection, STRATEGY RP-7; Vessel Spills, STRATEGY VS-6, STRATEGY VS-9</p>
<p>STRATEGY RP-9: Develop a framework for identifying and analyzing boundary options.</p>	<p>Activity 9.1 Through an incremental process gather information, analyze the data, and develop a recommendation on boundary options.</p> <p>Activity 9.2 The following recommended criteria will be used by the working group to evaluate different boundary options.</p>	<p><u>Objective 1</u> To build a comprehensive and coordinated resource protection plan to ensure protection for the resources and qualities of GFNMS.</p>	<p><u>GFNMS FMP</u> Research and Monitoring and Impacts from Fishing Activities, STRATEGY FA-1</p>
<p>STRATEGY RP-10: Continue to culture partnerships and leverage opportunities for protecting sanctuary wildlife, habitats, qualities and cultural resources.</p>	<p>Activity 10.1 Coordinate development of collaborative processes.</p> <p>Activity 10.2 Coordinate with other agency management and restoration plans to enhance and protect the sanctuary.</p>	<p><u>Objective 2</u> To continue to build on partnerships, collaborative efforts, and coordination with other agencies, institutions, and organizations, in taking a comprehensive and effective ecosystem protection approach.</p>	<p><u>GFNMS FMP</u> All strategies in draft management plan</p>

**Appendix IIC: Resource Protection  
GFNMS Management Plan**

Resource Protection Strategy	Activity	Program Area Objective(s) Addressed	Complementary Strategies
<p>STRATEGY RP-11: Evaluate condition of, and actual impacts on sanctuary resources and qualities from the Farallon Islands radioactive waste dump.</p>	<p>Activity 11.1 Convene a group of agency scientists to evaluate status of radioactive waste dump.</p> <p>Activity 11.2 Develop an outreach campaign to inform the public on the status and potential threats of the FIRWD.</p>	<p><u>Objective 1</u> To build a comprehensive and coordinated resource protection plan to ensure protection for the resources and qualities of GFNMS.</p> <p><u>Objective 2</u> To continue to build on partnerships, collaborative efforts, and coordination with other agencies, institutions, and organizations, in taking a comprehensive and effective ecosystem protection approach.</p>	
<p>STRATEGY RP-12: In cooperation and coordination with the other ten local, state and federal agencies, develop and implement comprehensive plan to ensure the protection of water quality, wildlife, habitats and safety in Tomales Bay</p>	<p>Activity 12.1 Develop vessel management guidelines to address moored vessels and moorings that may be impacting sensitive habitats.</p> <p>Activity 12.2 Develop sewage waste disposal for public and private boating facilities.</p> <p>Activity 12.3 Develop enforcement plan to address derelict and abandoned vessels.</p> <p>Activity 12.4 Address impacts to sensitive habitats from construction, modifications and additions to docks and piers in Tomales Bay.</p>	<p><u>Objective 1</u> To build a comprehensive and coordinated resource protection plan to ensure protection for the resources and qualities of GFNMS.</p> <p><u>Objective 2</u> To continue to build on partnerships, collaborative efforts, and coordination with other agencies, institutions, and organizations, in taking a comprehensive and effective ecosystem protection approach.</p>	<p><u>GFNMS FMP</u> Resource Protection, STRATEGY RP-4, STRATEGY RP-6, STRATEGY RP-10, Water Quality, STRATEGY WQ-1, STRATEGY WQ-2, STRATEGY WQ-3, STRATEGY WQ-6, STRATEGY WQ-9, Wildlife Disturbance, STRATEGY WD-4, Ecosystem Protection, STRATEGY EP-1, STRATEGY EP-3</p>
<p>STRATEGY RP-13: Working in collaboration with federal, state and local agencies, and the local community, restore the natural ecological processes of Bolinas Lagoon.</p>	<p>Activity 13.1 Collaborate in the development and implementation of a comprehensive plan to examine actions that would reduce, and possibly reverse, sediment accumulation and habitat shifts caused by human impacts.</p>	<p><u>Objective 1</u> To build a comprehensive and coordinated resource protection plan to ensure protection for the resources and qualities of GFNMS.</p> <p><u>Objective 2</u> To continue to build on partnerships, collaborative efforts, and coordination with other agencies, institutions, and organizations, in taking a comprehensive and effective ecosystem protection approach.</p>	<p><u>GFNMS FMP</u> STRATEGY RP-4, STRATEGY RP-6, STRATEGY RP-10</p>

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Resource Protection Strategy	Activity	Program Area Objective(s) Addressed	Complementary Strategies
<p>STRATEGY WQ-1: Develop an umbrella program to coordinate partnerships in implementing a comprehensive and integrated water quality monitoring program in order to track impacts on the estuarine and nearshore environment.</p>	<p>Activity 1.1 Through better coordination, both efficiency and effectiveness could be improved, and monitoring needs and data gaps identified and filled.</p>	<p><u>Objective 1</u> To develop a regionally based, cooperative water quality protection plan to address point and non-point source water quality impacts.</p> <p><u>Objective 2</u> To emphasize a watershed/ecosystem approach and address the range of water quality threats from chronic land-based runoff to catastrophic offshore events.</p>	<p><u>GFNMS FMP</u> Water Quality, STRATEGY WQ-2, STRATEGY WQ-3, STRATEGY WQ-4, STRATEGY WQ-5, STRATEGY WQ-6, STRATEGY WQ-7, STRATEGY WQ-8, STRATEGY WQ-9; Introduced Species, STRATEGY IS-2</p>
<p>STRATEGY WQ-2: Address sources of anthropogenic pathogens and pollutants from recreational and commercial boating activities and marinas.</p>	<p>Activity 2.1 Impacts from discharges are impacting Tomales Bay and Bodega Bay.</p> <p>Activity 2.2 Develop a combined outreach program on BMPs and interpretive enforcement for recreational and commercial user groups in and around Tomales and Bodega Bays.</p>	<p><u>Objective 1</u> To develop a regionally based, cooperative water quality protection plan to address point and non-point source water quality impacts.</p> <p><u>Objective 2</u> To emphasize a watershed/ecosystem approach and address the range of water quality threats from chronic land-based runoff to catastrophic offshore events.</p>	<p><u>GFNMS FMP</u> Water Quality, STRATEGY WQ-3</p> <p><u>MBNMS FMP</u> Water Quality, STRATEGY WQPP-13, WQPP-15, WQPP-16, WQPP-17</p> <p><u>GFNMS FMP</u> Water Quality, STRATEGY WQ-1, STRATEGY WQ-2; Vessel Spills, STRATEGY VS-3; Education, STRATEGY ED-7</p>
<p>STRATEGY WQ-3: Coordinate with other agencies to address land-based discharges into the estuarine and nearshore areas of the sanctuary including SWQPAs and CCAs.</p>	<p>Activity 3.1 The sanctuary will take the following steps to understand and address impacts from pathogens, sediments, nutrients and residual pollutants.</p> <p>Activity 3.2 industries that discharge into the watersheds in and adjacent to GFNMS will be encouraged through letters and awards of recognition to employ BMPs.</p> <p>Activity 3.3 Steps will be taken to address impacts from land development and encourage the use of BMPs during the planning, development and alteration of upland areas.</p>	<p><u>Objective 1</u> To develop a regionally based, cooperative water quality protection plan to address point and non-point source water quality impacts.</p> <p><u>Objective 2</u> To emphasize a watershed/ecosystem approach and address the range of water quality threats from chronic land-based runoff to catastrophic offshore events.</p>	<p><u>GFNMS FMP</u> Water Quality, STRATEGY WQ-6, STRATEGY WQ-7</p> <p><u>MBNMS FMP</u> Water Quality, STRATEGY WQPP-1, STRATEGY WQPP-18, STRATEGY WQPP-19, STRATEGY WQPP-20</p> <p><u>GFNMS FMP</u> Water Quality, STRATEGY WQ-7; Education, STRATEGY ED-7, STRATEGY ED-11</p> <p><u>GFNMS FMP</u> Water Quality, STRATEGY WQ-7; Education, STRATEGY ED-11</p>

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Resource Protection Strategy	Activity	Program Area Objective(s) Addressed	Complementary Strategies
STRATEGY WQ-4: Evaluate SWQPAs and make a determination whether to implement a no vessel discharge prohibition within these areas of concern.	Activity 4.1 Develop a process to make a determination on the need for a prohibition on vessel discharge in SWQPAs within the sanctuary to protect sanctuary resources.	<u>Objective 1</u> To develop a regionally based, cooperative water quality protection plan to address point and non-point source water quality impacts.  <u>Objective 2</u> To emphasize a watershed/ecosystem approach and address the range of water quality threats from chronic land-based runoff to catastrophic offshore events.	<u>GFNMS FMP</u> Water Quality, STRATEGY WQ-3
STRATEGY WQ-5: Ensure the continuation of the long-term data collection efforts under the Mussel Watch program.	Activity 5.1 The sanctuary should seek to continue this program.	<u>Objective 1</u> To develop a regionally based, cooperative water quality protection plan to address point and non-point source water quality impacts.  <u>Objective 2</u> To emphasize a watershed/ecosystem approach and address the range of water quality threats from chronic land-based runoff to catastrophic offshore events.	<u>GFNMS FMP</u> Water Quality, STRATEGY WQ-1, STRATEGY WQ-3
STRATEGY WQ-6: Develop a standing water quality working group, supported by sanctuary staff.	Activity 6.1 Create a working group of experts representing other agencies and institutions that can advise the sanctuary on the development and implementation of a comprehensive and cooperative water quality protection plan.	<u>Objective 1</u> To develop a regionally based, cooperative water quality protection plan to address point and non-point source water quality impacts.  <u>Objective 2</u> To emphasize a watershed/ecosystem approach and address the range of water quality threats from chronic land-based runoff to catastrophic offshore events.	<u>GFNMS FMP</u> Water Quality, STRATEGY WQ-1, STRATEGY WQ-3, STRATEGY WQ-5, STRATEGY WQ-7, STRATEGY WQ-9
STRATEGY WQ-9: Educate local decision makers on land-based water quality impacts in the sanctuary.	Activity 9.1 GFNMS will partner with the CCC and other agencies and institutions on NEMO to inform decision makers on the link between development/growth and water quality.	<u>Objective 1</u> To develop a regionally based, cooperative water quality protection plan to address point and non-point source water quality impacts.  <u>Objective 2</u> To emphasize a watershed/ecosystem approach and address the range of water quality threats from chronic land-based runoff to catastrophic offshore events.	<u>GFNMS FMP</u> Water Quality, STRATEGY WQ-3, STRATEGY WQ-6
STRATEGY WD-3: Coordinate with other agencies, institutions and programs to better understand and address anthropogenic noise, light and visual impacts on wildlife from vessels and low flying aircraft.	Activity 3.1 In coordination with partners, modify existing monitoring programs to identify types and frequency of impacts on wildlife from motorized and non-motorized aircraft and vessels	<u>Objective 1</u> To continually evaluate levels and sources of impacts on wildlife and habitats.	<u>GFNMS FMP</u> Wildlife Disturbance, STRATEGY WD-7; Vessel Spills, STRATEGY VS-3; Administration, STRATEGY AD-3
STRATEGY WD-4: Through interpretive enforcement and law enforcement efforts, address human behavior that may adversely impact wildlife.	Activity 4.2 Develop a coordinated and cooperative Protected Resource Enforcement Plan to ensure sufficient patrol presence in the sanctuary.	<u>Objective 2</u> To address human behavior that is impacting wildlife and habitats.	<u>MBNMS FMP</u> Marine Mammal & Seabird Disturbance, STRATEGY MMST-8

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Resource Protection Strategy	Activity	Program Area Objective(s) Addressed	Complementary Strategies
<p>STRATEGY WD-7: Coordinate the Seabird Colony Protection Program aimed at improving the survival and recruitment of seabird colonies by reduce and eliminate human disturbances at seabird breeding and roosting sites.</p>	<p><b>Activity 7.1:</b> Provide appropriate education and outreach to government agencies, ocean and coastal users, and individuals including pilots, researchers, rangers, sea kayakers, coastal recreational users, commercial and recreational fishermen, whale watchers and students.</p> <p><b>Activity 7.2:</b> Based on research and monitoring findings, take appropriate actions to address impacts on seabirds from vessels and low-flying aircraft</p>	<p><u>Objective 2</u> To address human behavior that is impacting wildlife and habitats</p>	<p><u>GFNMS FMP</u> Wildlife Disturbance, STRATEGY WD-3, STRATEGY WD-4, STRATEGY WD-5; Ecosystem Protection, STRATEGY EP-1, Resource Protection, STRATEGY RP-6, STRATEGY RP-10; Education, STRATEGY ED-7, STRATEGY ED-11, STRATEGY ED-13</p> <p><u>MBNMS FMP</u> Marine Mammal Seabird and Turtle Disturbance, STRATEGY MMST-2</p>
<p>STRATEGY IS-6: Develop partnerships with other agencies and organizations that are involved in issues related to introduced species to advise the sanctuary.</p>	<p>Activity 6.1 Develop a technical advisory council of experts to advise GFNMS on introduced species issues.</p> <p>Activity 6.2 A regional representative of the California sanctuaries should sit on CalFed’s Non-native Invasive Species Advisory Committee (NISAC).</p>	<p>To maintain an abundance and diversity of native marine/estuarine species:</p> <p><u>Objective 1</u> To prevent future introductions of introduced species in the sanctuary.</p> <p><u>Objective 2</u> To detect, manage, and where feasible, eradicate new and established introduced species in the sanctuary.</p>	<p><u>GFNMS FMP</u> Introduced Species, STRATEGY IS-1, STRATEGY IS-2, STRATEGY IS-3, STRATEGY IS-4, STRATEGY IS-5, STRATEGY IS-7, STRATEGY IS-8</p>
<p>STRATEGY IS-7: Have in place a rapid response plan and streamlined permit process in order to respond in a timely manner to necessary eradication or control efforts in the sanctuary.</p>	<p>Activity 7.1 Take the lead in coordinating with other agencies in the development of a rapid response plan to eradicate or control existing or new introduction in, or areas adjacent, to the sanctuary.</p>	<p>To maintain an abundance and diversity of native marine/estuarine species:</p> <p><u>Objective 1</u> To prevent future introductions of introduced species in the sanctuary.</p> <p><u>Objective 2</u> To detect, manage, and where feasible, eradicate new and established introduced species in the sanctuary.</p>	<p><u>GFNMS FMP</u> Introduced Species, STRATEGY IS-6</p>
<p>STRATEGY IS-8: Take regulatory action to control new introductions of introduced species.</p>	<p>Activity 8.1 Work with the State Water Resource Quality Control Board to include in the definition for “impaired waters” those areas where introduced species have been identified.</p> <p>Activity 8.2 Require the reporting of all research activities in the sanctuary.</p>	<p>To maintain an abundance and diversity of native marine/estuarine species:</p> <p><u>Objective 1</u> To prevent future introductions of introduced species in the sanctuary.</p> <p><u>Objective 2</u> To detect, manage, and where feasible, eradicate new and established introduced species in the sanctuary.</p>	

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<b>Resource Protection Strategy</b>	<b>Activity</b>	<b>Program Area Objective(s) Addressed</b>	<b>Complementary Strategies</b>
STRATEGY FA-2: Develop a socio-economic profile of fishing activities and communities in and adjacent to the sanctuary.	Activity 2.1 Hire a contractor to profile both the historic, and the evolution of fishing activities occurring in the sanctuary	To maintain an abundance of native marine/ estuarine/ intertidal species: 1) To better understand impacts from fishing activities on sanctuary resources.  2) To allow for fishing that is compatible with sanctuary goals and ecosystem protection.	<u>GFNMS FMP</u> Ecosystem Protection, STRATEGY FA-1, STRATEGY FA-5
STRATEGY FA-3: Evaluate impacts from fishing activities on sanctuary resources.	Activity 3.1 Work with the standing Living Resource and Habitat Protection Working Group of the sanctuary advisory council to develop a definition for “compatible use.”  Activity 3.2 Develop a compatibility index to rank and evaluate types and levels of impacts from fishing activities.	To maintain an abundance of native marine/ estuarine/ intertidal species: 1) To better understand impacts from fishing activities on sanctuary resources.  2) To allow for fishing that is compatible with sanctuary goals and ecosystem protection.	<u>GFNMS FMP</u> Ecosystem Protection, STRATEGY FA-1, STRATEGY FA-4, STRATEGY EP-1  <u>MBNMS FMP</u> Benthic Habitats, STRATEGY BH-2; Fishing Education, STRATEGY FRER-3
STRATEGY FA-4: Develop policy recommendations or management action(s) to address impacts from fishing activities on sanctuary resources.	Activity 4.1 If the compatibility index indicates significant negative impacts on sanctuary resources from fishing activities, as appropriate, a working group will be developed  Activity 4.2 Develop a series of management categories (policy responses), based on relative level of impact from a fishing activity, as determined by the compatibility index.	To maintain an abundance of native marine/ estuarine/ intertidal species: 1) To better understand impacts from fishing activities on sanctuary resources.  2) To allow for fishing that is compatible with sanctuary goals and ecosystem protection.	<u>GFNMS FMP</u> Ecosystem Protection, STRATEGY FA-3, STRATEGY EP-1 <u>GFNMS FMP</u> Ecosystem Protection, STRATEGY FA-3
STRATEGY FA-6: Establish consistent and coordinated region-wide sanctuary representation at the PFMC and FGC meetings.	Activity 6.1 Select regional sanctuary representative to attend PSFMC and FGC meetings and participate as appropriate.	To maintain an abundance of native marine/ estuarine/ intertidal species: 1) To better understand impacts from fishing activities on sanctuary resources.  2) To allow for fishing that is compatible with sanctuary goals and ecosystem protection.	<u>CBNMS FMP</u> Ecosystem Protection, STRATEGY FA-1;  <u>MBNMS FMP</u> STRATEGY FRER-1
STRATEGY FA-7: Work with CBNMS and MBNMS to address impacts on ecosystems in and around sanctuary waters from krill harvesting.	Activity 7.1 Monitor the implementation of the Coastal Pelagic Species Fishery Management Plan, which includes a preferred alternative for a permanent ban on krill harvesting.	To maintain an abundance of native marine/ estuarine/ intertidal species: 1) To better understand impacts from fishing activities on sanctuary resources.  2) To allow for fishing that is compatible with sanctuary goals and ecosystem protection.	<u>CBNMS FMP</u> Ecosystem Protection, STRATEGY FA-5;

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<b>Resource Protection Strategy</b>	<b>Activity</b>	<b>Program Area Objective(s) Addressed</b>	<b>Complementary Strategies</b>
STRATEGY EP-1: Develop a Resource Protection Plan (policy) to minimize user conflicts and provide special areas of protection for sensitive habitats, living resources, and other unique sanctuary features.	Activity 1.1 Determine the need for using tools such as zoning to take a proactive approach and address specific resource management issues.	To maintain an abundance of native marine/ estuarine/ intertidal species: 1) To better understand impacts from fishing activities on sanctuary resources.  2) To allow for fishing that is compatible with sanctuary goals and ecosystem protection.	<u>GFNMS FMP</u> Ecosystem Protection, STRATEGY FA-3, STRATEGY FA-4, STRATEGY EP-2  <u>MBNMS FMP</u> Marine Protected Areas, STRATEGY MPA-1
STRATEGY EP-2: Create a standing “Living Resource and Habitat Protection” working group to advise the sanctuary on ecosystem protection issues.	Activity 2.1 Develop a permanent standing working group of the sanctuary advisory council to address ecosystem protection issues in the sanctuary.	To maintain an abundance of native marine/ estuarine/ intertidal species: 1) To better understand impacts from fishing activities on sanctuary resources.  2) To allow for fishing that is compatible with sanctuary goals and ecosystem protection.	<u>GFNMS FMP</u> Ecosystem Protection, STRATEGY EP-1, STRATEGY FA-3, STRATEGY FA-4, STRATEGY FA-6  <u>MBNMS FMP</u> Benthic Habitats, STRATEGY BH-1
STRATEGY EP-3: Develop strategy to protect habitats that are known to be “special areas of concern.”	Activity 3.1 Through a community-based process, make a determination on marine reserve status for Estero Americano and Estero de San Antonio to protect and restore habitat for marine life.	To maintain an abundance of native marine/ estuarine/ intertidal species: 1) To better understand impacts from fishing activities on sanctuary resources.  2) To allow for fishing that is compatible with sanctuary goals and ecosystem protection.	<u>GFNMS FMP</u> Ecosystem Protection, STRATEGY FA-1, STRATEGY FA-2, STRATEGY EP-2; Water Quality, STRATEGY WQ-1, STRATEGY WQ-2, STRATEGY WQ-5; Introduced Species, STRATEGY IS-1, STRATEGY IS-2
STRATEGY VS-1: Expand MBNMS drift analysis model to include Point Arena and Mendocino.	Activity 1.1 Expand MBNMS drift analysis model north to Point Arena/Mendocino using existing data.	<u>Objective 1</u> To assess level of risk and determine whether improvements can be made to reduce risk.  <u>Objective 3</u> To review current response programs and identify areas of improvement, focusing on GFNMS resources at risk.  <u>Objective 5</u> To provide for continuous evaluation and leverage opportunities for improvement in coordination with partners.	<u>GFNMS FMP</u> Vessel Spills, STRATEGY VS-2, STRATEGY VS-3, STRATEGY VS-4
STRATEGY VS-2: Improve existing spill and drift model to increase accuracy of risk assessments.	Activity 2.1 Revise existing oceanographic circulation model to reflect the unique fine-scale features of the Gulf of the Farallones.	<u>Objective 1</u> To assess level of risk and determine whether improvements can be made to reduce risk.	<u>GFNMS FMP</u> Vessel Spills, STRATEGY VS-1, STRATEGY VS-3, STRATEGY VS-4

**Appendix IIC: Resource Protection  
GFNMS Management Plan**

Resource Protection Strategy	Activity	Program Area Objective(s) Addressed	Complementary Strategies
<p>STRATEGY VS-3: Evaluate vessel activities in the GFNMS as a first step to assessing the risk of spills in the sanctuary.</p>	<p>Activity 3.1 Profile vessel activities within the Gulf of the Farallones.</p> <p>Activity 3.2 Based on existing vessel traffic and risk assessment reports, determine potential risks to GFNMS and develop report.</p> <p>Activity 3.3 Based on existing vessel traffic and risk assessment reports, determine potential risks to GFNMS and develop report.</p>	<p><u>Objective 1</u> To assess level of risk and determine whether improvements can be made to reduce risk.</p> <p><u>Objective 5</u> To provide for continuous evaluation and leverage opportunities for improvement in coordination with partners.</p>	<p><u>GFNMS FMP</u> Vessel Spills, STRATEGY VS-1, STRATEGY VS-2, STRATEGY VS-3; Water Quality, STRATEGY WQ-5</p> <p><u>GFNMS FMP</u> Vessel Spills, STRATEGY VS-1, STRATEGY VS-2, STRATEGY VS-3; Water Quality, STRATEGY WQ-5.</p> <p><u>GFNMS FMP</u> Vessel Spills, STRATEGY VS-1, STRATEGY VS-2, STRATEGY VS-3; Water Quality, STRATEGY WQ-4</p>
<p>STRATEGY VS-4: Evaluate recent vessel routing changes related to the MBNMS vessel traffic study.</p>	<p>Activity 4.1 Evaluate how the vessel routing adjustments have affected GFNMS, what lessons have been learned, and what improvements could be made.</p>	<p><u>Objective 1</u> To assess level of risk and determine whether improvements can be made to reduce risk.</p> <p><u>Objective 3</u> To review current response programs and identify areas of improvement, focusing on GFNMS resources at risk.</p> <p><u>Objective 5</u> To provide for continuous evaluation and leverage opportunities for improvement in coordination with partners.</p>	<p><u>GFNMS FMP</u> Ecosystem Protection, STRATEGY FA-1, STRATEGY FA-3, STRATEGY FA-4; Introduced Species, STRATEGY IS-2; Vessel Spills, STRATEGY VS-2, STRATEGY VS-4, STRATEGY VS-6, STRATEGY VS-7, STRATEGY VS-8</p>
<p>STRATEGY VS-5: Track distribution and numbers of species of concern and habitats in relation to probable spill trajectories.</p>	<p>Activity 5.1 Refine resources-at-risk model analysis for Gulf of the Farallones.</p>	<p><u>Objective 1</u> To assess level of risk and determine whether improvements can be made to reduce risk.</p>	<p><u>GFNMS FMP</u> Vessel Spills, STRATEGY VS-2, STRATEGY VS-3, STRATEGY VS-7, STRATEGY VS-8</p>
<p>STRATEGY VS-6: Participate on regional response team to address risks to sanctuary resources.</p>	<p>Activity 6.1 Review regional response plan (RRP) and ACP.</p>	<p><u>Objective 1</u> To assess level of risk and determine whether improvements can be made to reduce risk.</p> <p><u>Objective 3</u> To review current response programs and identify areas of improvement, focusing on GFNMS resources at risk.</p> <p><u>Objective 5</u> To provide for continuous evaluation and leverage opportunities for improvement in coordination with partners.</p>	<p><u>GFNMS FMP</u> Vessel Spills, STRATEGY VS-1, STRATEGY VS-2, STRATEGY VS-4, STRATEGY VS-6, STRATEGY VS-9</p>

**Appendix IIC: Resource Protection  
GFNMS Management Plan**

<b>Resource Protection Strategy</b>	<b>Activity</b>	<b>Program Area Objective(s) Addressed</b>	<b>Complementary Strategies</b>
STRATEGY VS-7: Revise GFNMS in-house emergency response plan.	Activity 7.1 Revise tasks and responsibilities for GFNMS in the event of a vessel spill in the sanctuary.	<u>Objective 3</u> To review current response programs and identify areas of improvement, focusing on GFNMS resources at risk.	<u>GFNMS FMP</u> Vessel Spills, STRATEGY VS-1, STRATEGY VS-2, STRATEGY VS-4, STRATEGY VS-6
STRATEGY VS-8: Continue to improve integration of GFNMS Beach Watch and EDS data into ACP.	Activity 8.1 Increase frequency of integrating Beach Watch and EDS data into ACP.	<u>Objective 2</u> To develop long-term monitoring programs within GFNMS to identify trends and take proactive measures to reduce risk from vessel spills.  <u>Objective 5</u> To provide for continuous evaluation and leverage opportunities for improvement in coordination with partners.	<u>GFNMS FMP</u> Vessel Spills, STRATEGY VS-6, STRATEGY VS-7, STRATEGY VS-8
STRATEGY VS-10: Provide better communication between GFNMS and maritime trade industry.	Activity 10.1 Recruit maritime trade industry member for GFNMS Sanctuary Advisory Council.	<u>Objective 4</u> To develop outreach program for maritime industry, fishing, and recreational boating communities based on risk assessment and long-term monitoring results.  <u>Objective 5</u> To provide for continuous evaluation and leverage opportunities for improvement in coordination with partners.	<u>GFNMS FMP</u> Vessel Spills, STRATEGY VS-10, STRATEGY VS-12
STRATEGY VS-12: A sanctuary representative should participate in regional forums for addressing vessel traffic issues.	Activity 12.1 Sanctuary will attend regional meetings including the area committee meetings, harbor safety meetings, and ad hoc panels.	<u>Objective 1</u> To assess level of risk and determine whether improvements can be made to reduce risk.  <u>Objective 3</u> To review current response programs and identify areas of improvement, focusing on GFNMS resources at risk.  <u>Objective 5</u> To provide for continuous evaluation and leverage opportunities for improvement in coordination with partners.	<u>GFNMS FMP</u> Vessel Spills, STRATEGY VS-11, STRATEGY VS-13
STRATEGY VS-12: Create a standing vessel spills working group to advise the sanctuary on implementation of proposed action plans.	Activity 12.1 Create a vessel spills working group of the sanctuary advisory council.	<u>Objective 1</u> To assess level of risk and determine whether improvements can be made to reduce risk.  <u>Objective 3</u> To review current response programs and identify areas of improvement, focusing on GFNMS resources at risk.  <u>Objective 5</u> To provide for continuous evaluation and leverage opportunities for improvement in coordination with partners.	<u>GFNMS FMP</u> Vessel Spills, STRATEGY VS-9, STRATEGY VS-10, STRATEGY VS-11



OVERVIEW OF STRATEGIES:

**Appendix IID: Administration**

Administration Strategy	Activity	Program Area Objective(s) Addressed	Complementary Strategies
<p>STRATEGY AD-1: New sanctuary facilities will be developed through various partnerships with both the public and private sector.</p>	<p>Activity 1.1 Build a world class icon for marine stewardship in San Francisco</p> <p>Activity 1.2 Continue to maintain the Crissy Field and Pacifica visitor centers.</p> <p>Activity 1.3 Increase the sanctuary staff's ability to access the marine waters of the sanctuary by expanding vessel capabilities</p> <p>Activity 1.4 Complete priorities and implement facilities plan for visitors centers and outreach venues.</p> <p>Activity 1.5 Improve the site's information technology infrastructure.</p> <p>Activity 1.6 Partner with local research and academic institutions to develop facilities and infrastructure.</p>	<p><u>Objective 1</u> Develop an administrative framework to continuously evaluate, maintain and expand, when necessary, administrative operations.</p> <p><u>Objective 2</u> Identify appropriate staffing, budget levels and facility needs to support implementation of the management plan.</p> <p><u>Objective 3</u> Continue to build on partnerships, collaborative efforts and coordination with other agencies, institutions and organizations.</p>	<p>All</p>
<p>STRATEGY AD-2: Basic staffing requirements must provide support for administration and the program areas of research/monitoring, education/outreach, and marine resource management.</p>	<p>Activity 2.1 Sanctuary staff skills should collectively represent expertise in policy, marine resource management, education, outreach, volunteer development, research, monitoring, GIS, communications technology, and administration.</p> <p>Activity 2.2 GFNMS manager will allocate 1.5% of the base budget to encourage staff participation in professional development</p> <p>Activity 2.3 Collectively, the staff will function as a team supporting each program area</p>	<p><u>Objective 1</u> Develop an administrative framework to continuously evaluate, maintain and expand, when necessary, administrative operations.</p> <p><u>Objective 2</u> Identify appropriate staffing, budget levels and facility needs to support implementation of the management plan.</p>	<p>All</p>

**Appendix IID: Administration  
GFNMS Management Plan**

Administration Strategy	Activity	Program Area Objective(s) Addressed	Complementary Strategies
	<p>Activity 2.4 Through the administrative framework, the sanctuary will work to create a positive working environment.</p> <p>Activity 2.5 Work towards developing a strong and favorable public identity.</p>		
<p>STRATEGY AD-3: With limited staff and financial resources, GFNMS will develop partnerships, and identify outside funding sources, and in-kind services to assist in the implementation of the management plan.</p>	<p>Activity 3.1 Continue to maintain and build on existing partnerships.</p> <p>Activity 3.2 Expand informal working relationship with NMFS and USGS.</p>	<p><u>Objective 3</u> Continue to build on partnerships, collaborative efforts and coordination with other agencies, institutions and organizations.</p>	<p>All</p>
<p>STRATEGY AD-4: The sanctuary advisory council will develop a leading role in providing advice to the sanctuary manager.</p>	<p>Activity 4.1 Strengthen the structure of the sanctuary advisory council</p> <p>Activity 4.2 Identify the role of the sanctuary advisory council in addressing ecosystem management issues</p> <p>Activity 4.3 Provide support, resources, and guidance to help the sanctuary advisory council engage and educate the public</p> <p>Activity 4.4 Sanctuary advisory council members will be asked to serve on working groups.</p> <p>Activity 4.5 Add standing working groups and seats to the sanctuary advisory council.</p>	<p><u>Objective 1</u> Develop an administrative framework to continuously evaluate, maintain and expand, when necessary, administrative operations.</p> <p><u>Objective 2</u> Identify appropriate staffing, budget levels and facility needs to support implementation of the management plan.</p> <p><u>Objective 3</u> Continue to build on partnerships, collaborative efforts and coordination with other agencies, institutions and organizations.</p>	<p>All</p>

Administration Strategy	Activity	Program Area Objective(s) Addressed	Complementary Strategies
STRATEGY AD-5: GFNMS seeks to formalize intra- and interagency efforts.	Activity 5.1 GFNMS will engage other agencies in reviewing each other's actions.	<u>Objective 1</u> Develop an administrative framework to continuously evaluate, maintain and expand, when necessary, administrative operations.	All
	Activity 5.2 Formalize agreements with federal/state co-trustee managers signaling that the cooperative and integrated management approach established for GFNMS has been adopted by other agencies.	<u>Objective 2</u> Identify appropriate staffing, budget levels and facility needs to support implementation of the management plan.  <u>Objective 3</u> Continue to build on partnerships, collaborative efforts and coordination with other agencies, institutions and organizations.	
Activity 5.3 GFNMS will formalize agreements for: 1) Protected Resources Enforcement Plan and 2) Emergency Response Plan.			
STRATEGY AD-6: Develop and make use of performance indicators to measure performance of the management of the sanctuary as a whole, as well as to evaluate specific strategies within the management plan.	Activity 6.1 Use the Site Report Card developed by the NMSP as a tool for quickly measuring the overall management performance of the site.	<u>Objective 1</u> Develop an administrative framework to continuously evaluate, maintain and expand, when necessary, administrative operations.	All
	Activity 6.2 Work with national marine sanctuary headquarters staff to develop performance indicators for program areas	<u>Objective 2</u> Identify appropriate staffing, budget levels and facility needs to support implementation of the management plan.  <u>Objective 3</u> Continue to build on partnerships, collaborative efforts and coordination with other agencies, institutions and organizations.	
	Activity 6.3 GFNMS administrative framework will continue to prepare for and strengthen the infrastructure for the future.		





## **APPENDIX III: ADDITIONAL APPENDICES**

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### **GFNMS MANAGEMENT PLAN**

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- A. Jurisdictional Authorities**
- B. Glossary of Terms**
- C. Acronyms**
- D. National Marine Sanctuaries Act**
- E. Species List**
- F. Invertebrates and Algae**
- G. Introduced Species**



## **Appendix IIIA: Jurisdictional Authorities**

The sanctuary overlaps and borders the jurisdictions of several other agencies. Coordination and cooperation among the responsible agencies are critical to the success of the sanctuary. These agencies and their roles in assisting management of the sanctuary are described below.

### **FEDERAL AUTHORITIES**

#### **National Marine Sanctuaries**

Two other national marine sanctuaries share boundaries with Gulf of the Farallones National Marine Sanctuary (GFNMS). To the north and west is Cordell Bank National Marine Sanctuary (CBNMS); to the south and east is Monterey Bay National Marine Sanctuary (MBNMS). GFNMS works closely with both CBNMS and MBNMS to protect shared populations and habitats.

The GFNMS is responsible for managing programs and regulations of the Northern Management Area of MBNMS, which includes all MBNMS waters and submerged lands north of Point Año Nuevo and the San Mateo/ Santa Cruz county line.

#### **National Park Service**

The sanctuary manages waters adjacent to two agencies of the National Park Service (NPS), the Golden Gate National Recreation Area (GGNRA) and Point Reyes National Seashore (PRNS). They work closely with the sanctuary on the protection and management of natural and cultural marine resources. GGNRA includes an extensive network of recreational and historic sites. The sanctuary coordinates and cooperates with PRNS and GGNRA in the areas of interpretation, administrative support, wildlife protection, oil spill preparedness, and natural resource damage assessment and restoration. PRNS represents the largest stretch of shoreline adjacent to the sanctuary. It includes certain state tide and submerged lands that have been conveyed to the national seashore. The seashore's management plan defines Natural Zones that are to remain unaltered by human activity.

#### **United States Fish and Wildlife Service (FWS)**

Within the waters of GFNMS, the FWS is responsible for protecting all marine mammal species, including sea otters; other than cetaceans and pinnipeds under the Marine Mammal Protection Act (MMPA); and Brown Pelican, Short-Tailed Albatross and other bird species listed as threatened or endangered under the Endangered Species Act (ESA). The National Marine Fisheries Services (NMFS) is responsible for protecting cetaceans and pinnipeds under the MMPA, and sea turtles and fish that are listed as threatened or endangered under the ESA.

The FWS also has responsibility for managing the Farallon National Wildlife Refuge. The refuge includes North, Middle, and Southeast Farallon Islands; Maintop Island; and Noonday Rock. The refuge is operated primarily as a migratory bird refuge to protect murre, auklets, guillemots, puffins, and other birds, and secondarily, to protect seal, sea lion, and other marine mammal assemblages.

### **National Marine Fisheries Service (NMFS)**

The NMFS is responsible for enforcing the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA), the MMPA, and the ESA. Pursuant to the MSFCMA NMFS approves, implements and enforces fishery management plans (FMP) prepared by regional fishery management councils. NMFS works closely with the California Department of Fish and Game (CDFG) and United States Coast Guard (USCG) for enforcement operations both within and outside the three-mile territorial sea. Gulf of the Farallones fish populations affected by FMP regulations include lingcod, rockfish, and salmon.

The NMFS shares responsibility with the FWS for implementation of the MMPA and the ESA (see FWS entry above).

### **United States Coast Guard (USCG)**

The USCG is the federal government's primary maritime law enforcement agency. The USCG's missions include maritime law enforcement, national security, maritime safety, and marine environmental protection. For ocean and coastal activities, the USCG manages maritime transportation activities in order to minimize loss of life and damage to the environment. The USCG has historically held the primary responsibility for ensuring cleanup of any oil spill or other pollutants in the marine environment. To avert oil spills and promote safety, the USCG inspects vessels carrying oil and other hazardous materials. The USCG requires vessels to have approved response plans detailing owner and operator response to an oil spill and ensuring proper response activities. Pursuant to the Oil Spill Prevention Act of 1990 (OPA), which defines ground rules for dealing with oil pollution events and recommends pollution prevention measures, the USCG has responsibility for preparing most of the regulations necessary to implement OPA. Additionally, the USCG must be consulted in the development of oil spill contingency plans for marine oil and gas facilities and terminals. The OPA also allows for natural resource damage recovery by federal and state resource trustees.

### **Minerals Management Service (MMS)**

The Minerals Management Service (MMS) is responsible for managing offshore oil and gas exploration and development operations in accordance with the provisions of the Outer Continental Shelf Lands Act. The Outer Continental Shelf Lands Act establishes federal jurisdiction over the natural resources of the outer continental shelf (OCS) beyond three nautical miles. The MMS has primary responsibility for managing OCS mineral exploration and development. The Energy Policy Act of 2005, Section 388, granted MMS new authority to regulate alternative energy and alternate use on the OCS. Section 388 authority does not apply to areas within National Marine Sanctuaries.

### **Environmental Protection Agency (EPA)**

The Environmental Protection Agency (EPA) has regulatory responsibilities with regard to ocean water quality. Under the U. S. Clean Water Act (CWA), EPA establishes and enforces water quality standards for waters outside of the three-mile state waters. Title 1 of the Marine Protection, Research, and Sanctuaries Act (Ocean Dumping Act), prohibits the unpermitted

dumping of “any material transported from a location outside the United States” into the territorial sea of the United States, or into the zone contiguous to the territorial sea, to the extent discharge into the contiguous zone would effect the territorial sea or the territory of the United States. The act is administered by the EPA and supercedes any CWA requirements.

## **STATE AUTHORITIES**

### **California Department of Fish and Game (CDFG)**

The CDFG, under the Fish and Game Code (and Chapter 14 of the Administrative Code), regulates and manages a wide variety of activities affecting the living marine resources found in the territorial sea and in the 200-mile-wide exclusive economic zone (EEZ). In cooperation with NMFS, the CDFG enforces federal regulations established under the MSFCMA. It also enforces and implements the Marine Life Management Act and the Marine Life Protection Act (MLPA). The CDFG has established ecological reserves, marine reserves, game refuges, and marine life refuges in the ocean waters and submerged lands surrounding the Farallon Islands and Point Reyes. The agency has the authority to prohibit or restrict activities that may harm resources, including fishing, collecting, swimming, boating, and public entry. The CDFG works closely with the sanctuary in oil spill response, damage assessment, and restoration through its Office of Spill Prevention and Response (OSPR).

Several fisheries conducted within the GFNMS are managed by the state of California. The CDFG is responsible for preparing FMPs under the authority of the California Fish and Game Commission and the California State Legislature. Gulf of the Farallones fish populations affected by California regulations include Pacific herring, nearshore finfish, Market squid, and Dungeness crab.

### **State Water Resources Control Board (SWRCB)**

The SWRCB is responsible for water quality within state waters. The SWRCB adopts statewide water quality control plans and policies, such as the Ocean Plan, the Thermal Plan, and the State Implementation Policy. The Regional Water Control Boards adopt and submit basin plans to the state board for approval. Title III, Section 303 of the CWA requires California to submit statewide and basin plans to the EPA for approval.

The SWRCB has established a system of thirty-four Areas of Special Biological Significance (ASBS), now known as State Water Quality Protection Areas (SWQPA). These are areas designated for special protection from undesirable alteration in natural water quality. Five ASBSs (SWQPAs) are located in GFNMS. These are at Duxbury Reef, Point Reyes Headland, Double Point, Bird Rock, and the Farallon Islands.

### **California Coastal Commission (CCC)**

The CCC was established under the California Coastal Zone Management Act (CZMA) of 1972, which gives authority to the commission to establish policy for activities in state waters. The CZMA established the authority for a federal-state partnership to manage development and use

***Appendix IIIA: Jurisdictional Authorities***  
***GFNMS Management Plan***

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of the coastal zone. The CCC also has the authority to review federal activities in the coastal zone to ensure consistency with California's Coastal Zone Management Program.

**California State Lands Commission (SLC)**

SLC has jurisdiction over all of California's tide and submerged lands and over the beds of naturally navigable rivers and lakes, each of which are sovereign lands, swamp, and overflow lands, and school lands (proprietary lands). Management responsibilities of the SLC extend to activities within submerged land and those within three nautical miles of shore.

**California Department of Boating and Waterways (DBW)**

The DBW programs are designed to fulfill the needs of California's boating community including funding for local waterway law enforcement programs, assisting in beach erosion control projects, licensing yacht and ship brokers, and funding the development of public access boating facility projects. The DBW also provides grants to cities, counties, and districts for developing small craft harbors/marinas; and loans to private recreational marinas.

## **Appendix IIIB: Glossary of Terms**

**Action plan:** A major section of a management plan containing related strategies and activities designed to address a specific issue or function (NOAA, *National Marine Sanctuary Management Plan Handbook*, 3<sup>rd</sup> edition, 2002).

**Activity:** Specific actions that will be taken to carry out a strategy (NOAA, *National Marine Sanctuary Management Plan Handbook*, 3<sup>rd</sup> edition, 2002).

**Aquaculture:** The cultivation of marine life for harvest and utilization by humans.

**Bathymetry:** Water depth measurement information used to produce depth-contoured charts.

**Benthic:** The region of the ocean consisting of the sea bed and the organisms that live on or in it.

**Benthic communities:** Bottom-dwelling plants and animals.

**Biodiversity:** The variability among living organisms from all sources, including terrestrial, marine, and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems.

**Chum:** Bait usually consisting of oily fish ground up and scattered on the water.

**Continental shelf:** A generally shallow, flat submerged portion of a continent, extending to the point of step descent to the ocean floor.

**Critical habitat:** The specific areas within the geographical area occupied by a threatened or endangered species on which are found those physical or biological features essential to the conservation of the species, and which may require special management considerations or protection.

**Demersal:** Fishes and other aquatic organisms that live near the bottom of the water column.

**Depleted:** A species is termed depleted when it falls below its optimum sustainable population.

**Designation document:** A portion of the regulations for a given sanctuary that spells out the terms of its designation, including boundaries, regulations, and those activities potentially subject to future regulation.

**Desired outcome:** A succinct and concise statement that articulates a desired future for a sanctuary relative to a specific problem statement (NOAA, *National Marine Sanctuary Management Plan Handbook*, 3<sup>rd</sup> edition, 2002).

**Ecology:** The science of the relationships between organisms and their environments.

**Ecosystem:** The sum total of all living and nonliving components of a particular area that interact and exchange materials with each other; sometimes defined as the ecological community of organisms plus the environment with which they interact. Energy flow and nutrient cycling are regulated within a particular ecosystem and are studied as indicators of its overall health.

**Effluent:** An outflow of waste, as from a sewer.

**Endangered species:** Any species that is in danger of extinction throughout all or a significant portion of its range.

**Epifauna:** Animals that live on the ocean bottom, either attached or moving freely over it.

**Food chain:** A succession of organisms in a community that constitutes a feeding chain in which food energy is transferred from one organism to another as each consumes a lower member and in turn is preyed upon by a higher member.

**Indigenous:** Living or occurring naturally in a specific area or environment.

**Infaunal:** Organisms that live buried in sediments, including a variety of polychaetes, burrowing crustaceans, and mollusks.

**Infrastructure:** Basic installations and facilities, such as roads, power plants, transportation, and communication systems.

**Invertebrate:** An animal lacking a backbone or spinal column.

**Isobath:** An imaginary line or one drawn on a map connecting all points of equal depth below the surface of a body of water.

**Marine protected area:** Any area of the marine environment that has been reserved by federal, state, territorial, tribal, or local laws or regulations to provide lasting protection for part or all of the natural and cultural resources therein. (Executive Order 13158 on Marine Protected Areas). Under this broad definition, a wide variety of sites including fishery management zones, national parks, national marine sanctuaries, national estuarine research reserves, state conservation areas, critical habitats, and state reserves could be considered as marine protected areas.

**Marine reserve:** A kind of marine protected area generally agreed to have strict regulations regarding the extraction of resources.

**Marine sanitation device:** Any equipment for installation on board a vessel which is designed to receive, retain, treat, or discharge sewage, and any process to treat such sewage.

**Mollusks:** Any of various members of the phylum Mollusca, largely marine invertebrates, including the edible shellfish and some 100,000 other species.

**Multibeam:** A type of sonar that has multiple beams to record water depth.

**Nonpoint source pollutant discharges:** Those pollutant discharges not associated with a specific location (e.g., urban and agricultural pesticide runoff).

**Organism:** Plant or animal.

**Overfished:** An overfished stock or stock complex is one whose size is sufficiently depleted that a change in management practices is required in order to achieve an appropriate level and rate of rebuilding. A rebuilding plan is required for stocks that are overfished.

**Pathogens:** Any agent, most commonly a micro-organism, capable of causing a disease.

**Pelagic:** Of, relating to, or living in open seas or oceans rather than waters adjacent to land or inland waters.

**Planktonic:** Organisms dependent on water movement and currents as their means of transportation, including phytoplankton, zooplankton, and ichthyoplankton.

**Point source pollutant discharges:** The discharge of pollutants from a distinct and identifiable source, such as a sewer or industrial outfall pipe.

**Program/Issue Statements:** A one or two sentence articulation of the specific components of an issue (NOAA, *National Marine Sanctuary Management Plan Handbook*, 3<sup>rd</sup> edition, 2002).

**Salinity:** The relative concentration of salts, usually sodium chloride, in a given water sample. It is usually expressed in terms of the number of parts per thousand (ppt) or parts per million (ppm) of chlorine (Cl). As a reference, the salinity of seawater is approximately 35 ppt.

**Side-scan sonar:** A type of sonar that gathers sound reflections at oblique angles to the sensor.

**Socioeconomic:** Being both social and economic.

**Strategy:** The means by which a particular desired outcome can be achieved (NOAA, *National Marine Sanctuary Management Plan Handbook*, 3<sup>rd</sup> edition, 2002).

**Substrate:** A surface on which a plant or animal grows or is attached.

**Threatened species:** Plant or animal species believed likely to move into the endangered category in the foreseeable future.

**Trawling:** To fish using a trawl, a large tapered and flattened or conical net towed along the sea bottom.

**Trolling:** To fish by running a baited line behind a slowly moving boat.

**Trophic:** A description related to feeding; it often refers to a feeding level in a food chain.

**Trophic level:** One of a succession of steps in the movement of energy and matter through a food chain in an ecosystem.

***Appendix IIB: Glossary of Terms***  
***GFNMS Management Plan***

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**Turbidity:** The extent to which there are suspended or stirred up particles or sediments, as in the water column.

**Zone:** An area or region considered as separate and distinct from others because of its designated use, plant or animal life, etc.

**Zoning:** The act of partitioning areas of land or water into sections dedicated to specific purposes and activities.

## **Appendix III C: Acronyms**

ACP	Area Contingency Plan (USCG)
ACR	Audubon Canyon Ranch
ACS	American Cetacean Society
AIS	Automated Identification System
AOP	Annual Operating Plan
APPS	U.S. Act to Prevent Pollution from Ships
ASBS	Area of Special Biological Significance
ATOC	Acoustic Thermometry of Ocean Climate
BASA	Bay Area Science Alliance
BLM	Bureau of Land Management
BML	Bodega Marine Laboratory
BMP	best management practices
Cal EPA	California Environmental Protection Agency
CalCOFI	California Cooperative Oceanic Fisheries Investigations
CalTrans	California Department of Transportation
CAP	Civil Aeronautical Patrol
CAS	California Academy of Sciences
CBNMS	Cordell Bank National Marine Sanctuary
CBSOA	California Boating Safety Officers Association
CCA	California Critical Coastal Areas
CCC	California Coastal Commission
CCR	California Code of Regulations
CCRWQBC	Central Coast Regional Water Quality Control Board
CDBW	California Department of Boating and Waterways
CDF	California Department of Forestry
CDFG	California Department of Fish and Game
CDPR	California Department of Parks and Recreation
CenCOOS	Central California Ocean Observing Systems
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CHP	California Highway Patrol
CIMT	Center for Integrated Marine Technology
CINMS	Channel Islands National Marine Sanctuary
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CMAR	Coastal Maritime Archaeology Resources
COASST	Coastal Observation and Seabird Survey Team
CODAR	Coastal Ocean Dynamics Applications Radar
COE	U.S. Army Corps. of Engineers
CSC	California Species of Special Concern
CSC	Coastal Services Center
CSLC	California State Lands Commission
CSUMB	California State University Monterey Bay
CWA	U.S. Clean Water Act
CZARA	Coastal Zone Authorization Amendments
CZMA	Coastal Zone Management Act
DARRF	Damage Assessment and Restoration Evolving Fund
DBW	California Department of Boating and Waterways

***Appendix III C: Acronyms  
GFNMS Management Plan***

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DDT	dichlorodiphenyltrichloroethane
DEIS	Draft Environmental Impact Statement
DFG	California Department of Fish and Game
DMP	Draft Management Plan
DOC	United States Department of Commerce
DOI	United States Department of the Interior
DPR	California Department of Parks and Recreation
EDS	Ecosystem Dynamics Study
EEDCOM	Environmental Education Council of Marin
EEZ	U.S. Exclusive Economic Zone
EFH	essential fish habitat
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
ESNERR	Elkhorn Slough National Estuarine Research Reserve
FAA	Federal Aviation Administration
FCC	Federal Communications Commission
FEIS/MP	Final Environmental Impact Statement / Management Plan
FES	Friends of the Elephant Seal
FGC	Fish and Game Commission
FGDC	Federal Geospatial Data Center
FIRWD	Farallon Islands Radioactive Waste Dumpsite
FKNMS	Florida Keys National Marine Sanctuary
FMP	Fishery Management Plan
FMR	Fitzgerald Marine Reserve
FMSA	Farallones Marine Sanctuary Association
FSO	Friends of the Sea Otter
FWPCA	Federal Water Pollution Control Act
GCEL	General Council Enforcement Litigation
GCOS	General Council Ocean Service
GFNMS	Gulf of the Farallones National Marine Sanctuary
GGNRA	Golden Gate National Recreation Area
GIS	geographic information systems
GPS	global positioning system
GRNMS	Grey's Reef National Marine Sanctuary
GSA	General Services Administration
HAB	harmful algal bloom
HAZMAT	Hazardous Materials Response Division
HDD	horizontal directional drilling
HIHWNMS	Hawaiian Islands Humpback Whale National Marine Sanctuary
IACC	Interagency Coordinating Committee
ICES	International Council for Exploration of the Sea
ICS	Incident Command System
IFQ	individual fishing quota
IGERT	Integrative Graduate Education and Research Traineeship Program
IMO	International Maritime Organization
IPPC	International Plant Protection Convention
ITQ	individual transferable quota
IUCN	International Union for Conservation of Nature and Natural Resources

JMPR	Joint Management Plan Review
LCP	Local Coastal Program
LCV	Large Commercial Vessels
LiMPETS	Long-term Monitoring Program and Experiential Training for Students
MAC	Maritime Archaeology Center (NOAA)
MALT	Marin Agricultural Land Trust
MARE	Marine Activities, Resources, and Education
MARPOL	International Convention for the Prevention of Pollution from Ships
MATE	Marine Advanced Technology Education (Center)
MBA	Monterey Bay Aquarium
MBARI	Monterey Bay Aquarium Research Institute
MBNMS	Monterey Bay National Marine Sanctuary
MBTA	Migratory Bird Treaty Act
MCBI	Marine Conservation Biology Institute
MCSTOPPP	Marin County Stormwater Pollution Prevention Program
MERITO	Multicultural Education for Resource Issues Threatening Oceans
MGD	million gallons per day
MHW	mean high water
MHWL	mean high water line
MLMA	Marine Life Management Act
MLML	Moss Landing Marine Laboratories
MLPA	Marine Life Protection Act
MPMA	Marine Mammal Protection Act
MMS	Minerals Management Service
MOA	memorandum of agreement
MOU	memorandum of understanding
MPA	marine protected area
MRDC	Marin Rural Development Council
MSD	marine sanitation device
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act
NANPCA	Nonindigenous Aquatic Nuisance Prevention and Control Act
NAS	Nautical Archaeology Society
NASA	National Aeronautics and Space Administration
NCCOS	The National Centers for Coastal Ocean Science
NEMO	Nonpoint Education for Municipal Officials
NEPA	National Environmental Policy Act
NGO	non-governmental organization
NHPA	National Historic Preservation Act
NISA	National Invasive Species Act of 1996
NISAC	Non-native Invasive Species Advisory Committee
NM	nautical mile
NMFS	National Marine Fisheries Service
NMSA	National Marine Sanctuaries Act
NMSF	National Marine Sanctuaries Foundation
NMSP	National Marine Sanctuary Program
NMSS	National Marine Sanctuary System
NOAA OLE	NOAA Office of Law Enforcement
NOAA	National Oceanic and Atmospheric Administration
NODC	National Oceanographic Data Center
NOS	National Ocean Service

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NPDES	National Pollutant Discharge Elimination System
NPR	National Public Radio
NPS	National Park Service
NPS	Naval Postgraduate School
NPS	non-point source pollution
NRDA	National Resource Damage Assessment and Restoration
NURP	National Undersea Research Program (NOAA)
OCNMS	Olympic Coast National Marine Sanctuary
OCRM	Office of Coastal Resource Management (NOAA)
OCS	outer continental shelf
OE	Office of Enforcement
OES	Office of Emergency Services
ONMS	Office of National Marine Sanctuaries
OPA	Oil Spill Prevention Act of 1990
ORR	Office of Response and Restoration
OSPR	(Office of) Oil Spill Prevention and Response (CDFG)
OSRO	Oil Spill Response Organization
OWE	Open Water Exchange
PARS	Port Access Route Studies
PCB	polychlorinated biphenyl
PCFFA	Pacific Coast Federation of Fishermen's Associations
PCLC	Pacific Coast Learning Center
PFMC	Pacific Fishery Management Council
PISCO	Partnership for Interdisciplinary Studies of Coastal Oceans
PRBO	PRBO Conservation Science (Point Reyes Bird Observatory)
PRNS	Point Reyes National Seashore
PRNSA	Point Reyes National Seashore Association
PSA	public service announcement
PSMFC	Pacific States Marine Fisheries Commission
PWSA	Ports and Waterways Safety Act
RBOC	Recreational Boaters of California
RCRA	U.S. Resource Conservation and Recovery Act
ROV	remotely operated vehicle
RRP	Regional Response Plan
RUST	Resources and Under Sea Threats (NMSP database system)
RWQCB	Regional Water Quality Control Board
SAC	Sanctuary Advisory Council
SBNMS	Stellwagen Bank National Marine Sanctuary
SCCAT	Southern California Caulerpa Action Team
SCRP	Submerged Cultural Resources Program (NMSP)
SEALS	Sanctuary Education Awareness and Long-term Stewardship
SeaWif	Sea-viewing Wide Field of Vision
SERC	Smithsonian Environmental Research Center
SFBNERR	San Francisco Bay National Estuarine Research Reserve
SFSU	San Francisco State University
SFU	San Francisco State University
SHIELDS	Sanctuaries Hazardous Incident Emergency Logistics Database System
SHPO	California State Historic Preservation Office
SIMoN	Sanctuary Integrated Monitoring Network (MBNMS)
SLC	California State Lands Commission

SMCNHA	San Mateo Coast Natural History Association
SPO	Special Projects Office
SST	sea surface temperature
STRAW	Students and Teachers Restoring a Watershed
SWiM	System Wide Monitoring Program (NMSP)
SWMEA	Southwest Marine and Aquatic Educator's Association
SWQB	State Water Quality Board
SWQPA	State Water Quality Protection Area
SWRCB	State Water Resources Control Board
TBNMS	Thunder Bay National Marine Sanctuary
TMDL	total maximum daily loads
TMMC	The Marine Mammal Center
UCCE	University of California Cooperative Extension
UCD	University of California Davis
UCSC	University of California Santa Cruz
UNESCO	United Nations Educational Scientific and Cultural Organization
USACE	U.S. Army Corps of Engineers
USCG	United States Coast Guard
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VTS	Vessel Traffic System
VTSS	Vessel Traffic Separation Schemes
WDR	Waste Discharge Requirement
WRP	Western Regional Panel on Aquatic Nuisance Species



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## **Appendix IIID: National Marine Sanctuaries Act**

16 U.S.C. 1431 ET. SEQ., as amended by Public Law 106-513

Sec. 301. FINDINGS, PURPOSES, AND POLICIES; ESTABLISHMENT OF SYSTEM.

(a) FINDINGS.--The Congress finds that--

(1) this Nation historically has recognized the importance of protecting special areas of its public domain, but these efforts have been directed almost exclusively to land areas above the high-water mark;

(2) certain areas of the marine environment possess conservation, recreational, ecological, historical, scientific, educational, cultural, archeological, or aesthetic qualities which give them special national, and in some instances, international, significance;

(3) while the need to control the effects of particular activities has led to enactment of resource-specific legislation, these laws cannot in all cases provide a coordinated and comprehensive approach to the conservation and management of special areas of the marine environment; and

(4) a Federal program which establishes areas of the marine environment which have special conservation, recreational, ecological, historical, cultural, archeological, scientific, educational, or aesthetic qualities as national marine sanctuaries managed as the National Marine Sanctuary System will-

(A) improve the conservation, understanding, management, and wise and sustainable use of marine resources;

(B) enhance public awareness, understanding, and appreciation of the marine environment; and

(C) maintain for future generations the habitat, and ecological services, of the natural assemblage of living resources that inhabit these areas.

(b) PURPOSES AND POLICIES.--The purposes and policies of this title are--

(1) to identify and designate as national marine sanctuaries areas of the marine environment which are of special national significance and to manage these areas as the National Marine Sanctuary System;

(2) to provide authority for comprehensive and coordinated conservation and management of these marine areas, and activities affecting them, in a manner, which complements existing regulatory authorities;

(3) to maintain the natural biological communities in the national marine sanctuaries, and to protect, and, where appropriate, restore and enhance natural habitats, populations, and ecological processes;

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(4) to enhance public awareness, understanding, appreciation, and wise and sustainable use of the marine environment, and the natural, historical, cultural, and archeological resources of the National Marine Sanctuary System;

(5) to support, promote, and coordinate scientific research on, and long-term monitoring of, the resources of these marine areas;

(6) to facilitate to the extent compatible with the primary objective of resource protection, all public and private uses of the resources of these marine areas not prohibited pursuant to other authorities;

(7) to develop and implement coordinated plans for the protection and management of these areas with appropriate Federal agencies, State and local governments, Native American tribes and organizations, international organizations, and other public and private interests concerned with the continuing health and resilience of these marine areas;

(8) to create models of, and incentives for, ways to conserve and manage these areas, including the application of innovative management techniques; and

(9) to cooperate with global programs encouraging conservation of marine resources.

(c) ESTABLISHMENT OF SYSTEM.--There is established the National Marine Sanctuary System, which shall consist of national marine sanctuaries designated by the Secretary in accordance with this title.

Sec. 302. DEFINITIONS

As used in this title, the term--

(1) "Draft management plan" means the plan described in section 304(a)(1)(C)(v);

(2) "Magnuson-Stevens Act" means the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. 1801 et seq.);

(3) "marine environment" means those areas of coastal and ocean waters, the Great Lakes and their connecting waters, and submerged lands over which the United States exercises jurisdiction, including the exclusive economic zone, consistent with international law;

(4) "Secretary" means the Secretary of Commerce;

(5) "State" means each of the several States, the District of Columbia, the Commonwealth of Puerto Rico, the Commonwealth of the Northern Mariana Islands, American Samoa, the Virgin Islands, Guam, and any other commonwealth, territory, or possession of the United States;

(6) "damages" includes--

(A) compensation for--

- (i)(I) the cost of replacing, restoring, or acquiring the equivalent of a sanctuary resource; and (II) the value of the lost use of a sanctuary resource pending its restoration or replacement or the acquisition of an equivalent sanctuary resource; or
- (ii) the value of a sanctuary resource if the sanctuary resource cannot be restored or replaced or if the equivalent of such resource cannot be acquired;
- (B) the cost of damage assessments under section 312(b)(2);
- (C) the reasonable cost of monitoring appropriate to the injured, restored, or replaced resources;
- (D) the cost of curation and conservation of archeological, historical, and cultural sanctuary resources; and
- (E) the cost of enforcement actions undertaken by the Secretary in response to the destruction or loss of, or injury to, a sanctuary resource;
- (7) "response costs" means the costs of actions taken or authorized by the Secretary to minimize destruction or loss of, or injury to, sanctuary resources, or to minimize the imminent risks of such destruction, loss, or injury, including costs related to seizure forfeiture, storage, or disposal arising from liability under section 312;
- (8) "sanctuary resource" means any living or nonliving resource of a national marine sanctuary that contributes to the conservation, recreational, ecological, historical, educational, cultural, archeological, scientific, or aesthetic value of the sanctuary;
- (9) "exclusive economic zone" means the exclusive economic zone as defined in the Magnuson-Stevens Act; and
- (10) 'System' means the National Marine Sanctuary System established by section 301.

#### Sec. 303. SANCTUARY DESIGNATION STANDARDS

- (a) STANDARDS.--The Secretary may designate any discrete area of the marine environment as a national marine sanctuary and promulgate regulations implementing the designation if the Secretary determines that--
  - (1) the designation will fulfill the purposes and policies of this title;
  - (2) the area is of special national significance due to--
    - (A) its conservation, recreational, ecological, historical, scientific, cultural, archeological, educational, or aesthetic qualities;
    - (B) the communities of living marine resources it harbors; or
    - (C) its resource or human-use values;

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(3) existing State and Federal authorities are inadequate or should be supplemented to ensure coordinated and comprehensive conservation and management of the area, including resource protection, scientific research, and public education;

(4) designation of the area as a national marine sanctuary will facilitate the objectives in subparagraph (3); and

(5) the area is of a size and nature that will permit comprehensive and coordinated conservation and management.

**(b) FACTORS AND CONSULTATIONS REQUIRED IN MAKING DETERMINATIONS AND FINDINGS.--**

(1) Factors.--For purposes of determining if an area of the marine environment meets the standards set forth in subsection (a), the Secretary shall consider--

(A) the area's natural resource and ecological qualities, including its contribution to biological productivity, maintenance of ecosystem structure, maintenance of ecologically or commercially important or threatened species or species assemblages, maintenance of critical habitat of endangered species, and the biogeographic representation of the site;

(B) the area's historical, cultural, archaeological, or paleontological significance;

(C) the present and potential uses of the area that depend on maintenance of the area's resources, including commercial and recreational fishing, subsistence uses other commercial and recreational activities, and research and education;

(D) the present and potential activities that may adversely affect the factors identified in subparagraphs (A), (B), (C);

(E) the existing State and Federal regulatory and management authorities applicable to the area and the adequacy of those authorities to fulfill the purposes and policies of this title;

(F) the manageability of the area, including such factors as its size, its ability to be identified as a discrete ecological unit with definable boundaries, its accessibility, and its suitability for monitoring and enforcement activities;

(G) the public benefits to be derived from sanctuary status, with emphasis on the benefits of long-term protection of nationally significant resources, vital habitats, and resources, which generate tourism;

(H) the negative impacts produced by management restrictions on income-generating activities such as living and nonliving resources development;

(I) the socioeconomic effects of sanctuary designation;

(J) the area's scientific value and value for monitoring the resources and natural processes that occur there;

(K) the feasibility, where appropriate, of employing innovative management approaches to protect sanctuary resources or to manage compatible uses; and

(L) the value of the area as an addition to the System.

(2) Consultation.--In making determinations and findings, the Secretary shall consult with--

(A) the Committee on Resources of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate;

(B) the Secretaries of State, Defense, Transportation, and the Interior, the Administrator, and the heads of other interested Federal agencies;

(C) the responsible officials or relevant agency heads of the appropriate State and local government entities, including coastal zone management agencies, that will or are likely to be affected by the establishment of the area as a national marine sanctuary;

(D) the appropriate officials of any Regional Fishery Management Council established by section 302 of the Magnuson-Stevens Act (16 U.S.C. 1852) that may be affected by the proposed designation; and

(E) other interested persons.

#### Sec. 304. PROCEDURES FOR DESIGNATION AND IMPLEMENTATION

(a) SANCTUARY PROPOSAL.--

(1) Notice.--In proposing to designate a national marine sanctuary, the Secretary shall--

(A) issue, in the Federal Register, a notice of the proposal, proposed regulations that may be necessary and reasonable to implement the proposal, and a summary of the draft management plan;

(B) provide notice of the proposal in newspapers of general circulation or electronic media in the communities that may be affected by the proposal; and

(C) no later than the day on which the notice required under subparagraph (A) is submitted to Office of the Federal Register, submit a copy of that notice and the draft sanctuary designation documents prepared pursuant to section 304(a)(2), including an executive summary, to the Committee on Resources of the House of Representatives, the Committee on Commerce, Science, and Transportation of the Senate, and the Governor of each State in which any part of the proposed sanctuary would be located.

(2) Sanctuary Designation Documents.-- The Secretary shall prepare and make available to the public sanctuary designation documents on the proposal that include the following:

(A) A Final Environmental Impact Statement pursuant to the National Environmental Policy Act of 1969 (42 U.S.C. 4321 et seq.).

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(B) A resource assessment that documents--

(i) present and potential uses of the area, including commercial and recreational fishing, research and education, minerals and energy development, subsistence uses, and other commercial, governmental, or recreational uses;

(ii) after consultation with the Secretary of the Interior, any commercial, governmental, or recreational resource uses in the areas that are subject to the primary jurisdiction of the Department of the Interior; and

(iii) information prepared in consultation with the Secretary of Defense, the Secretary of Energy, and the Administrator of the Environmental Protection Agency, on any past, present, or proposed future disposal or discharge of materials in the vicinity of the proposed sanctuary. Public disclosure by the Secretary of such information shall be consistent with national security regulations.

(C) A draft management plan for the proposed national marine sanctuary that includes the following:

(i) The terms of the proposed designation.

(ii) Proposed mechanisms to coordinate existing regulatory and management authorities within the area.

(iii) The proposed goals and objectives, management responsibilities, resource studies, and appropriate strategies for managing sanctuary resources of the proposed sanctuary, including interpretation and education, innovative management strategies, research, monitoring and assessment, resource protection, restoration, enforcement, and surveillance activities.

(iv) An evaluation of the advantages of cooperative State and Federal management if all or part of the proposed sanctuary is within the territorial limits of any State or is superjacent to the subsoil and seabed within the seaward boundary of a State, as that boundary is established.

under the Submerged Lands Act (43 U.S.C. 1301 et seq.).

(v) An estimate of the annual cost to the Federal Government of the proposed designation, including costs of personnel, equipment and facilities, enforcement, research, and public education.

(vi) The proposed regulations referred to in paragraph (1)(A).

(D) Maps depicting the boundaries of the proposed sanctuary.

(E) The basis for the determinations made under section 303(a) with respect to the area.

(F) An assessment of the considerations under section 303(b)(1).

(3) Public Hearing.--No sooner than thirty days after issuing a notice under this subsection, the Secretary shall hold at least one public hearing in the coastal area or areas that will be most affected by the proposed designation of the area as a national marine sanctuary for the purpose of receiving the views of interested parties.

(4) Terms of Designation.--The terms of designation of a sanctuary shall include the geographic area proposed to be included within the sanctuary, the characteristics of the area that give it conservation, recreational, ecological, historical, research, educational, or aesthetic value, and the types of activities that will be subject to regulation by the Secretary to protect those characteristics. The terms of designation may be modified only by the same procedures by which the original designation is made.

(5) Fishing Regulations.--The Secretary shall provide the appropriate Regional Fishery Management Council with the opportunity to prepare draft regulations for fishing within the Exclusive Economic Zone as the Council may deem necessary to implement the proposed designation. Draft regulations prepared by the Council, or a Council determination that regulations are not necessary pursuant to this paragraph, shall be accepted and issued as proposed regulations by the Secretary unless the Secretary finds that the Council's action fails to fulfill the purposes and policies of this title and the goals and objectives of the proposed designation. In preparing the draft regulations, a Regional Fishery Management Council shall use as guidance the national standards of section 301(a) of the Magnuson-Stevens Act (16 U.S.C. 1851) to the extent that the standards are consistent and compatible with the goals and objectives of the proposed designation. The Secretary shall prepare the fishing regulations, if the Council declines to make a determination with respect to the need for regulations, makes a determination which is rejected by the Secretary, or fails to prepare the draft regulations in a timely manner. Any amendments to the fishing regulations shall be drafted, approved, and issued in the same manner as the original regulations. The Secretary shall also cooperate with other appropriate fishery management authorities with rights or responsibilities within a proposed sanctuary at the earliest practicable stage in drafting any sanctuary fishing regulations.

(6) Committee Action.--After receiving the documents under subsection (a)(1)(C), the Committee on Resources of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate may each hold hearings on the proposed designation and on the matters set forth in the documents. If within the forty-five day period of continuous session of Congress beginning on the date of submission of the documents, either Committee issues a report concerning matters addressed in the documents, the Secretary shall consider this report before publishing a notice to designate the national marine sanctuary.

**(b) TAKING EFFECT OF DESIGNATIONS.--**

(1) Notice.--In designating a national marine sanctuary, the Secretary shall publish in the Federal Register notice of the designation together with final regulations to implement the designation and any other matters required by law, and submit such notice to the Congress. The Secretary shall advise the public of the availability of the final management plan and the final environmental impact statement with respect to such sanctuary. The Secretary shall issue a notice of designation with respect to a proposed national marine sanctuary site not later than 30 months after the date a notice declaring the site to be an active candidate for sanctuary

designation is published in the Federal Register under regulations issued under this Act, or shall publish not later than such date in the Federal Register findings regarding why such notice has not been published. No notice of designation may occur until the expiration of the period for Committee action under subsection (a)(6). The designation (and any of its terms not disapproved under this subsection) and regulations shall take effect and become final after the close of a review period of forty-five days of continuous session of Congress beginning on the day on which such notice is published unless in the case of a natural [sic] marine sanctuary that is located partially or entirely within the seaward boundary of any State, the Governor affected certifies to the Secretary that the designation or any of its terms is unacceptable, in which case the designation or the unacceptable term shall not take effect in the area of the sanctuary lying within the seaward boundary of the State.

(2) **Withdrawal of Designation.**-- If the Secretary considers that actions taken under paragraph (1) will affect the designation of a national marine sanctuary in a manner that the goals and objectives of the sanctuary or System cannot be fulfilled, the Secretary may withdraw the entire designation. If the Secretary does not withdraw the designation, only those terms of the designation or not certified under paragraph (1) shall take effect.

(3) **Procedures.**-- In computing the forty-five-day periods of continuous session of Congress pursuant to subsection (a)(6) and paragraph (1) of this subsection--

(A) continuity of session is broken only by an adjournment of Congress sine die; and

(B) the days on which either House of Congress is not in session because of an adjournment of more than three days to a day certain are excluded.

(c) **ACCESS AND VALID RIGHTS.**--

(1) Nothing in this title shall be construed as terminating or granting to the Secretary the right to terminate any valid lease, permit, license, or right of subsistence use or of access that is in existence on the date of designation of any national marine sanctuary.

(2) The exercise of a lease, permit, license, or right is subject to regulation by the Secretary consistent with the purposes for which the sanctuary is designated.

(d) **INTERAGENCY COOPERATION.**--

(1) **Review of Agency Actions.**--

(A) **In General.**--Federal agency actions internal or external to a national marine sanctuary, including private activities authorized by licenses, leases, or permits, that are likely to destroy, cause the loss of, or injure any sanctuary resource are subject to consultation with the Secretary.

(B) **Agency Statements Required.**-- Subject to any regulations the Secretary may establish each Federal agency proposing an action described in subparagraph (A) shall provide the Secretary with a written statement describing the action and its potential effects on sanctuary resources at the earliest practicable time, but in no case later than 45 days before the final approval of the action unless such Federal agency and the Secretary agree to a different schedule.

(2) Secretary's Recommended Alternatives.--If the Secretary finds that a Federal agency action is likely to destroy, cause the loss of, or injure a sanctuary resource, the Secretary shall (within 45 days of receipt of complete information on the proposed agency action) recommend reasonable and prudent alternatives, which may include conduct of the action elsewhere, which can be taken by the Federal agency in implementing the agency action that will protect sanctuary resources.

(3) Response to Recommendations.--The agency head who receives the Secretary's recommended alternatives under paragraph (2) shall promptly consult with the Secretary on the alternatives. If the agency head decides not to follow the alternatives, the agency head shall provide the Secretary with a written statement explaining the reasons for that decision.

(4) FAILURE TO FOLLOW ALTERNATIVE.-- If the head of a Federal agency takes an action other than an alternative recommended by the Secretary and such action results in the destruction of, loss of, or injury to a sanctuary resource, the head of the agency shall promptly prevent and mitigate further damage and restore or replace the sanctuary resource in a manner approved by the Secretary.

(e) REVIEW OF MANAGEMENT PLANS.--Not more than 5 years after the date of designation of any national marine sanctuary, and thereafter at intervals not exceeding 5 years, the Secretary shall evaluate the substantive progress toward implementing the management plan and goals for the sanctuary, especially the effectiveness of site-specific management techniques and strategies, and shall revise the management plan and regulations as necessary to fulfill the purposes and policies of this title. This review shall include a prioritization of management objectives.

(f) LIMITATION ON DESIGNATION OF NEW SANCTUARIES.--

(1) FINDING REQUIRED.--The Secretary may not publish in the Federal Register any sanctuary designation notice or regulations proposing to designate a new sanctuary, unless the Secretary has published a finding that--

(A) the addition of a new sanctuary will not have a negative impact on the System; and

(B) sufficient resources were available in the fiscal year in which the finding is made to--

(i) effectively implement sanctuary management plans for each sanctuary in the System; and

(ii) complete site characterization studies and inventory known sanctuary resources, including cultural resources, for each sanctuary in the System within 10 years after the date that the finding is made if the resources available for those activities are maintained at the same level for each fiscal year in that 10 year period.

(2) DEADLINE-- If the Secretary does not submit the findings required by paragraph (1) before February 1, 2004, the Secretary shall submit to the Congress before October 1, 2004, a finding with respect to whether the requirements of subparagraphs (A) and (B) of paragraph 1 have been met by all existing sanctuaries.

(3) LIMITATION ON APPLICATION-- Paragraph (1) does not apply to any sanctuary designation documents for--

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(A) a Thunder Bay National Marine Sanctuary; or

(B) a Northwestern Hawaiian Islands National Marine Sanctuary.

(g) NORTHWESTERN HAWAIIAN ISLANDS CORAL REEF RESERVE.--

(1) PRESIDENTIAL DESIGNATION.-- The President, after consultation with the Governor of the State of Hawaii, may designate any Northwestern Hawaiian Islands coral reef or coral reef ecosystem as a coral reef reserve to be managed by the Secretary of Commerce.

(2) SECRETARIAL ACTION.-- Upon the designation of a reserve under paragraph (1) by the President, the Secretary shall--

(A) take action to initiate the designation of the reserve as a National Marine Sanctuary under sections 303 and 304 of the National Marine Sanctuaries Act (16 U.S.C. 1433);

(B) establish a Northwestern Hawaiian Islands Reserve Advisory Council under section 315 of that Act (16 U.S.C. 1445a), the membership of which shall include at least 1 representative from Native Hawaiian groups; and

(C) until the reserve is designated as a National Marine Sanctuary, manage the reserve in a manner consistent with the purposes and policies of that Act.

(3) PUBLIC COMMENT-- Notwithstanding any other provision of law, no closure areas around the Northwestern Hawaiian Islands shall become permanent without adequate review and comment.

(4) COORDINATION--The Secretary shall work with other Federal agencies and the Director of the National Science Foundation, to develop a coordinated plan to make vessels and other resources available for conservation or research activities for the reserve.

(5) REVIEW-- If the Secretary has not designated a national marine sanctuary in the Northwestern Hawaiian Islands under sections 303 and 304 of the National Marine Sanctuaries Act (16 U.S.C. 1433, 1434) before October 1, 2005, the Secretary shall conduct a review of the management of the reserve under section 304(e) of that Act (16 U.S.C. 1434(e)).

(6) REPORT-- No later than 6 months after the date of enactment of this Act, the Secretary shall submit a report to the Senate Committee on Commerce, Science, and Transportation and the House of Representatives Committee on Resources, describing actions taken to implement this subsection, including costs of monitoring, enforcing, and addressing marine debris, and the extent to which the fiscal or other resources necessary to carry out this subsection are

reflected in the Budget of the United States Government submitted by the President under section 1104 of title 31, United States Code.

(7) AUTHORIZATION OF APPROPRIATIONS-- There are authorized to be appropriated to the Secretary of Commerce to carry out the provisions of this subsection such sums, not

exceeding \$4,000,000 for each of fiscal years 2001, 2002, 2003, 2004, and 2005, as are reported under paragraph (6) to be reflected in the Budget of the United States Government.

Sec. 305. APPLICATION OF REGULATIONS AND INTERNATIONAL NEGOTIATIONS

(a) REGULATIONS.--This title and the regulations issued under section 304 shall be applied in accordance with generally recognized principles of international law, and in accordance with the treaties, conventions, and other agreements to which the United States is a party. No regulation shall apply to or be enforced against a person who is not a citizen, national, or resident alien of the United States, unless in accordance with--

- (1) generally recognized principles of international law;
- (2) an agreement between the United States and the foreign state of which the person is a citizen; or
- (3) an agreement between the United States and the flag state of a foreign vessel, if the person is a crewmember of the vessel.

(b) NEGOTIATIONS.--The Secretary of State, in consultation with the Secretary, shall take appropriate action to enter into negotiations with other governments to make necessary arrangements for the protection of any national marine sanctuary and to promote the purposes for which the sanctuary is established.

(c) INTERNATIONAL COOPERATION.--The Secretary, in consultation with the Secretary of State and other appropriate Federal agencies, shall cooperate with other governments and international organizations in the furtherance of the purposes and policies of this title and consistent with applicable regional and multilateral arrangements for the protection and management of special marine areas.

Sec. 306. PROHIBITED ACTIVITIES

It is unlawful for any person to--

- (1) destroy, cause the loss of, or injure any sanctuary resource managed under law or regulations for that sanctuary;
- (2) possess, sell, offer for sale, purchase, import, export, deliver, carry, transport, or ship by any means any sanctuary resource taken in violation of this section;
- (3) interfere with the enforcement of this title by--
  - (A) refusing to permit any officer authorized to enforce this title to board a vessel, other than a vessel operated by the Department of Defense or United States Coast Guard, subject to such person's control for the purposes of conducting any search or inspection in connection with the enforcement of this title;

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(B) resisting, opposing, impeding, intimidating, harassing, bribing, interfering with, or forcibly assaulting any person authorized by the Secretary to implement this title or any such authorized officer in the conduct of any search or inspection performed under this title; or

(C) knowingly and willfully submitting false information to the Secretary or any officer authorized to enforce this title in connection with any search or inspection conducted under this title; or

(4) violate any provision of this title or any regulation or permit issued pursuant to this title.

Sec. 307. ENFORCEMENT

(a) IN GENERAL.--The Secretary shall conduct such enforcement activities as are necessary and reasonable to carry out this title.

(b) POWERS OF AUTHORIZED OFFICERS.--Any person who is authorized to enforce this title may--

(1) board, search, inspect, and seize any vessel suspected of being used to violate this title or any regulation or permit issued under this title and any equipment, stores, and cargo of such vessel;

(2) seize wherever found any sanctuary resource taken or retained in violation of this title or any regulation or permit issued under this title;

(3) seize any evidence of a violation of this title or of any regulation or permit issued under this title;

(4) execute any warrant or other process issued by any court of competent jurisdiction;

(5) exercise any other lawful authority; and

(6) arrest any person, if there is reasonable cause to believe that such a person has committed an act prohibited by section 306(3).

(c) CRIMINAL OFFENSES--

(1) OFFENSES.-- A person is guilty of an offense under this subsection if the person commits any act prohibited by section 306(3).

(2) PUNISHMENT.-- Any person that is guilty of an offense under this subsection--

(A) except as provided in subparagraph (B), shall be fined under title 18, United States Code, imprisoned for not more than 6 months, or both; or

(B) in the case of a person who in the commission of such an offense uses a dangerous weapon, engages in conduct that causes bodily injury to any person authorized to enforce this title or any person authorized to implement the provisions of this title, or places any such person in fear of

imminent bodily injury, shall be fined under title 18, United States Code, imprisoned for not more than 10 years, or both.

(d) CIVIL PENALTIES.--

(1) Civil penalty.--Any person subject to the jurisdiction of the United States who violates this title or any regulation or permit issued under this title shall be liable to the United States for a civil penalty of not more than \$100,000 for each such violation, to be assessed by the Secretary. Each day of a continuing violation shall constitute a separate violation.

(2) Notice.--No penalty shall be assessed under this subsection until after the person charged has been given notice and an opportunity for a hearing.

(3) In Rem Jurisdiction.--A vessel used in violating this title or any regulation or permit issued under this title shall be liable in rem for any civil penalty assessed for such violation. Such penalty shall constitute a maritime lien on the vessel and may be recovered in an action in rem in the district court of the United States having jurisdiction over the vessel.

(4) Review of Civil Penalty.--Any person against whom a civil penalty is assessed under this subsection may obtain review in the United States district court for the appropriate district by filing a complaint in such court not later than 30 days after the date of such order.

(5) Collection of Penalties.--If any person fails to pay an assessment of a civil penalty under this section after it has become a final and unappealable order, or after the appropriate court has entered final judgment in favor of the Secretary, the Secretary shall refer the matter to the Attorney General, who shall recover the amount assessed in any appropriate district court of the United States. In such action, the validity and appropriateness of the final order imposing the civil penalty shall not be subject to review.

(6) Compromise or Other Action by Secretary.--The Secretary may compromise, modify, or remit, with or without conditions, any civil penalty which is or may be imposed under this section.

(e) FORFEITURE.--

(1) In General.--Any vessel (including the vessel's equipment, stores, and cargo) and other item used, and any sanctuary resource taken or retained, in any manner, in connection with or as a result of any violation of this title or of any regulation or permit issued under this title shall be subject to forfeiture to the United States pursuant to a civil proceeding under this subsection. The proceeds from forfeiture actions under this subsection shall constitute a separate recovery in addition to any amounts recovered as civil penalties under this section or as civil damages under section 312. None of those proceeds shall be subject to set-off.

(2) Application of the Customs Laws.--The Secretary may exercise the authority of any United States official granted by any relevant customs law relating to the seizure, forfeiture, condemnation, disposition, remission, and mitigation of property in enforcing this title.

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(3) Disposal of Sanctuary Resources.--Any sanctuary resource seized pursuant to this title may be disposed of pursuant to an order of the appropriate court or, if perishable, in a manner prescribed by regulations promulgated by the Secretary. Any proceeds from the sale of such sanctuary resource shall for all purposes represent the sanctuary resource so disposed of in any subsequent legal proceedings.

(4) Presumption.--For the purposes of this section there is a reputable presumption that all sanctuary resources found on board a vessel that is used or seized in connection with a violation of this title or of any regulation or permit issued under this title were taken or retained in violation of this title or of a regulation or permit issued under this title.

**(f) PAYMENT OF STORAGE, CARE, AND OTHER COSTS.--**

(1) Expenditures.--

(A) Notwithstanding any other law, amounts received by the United States as civil penalties, forfeitures of property, and costs imposed under paragraph (2) shall be retained by the Secretary in the manner provided for in section 107(f)(1) of the Comprehensive Environmental Response, Compensation and Liability Act of 1980.

(B) Amounts received under this section for forfeitures and costs imposed under paragraph (2) shall be used to pay the reasonable and necessary costs incurred by the Secretary to provide temporary storage, care, maintenance, and disposal of any sanctuary resource or other property seized in connection with a violation of this title or any regulation or permit issued under this title.

(C) Amounts received under this section as civil penalties and any amounts remaining after the operation of subparagraph (B) shall be used, in order of priority, to--

(i) manage and improve the national marine sanctuary with respect to which the violation occurred that resulted in the penalty or forfeiture;

(ii) pay a reward to any person who furnishes information leading to an assessment of a civil penalty, or to a forfeiture of property, for a violation of this title or any regulation or permit issued under this title; and

(iii) manage and improve any other national marine sanctuary.

(2) Liability for Costs.--Any person assessed a civil penalty for a violation of this title or of any regulation or permit issued under this title, and any claimant in a forfeiture action brought for such a violation, shall be liable for the reasonable costs incurred by the Secretary in storage, care, and maintenance of any sanctuary resource or other property seized in connection with the violation.

(g) SUBPOENAS.--In the case of any hearing under this section which is determined on the record in accordance with the procedures provided for under section 554 of title 5, United States Code, the Secretary may issue subpoenas for the attendance and testimony of witnesses and the production of relevant papers, books, electronic files, and documents, and may administer oaths.

(h) USE OF RESOURCES OF STATE AND OTHER FEDERAL AGENCIES.--The Secretary shall, whenever appropriate, use by agreement the personnel, services, and facilities of State and other Federal departments, agencies, and instrumentalities, on a reimbursable or nonreimbursable basis, to carry out the Secretary's responsibilities under this section.

(i) COAST GUARD AUTHORITY NOT LIMITED.--Nothing in this section shall be considered to limit the authority of the Coast Guard to enforce this or any other Federal law under section 89 of title 14, United States Code.

(j) INJUNCTIVE RELIEF.--If the Secretary determines that there is an imminent risk of destruction or loss of or injury to a sanctuary resource, or that there has been actual destruction or loss of, or injury to, a sanctuary resource which may give rise to liability under section 312, the Attorney General, upon request of the Secretary, shall seek to obtain such relief as may be necessary to abate such risk or actual destruction, loss, or injury, or to restore or replace the sanctuary resource, or both. The district courts of the United States shall have jurisdiction in such a case to order such relief as the public interest and the equities of the case may require.

(k) AREA OF APPLICATION AND ENFORCEABILITY.--The area of application and enforceability of this title includes the territorial sea of the United States, as described in Presidential Proclamation 5928 of December 27, 1988, which is subject to the sovereignty of the United States, and the United States exclusive economic zone, consistent with international law.

(l) NATIONWIDE SERVICE OF PROCESS.-- In any action by the United States under this title, process may be served in any district where the defendant is found, resides, transacts business, or has appointed an agent for the service of process.

#### Sec. 308. REGULATIONS.

The Secretary may issue such regulations as may be necessary to carry out this title.

#### Sec. 309. RESEARCH, MONITORING, AND EDUCATION.

(a) IN GENERAL-- The Secretary shall conduct, support, or coordinate research, monitoring, evaluation, and education programs consistent with subsections (b) and (c) and the purposes and policies of this title.

(b) RESEARCH AND MONITORING.--

(1) IN GENERAL.-- The Secretary may--

(A) support, promote, and coordinate research on, and long-term monitoring of, sanctuary resources and natural processes that occur in national marine sanctuaries, including exploration, mapping, and environmental and socioeconomic assessment;

(B) develop and test methods to enhance degraded habitats or restore damaged, injured, or lost sanctuary resources; and

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(C) support, promote, and coordinate research on, and the conservation, curation, and public display of, the cultural, archeological, and historical resources of national marine sanctuaries.

(2) AVAILABILITY OF RESULTS.-- The results of research and monitoring conducted, supported, or permitted by the Secretary under this subsection shall be made available to the public.

(c) EDUCATION--

(1) IN GENERAL.-- The Secretary may support, promote, and coordinate efforts to enhance public awareness, understanding, and appreciation of national marine sanctuaries and the System. Efforts supported, promoted, or coordinated under this subsection must emphasize the conservation goals and sustainable public uses of national marine sanctuaries and the System.

(2) EDUCATIONAL ACTIVITIES.-- Activities under this subsection may include education of the general public, teachers, students, national marine sanctuary users, and ocean and coastal resource managers.

(d) INTERPRETIVE FACILITIES.--

(1) IN GENERAL.-- The Secretary may develop interpretive facilities near any national marine sanctuary.

(2) FACILITY REQUIREMENT.-- Any facility developed under this subsection must emphasize the conservation goals and sustainable public uses of national marine sanctuaries by providing the public with information about the conservation, recreational, ecological, historical, cultural, archeological, scientific, educational, or aesthetic qualities of the national marine sanctuary.

(e) CONSULTATION AND COORDINATION.-- In conducting, supporting, and coordinating research, monitoring, evaluation, and education programs under subsection (a) and developing interpretive facilities under subsection (d), the Secretary may consult or coordinate with Federal, interstate, or regional agencies, States or local governments.

**Sec. 310. SPECIAL USE PERMITS**

(a) ISSUANCE OF PERMITS.--The Secretary may issue special use permits that authorize the conduct of specific activities in a national marine sanctuary if the Secretary determines such authorization is necessary--

(1) to establish conditions of access to and use of any sanctuary resource; or

(2) to promote public use and understanding of a sanctuary resource.

(b) PUBLIC NOTICE REQUIRED.-- The Secretary shall provide appropriate public notice before identifying any category of activity subject to a special use permit under subsection (a).

(c) PERMIT TERMS.--A permit issued under this section--

- (1) shall authorize the conduct of an activity only if that activity is compatible with the purposes for which the sanctuary is designated and with protection of sanctuary resources;
  - (2) shall not authorize the conduct of any activity for a period of more than 5 years unless renewed by the Secretary;
  - (3) shall require that activities carried out under the permit be conducted in a manner that does not destroy, cause the loss of, or injure sanctuary resources; and
  - (4) shall require the permittee to purchase and maintain comprehensive general liability insurance, or post an equivalent bond, against claims arising out of activities conducted under the permit and to agree to hold the United States harmless against such claims.
- (d) FEES.--
- (1) Assessment and Collection.--The Secretary may assess and collect fees for the conduct of any activity under a permit issued under this section.
  - (2) Amount.--The amount of a fee under this subsection shall be equal to the sum of--
    - (A) costs incurred, or expected to be incurred, by the Secretary in issuing the permit;
    - (B) costs incurred, or expected to be incurred, by the Secretary as a direct result of the conduct of the activity for which the permit is issued, including costs of monitoring the conduct of the activity; and
    - (C) an amount that represents the fair market value of the use of the sanctuary resource.
  - (3) Use of Fees.--Amounts collected by the Secretary in the form of fees under this section may be used by the Secretary--
    - (A) for issuing and administering permits under this section; and
    - (B) for expenses of managing national marine sanctuaries.
  - (4) WAIVER OR REDUCTION OF FEES.-- The Secretary may accept in-kind contributions in lieu of a fee under paragraph (2)(C), or waive or reduce any fee assessed under this subsection for any activity that does not derive a profit from the access to or use of sanctuary resources.
- (e) VIOLATIONS.--Upon violation of a term or condition of a permit issued under this section, the Secretary may--
- (1) suspend or revoke the permit without compensation to the permittee and without liability to the United States;
  - (2) assess a civil penalty in accordance with section 307; or
  - (3) both.

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(f) REPORTS.--Each person issued a permit under this section shall submit an annual report to the Secretary not later than December 31 of each year which describes activities conducted under that permit and revenues derived from such activities during the year.

(g) FISHING.--Nothing in this section shall be considered to require a person to obtain a permit under this section for the conduct of any fishing activities in a national marine sanctuary.

Sec. 311. COOPERATIVE AGREEMENTS, DONATIONS, AND ACQUISITIONS

(a) AGREEMENTS AND GRANTS.--The Secretary may enter into cooperative agreements, contracts, or other agreements with, or make grants to, States, local governments, regional agencies, interstate agencies, or other persons to carry out the purposes and policies of this title.

(b) AUTHORIZATION TO SOLICIT DONATIONS.--The Secretary may enter into such agreements with any nonprofit organization authorizing the organization to solicit private donations to carry out the purposes and policies of this title.

(c) DONATIONS.--The Secretary may accept donations of funds, property, and services for use in designating and administering national marine sanctuaries under this title. Donations accepted under this section shall be considered as a gift or bequest to or for the use of the United States.

(d) ACQUISITIONS.--The Secretary may acquire by purchase, lease, or exchange, any land, facilities, or other property necessary and appropriate to carry out the purposes and policies of this title

(e) USE OF RESOURCES OF OTHER GOVERNMENT AGENCIES.--The Secretary may, whenever appropriate, enter into an agreement with a State or other Federal agency to use the personnel, services, or facilities of such agency on a reimbursable or nonreimbursable basis, to assist in carrying out the purposes and policies of this title.

(f) AUTHORITY TO OBTAIN GRANTS.--Notwithstanding any other provision of law that prohibits a Federal agency from receiving assistance, the Secretary may apply for, accept, and use grants from other Federal agencies, States, local governments, regional agencies, interstate agencies, foundations, or other persons, to carry out the purposes and policies of this title.

Sec. 312. DESTRUCTION OR LOSS OF, OR INJURY TO, SANCTUARY RESOURCES

(a) LIABILITY FOR INTEREST.--

(1) Liability to UNITED STATES.--Any person who destroys, causes the loss of, or injures any sanctuary resource is liable to the United States for an amount equal to the sum of--

(A) the amount of response costs and damages resulting from the destruction, loss, or injury; and

(B) interests on that amount calculated in the manner described under section 1005 of the Oil Pollution Act of 1990.

(2) Liability In Rem.--Any vessel used to destroy, cause the loss of, or injure any sanctuary resource shall be liable in rem to the United States for response costs and damages resulting from such destruction, loss, or injury. The amount of that liability shall constitute a maritime lien on the vessel and may be recovered in an action in rem in the district court of the United States having jurisdiction over the vessel.

(3) Defenses.--A person is not liable under this subsection if that person establishes that--

(A) the destruction or loss of, or injury to, the sanctuary resource was caused solely by an act of God, an act of war, or an act or omission of a third party, and the person acted with due care;

(B) the destruction, loss, or injury was caused by an activity authorized by Federal or State law;  
or

(C) the destruction, loss, or injury was negligible.

(4) Limits to Liability.-- Nothing in sections 4281-4289 of the Revised Statutes of the United States or section 3 of the Act of February 13, 1893, shall limit the liability of any person under this title.

(b) RESPONSE ACTIONS AND DAMAGE ASSESSMENT.--

(1) Response Actions.--The Secretary may undertake or authorize all necessary actions to prevent or minimize the destruction or loss of, or injury to, sanctuary resources, or to minimize the imminent risk of such destruction, loss, or injury.

(2) Damage Assessment.--The Secretary shall assess damages to sanctuary resources in accordance with section 302(6).

(c) CIVIL ACTIONS FOR RESPONSE COSTS AND DAMAGES.--

(1) The Attorney General, upon request of the Secretary, may commence a civil action against any person or vessel that may be liable under subsection (a) for response costs and damages. The Secretary, acting as trustee for sanctuary resources for the United States, shall submit a request for such an action to the Attorney General whenever a person may be liable for such costs or damages.

(2) An action under this subsection may be brought in the United States district court for any district in which-

(A) the defendant is located, resides, or is doing business, in the case of an action against a person;

(B) the vessel is located, in the case of an action against a vessel; or

(C) the destruction of, loss of, or injury to a sanctuary resource occurred.

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(d) USE OF RECOVERED AMOUNTS.--Response costs and damages recovered by the Secretary under this section shall be retained by the Secretary in the manner provided for in section 107(f)(1) of the Comprehensive Environmental Response, Compensation and Liability Act (42 U.S.C. 9607(f)(1)), and used as follows:

(1) RESPONSE COSTS.- Amounts recovered by the United States for costs of response actions and damage assessments under this section shall be used, as the Secretary considers appropriate--

(A) to reimburse the Secretary or any other Federal or State agency that conducted those activities; and

(B) after reimbursement of such costs, to restore, replace, or acquire the equivalent of any sanctuary resource.

(2) OTHER AMOUNTS.--All other amounts recovered shall be used, in order of priority--

(A) to restore, replace, or acquire the equivalent of the sanctuary resources that were the subject of the action, including for costs of monitoring and the costs of curation and conservation of archeological, historical, and cultural sanctuary resources;

(B) to restore degraded sanctuary resources of the national marine sanctuary that was the subject of the action, giving priority to sanctuary resources and habitats that are comparable to the sanctuary resources that were the subject of the action; and

(C) to restore degraded sanctuary resources of other national marine sanctuaries.

(3) Federal-State Coordination.--Amounts recovered under this section with respect to sanctuary resources lying within the jurisdiction of a State shall be used under paragraphs (2)(A) and (B) in accordance with the court decree or settlement agreement and an agreement entered into by the Secretary and the Governor of that State.

(e) STATUTE OF LIMITATIONS.--An action for response costs or damages under subsection (c) shall be barred unless the complaint is filed within 3 years after the date on which the Secretary completes a damage assessment and restoration plan for the sanctuary resources to which the action relates.

**SEC. 313. AUTHORIZATION OF APPROPRIATIONS.**

There are authorized to be appropriated to the Secretary--

(1) to carry out this title--

(A) \$32,000,000 for fiscal year 2001;

(B) \$34,000,000 for fiscal year 2002;

(C) \$36,000,000 for fiscal year 2003;

(D) \$38,000,000 for fiscal year 2004;

(E) \$40,000,000 for fiscal year 2005; and

(2) for construction projects at national marine sanctuaries, \$6,000,000 for each of fiscal years 2001, 2002, 2003, 2004, and 2005.

Sec. 314. U.S.S. MONITOR ARTIFACTS AND MATERIALS

(a) CONGRESSIONAL POLICY.--In recognition of the historical significance of the wreck of the United States ship Monitor to coastal North Carolina and to the area off the coast of North Carolina known as the Graveyard of the Atlantic, the Congress directs that a suitable display of artifacts and materials from the United States ship Monitor be maintained permanently at an appropriate site in coastal North Carolina. [P.L. 102-587 authorized a grant for the acquisition of space in Hatteras Village, NC, for display of artifacts and administration and operations of the Monitor National Marine Sanctuary.

(b) DISCLAIMER.--This section shall not affect the following:

(1) Responsibilities Of Secretary.--The responsibilities of the Secretary to provide for the protection, conservation, and display of artifacts and materials from the United States ship Monitor.

(2) Authority Of Secretary.--The authority of the Secretary to designate the Mariner's Museum, located at Newport News, Virginia, as the principal museum for coordination of activities referred to in paragraph (1).

Sec. 315. ADVISORY COUNCILS

(a) ESTABLISHMENT.--The Secretary may establish one or more advisory councils (in this section referred to as an 'Advisory Council') to advise and make recommendations to the Secretary regarding the designation and management of national marine sanctuaries. The Advisory Councils shall be exempt from the Federal Advisory Committee Act.

(b) MEMBERSHIP.--Members of the Advisory Councils may be appointed from among--

(1) persons employed by Federal or State agencies with expertise in management of natural resources;

(2) members of relevant Regional Fishery Management Councils established under section 302 of the Magnuson-Stevens Act; and

(3) representatives of local user groups, conservation and other public interest organizations, scientific organizations, educational organizations, or others interested in the protection and multiple use management of sanctuary resources.

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(c) LIMITS ON MEMBERSHIP.--For sanctuaries designated after the date of enactment of the National Marine Sanctuaries Program Amendments Act of 1992, the membership of Advisory Councils shall be limited to no more than 15 members.

(d) STAFFING AND ASSISTANCE.--The Secretary may make available to an Advisory Council any staff, information, administrative services, or assistance the Secretary determines are reasonably required to enable the Advisory Council to carry out its functions.

(e) PUBLIC PARTICIPATION AND PROCEDURAL MATTERS.--The following guidelines apply with respect to the conduct of business meetings of an Advisory Council:

(1) Each meeting shall be open to the public, and interested persons shall be permitted to present oral or written statements on items on the agenda.

(2) Emergency meetings may be held at the call of the chairman or presiding officer.

(3) Timely notice of each meeting, including the time, place, and agenda of the meeting, shall be published locally and in the Federal Register, except that in the case of a meeting of an Advisory Council established to provide assistance regarding any individual national marine sanctuary the notice is not required to be published in the Federal Register.

(4) Minutes of each meeting shall be kept and contain a summary of the attendees and matters discussed.

**Sec. 316. ENHANCING SUPPORT FOR NATIONAL MARINE SANCTUARIES**

(a) AUTHORITY.--The Secretary may establish a program consisting of--

(1) the creation, adoption, and publication in the Federal Register by the Secretary of a symbol for the national marine sanctuary program, or for individual national marine sanctuaries or the System;

(2) the solicitation of persons to be designated as official sponsors of the national marine sanctuary program or of individual national marine sanctuaries;

(3) the designation of persons by the Secretary as official sponsors of the national marine sanctuary program or of individual sanctuaries;

(4) the authorization by the Secretary of the manufacture, reproduction, or other use of any symbol published under paragraph (1), including the sale of items bearing such a symbol, by official sponsors of the national marine sanctuary program or of individual national marine sanctuaries;

(5) the creation, marketing, and selling of products to promote the national marine sanctuary program, and entering into exclusive or nonexclusive agreements authorizing entities to create, market or sell on the Secretary's behalf;

(6) the solicitation and collection by the Secretary of monetary or in-kind contributions from official sponsors for the manufacture, reproduction or use of the symbols published under paragraph (1);

(7) the retention of any monetary or in-kind contributions collected under paragraphs (5) and (6) by the Secretary; and

(8) the expenditure and use of any monetary and in-kind contributions, without appropriation, by the Secretary to designate and manage national marine sanctuaries.

Monetary and in-kind contributions raised through the sale, marketing, or use of symbols and products related to an individual national marine sanctuary shall be used to support that sanctuary.

(b) **CONTRACT AUTHORITY.**--The Secretary may contract with any person for the creation of symbols or the solicitation of official sponsors under subsection (a).

(c) **RESTRICTIONS.**--The Secretary may restrict the use of the symbols published under subsection (a), and the designation of official sponsors of the national marine sanctuary program or of individual national marine sanctuaries to ensure compatibility with the goals of the national marine sanctuary program.

(d) **PROPERTY OF UNITED STATES.**--Any symbol that is adopted by the Secretary and published in the Federal Register under subsection (a) is deemed to be the property of the United States.

(e) **PROHIBITED ACTIVITIES.**--It is unlawful for any person--

(1) designated as an official sponsor to influence or seek to influence any decision by the Secretary or any other Federal official related to the designation or management of a national marine sanctuary, except to the extent that a person who is not so designated may do so;

(2) to represent himself or herself to be an official sponsor absent a designation by the Secretary;

(3) to manufacture, reproduce, or otherwise use any symbol adopted by the Secretary under subsection (a)(1), including to sell any item bearing such a symbol, unless authorized by the Secretary under subsection (a)(4) or subsection (f); or

(4) to violate any regulation promulgated by the Secretary under this section.

(f) **COLLABORATIONS.**--The Secretary may authorize the use of a symbol adopted by the Secretary under subsection (a)(1) by any person engaged in a collaborative effort with the Secretary to carry out the purposes and policies of this title and to benefit a national marine sanctuary or the System.

(g) **AUTHORIZATION FOR NON-PROFIT PARTNER ORGANIZATION TO SOLICIT SPONSORS.**--

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(1) IN GENERAL.--The Secretary may enter into an agreement with a non-profit partner organization authorizing it to assist in the administration of the sponsorship program established under this section. Under an agreement entered into under this paragraph, the Secretary may authorize the non-profit partner organization to solicit persons to be official sponsors of the national marine sanctuary system or of individual national marine sanctuaries, upon such terms as the Secretary deems reasonable and will contribute to the successful administration of the sanctuary system. The Secretary may also authorize the non-profit partner organization to collect the statutory contribution from the sponsor, and, subject to paragraph (2), transfer the contribution to the Secretary.

(2) REIMBURSEMENT FOR ADMINISTRATIVE COSTS.--Under the agreement entered into under paragraph (1), the Secretary may authorize the non-profit partner organization to retain not more than 5 percent of the amount of monetary contributions it receives from official sponsors under the agreement to offset the administrative costs of the organization in soliciting sponsors.

(3) PARTNER ORGANIZATION DEFINED.--In this subsection, the term 'partner organization' means an organization that--

(A) draws its membership from individuals, private organizations, corporation, academic institutions, or State and local governments; and

(B) is established to promote the understanding of, education relating to, and the conservation of the resources of a particular sanctuary or 2 or more related sanctuaries.

**Sec. 318. DR. NANCY FOSTER SCHOLARSHIP PROGRAM.**

(a) ESTABLISHMENT.--The Secretary shall establish and administer through the National Ocean Service the Dr. Nancy Foster Scholarship Program. Under the program, the Secretary shall award graduate education scholarships in oceanography, marine biology or maritime archeology, to be known as Dr. Nancy Foster Scholarships.

(b) PURPOSES- The purposes of the Dr. Nancy Foster Scholarship Program are--

(1) to recognize outstanding scholarship in oceanography, marine biology, or maritime archeology, particularly by women and members of minority groups ; and

(2) to encourage independent graduate level research in oceanography, marine biology, or maritime archeology.

(c) AWARD.--Each Dr. Nancy Foster Scholarship--

(1) shall be used to support graduate studies in oceanography, marine biology, or maritime archeology at a graduate level institution of higher education; and

(2) shall be awarded in accordance with guidelines issued by the Secretary.

(d) DISTRIBUTION OF FUNDS.--The amount of each Dr. Nancy Foster Scholarship shall be provided directly to a recipient selected by the Secretary upon receipt of certification that the

recipient will adhere to a specific and detailed plan of study and research approved by a graduate level institution of higher education.

(e) FUNDING--Of the amount available each fiscal year to carry out this title, the Secretary shall award 1 percent as Dr. Nancy Foster Scholarships.

(f) SCHOLARSHIP REPAYMENT REQUIREMENT--The Secretary shall require an individual receiving a scholarship under this section to repay the full amount of the scholarship to the Secretary if the Secretary determines that the individual, in obtaining or using the scholarship, engaged in fraudulent conduct or failed to comply with any term or condition of the scholarship.

(g) MARITIME ARCHEOLOGY DEFINED--In this section the term 'maritime archeology' includes the curation, preservation, and display of maritime artifacts.



## **Appendix III E: Species List**

### **GULF OF THE FARALLONES NATIONAL MARINE SANCTUARY**

#### **VERTEBRATES**

Compiled by Peter Pyle  
4990 Shoreline Hwy, Stinson Beach, CA 94970  
[ppyle@prbo.org](mailto:ppyle@prbo.org)

Douglas Long  
California Academy of Sciences, San Francisco, CA  
[dlong@calacademy.org](mailto:dlong@calacademy.org)

Robert N. Lea  
California Department of Fish and Game (retired)  
[RNLea2@aol.com](mailto:RNLea2@aol.com)

Jan Roletto  
Gulf of the Farallones National Marine Sanctuary  
[Jan.Roletto@noaa.gov](mailto:Jan.Roletto@noaa.gov)

The following lists of vertebrate species occurring in the Gulf of the Farallones (GFNMS) National Marine Sanctuary, have been constructed. These lists include 36 mammal, 163 bird, 5 reptile, and 370 fish species that have been recorded or, for some species of reptiles and fish, suspected of occurring within the boundary of the GFNMS, including the waters of Tomales Bay, Drakes and Limantour Esteros, and Bolinas Lagoon. In addition to common and scientific names of each specific taxon, the lists include information or data on Federal listed status, estimated population size, population trend, seasonal and geographical distribution, longevity, and age of first breeding. A "Habitat Importance" designation is also given which reflects the importance of the sanctuary to that particular species. This designation is based on 1) the abundance of the species within the sanctuary, 2) the proportion of the overall range or population that occurs in the sanctuary, and 3) the importance of the sanctuary to breeding individuals.

Taxonomic classification, phylogenetic order, and all other information are according to references used for each class of vertebrates, listed below. Each class has slightly differing criteria for acceptance to the list. For mammals the list includes all marine species, including vagrants, that have been recorded within sanctuary waters. Only one fresh-water/estuarine species, river otter, is included based on occurrence in coastal bodies of water and because the GFNMS boundary includes estuarine habitats where these otters have been documented. For birds the list includes all marine species, including vagrants, that have been recorded in sanctuary waters and those species that are regularly found in the coastal esteros and lagoons. For a full list of over 400 bird species, including vagrant estuarine species and landbirds recorded on Southeast Farallon Island, see Pyle 2000 (cited below). For reptiles and fish the lists include

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those species recorded in the sanctuary plus others suspected of occurring based on records both north and south of the sanctuary, but for which no definite records are currently known. Species just suspected of occurring in sanctuary waters are marked with a "?" in the GC column (see abbreviation codes below).

The headings of the vertebrate lists include the following categories:

**COMMON NAME** - The common (English) name of the species.

**SCIENTIFIC NAME** - The scientific (Latin) name of the species.

**FED STATUS** - The federal listed status as of August 16th, 2007 (as found at [//ecos.fws.gov/webpage/webpage\\_vip\\_listed.html](http://ecos.fws.gov/webpage/webpage_vip_listed.html)). These designations are given if any population or subspecies occurring in the sanctuary is so listed.

- E - Endangered
- T - Threatened
- D - Delisted

**POP ESTIM** - The estimated population size in a given location (LOCATION, see below). When numbers are given they represent 1000's of individuals. When no population estimates are available the terms "Common," "Uncommon," and "Rare" are used as general indicators of the worldwide population size. Population estimates for birds and mammals are estimates from 1999.

**LOCATION** - The geographic location (area) for which the population estimate applies, as follows:

- World - World
- N.Am - North America
- Pacif - Pacific Ocean or Pacific North American Coast
- Calif - California

Compare this with RANGE (below), as often the "World" population will be restricted to North America and so forth.

**HABITAT IMPORT** - The "Habitat Importance" of the sanctuary to the species. Codes are as follows:

- E - Extremely Important
- V - Very Important
- S - Somewhat Important
- No designation indicates the NMS is of little importance.

**VERTEBRATES**

**Birds**

COMMON NAME	SCIENTIFIC NAME	FED STATUS	POP EST	LOCATION	HABITAT IMPORT
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**Birds**

COMMON NAME	SCIENTIFIC NAME	FED STATUS	POP EST	LOCATION	HABITAT IMPORT
Red-throated Loon	<i>Gavia stellata</i>		25	N.Am	V
Pacific Loon	<i>Gavia pacifica</i>		50	World	E
Common Loon	<i>Gavia immer</i>		500	N.Am	V
Yellow-billed Loon	<i>Gavia adamsii</i>		7	N.Am	
Pied-billed Grebe	<i>Podilymbus podiceps</i>		Common		V
Horned Grebe	<i>Podiceps auritus</i>		100	N.Am	V
Red-necked Grebe	<i>Podiceps grisegena</i>		45	N.Am	V
Eared Grebe	<i>Podiceps nigricollis</i>		4100	N.Am	E
Western Grebe	<i>Aechmophorus occidentalis</i>		Common		E
Clark's Grebe	<i>Aechmophorus clarkii</i>		Uncommon		E
Laysan Albatross	<i>Phoebastria immutabilis</i>		2600	World	S
Black-footed Albatross	<i>Phoebastria nigripes</i>		200	World	E
Short-tailed Albatross	<i>Diomedea albatrus</i>	E	1	World	S
Northern Fulmar	<i>Fulmarus glacialis</i>		1400	Pacif	E
Murphy's Petrel	<i>Pterodroma ultima</i>		Uncommon		S
Mottled Petrel	<i>Pterodroma inexpectata</i>		Uncommon		S
Dark-rumped Petrel	<i>Pterodroma phaeopygia</i>	E	70	World	
Pink-footed Shearwater	<i>Puffinus creatopus</i>		Common		E
Flesh-footed Shearwater	<i>Puffinus carneipes</i>		Uncommon		V
Buller's Shearwater	<i>Puffinus bulleri</i>		Uncommon		E
Sooty Shearwater	<i>Puffinus griseus</i>		Common		E
Short-tailed Shearwater	<i>Puffinus tenuirostris</i>		Common		E
Manx Shearwater	<i>Puffinus puffinus</i>		1000	World	
Black-vented Shearwater	<i>Puffinus opisthomelas</i>		30	World	V
Wilson's Storm-Petrel	<i>Oceanites oceanicus</i>		Common		
Fork-tailed Storm-Petrel	<i>Oceanodroma furcata</i>		1	Calif	V
Leach's Storm-Petrel	<i>Oceanodroma leucorhoa</i>		20	Calif	V
Ashy Storm-Petrel	<i>Oceanodroma homochroa</i>		7.5	Calif	E
Black Storm-Petrel	<i>Oceanodroma melania</i>		Uncommon		
Red-billed Tropicbird	<i>Phaethon aethereus</i>		Uncommon		
Red-tailed Tropicbird	<i>Phaethon rubricauda</i>		31	Pacif	
Masked Booby	<i>Sula dactylatra</i>		Uncommon		
Brown Booby	<i>Sula leucogaster</i>		Common		
Red-footed Booby	<i>Sula sula</i>		292	Pacif	
Brown Pelican	<i>Pelecanus occidentalis</i>	E	150	Pacif	E
American White Pelican	<i>Pelecanus erythrorhynchos</i>		75	World	S
Brandt's Cormorant	<i>Phalacrocorax penicillatus</i>		125	Calif	E
Double-crested Cormorant	<i>Phalacrocorax auritus</i>		10	Calif	V
Pelagic Cormorant	<i>Phalacrocorax pelagicus</i>		25	Calif	E
Magnificent Frigatebird	<i>Fregata magnificens</i>		Common		
Great Frigatebird	<i>Fregata minor</i>		Common		
American Bittern	<i>Botaurus lentiginosus</i>		Uncommon		S
Great Blue Heron	<i>Ardea herodias</i>		Common		E

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**Birds**

COMMON NAME	SCIENTIFIC NAME	FED STATUS	POP EST	LOCATION	HABITAT IMPORT
Great Egret	<i>Ardea alba</i>		Common		E
Snowy Egret	<i>Egretta thula</i>		Common		V
Green Heron	<i>Butorides virescens</i>		Common		V
Black-crowned Night-Heron	<i>Nycticorax nycticorax</i>		Common		E
Turkey Vulture	<i>Cathartes aura</i>		Common		S
Canada Goose ( <i>B.c. leucopareia</i> )	<i>Branta canadensis</i>	D	4000	World	S
Brant	<i>Branta bernicla</i>		50	Pacif	E
Gadwall	<i>Anas strepera</i>		3000	N.Am	V
Eurasian Wigeon	<i>Anas penelope</i>		2500	World	S
American Wigeon	<i>Anas americana</i>		3100	N.Am	E
Mallard	<i>Anas platyrhynchos</i>		6000	N.Am	E
Blue-winged Teal	<i>Anas discors</i>		4333	N.Am	S
Cinnamon Teal	<i>Anas cyanoptera</i>		280	World	V
Northern Shoveler	<i>Anas clypeata</i>		2850	N.Am	E
Northern Pintail	<i>Anas acuta</i>		4500	N.Am	E
Green-winged Teal	<i>Anas crecca</i>		3032	N.Am	V
Greater Scaup	<i>Aythya marila</i>		700	N.Am	E
Lesser Scaup	<i>Aythya affinis</i>		4300	N.Am	S
Harlequin Duck	<i>Histrionicus histrionicus</i>		250	N.Am	S
Surf Scoter	<i>Melanitta perspicillata</i>		536	Pacif	E
White-winged Scoter	<i>Melanitta fusca</i>		675	N.Am	E
Black Scoter	<i>Melanitta nigra</i>		100	Pacif	E
Oldsquaw	<i>Clangula hyemalis</i>		2703	N.Am	S
Bufflehead	<i>Bucephala albeola</i>		1390	World	E
Common Goldeneye	<i>Bucephala clangula</i>		1250	N.Am	E
Red-breasted Merganser	<i>Mergus serrator</i>		237	Pacif	V
Ruddy Duck	<i>Oxyura jamaicensis</i>		650	N.Am	E
Osprey	<i>Pandion haliaetus</i>		Uncommon		E
Bald Eagle	<i>Haliaeetus leucocephalus</i>	T	100	World	S
Northern Harrier	<i>Circus cyaneus</i>		160	N.Am	S
Merlin	<i>Falco columbarius</i>		Uncommon		V
Peregrine Falcon	<i>Falco peregrinus</i>	D	Uncommon		E
Black Rail	<i>Laterallus jamaicensis</i>		6	Calif	E
Virginia Rail	<i>Rallus limicola</i>		Uncommon		V
Yellow Rail	<i>Coturnicops noveboracensis</i>		Rare		S
Sora	<i>Porzana carolina</i>		Uncommon		V
American Coot	<i>Fulica americana</i>		Common		V
Black-bellied Plover	<i>Pluvialis squatarola</i>		200	N.Am	E
Western Snowy Plover	<i>Charadrius alexandrinus nivosus</i>	T	16	N.Am	E
Semipalmated Plover	<i>Charadrius semipalmatus</i>		150	World	V
Killdeer	<i>Charadrius vociferus</i>		100	N.Am	V
Black Oystercatcher	<i>Haematopus bachmani</i>		1.5	Calif	E

**Birds**

COMMON NAME	SCIENTIFIC NAME	FED STATUS	POP EST	LOCATION	HABITAT IMPORT
American Avocet	<i>Recurvirostra americana</i>		450	World	V
Greater Yellowlegs	<i>Tringa melanoleuca</i>		100	World	V
Willet	<i>Catoptrophorus semipalmatus</i>		250	World	E
Wandering Tattler	<i>Heteroscelus incanus</i>		10	World	V
Spotted Sandpiper	<i>Actitis macularia</i>		150	World	V
Whimbrel	<i>Numenius phaeopus</i>		57	N.Am	V
Long-billed Curlew	<i>Numenius americanus</i>		20	World	E
Marbled Godwit	<i>Limosa fedoa</i>		100	World	E
Ruddy Turnstone	<i>Arenaria interpres</i>		235	N.Am	S
Black Turnstone	<i>Arenaria melanocephala</i>		80	World	E
Surfbird	<i>Aphriza virgata</i>		70	World	V
Red Knot	<i>Calidris canutus</i>		400	N.Am	S
Sanderling	<i>Calidris alba</i>		300	N.Am	E
Western Sandpiper	<i>Calidris mauri</i>		3500	World	E
Least Sandpiper	<i>Calidris minutilla</i>		600	World	E
Rock Sandpiper	<i>Calidris ptilocnemis</i>		150	World	S
Dunlin	<i>Calidris alpina</i>		1500	N.Am	E
Short-billed Dowitcher	<i>Limnodromus griseus</i>		320	World	V
Long-billed Dowitcher	<i>Limnodromus scolopaceus</i>		500	World	V
Common Snipe	<i>Gallinago gallinago</i>		2000	N.Am	V
Red-necked Phalarope	<i>Phalaropus lobatus</i>		2500	N.Am	E
Red Phalarope	<i>Phalaropus fulicaria</i>		1000	N.Am	E
South Polar Skua	<i>Catharacta maccormicki</i>		Uncommon		V
Pomarine Jaeger	<i>Stercorarius pomarinus</i>		Common		E
Parasitic Jaeger	<i>Stercorarius parasiticus</i>		Common		E
Long-tailed Jaeger	<i>Stercorarius longicaudus</i>		250	World	V
Bonaparte's Gull	<i>Larus philadelphia</i>		Uncommon		V
Heermann's Gull	<i>Larus heermanni</i>		1500	World	E
Mew Gull	<i>Larus canus</i>		Uncommon		E
Ring-billed Gull	<i>Larus delawarensis</i>		3500	World	V
California Gull	<i>Larus californicus</i>		Common		E
Herring Gull	<i>Larus argentatus</i>		500	N.Am	V
Thayer's Gull	<i>Larus thayeri</i>		Uncommon		V
Western Gull	<i>Larus occidentalis</i>		60	Calif	E
Glaucous-winged Gull	<i>Larus glaucescens</i>		200	N.Am	E
Glaucous Gull	<i>Larus hyperboreus</i>		Uncommon		S
Sabine's Gull	<i>Xema sabini</i>		Uncommon		V
Swallow-tailed Gull	<i>Creagrus furcatus</i>		35	World	
Black-legged Kittiwake	<i>Rissa tridactyla</i>		2600	Pacif	V
Caspian Tern	<i>Sterna caspia</i>		35	N.Am	E
Elegant Tern	<i>Sterna elegans</i>		29	World	E
Common Tern	<i>Sterna hirundo</i>		100	N.Am	V
Arctic Tern	<i>Sterna paradisaea</i>		Common		V

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**Birds**

COMMON NAME	SCIENTIFIC NAME	FED STATUS	POP EST	LOCATION	HABITAT IMPORT
Forster's Tern	<i>Sterna forsteri</i>		400	World	E
California Least Tern	<i>Sterna antillarum browni</i>	E			
Common Murre	<i>Uria aalge</i>		800	Calif	E
Thick-billed Murre	<i>Uria lomvia</i>		5000	Pacif	
Pigeon Guillemot	<i>Cephus columba</i>		30	Calif	E
Marbled Murrelet	<i>Brachyramphus marmoratus</i>	T	6.5	Calif	E
Long-billed Murrelet	<i>Brachyramphus perdix</i>		30	World	
Xantus's Murrelet	<i>Synthliboramphus hypoleucus</i>		8	World	S
Craveri's Murrelet	<i>Synthliboramphus craveri</i>		Rare		S
Ancient Murrelet	<i>Synthliboramphus antiquus</i>		1200	World	V
Cassin's Auklet	<i>Ptychoramphus aleuticus</i>		75	Calif	E
Parakeet Auklet	<i>Aethia psittacula</i>		3000	World	
Least Auklet	<i>Aethia pusilla</i>		9000	World	
Crested Auklet	<i>Aethia cristatella</i>		Common		
Rhinoceros Auklet	<i>Cerorhinca monocerata</i>		5	Calif	E
Horned Puffin	<i>Fratercula corniculata</i>		Common		S
Tufted Puffin	<i>Fratercula cirrhata</i>		0.7	Calif	E
Short-eared Owl	<i>Asio flammeus</i>		Uncommon		S
Belted Kingfisher	<i>Ceryle alcyon</i>		Common		V
Black Phoebe	<i>Sayornis nigricans</i>		Uncommon		S
Say's Phoebe	<i>Sayornis saya</i>		Common		S
Common Raven	<i>Corvus corax</i>		Common		V
Horned Lark	<i>Eremophila alpestris</i>		Common		V
Tree Swallow	<i>Tachycineta bicolor</i>		Common		S
Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>		Common		V
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>		Common		S
Barn Swallow	<i>Hirundo rustica</i>		Common		S
Rock Wren	<i>Salpinctes obsoletus</i>		Uncommon		V
Marsh Wren	<i>Cistothorus palustris</i>		Common		V
American Pipit	<i>Anthus rubescens</i>		Common		S
Yellow-rumped Warbler	<i>Dendroica coronata</i>		Common		S
Savannah Sparrow	<i>Passerculus sandwichensis</i>		Common		V
Song Sparrow	<i>Melospiza melodia</i>		Common		V
Swamp Sparrow	<i>Melospiza georgiana</i>		Uncommon		S
Red-winged Blackbird	<i>Agelaius phoeniceus</i>		190000	N.Am	V
Western Meadowlark	<i>Sturnella neglecta</i>		Common		S

**Mammals**

COMMON NAME	SCIENTIFIC NAME	FED STATUS	POP EST	LOCATION	HABITAT IMPORT
Blue Whale	<i>Balaenoptera musculus</i>	E	2	Pacif	E

**Mammals**

COMMON NAME	SCIENTIFIC NAME	FED STATUS	POP EST	LOCATION	HABITAT IMPORT
Fin Whale	<i>Balaenoptera physalus</i>	E	1.2	C,O,W	S
Sei Whale	<i>Balaenoptera borealis</i>	E	rare	Pacif	S
Minke Whale	<i>Balaenoptera acutorostrata</i>		0.6	Calif	V
Humpback Whale	<i>Megaptera novaeangliae</i>	E	6	Pacif	E
Gray Whale	<i>Eschrichtius robustus</i>	D	26	World	V
Northern Right Whale	<i>Eubalaena glacialis</i>	E	0.2	Pacif	S
Harbor Porpoise	<i>Phocoena phocoena</i>		16.7	Cent-No. Ca	E
Dall's Porpoise	<i>Phocoenoides dalli</i>		117.5	C,O,W	E
Pacific White-sided Dolphin	<i>Lagenorhynchus obliquidens</i>		25.8	C,O,W	E
Northern Right Whale Dolphin	<i>Lissodelphis borealis</i>	E	13.7	C,O,W	E
Short-beaked Common Dolphin	<i>Delphinus delphis</i>		Common	C,O,W	S
Long-beaked Common Dolphin	<i>Delphinus capensis</i>		Common	C,O,W	S
Bottlenose Dolphin	<i>Tursiops truncatus</i>		1.2	Calif	S
Striped Dolphin	<i>Stenella coeruleoalba</i>		20.2	C,O,W	
Spotted Dolphin	<i>Stenella attenuata</i>		rare	Calif	
Rough-toothed Dolphin	<i>Steno bredanensis</i>		rare	Calif	
Risso's Dolphin	<i>Grampus griseus</i>		16.5	C,O,W	V
Killer Whale – southern resident	<i>Orcinus orca</i>	*E	1	C,O,W	V
Short-finned Pilot Whale	<i>Globicephala macrorhynchus</i>		60	World	
Sperm Whale	<i>Physeter macrocephalus</i>	E	1800	World	S
Pigmy Sperm Whale	<i>Kogia breviceps</i>		Uncommon		S
Dwarf Sperm Whale	<i>Kogia simus</i>		Rare		S
Cuvier's Beaked Whale	<i>Ziphius cavirostris</i>		Uncommon		V
Baird's Beaked Whale	<i>Berardius bairdii</i>		Rare		V
Hubb's Beaked Whale	<i>Mesoplodon calrhubbsi</i>		Rare		S
Blainsville's Beaked Whale	<i>Mesoplodon densirostris</i>		Rare		S
Steineger's Beaked Whale	<i>Mesoplodon stejnegeri</i>		Rare		S
Steller Sea Lion	<i>Eumetopius jubatus</i>	**T	0.4	Calif	E
California Sea Lion	<i>Zalophus californianus</i>		214	C,O,W	V
Northern Fur Seal	<i>Callorhinus ursinus</i>		4.3	Calif	V
Guadalupe Fur Seal	<i>Arctocephalus townsendi</i>	T	7.4	World	S
Northern Elephant Seal	<i>Mirounga angustirostris</i>		84	Calif	E
Harbor Seal	<i>Phoca vitulina</i>		28	Calif	E
Sea Otter	<i>Enhydra lutris</i>	T	2.4	Calif	S
River Otter	<i>Lantra canadensis</i>		Uncommon		V

\* In 2006, the Distinct Population Segment of southern killer whales (*Orcinus orca*) was designated as Endangered under the MMPA and ESA. Recent anecdotal information suggests that some of the migratory and feeding killer whales within the GFNMS, CBNMS and MBNMS maybe be part of this DPS and therefore have been noted as Endangered in the GFNMS species inventory.

\*\* Critical habitat for Steller sea lions includes the rookeries at Año Nuevo Island within the MBNMS and South Farallon Islands within the GFNMS (see 50 CFR 226.202(b) and Table 1 to Part 226).

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**Fish**

COMMON NAME	SCIENTIFIC NAME	FED STATUS	POP EST	LOCATION	HABITAT IMPORT
Pacific Hagfish	<i>Eptatretus stoutii</i>		Common	Pacif	V
Black Hagfish	<i>Eptatretus deani</i>				
Pacific Lamprey	<i>Lampreta tridentata</i>		Common	Pacif	E
Western River Lamprey	<i>Lampetra ayersii</i>		Uncommon	Pacif	
Sevengill Shark	<i>Notorynchus cepedianus</i>		Common	Pacif	V
Sixgill Shark	<i>Hexanchus griseus</i>		Common	Pacif	E
Spiny Dogfish	<i>Squalus acanthias</i>		Common	Pacif	E
Pacific Sleeper Shark	<i>Somniosus pacificus</i>		Uncommon	Pacif	V
Prickly Shark	<i>Echinorhinus cookei</i>		Uncommon	Pacif	
Pacific Angel Shark	<i>Squatina californica</i>		Common	Pacif	V
Common Thresher	<i>Alopias vulpinus</i>		Common	Pacif	E
Basking Shark	<i>Cetorhinus maximus</i>		Common	Pacif	S
Brown Catshark	<i>Apristurus brunneus</i>		Uncommon	Pacif	E
Longnose Catshark	<i>Apristurus kampae</i>		Rare	Pacif	E
Filetail Catshark	<i>Parmaturus xaniurus</i>		Uncommon	Pacif	E
White Shark	<i>Carcharodon carcharias</i>		Uncommon	Pacif	E
Shortfin Mako Shark	<i>Isurus oxyrinchus</i>		Uncommon	Pacif	V
Salmon Shark	<i>Lamna ditropis</i>		Uncommon	Pacif	E
Leopard Shark	<i>Triakis semifasciata</i>		Common	Pacif	E
Gray Smoothhound Shark	<i>Mustelus californicus</i>		Common	Pacif	V
Brown Smoothhound Shark	<i>Mustelus henlei</i>		Common	Pacif	E
Soupfin Shark	<i>Galeorhinus galeus</i>		Common	Pacif	E
Blue Shark	<i>Prionace glauca</i>		Common	Pacif	E
Pacific Electric Ray	<i>Torpedo californica</i>		Common	Pacif	E
Pacific Thornback	<i>Platyrhinoidis triseriata</i>		Common	Pacif	S
Shovelnose Guitarfish	<i>Rhinobatos productus</i>		Common	Pacif	V
Sandpaper Skate	<i>Bathyraja kincaidii</i>		Uncommon	Pacif	V
Black Skate	<i>Bathyraja trachura</i>		Uncommon	Pacif	E
Big Skate	<i>Raja binoculata</i>		Common	Pacif	E
Broad Skate	<i>Amblyraja badia</i>				
California Skate	<i>Raja inornata</i>		Uncommon	Pacif	E
Longnose Skate	<i>Raja rhina</i>		Common	Pacif	E
Starry Skate	<i>Raja stellulata</i>		Uncommon	Pacif	E
White Skate	<i>Bathyraja spinosissima</i>		Rare	Pacif	V
Deepsea Skate	<i>Bathyraja abyssicola</i>		Rare	Pacif	E
Bering Skate	<i>Bathyraja interrupta</i>		Rare	Pacif	E
Alaska Skate	<i>Bathyraja parmifera</i>		Rare	Pacif	E
Manta	<i>Manta birostris</i>		Rare	Pacif	
Bat Ray	<i>Myliobatis californica</i>		Common	Pacif	E
Round Stingray	<i>Urolophus halleri</i>		Common	Pacif	
Diamond Stingray	<i>Dasyatis dipterura</i>		Common	Pacif	
Pelagic Stingray	<i>Dasyatis violacea</i>		Rare	Pacif	S
Pacific Ratfish	<i>Hydrolagus colliei</i>		Common	Pacif	E

**Fish**

COMMON NAME	SCIENTIFIC NAME	FED STATUS	POP EST	LOCATION	HABITAT IMPORT
Green Sturgeon	<i>Acipenser medirostris</i>	T (southern pop.)	Common	Pacif	V
White Sturgeon	<i>Acipenser transmontanus</i>		Common	Pacif	V
Bonefish	<i>Albula vulpes</i>		Uncommon	Pacif	
Yellow Snake Eel	<i>Ophichthus zaphochir</i>		Rare	Pacif	
Spotted Snake Eel	<i>Ophichthus triserialis</i>		Rare	Pacif	
Threadfin Shad	<i>Dorosoma petense</i>		Rare	Pacif	
Pacific Herring	<i>Clupea pallasii</i>		Common	Pacif	E
Pacific Sardine	<i>Sardinops sagax</i>		Common	Pacif	E
American Shad	<i>Alosa sapidissima</i>		Common	Pacif	E
Northern Anchovy	<i>Engraulis mordax</i>		Common	Pacif	E
Rainbow (Steelhead) Trout (Southern California DPS)	<i>Oncorhynchus mykiss</i>	E	Common	Pacif	E
Rainbow (Steelhead) Trout (South-Central California DPS)	<i>Oncorhynchus mykiss</i>	T			
Rainbow (Steelhead) Trout (Central California Coast DPS)	<i>Oncorhynchus mykiss</i>	T			
Rainbow (Steelhead) Trout (California Central Valley DPS)	<i>Oncorhynchus mykiss</i>	T			
Rainbow (Steelhead) Trout (Northern California DPS)	<i>Oncorhynchus mykiss</i>	T			
Chum Salmon	<i>Oncorhynchus keta</i>	T	Uncommon	Pacif	
Sockeye Salmon	<i>Oncorhynchus nerka</i>		Rare	Pacif	
Pink Salmon	<i>Oncorhynchus gorbuscha</i>		Uncommon	Pacif	
Chinook Salmon (Sacramento River winter; ESU)	<i>Oncorhynchus tshawytscha</i>	E			
Chinook Salmon (Central Valley ESU)	<i>Oncorhynchus tshawytscha</i>	T			
Chinook Salmon (California Coastal ESU)	<i>Oncorhynchus tshawytscha</i>	T			
Coho Salmon (Central California Coastal ESU)	<i>Oncorhynchus kisutch</i>	E			
Coho Salmon (S. Oregon/N.CA Coastal ESU)	<i>Oncorhynchus kisutch</i>	T			
Longnose Lancetfish	<i>Alepisaurus ferox</i>		Uncommon	Pacif	V
California Slickhead	<i>Alepocephalus tenebrosus</i>		Uncommon	Pacif	E
Slender Snipe Eel	<i>Nemichthys scolopaceus</i>		Uncommon	Pacif	V
Threadfin Slickhead	<i>Talismaania bifurcata</i>		Rare	Pacif	E
Sawtooth Snipe Eel	<i>Serrivomer sector</i>		Rare	Pacif	E
Bobtail Snipe Eel	<i>Cyema atrum</i>		Rare	Pacif	
Surf Smelt	<i>Hypomesus pretiosus</i>		Common	Pacif	E
Whitebait Smelt	<i>Allosmerus elongatus</i>		Uncommon	Pacif	E
Night Smelt	<i>Spirinchus starksi</i>		Common	Pacif	V

DPS – Distinct Population Segment

ESU – Evolutionarily Significant Unit

**Appendix III E: Species List**  
**GFNMS Management Plan**

**Fish**

COMMON NAME	SCIENTIFIC NAME	FED STATUS	POP EST	LOCATION	HABITAT IMPORT
Longfin Smelt	<i>Spirinchus thaleichthys</i>		Common	Pacif	V
Benttooth Bristlemouth	<i>Cyclothone acclinidens</i>		Common	Pacif	V
Showy Bristlemouth	<i>Cyclothone signata</i>				
Bigeye Lightfish	<i>Daphnos oculatus</i>		Uncommon	Pacif	
Pacific Argentine	<i>Argentina sialis</i>		Uncommon	Pacif	E
California Smoothtongue	<i>Leoroglossus stilbius</i>		Common	Pacif	E
Snubnose Blacksmelt	<i>Bathylagus wesethi</i>		Uncommon	Pacif	
Popeye Blacksmelt	<i>Bathylagus ochotensis</i>		Uncommon	Pacif	
Robust Blacksmelt	<i>Bathylagus milleri</i>		Uncommon	Pacif	E
Pacific Blacksmelt	<i>Bathylagus pacificus</i>		Uncommon	Pacif	V
Stout Blacksmelt	<i>Pseudobathylagus milleri</i>				
Dollar Hatchetfish	<i>Sternoptyx sp.</i>		Uncommon	Pacif	
Spurred Hatchetfish	<i>Argyropelecus hemigymnus</i>		Uncommon	Pacif	
Silvery Hatchetfish	<i>Argyropelecus sladeni</i>		Uncommon	Pacif	V
Silver Hatchetfish	<i>Argyropelecus lychnus</i>		Uncommon	Pacif	V
Pacific Hatchetfish	<i>Argyropelecus affinis</i>				
Pacific Barreleye	<i>Macropinna microstoma</i>		Uncommon	Pacif	
Highfin Dragonfish	<i>Bathophilus flemingi</i>		Uncommon	Pacif	
Longfin Dragonfish	<i>Tactostoma macropus</i>		Uncommon	Pacif	E
Pacific Viperfish	<i>Chauliodus macouni</i>		Uncommon	Pacif	E
Daggertooth	<i>Anotopterus pharao</i>		Uncommon	Pacif	
Slender Barricudina	<i>Lestidium ringens</i>		Uncommon	Pacif	E
Northern Pearleye	<i>Benthalbella dentata</i>		Uncommon	Pacif	
California Lizardfish	<i>Synodus lucioceps</i>		Uncommon	Pacif	S
Shiny Loosejaw	<i>Aristostomias scintillans</i>		Rare	Pacif	
Scaly Paperbone	<i>Scopelosaurus harryi</i>		Rare	Pacif	
California Flashlightfish	<i>Protomyctophum crockeri</i>		Uncommon	Pacif	V
Northern Lampfish	<i>Stenobrachius leucopsaurus</i>		Uncommon	Pacif	V
Blue Lanternfish	<i>Tarletonbaenia crenularis</i>		Uncommon	Pacif	E
Diogenes Lanternfish	<i>Diogenichthys laternatus</i>				
Bigeye Lanternfish	<i>Protomyctophum thompsoni</i>				
Mexican Lampfish	<i>Triphoturus mexicanus</i>		Uncommon	Pacif	S
Broadfin Lampfish	<i>Lampanyctus ritteri</i>		Uncommon	Pacif	V
Dogtooth lampfish	<i>Ceratoscopelus townsendi</i>				
Plainfin Midshipman	<i>Porichthys notatus</i>		Common	Pacif	E
Spotted Cusk Eel	<i>Chilara taylori</i>		Common	Pacif	E
Basketweave Cusk Eel	<i>Ophidion scrippsae</i>		Uncommon	Pacif	E
Red Brotula	<i>Brosmophycis marginata</i>		Common	Pacif	V
Northern Clingfish	<i>Gobiesox meandricus</i>		Common	Pacif	V
Kelp Clingfish	<i>Rimicola muscarum</i>		Uncommon	Pacif	
California Grenadier	<i>Nezumia stelgidolepis</i>		Uncommon	Pacif	E
Pacific Grenadier	<i>Coryphaenoides acrolepis</i>		Uncommon	Pacif	E
Hundred Fathom Codling	<i>Physiculus rastrelliger</i>		Uncommon	Pacif	

**Fish**

COMMON NAME	SCIENTIFIC NAME	FED STATUS	POP EST	LOCATION	HABITAT IMPORT
Finescale Codling	<i>Antimora microlepis</i>		Uncommon	Pacif	E
Pacific Hake	<i>Merluccius productus</i>		Common	Pacif	E
Pacific Cod	<i>Gadus microcephalus</i>		Uncommon	Pacif	V
Pacific Tomcod	<i>Microgadus proximus</i>		Common	Pacif	E
Walleye Pollock	<i>Theragra chalcogramma</i>		Rare	Pacif	V
Whiptail ribbonfish	<i>Desmodema lorum</i>				
Giant Grenadier	<i>Albatrossia pectoralis</i>		Rare	Pacif	E
Shoulderspot Grenadier	<i>Coelorinchus scaphopsis</i>		Rare	Pacif	E
Bearded Eelpout	<i>Lycinema barbatus</i>		Uncommon	Pacif	
Black Eelpout	<i>Lycodes diapterus</i>		Common	Pacif	E
Flatcheek Eelpout	<i>Embryx crotalina</i>		Rare	Pacif	
Bigfin Eelpout	<i>Aprodon cortezianus</i>		Common	Pacif	E
Blackbelly Eelpout	<i>Lycodopsis pacifica</i>		Common	Pacif	E
Midwater Eelpout	<i>Melanostigma pammelas</i>		Uncommon	Pacif	E
Twoline Eelpout	<i>Bothrocara brunneum</i>		Common	Pacif	E
Soft Eelpout	<i>Bothrocara molle</i>		Uncommon	Pacif	
Blackmouth Eelpout	<i>Lycodapus fierasfer</i>		Rare	Pacif	
Pallid Eelpout	<i>Lycodapus mandibularis</i>		Rare	Pacif	E
California Flyingfish	<i>Cypselurus californicus</i>		Common	Pacif	
California Needlefish	<i>Strongylura exilis</i>		Common	Pacif	S
Pacific Saury	<i>Cololabris saira</i>		Common	Pacif	E
California Grunion	<i>Leuresthes tenuis</i>		Common	Pacif	S
Jacksmelt	<i>Atherinopsis californiensis</i>		Common	Pacif	E
Topsmelt	<i>Atherinops affinis</i>		Common	Pacif	E
Opah	<i>Lampris regius</i>		Uncommon	Pacif	S
Flapjack Devilfish	<i>Opisthoteuthis californiana</i>		Rare	Pacif	E
Fangtooth	<i>Anoplogaster cornuta</i>		Rare	Pacif	E
Veilfin	<i>Caristius macropus</i>		Rare	Pacif	
California headlightfish	<i>Diaphus theta</i>				
Crested Bigscale	<i>Poromitra crassiceps</i>		Uncommon	Pacif	
Twospine Bigscale	<i>Scopelogadus mizolepis</i>		Uncommon	Pacif	V
Highsnout Bigscale	<i>Melamphaes lugubris</i>		Rare	Pacif	E
King-of-the-salmon	<i>Trachipterus altivelis</i>		Uncommon	Pacif	
Tubesnout	<i>Aulorhynchus flavidus</i>		Uncommon	Pacif	
Threespine Stickleback	<i>Gasterosteus aculeatus</i>		Common	Pacif	E
Kelp Pipefish	<i>Syngnathus californiensis</i>		Common	Pacif	
Bay Pipefish	<i>Syngnathus leptorhynchus</i>		Common	Pacif	V
Snubnose Pipefish	<i>Cosmocampus arctus</i>		Uncommon	Pacif	V
Shortspine Thornyhead	<i>Sebastolobus alascanus</i>		Common	Pacif	E
Longspine Thornyhead	<i>Sebastolobus altivelis</i>		Uncommon	Pacif	E
Copper Rockfish	<i>Sebastes caurinus</i>		Common	Pacif	E
Whitebelly Rockfish	<i>Sebastes vexilaris</i>		Common	Pacif	
Calico Rockfish	<i>Sebastes dallii</i>		Common	Pacif	V

**Appendix III E: Species List**  
**GFNMS Management Plan**

**Fish**

COMMON NAME	SCIENTIFIC NAME	FED STATUS	POP EST	LOCATION	HABITAT IMPORT
Silvergray Rockfish	<i>Sebastes brevispinis</i>		Rare	Pacif	V
Treefish	<i>Sebastes serriceps</i>		Common	Pacif	V
China Rockfish	<i>Sebastes nebulosus</i>		Common	Pacif	E
Black and Yellow Rockfish	<i>Sebastes chrysomelas</i>		Common	Pacif	V
Gopher Rockfish	<i>Sebastes carnatus</i>		Common	Pacif	E
Brown Rockfish	<i>Sebastes auriculatus</i>		Common	Pacif	E
Quillback Rockfish	<i>Sebastes maliger</i>		Uncommon	Pacif	E
Grass Rockfish	<i>Sebastes rastrelliger</i>		Common	Pacif	V
Kelp Rockfish	<i>Sebastes atrovirens</i>		Common	Pacif	V
Black Rockfish	<i>Sebastes melanops</i>		Common	Pacif	E
Blue Rockfish	<i>Sebastes mystinus</i>		Common	Pacif	E
Squarespot Rockfish	<i>Sebastes hopkinsi</i>		Uncommon	Pacif	V
Speckled Rockfish	<i>Sebastes ovalis</i>		Common	Pacif	E
Widow Rockfish	<i>Sebastes entomelas</i>		Common	Pacif	E
Olive Rockfish	<i>Sebastes serranoides</i>		Common	Pacif	E
Starry Rockfish	<i>Sebastes constellatus</i>		Common	Pacif	E
Rosy Rockfish	<i>Sebastes rosaceus</i>		Common	Pacif	V
Rosethorn Rockfish	<i>Sebastes helvomaculatus</i>		Uncommon	Pacif	E
Swordspine Rockfish	<i>Sebastes ensifer</i>		Uncommon	Pacif	V
Pink Rockfish	<i>Sebastes eos</i>		Common	Pacif	E
Greenspotted Rockfish	<i>Sebastes chlorostictus</i>				
Greenblotched Rockfish	<i>Sebastes rosenblatti</i>		Common	Pacif	E
Shortbelly Rockfish	<i>Sebastes jordani</i>		Common	Pacif	E
Flag Rockfish	<i>Sebastes rubrivinctus</i>		Common	Pacif	E
Redbanded Rockfish	<i>Sebastes babcocki</i>		Common	Pacif	E
Greenstriped Rockfish	<i>Sebastes elongatus</i>		Common	Pacif	E
Bocaccio	<i>Sebastes paucispinis</i>		Common	Pacif	E
Chameleon rockfish	<i>Sebastes phillipsi</i>				
Chilipepper	<i>Sebastes goodei</i>		Common	Pacif	E
Yellowtail Rockfish	<i>Sebastes flavidus</i>				
Cowcod	<i>Sebastes laevis</i>		Common	Pacif	E
Rougheye rockfish	<i>Sebastes aleutianus</i>				
Yelloweye Rockfish	<i>Sebastes ruberrimus</i>		Common	Pacif	E
Splitnose Rockfish	<i>Sebastes diploproa</i>		Common	Pacif	E
Aurora Rockfish	<i>Sebastes aurora</i>		Common	Pacif	E
Tiger Rockfish	<i>Sebastes nigrocinctus</i>				
Blackgill Rockfish	<i>Sebastes melanostomus</i>		Common	Pacif	E
Redstripe Rockfish	<i>Sebastes proriger</i>		Uncommon	Pacif	E
Bank Rockfish	<i>Sebastes rufus</i>		Common	Pacif	E
Pacific Ocean Perch	<i>Sebastes alutus</i>		Common	Pacif	E
Canary Rockfish	<i>Sebastes pinniger</i>		Common	Pacif	E
Vermilion Rockfish	<i>Sebastes miniatus</i>		Common	Pacif	E
Darkblotched Rockfish	<i>Sebastes crameri</i>		Uncommon	Pacif	E

**Fish**

COMMON NAME	SCIENTIFIC NAME	FED STATUS	POP EST	LOCATION	HABITAT IMPORT
Stripetail Rockfish	<i>Sebastes saxicola</i>		Common	Pacif	E
Halfbanded Rockfish	<i>Sebastes semicinctus</i>		Common	Pacif	E
Sharpchin Rockfish	<i>Sebastes zacentrus</i>		Uncommon	Pacif	E
Pygmy Rockfish	<i>Sebastes wilsoni</i>		Rare	Pacif	E
Lumptail Searobin	<i>Prionotus stephanophrys</i>		Uncommon	Pacif	
Sablefish	<i>Anoplopoma fimbria</i>		Common	Pacif	E
Skilfish	<i>Erilepis zonifer</i>		Rare	Pacif	
Shortspine Combfish	<i>Zaniolepis frenata</i>		Uncommon	Pacif	V
Longspine Combfish	<i>Zaniolepis latipinnis</i>		Uncommon	Pacif	E
Painted Greenling	<i>Oxylebius pictus</i>		Common	Pacif	E
Lingcod	<i>Ophiodon elongaus</i>		Common	Pacif	E
Atka Mackerel	<i>Pleurogrammus monopterygius</i>		Rare	Pacif	V
Kelp Greenling	<i>Hexagrammos decagrammus</i>		Common	Pacif	E
Rock Greenling	<i>Hexagrammos superciliosus</i>		Common	Pacif	E
Grunt Sculpin	<i>Rhamphocottus richardsonii</i>		Uncommon	Pacif	V
Rosylip Sculpin	<i>Ascelichthys rhodorus</i>		Uncommon	Pacif	V
Manacled Sculpin	<i>Synchirus gilli</i>		Uncommon	Pacif	V
Cabezon Sculpin	<i>Scorpaenichthys marmoratus</i>		Common	Pacif	E
Longfin Sculpin	<i>Jordania zonope</i>		Uncommon	Pacif	V
Thornback Sculpin	<i>Paricelinus hopliticus</i>		Rare	Pacif	V
Sailfin Sculpin	<i>Nautichthys oculo fasciatus</i>		Uncommon	Pacif	V
Silverspotted Sculpin	<i>Belpsius cirrhosus</i>		Uncommon	Pacif	V
Brown Irishlord	<i>Hemilepidotus spinosus</i>		Uncommon	Pacif	E
Red Irishlord	<i>Hemilepidotus hemilepidotus</i>		Common	Pacif	V
Staghorn Sculpin	<i>Leptocottus armatus</i>		Common	Pacif	V
Buffalo Sculpin	<i>Enophrys bison</i>		Common	Pacif	V
Bull Sculpin	<i>Enophrys taurina</i>		Uncommon	Pacif	E
Yellowchin Sculpin	<i>Icelinus quadriseriatus</i>		Uncommon	Pacif	V
Frogmouth Sculpin	<i>Icelinus oculatus</i>		Rare	Pacif	V
Dusky Sculpin	<i>Icelinus burchami</i>		Rare	Pacif	V
Threadfin Sculpin	<i>Icelinus filamentosus</i>		Uncommon	Pacif	E
Spotfin Sculpin	<i>Icelinus tenuis</i>		Uncommon	Pacif	V
Roughback Sculpin	<i>Chitonotus pugetensis</i>		Uncommon	Pacif	E
Snubnose Sculpin	<i>Orthonopias triacis</i>		Common	Pacif	S
Corraline Sculpin	<i>Artedius corallinus</i>		Common	Pacif	V
Smoothhead Sculpin	<i>Artedius lateralis</i>		Common	Pacif	V
Padded Sculpin	<i>Artedius fenestralis</i>		Uncommon	Pacif	V
Bonyhead Sculpin	<i>Artedius notospilotus</i>		Uncommon	Pacif	V
Puget Sound Sculpin	<i>Artedius meanyi</i>		Rare	Pacif	E
Scalyhead Sculpin	<i>Artedius harringtoni</i>		Uncommon	Pacif	V
Darter Sculpin	<i>Radulinus boleoides</i>		Rare	Pacif	V
Flabby Sculpin	<i>Zesticelus profundurum</i>		Rare	Pacif	
Saddleback Sculpin	<i>Oligocottus rimensis</i>		Common	Pacif	V

**Appendix III E: Species List**  
**GFNMS Management Plan**

**Fish**

COMMON NAME	SCIENTIFIC NAME	FED STATUS	POP EST	LOCATION	HABITAT IMPORT
Tidepool Sculpin	<i>Oligocottus maculosus</i>		Common	Pacif	V
Fluffy Sculpin	<i>Oligocottus snyderi</i>		Common	Pacif	V
Rosy Sculpin	<i>Oligocottus rubellio</i>		Common	Pacif	V
Wooly Sculpin	<i>Clinocottus analis</i>		Common	Pacif	V
Sharpnose Sculpin	<i>Clinocottus acuticeps</i>		Uncommon	Pacif	V
Calico Sculpin	<i>Clinocottus embryum</i>		Common	Pacif	V
Mosshead Sculpin	<i>Clinocottus globiceps</i>		Common	Pacif	V
Bald Sculpin	<i>Clinocottus recalvus</i>		Common	Pacif	V
Blob Sculpin	<i>Psychrolutes phrictus</i>		Rare	Pacif	E
Rockhead Poacher	<i>Bothragonus swanii</i>		Rare	Pacif	V
Kelp Poacher	<i>Agonomalus sp.</i>		Rare	Pacif	
Warty Poacher	<i>Chesnonia verrucosa</i>		Common	Pacif	V
Pricklebreast Poacher	<i>Stellerina xyosterna</i>		Uncommon	Pacif	V
Beardless Spearnose Poacher	<i>Ganoides vulsus</i>		Rare	Pacif	
Northern Spearnose Poacher	<i>Agonopsis emmelane</i>		Uncommon	Pacif	V
Smooth Alligatorfish	<i>Anoplagonus inermis</i>		Rare	Pacif	E
Pygmy Poacher	<i>Odontopyxis trispinosa</i>		Common	Pacif	E
Blackfin Poacher	<i>Bathyagonus nigripinnis</i>		Rare	Pacif	E
Bigeye Poacher	<i>Bathyagonus pentacantha</i>		Uncommon	Pacif	V
Bluespotted Poacher	<i>Xeneretmus triacanthus</i>		Common	Pacif	V
Blackedge Poacher	<i>Xeneretmus latifrons</i>		Uncommon	Pacif	E
Blacktail Snailfish	<i>Careproctus melanurus</i>		Uncommon	Pacif	E
Showy Snailfish	<i>Liparis pulchellus</i>		Uncommon	Pacif	V
Slipskin Snailfish	<i>Liparis fuscensis</i>		Uncommon	Pacif	V
Ringtail Snailfish	<i>Liparis rutteri</i>		Uncommon	Pacif	V
Tidepool Snailfish	<i>Liparis florum</i>		Common	Pacif	V
Slimy Snailfish	<i>Liparis mucosus</i>		Uncommon	Pacif	V
Blackfin Snailfish	<i>Careproctus cypselurus</i>		Rare	Pacif	E
Salmon Snailfish	<i>Careproctus rastrinus</i>		Rare	Pacif	E
Striped Bass	<i>Morone saxatilis</i>		Common	Pacif	E
Giant Sea Bass	<i>Stereolepis gigas</i>		Common	Pacif	V
Broomtail Grouper	<i>Mycteroperca xenarcha</i>		Rare	Pacif	V
Kelp Bass	<i>Paralabrax clathratus</i>		Common	Pacif	V
Ocean Whitefish	<i>Caulotilus princeps</i>		Common	Pacif	V
White Suckerfish	<i>Remorina albescens</i>		Rare	Pacif	
Remora	<i>Remora remora</i>		Uncommon	Pacif	V
Jack Mackerel	<i>Trachurus symmetricus</i>		Common	Pacif	E
Yellowtail	<i>Seriola lalandi</i>		Common	Pacif	V
Dolphinfish	<i>Coryphaena hippurus</i>		Uncommon	Pacif	S
Pacific Pomfret	<i>Brama japonica</i>		Uncommon	Pacif	V
Queenfish	<i>Seriphus politus</i>		Common	Pacif	V
White Seabass	<i>Atractoscion nobilis</i>		Common	Pacif	V
White Croaker	<i>Genyonemus lineatus</i>		Common	Pacif	E

**Fish**

COMMON NAME	SCIENTIFIC NAME	FED STATUS	POP EST	LOCATION	HABITAT IMPORT
Opaleye	<i>Girella nigricans</i>		Common	Pacif	V
Halfmoon	<i>Medialuna californiensis</i>		Common	Pacif	V
Pelagic Armorhead	<i>Pentaceros richardsoni</i>		Rare	Pacif	V
Rubberlip Surfperch	<i>Rhacochilus toxotes</i>		Common	Pacif	V
Black Surfperch	<i>Embiotoca jacksoni</i>		Common	Pacif	V
Barred Surfperch	<i>Amphistichus argenteus</i>		Common	Pacif	E
Calico Surfperch	<i>Amphistichus koelzi</i>		Common	Pacif	V
Redtail Surfperch	<i>Amphistichus rhodoterus</i>		Common	Pacif	V
Spotfin Surfperch	<i>Hyperprosopon anale</i>		Uncommon	Pacif	E
Walleye Surfperch	<i>Hyperprosopon argenteum</i>		Common	Pacif	V
Silver Surfperch	<i>Hyperprosopon ellipticum</i>		Common	Pacif	V
Shiner Surfperch	<i>Cymatogaster aggregata</i>		Common	Pacif	E
Pink Surfperch	<i>Zalembius rosaceus</i>		Uncommon	Pacif	E
Rainbow Surfperch	<i>Hypsurus caryi</i>		Common	Pacif	V
Striped Surfperch	<i>Embiotoca lateralis</i>		Common	Pacif	V
Kelp Surfperch	<i>Brachyistius frenatus</i>		Common	Pacif	V
Dwarf Surfperch	<i>Micrometrus minimus</i>		Common	Pacif	S
Reef Surfperch	<i>Micrometrus aurora</i>		Common	Pacif	S
Pile Surfperch	<i>Damalichthys vacca</i>		Common	Pacif	V
White Surfperch	<i>Phanerodon furcatus</i>		Common	Pacif	V
Sharpnose Surfperch	<i>Phanerodon atripes</i>		Uncommon	Pacif	S
California Barracuda	<i>Sphyræna argentea</i>		Common	Pacif	V
California Sheephead	<i>Semicossyphus pulcher</i>		Common	Pacif	
Senorita	<i>Oxyjulis californica</i>		Common	Pacif	S
Pacific Sandfish	<i>Trichodon trichodon</i>		Rare	Pacif	V
Stripefin Ronquil	<i>Rathbunella hypoplecta</i>		Common	Pacif	V
Northern Ronquil	<i>Ronquilus jordani</i>		Rare	Pacif	V
Wolf Eel	<i>Anarrhichthys ocellatus</i>		Common	Pacif	E
Onespot Fringehead	<i>Neoclinus uniornatus</i>		Uncommon	Pacif	S
Sarcastic Fringehead	<i>Neoclinus blanchardi</i>		Uncommon	Pacif	S
Giant Kelpfish	<i>Heterostichus rostratus</i>		Common	Pacif	V
Striped Kelpfish	<i>Gibbonsia metzi</i>		Common	Pacif	V
Crevice Kelpfish	<i>Gibbonsia montereyensis</i>		Common	Pacif	V
Dwarf Wrymouth	<i>Lyconectes aleutensis</i>		Uncommon	Pacif	V
Monkeyface Eel	<i>Cebidichthys violaceus</i>		Common	Pacif	V
High Cockscomb	<i>Anoplarchus purpurescens</i>		Common	Pacif	V
Black Prickleback	<i>Xiphister atropurpureus</i>		Common	Pacif	V
Rock Prickleback	<i>Xiphister mucosus</i>		Common	Pacif	V
Ribbon Prickleback	<i>Phytichthys chirus</i>		Uncommon	Pacif	V
Mosshead Warbonnet	<i>Chirolophis nugator</i>		Uncommon	Pacif	V
Whitebarred Prickleback	<i>Poroclinus rothrocki</i>		Uncommon	Pacif	V
Bluebarred Prickleback	<i>Plectrobranchus evides</i>		Uncommon	Pacif	V
Penpoint Gunnel	<i>Apodichthys flavidus</i>		Common	Pacif	V

**Appendix III E: Species List**  
**GFNMS Management Plan**

**Fish**

COMMON NAME	SCIENTIFIC NAME	FED STATUS	POP EST	LOCATION	HABITAT IMPORT
Rockweed Gunnel	<i>Apodichthys fucorum</i>		Common	Pacif	V
Red Gunnel	<i>Pholis schultzi</i>		Uncommon	Pacif	V
Saddleback Gunnel	<i>Pholis ornata</i>		Uncommon	Pacif	V
Graveldiver	<i>Scytalina cerdale</i>		Uncommon	Pacif	
Pacific Sand Lance	<i>Ammodytes hexapterus</i>		Common	Pacif	V
Prowfish	<i>Zaprora silenus</i>		Rare	Pacif	E
Pacific Fat Sleeper	<i>Dormitator latofrons</i>		Rare	Pacif	
Ragfish	<i>Icosteus aenigmaticus</i>		Uncommon	Pacif	V
Blackeye Goby	<i>Coryphopterus nicholsii</i>		Common	Pacif	V
Tidewater Goby	<i>Eucyclogobius newberryi</i>	E	Common	Pacif	E
Longjaw Mudsucker	<i>Gillichthys mirabilis</i>		Common	Pacif	V
Bay Goby	<i>Lepidogobius lepidus</i>		Common	Pacif	V
Yellowfin Goby	<i>Acanthogobius flavimanus</i>		Common	Pacif	E
Cheekspot Goby	<i>Ilypnus gilberti</i>		Common	Pacif	S
Arrow Goby	<i>Clevelandia ios</i>		Common	Pacif	V
Pacific Scabbardfish	<i>Lepidopus xantusi</i>		Uncommon	Pacif	V
Escolar	<i>Lepidocybrium flavobrunneum</i>		Rare	Pacif	
Pacific Mackerel	<i>Scomber japonicus</i>		Common	Pacif	E
Skipjack	<i>Euthynnus pelamis</i>		Common	Pacif	V
Pacific Bonito	<i>Sarda chiliensis</i>		Common	Pacif	V
Albacore	<i>Thunnus alalunga</i>		Common	Pacif	V
Bigeye Tuna	<i>Thunnus obesus</i>		Rare	Pacif	
Pacific Bluefin Tuna	<i>Thunnus orientalis</i>		Common	Pacif	V
Swordfish	<i>Xiphias gladius</i>		Common	Pacif	
Shortbill Spearfish	<i>Tetrapturus angustirostris</i>		Rare	Pacif	
Sailfish	<i>Istiophorus platypterus</i>		Rare	Pacif	
Striped Marlin	<i>Tetrapturus audax</i>		Common	Pacif	
Louvar	<i>Louvarus imperialis</i>		Uncommon	Pacif	V
Medusafish	<i>Ichthyoscyops lockingtoni</i>		Common	Pacif	E
Smalleye Squaretail	<i>Tetrogonurus cuvieri</i>		Rare	Pacif	
Pacific Pompano	<i>Peprilus simillimus</i>		Common	Pacif	E
California Tonguefish	<i>Symphurus atricauda</i>		Common	Pacif	V
California Halibut	<i>Paralichthys californicus</i>		Common	Pacif	E
Pacific Halibut	<i>Hippoglossus stenolepis</i>		Uncommon	Pacif	E
Southern Rock Sole	<i>Lepidopsetta bilineata</i>		Common	Pacif	E
Curlfin Turbot	<i>Pleuronichthys decurrens</i>		Common	Pacif	E
Hornyhead Turbot	<i>Pleuronichthys verticalis</i>		Common	Pacif	E
C-O Turbot	<i>Pleuronichthys coenosus</i>		Common	Pacif	V
Sand Sole	<i>Psettichthys melanostictus</i>		Common	Pacif	E
Diamond Turbot	<i>Hypopsetta guttulata</i>		Common	Pacif	V
English Sole	<i>Parophrys vetulus</i>		Common	Pacif	E
Butter Sole	<i>Isopsetta isolepis</i>		Common	Pacif	E

**Fish**

COMMON NAME	SCIENTIFIC NAME	FED STATUS	POP EST	LOCATION	HABITAT IMPORT
Starry Flounder	<i>Platichthys stellatus</i>		Common	Pacif	E
Pacific Sanddab	<i>Citharichthys sordidus</i>		Common	Pacif	E
Speckled Sanddab	<i>Citharichthys stigmaeus</i>		Common	Pacif	E
Rex Sole	<i>Glyptocephalus zachirus</i>		Common	Pacif	E
Deepsea Sole	<i>Embassichthys bathybius</i>		Uncommon	Pacif	E
Greenland Halibut	<i>Reinhardtius hippoglossoides</i>		Uncommon	Pacif	V
Arrowtooth Flounder	<i>Atheresthes stomias</i>		Uncommon	Pacif	E
Dover Sole	<i>Mocrostomus pacificus</i>		Common	Pacif	E
Slender Sole	<i>Lyopsetta exilis</i>		Uncommon	Pacif	E
Petrale Sole	<i>Eopsetta jordani</i>		Common	Pacif	E
Roughscale sole	<i>Clidoderma asperrimum</i>				
Finescale Triggerfish	<i>Balistes polylepis</i>		Rare	Pacif	
Stripefin ronquil	<i>Rathbunella alleni</i>				
Black Durgon	<i>Melichthys niger</i>		Rare	Pacif	
Oceanic Pufferfish	<i>Lagocephalus lagocephalus</i>		Rare	Pacif	V
Spotted Porcupinefish	<i>Diodon hystrix</i>		Rare	Pacif	
Smooth-eye Poacher	<i>Xeneretmus leiops</i>				
Northern Spearnose Poacher	<i>Agonopsis vulsa</i>				
Tubenose Poacher	<i>Pallasina barbata</i>				
Oxeye Oreo	<i>Alloctytus folletti</i>				
Shining Tubeshoulder	<i>Sagamichthys abei</i>				
Balloonfish	<i>Diodon holocanthus</i>		Rare	Pacif	
Common Mola	<i>Mola mola</i>		Common	Pacif	E

**Reptiles**

COMMON NAME	SCIENTIFIC NAME	FEDERAL STATUS	POP EST	LOCATION	HABITAT IMPORT
Green Sea Turtle	<i>Chelonia mydas</i>	E/T*	Common	World	
Pacific (Olive) Ridley	<i>Lepidochelys olivacea</i>	E/T*	Uncommon	World	
Loggerhead Turtle	<i>Caretta caretta</i>	T	Uncommon	World	
Leatherback Turtle	<i>Dermodochelys coriacea</i>	E	Rare	World	E

\* In the Pacific Ocean, breeding colony populations on the Pacific coast of Mexico of both gree turtles and olive ridley turtles are listed as endangered; all others are listed as threatened.



## **Appendix III F: Invertebrates and Algae**

### **GULF OF THE FARALLONES NATIONAL MARINE SANCTUARY**

#### **INVERTEBRATES AND ALGAE**

Compiled by Natalie Cosentino-Manning  
National Marine Fisheries Service  
Santa Rosa, CA

[Natalie.Cosentino-Manning@noaa.gov](mailto:Natalie.Cosentino-Manning@noaa.gov)

Jan Roletto  
Gulf of the Farallones National Marine Sanctuary  
[Jan.Roletto@noaa.gov](mailto:Jan.Roletto@noaa.gov)

The following lists of algae and invertebrate species occurring within and adjacent to the GFNMS have been constructed. In addition to common (when applicable) and scientific names of each specific taxon, the lists include information on the known range, and status within the sanctuary and along its known range. Status is classified as relative abundance within the Sanctuary and throughout the known ranges. Range abbreviations are the same as above, in the vertebrate section. This list does not constitute a complete list. There are over 500 species of invertebrates and algae found in the intertidal regions alone. Species listed are represented at most intertidal sites within GFNMS as well as some offshore organisms. Species list does include species found at the Farallon Islands, Tomales Bay and Bolinas Lagoon.

The headings of the invertebrate and algae lists include the following categories:

**COMMON NAME** - The common (English) name of the species.

**SCIENTIFIC NAME** - The scientific (Latin) name of the species.

**POPEST** (Sanctuary) – No population or density estimate are available for invertebrates or plants so relative abundance within the GFNMS is given.

Abundant (Ab) - Organism covers all suitable or available space throughout a given depth or zone.

Common (Co) - Organism is seen in dense patches or in numerous numbers throughout a given depth or zone.

Uncommon (UnCo) -

Occasional (Oc) - Organism is seen, but sparse throughout a given depth or zone.

Rare (rare) - Organism is only seen once or twice throughout a given depth or zone.

**POPEST** (N.E. Pacific) – No population or density estimate are available for invertebrates or plants so relative abundance within the north eastern Pacific is given.

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Abundant (Ab)- Organism covers all suitable or available space throughout a given depth or zone.

Common (Co)- Organism is seen in dense patches or in numerous numbers throughout a given depth or zone.

Uncommon (UnCo) -

Occasional (Oc)- Organism is seen, but sparse throughout a given depth or zone.

Rare (rare)- Organism is only seen once or twice throughout a given depth or zone.

**RANGE** - The overall range of the species along the northern eastern Pacific.

Abbreviations have been used and are given in the form, e.g., "s.CA-AK" to indicate southern California to Alaska. Common abbreviations are as follows:

BC - British Columbia, Canada

Baja - Baja, California, Mexico

AK- Alaska

GCA - Gulf of California

s.CA - southern California (Pt. Conception south)

c.CA - central California (Pt. Conception to Bodega Bay)

n.CA - northern California (Bodega Bay north)

MEX-Mexico

OR - Oregon

**Invertebrates**

CLASSIFICATION & COMMON NAME	SCIENTIFIC NAME	POPEST (Sanctuary)	POPEST (N.E. Pacific)	RANGE
<b>Annelida</b>				
	<i>Arabella iricolor</i>			
	<i>Cheilonereis cyclurus</i>			
	<i>Errantia spp.</i>			
<b>Polycheate</b>	<i>Nereis guberi</i>			
	<i>Phragmatopoma californica</i>			
	<i>Phyllochaetopterus prolifica</i>			
	<i>Platynereis bicanaliculata</i>			
<b>Tube worm</b>	<i>Serpula vermicularis</i>			
	<i>Spirorbis borealis</i>			
	<i>Stylianthea prophyra</i>			
	<i>Terribellidae</i>			
	<i>Thelepus crispus</i>			
	<i>Typosyllis aciculata</i>			
<b>Arthropoda</b>				
	<i>Acanthomysis sp.</i>			
	<i>Achelia chelata</i>			
	<i>Achelia nudiscula</i>			
	<i>Achelia spinoseta</i>			
	<i>Allorchestes anceps</i>			

**Invertebrates**

CLASSIFICATION & COMMON NAME	SCIENTIFIC NAME	POPEST (Sanctuary)	POPEST (N.E. Pacific)	RANGE
	<i>Alpheus dentipes</i>			
	<i>Ammothea hilgendorfi</i>			
	<i>Amphiodia occidentalis</i>			
	<i>Amphissa columbiana</i>			
	<i>Anatanaïs normani</i>			
	<i>Balanus amphitrite</i>			
Barnacle	<i>Balanus cariosus</i>			
Barnacle	<i>Balanus glandula</i>			
Barnacle	<i>Balanus nubilus</i>			
	<i>Cancer antennarius</i>			
	<i>Cancer magister</i>			
	<i>Cancer productus</i>			
	<i>Caprella californica</i>			
	<i>Chthamalus dalli</i>			
	<i>Cirolana harfordi</i>			
	<i>Elasmopus serricatus</i>			
	<i>Emerita analoga</i>			
	<i>Euphausia pacifica</i>			
	<i>Exosphaeroma inornata</i>			
	<i>Exosphaeroma rhomburum</i>			
	<i>Fabia subquadrata</i>			
	<i>Hemigrapsus nudus</i>			
	<i>Hildenbrandia prototypus</i>			
	<i>Hyale frequens</i>			
	<i>Hyale grandicornis</i>			
	<i>Ianiropsis kincaidi</i>			
	<i>Idotea fewkesi</i>			
	<i>Idotea resecata</i>			
	<i>Idotea schmitti</i>			
	<i>Idotea sp.</i>			
	<i>Idotea stenops</i>			
	<i>Idotea urotoma</i>			
	<i>Idotea wosnesenskii</i>			
	<i>Lecythorhynchus hilgendorfi</i>			
	<i>Ligia occidentalis</i>			
	<i>Ligia pallasii</i>			
	<i>Limnoria algarum</i>			
	<i>Littorophiloscia richardsonae</i>			
	<i>Lophopanopeus leucomanus</i>			
Crab	<i>Loxorhynchus crispatus</i>			
	<i>Melita californica</i>			
	<i>Metacaprella anomala</i>			

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**Invertebrates**

CLASSIFICATION & COMMON NAME	SCIENTIFIC NAME	POPEST (Sanctuary)	POPEST (N.E. Pacific)	RANGE
	<i>Metacaprella kennerlyi</i>			
	<i>Nymphopsis spinosissima</i>			
	<i>Oedignathus inermis</i>			
	<i>Oligochinus lighti</i>			
	<i>Pachycheles rudis</i>			
Crab	<i>Pachygrapsus crassipes</i>			
	<i>Pachygrapsus nudus</i>			
	<i>Pagurus granosimanus</i>			
Hermit crab	<i>Pagurus hirsutiussculus</i>			
	<i>Pagurus samuelensis</i>			
	<i>Pagurus sp.</i>			
	<i>Paracerceis cordata</i>			
	<i>Paradynoides benedicti</i>			
	<i>Parallorchestes ochotensis</i>			
	<i>Paranthura elegans</i>			
	<i>Paraxanthia taylorii</i>			
	<i>Petrolisthes cinctipes</i>			
	<i>Pinnixa franciscana</i>			
	<i>Pollicipes polymerus</i>			
	<i>Polycheria osborni</i>			
	<i>Porcellio americanus</i>			
Crab	<i>Pugettia fragilissima</i>			
Crab	<i>Pugettia gracilis</i>			
Crab	<i>Pugettia producta</i>			
Sea spider	<i>Pycnogonum rickettsi</i>			
Sea spider	<i>Pycnogonum stearnsi</i>			
Crab	<i>Scyra acutifrons</i>			
Barnacle	<i>Semibalanus cariosus</i>			
	<i>Semibalanus sp.</i>			
Barnacle	<i>Tetraclita rubescens</i>			
	<i>Thysanoessa spinifera</i>			
<b>Chordata</b>				
	<i>Aplidium arenatum</i>			
Tunicate	<i>Aplidium californicum</i>	Co	Co	BC - Baja
Tunicate	<i>Cystodytes lobatus</i>	Co	Co	BC - Baja
Tunicate	<i>Didemnum carnulentum</i>	Co	Co	OR - c.AM
	<i>Polyclinum planum</i>			
Tunicate	<i>Pycnoclayella stanleyi</i>	Co	Co	BC - Baja
Tunicate	<i>Ritterella aequalisphonis</i>	Ab	Co	WA - s. CA+
<b>Cnidaria</b>				
Fern hydroid	<i>Abietinaria sp.</i>	Co	Co	AK - s.CA

**Invertebrates**

CLASSIFICATION & COMMON NAME	SCIENTIFIC NAME	POPEST (Sanctuary)	POPEST (N.E. Pacific)	RANGE
	<i>Aglaophenia inconspicua</i>			
Ostrich-plume hydroid	<i>Aglaophenia latirostris</i>	Ab	Co	AK - s. CA
	<i>Aglaophenia sp</i>			
Aggregating anemone	<i>Anthopleura elegantissima</i>	Ab	Ab	AK - Baja
Giant green anemone	<i>Anthopleura xanthogrammica</i>	Co	Co	AK - C. Am
	<i>Aurelia aurita</i>			
Orange cup coral	<i>Balanophyllia elegans</i>	Co	Co	OR - s. CA
	<i>Corynactis californica</i>			
Poliferating anemone	<i>Epiactis prolifera</i>	Co	Co	AK - s.CA
	<i>Eudendrium californicum</i>			
	<i>Garveia annulata</i>	Ab	Co	AK - s. CA
White-plumed anemone	<i>Metridium senile</i>	Co	Co	AK - s. CA
	<i>Obelia sp.</i>			n.CA+
	<i>Sertularella turgida</i>			
	<i>Sertularia sp.</i>			
Sea pen	<i>Stylatula elongata</i>	Co	Co	n. CA - s. CA
	<i>Tealia crassicornis</i>	Co	Co	AK - c.CA+
	<i>Tealia lofotensis</i>	Co	Co	WA - s. CA
	<i>Tubularia crocea</i>			
	<i>Urticina crassicornia</i>			
	<i>Urticina lofotensis</i>			
<b>Echinodermata</b>				
	<i>Amphipholis squamata</i>			
	<i>Asterina miniata</i>			
Sea cucumber	<i>Cucumaria curata</i>	rare	rare	c.CA
Sea cucumber	<i>Cucumaria pseudocurata</i>	Co	Co	BC -c. CA
Leather star	<i>Dermasterias imbricata</i>	Co	Co	AK - s.CA
Blood star	<i>Henricia leviuscula</i>	Co	Co	AK - Baja
	<i>Leptasterias aequalis</i>			
6-rayed star	<i>Leptasterias hexactis</i>	Co	Co	WA - s.CA
	<i>Leptasterias puscilla</i>			
	<i>Ophiopholis aculeata</i>			
	<i>Ophioplocus papillosa</i>			
Brittle star	<i>Ophiothrix spiculata</i>	Co	Co	c.CA - s.Am
Sea cucumber	<i>Parastichopus parvimensis</i>	UnCo	Co	c.CA - Baja
Bat star	<i>Patiria miniata</i>	Co	Co	AK - Baja
	<i>Pisaster giganteus</i>			
Ochre star	<i>Pisaster ochraceus</i>	Ab	Co	Ak - c.CA
Sunflower star	<i>Pycnopodia helianthoides</i>	Co	Co	AK - s.CA
	<i>Strongylocentrotus droebachiensis</i>			

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GFNMS Management Plan**

**Invertebrates**

CLASSIFICATION & COMMON NAME	SCIENTIFIC NAME	POPEST (Sanctuary)	POPEST (N.E. Pacific)	RANGE
Red sea urchin	<i>Strongylocentrotus franciscanus</i>	Co	Unco	AK - Baja+
Purple sea urchin	<i>Strongylocentrotus purpuratus</i>	Ab	Co	BC - Baja
<b>Ectoprocta</b>				
	<i>Barentsia benedeni</i>			
Bryozoan	<i>Bugula californica</i>	Ab	Co	BC - s. Am
	<i>Crisia maxima</i>			
Bryozoan	<i>Dendrobeania laxa</i>	Ab	Ab	BC - s.CA
	<i>Dendrobeania lichenoides</i>			
	<i>Eurystomella bilabiata</i>			
Bryozoan	<i>Flustrellidra corniculata</i>	Co	Co	AK - c.CA
	<i>Tricellaria occidentalis</i>			
	<i>Tricellaria sp</i>			
	<i>Tricellaria ternata</i>			
<b>Mollusca</b>				
Angular unicorn	<i>Acanthina spirata</i>	Co	Co	n. CA -Baja
	<i>Acanthina spp.</i>			
	<i>Acanthodoris nanaimoensis</i>			
	<i>Aclis shepardiana</i>			
White capped limpet	<i>Acmaea mitra</i>	Co	Co	AK - Baja
Shag-rug nudibranch	<i>Aeolidia papillosa</i>	Co	Co	n.CA -s.CA+
	<i>Alia carinata</i>			
Variegated amphissa	<i>Amphissa versicolor</i>	Co	Co	n. CA - Baja
Sea lemon	<i>Anisodoris noblis</i>	Co	Co	BC - Baja
	<i>Antiopella barbarensis</i>			
Monterey dorid	<i>Archidoris montereyensis</i>	Co	Co	AK - s.CA
	<i>Balcis thersites</i>			
	<i>Baptodoris mimetica</i>			
Snail	<i>Barleeia haliotiphila</i>			
Snail	<i>Barleeia subtenuis</i>			
Horn snail	<i>Batillaria attramentaria</i>	Co	Co	BC - c. CA
Threaded bittium	<i>Bittium eschrichtii</i>	Unco	Co	AK - Baja
	<i>Bittium purpureum</i>			
	<i>Bittium schrichtii</i>			
	<i>Cadlina luteomarginata</i>			
Yellow-edged cadlina	<i>Cadlina modesta</i>	Co	Co	BC - Baja
Channeled top snail	<i>Calliostoma canaliculatum</i>	Co	Co	AK - Baja
Blue top snail	<i>Callistoma ligatum</i>	Co	Co	AK - s.CA
	<i>Ceratostoma foliatum</i>			
	<i>Cerithiopsis carpenteri</i>			
	<i>Chama arcana</i>			
	<i>Collisella scabra</i>			

**Invertebrates**

CLASSIFICATION & COMMON NAME	SCIENTIFIC NAME	POPEST (Sanctuary)	POPEST (N.E. Pacific)	RANGE
	<i>Corolla spectabilis (Pteropod)</i>			
Pacific oyster	<i>Crassostrea gigas</i>	Co	Co	BC - s.CA
Hooked slipper snail	<i>Crepidula adunca</i>	Co	Co	BC - Baja
	<i>Crepidula nummaria</i>			
	<i>Crepidula perforans</i>			
	<i>Crepidatella lingulata</i>			
Gumboot chiton	<i>Cryptochiton stelleri</i>	Rare	Co-Rare	AK - s.CA+
	<i>Cryptomya californica</i>			
	<i>Cymakra aspera</i>			
	<i>Daphana californica</i>			
	<i>Diaphana californica</i>			
Ring spotted dorid	<i>Diaulula sandiegensis</i>	Co	Co	AK - Baja
	<i>Diplodonta orbella</i>			
	<i>Discurria scutum</i>			
	<i>Dirona picta</i>			
	<i>Doto columbiana</i>	Unco	Unco	BC - n.CA
	<i>Entodesma saxicola</i>			
Snail	<i>Epitonium tinctum</i>			
	<i>Fissurella volcano</i>			
	<i>Fusinus luteopictus</i>			
	<i>Granula margaritula</i>			
Black Abalone	<i>Haliotis cracherodii</i>	UnCo	Co	c. CA - Baja
	<i>Haliotis racherodii</i>			
Red Abalone	<i>Haliotis rufescens</i>	Co	Unco	OR - Baja
Hermisenda	<i>Hermisenda crassicornis</i>	Co	Co	AK - Baja
	<i>Hiatella arctica</i>			
	<i>Hinnites giganteus</i>			
Hoof snail	<i>Hipponix craniodes</i>	Co	Co	BC - Baja+
Hopkin's Rose	<i>Hopkinsia rosacea</i>	Co	Co	OR -Baja
	<i>Irus lamellifer</i>			
Chiton	<i>Ischnochiton regularis</i>			
Chiton	<i>Katharina tunicata</i>			
	<i>Kellia laperousii</i>			
	<i>Lacuna cistula</i>			
Chink snail	<i>Lacuna marmorata</i>	Co	Co	AK - s.CA
	<i>Lacuna porrecta</i>			
	<i>Lacuna unifasciata</i>			
	<i>Lasaea cistula</i>			
Clam	<i>Lasaea subviridis</i>	Ab	Co	AK - Baja
Chiton	<i>Lepidochitona dentiens</i>			
	<i>Lepidozona sinudentata</i>			

**Appendix III F: Invertebrates and Algae  
GFNMS Management Plan**

**Invertebrates**

CLASSIFICATION & COMMON NAME	SCIENTIFIC NAME	POPEST (Sanctuary)	POPEST (N.E. Pacific)	RANGE
	<i>Littorina keanae</i>			
Eroded periwinkle	<i>Littorina planaxis</i>	Ab	Ab	WA - Baja
Checkered periwinkle	<i>Littorina scutulata</i>	Ab	Ab	AK - Baja
	<i>Littorina sitkana</i>			
	<i>Littorina sp.</i>			
	<i>Lottia asmi</i>			
Ribbed limpet	<i>Lottia digitalis</i>	Ab	Co	AK - Baja
Owl limpet	<i>Lottia gigantea</i>	Ab	Co	WA - Baja
Unstable seaweed limpet	<i>Lottia instabilis</i>	Ab	Co	AK - s.CA
File limpet	<i>Lottia limantula</i>	Co	Ab	OR - s.Baja
Shield limpet	<i>Lottia pelta</i>	Co	Co	AK - Baja
	<i>Lottia strigatella</i>			
Triangular limpet	<i>Lottia triangularis</i>	Co	Co	AK - Baja
Rough limpet	<i>Macclintockia scabra</i>	Ab	Co	OR - Baja
	<i>Milneria minima</i>			
	<i>Mitrella carinata</i>			
	<i>Mitrella tuberosa</i>			
Fat horse mussel	<i>Modiolus capax</i>	Co	Co	c.CA -S.AM
	<i>Modiolus carpenti</i>			
Hairy chiton	<i>Mopalia ciliata</i>	Co	Co	AK - Baja
Mossy chiton	<i>Mopalia muscosa</i>	Co	Co	BC - Baja
Pygmy mussel	<i>Musculus pygmaeus</i>	Ab	Co	c.CA
	<i>Mytilimeria nuttallii</i>			
California mussel	<i>Mytilus californianus</i>	Ab	Ab	AK - Baja
Bay mussel	<i>Mytilus edulis</i>	Co	Co	AK - Baja+
	<i>Nassarius mendicus</i>			
Limpet	<i>Notoacmea insessa</i>			
Limpet	<i>Notoacmea persona</i>			
Channeled dogwinkle	<i>Nucella canaliculata</i>	Ab	Co	Ak - c.CA
Emarginate dogwinkle	<i>Nucella emarginata</i>	Ab	Co	Ak - n. Baja
Chiton	<i>Nuttallina californica</i>	Co	Co	WA - s. CA
	<i>Ocenebra atropurpurea</i>			
	<i>Ocenebra interfossa</i>			
	<i>Ocenebra lurida</i>			
	<i>Octopus dofleini</i>			
	<i>Octopus rubescens</i>			
	<i>Octopus sp.</i>			
	<i>Odostomia sp.</i>			
	<i>Onchidella borealis</i>			
	<i>Opalia wroblewskyi</i>			
Olympic oyster	<i>Ostrea lurida</i>	Rare	Rare-Co	AK - Baja

**Invertebrates**

CLASSIFICATION & COMMON NAME	SCIENTIFIC NAME	POPEST (Sanctuary)	POPEST (N.E. Pacific)	RANGE
	<i>Palciphorella velatta</i>			
	<i>Penitella conradi</i>			
	<i>Penitella turnerae</i>			
	<i>Petalocochus montereyensis</i>			
	<i>Petricola carditoides</i>			
	<i>Philobrya setosa</i>			
Abalone jingle	<i>Pododesmus cepio</i>	Co	Co	AK - Baja
	<i>Protothaca staminea</i>			
Red sponge nudibranch	<i>Rostanga pulchra</i>	Ab	Ab	BC - Baja
Dire welk	<i>Searlesia dira</i>	Co	Co	AK - c.CA
	<i>Stenoplax heathiana</i>			
Streaked stiliger	<i>Stiliger fuscovittatus</i>	Ab	Ab	WA - Baja
	<i>Tectura insessa</i>			
	<i>Tectura persona</i>			
	<i>Tectura scutum</i>			
Brown turban snail	<i>Tegula brunnea</i>	Ab	Ab	OR - s. CA
Black turban snail	<i>Tegula funebris</i>	Ab	Co-Ab	BC - Baja
Lined chiton	<i>Tonicella lineata</i>	Ab	Co	AK - s.CA+
	<i>Transennella tantilla</i>			
Reticulate button snail	<i>Trimusculus reticulatus</i>	Co	Co	OR - MEX
Sea-clown nudibranch	<i>Triopha catalinae</i>	Co	Co	AK - Baja
	<i>Triopha maculata</i>			
	<i>Trivia californica</i>			
	<i>Velutina velutina</i>			
<b>Nemertea</b>				
	<i>Emplectonema gracile</i>			
	<i>Tubulanus sexlineatus</i>			
<b>Porifera</b>				
Sponge	<i>Acarus erithacus</i>			
	<i>Allopora porphyra</i>			
Sponge	<i>Anaata spongigartina</i>			
	<i>Antho lithophoenix</i>			
Keratose sponge	<i>Aplysilla glacialis</i>	Ab	Ab	
	<i>Aplysilla polyraphis</i>			
Sponge	<i>Axocelita originalis</i>			
	<i>Clathria sp.</i>			
	<i>Cliona celata</i>			
Sponge	<i>Geodia mesotriaence</i>	Co	Co	AK - Mex
Crumb-of-bread sponge	<i>Halichondria panicea</i>	Ab	Ab	n.CA
	<i>Halichondria sp.</i>			

**Appendix III F: Invertebrates and Algae  
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**Invertebrates**

CLASSIFICATION & COMMON NAME	SCIENTIFIC NAME	POPEST (Sanctuary)	POPEST (N.E. Pacific)	RANGE
	<i>Haliclona permollis</i>			
Sponge	<i>Haliclona sp.</i>	Ab	Ab	n. CA +
	<i>Higginsia sp.</i>			
	<i>Hinksia sandriana</i>			
	<i>Hymedesmia sp.</i>			
	<i>Hymenamphiastra cyanocrypta</i>			
Sponge	<i>Leucandra heathi</i>			
Sponge	<i>Leucilla nuttingi</i>			
Sponge	<i>Leucosolenia eleanor</i>			
Sponge	<i>Lissodendoryx firma</i>			
Sponge	<i>Lissodendoryx topsenti</i>			
Sponge	<i>Mycale psila</i>			
	<i>Myxilla incrustans</i>			
Sponge	<i>Ophlitaspongia pennata</i>	Ab	Co	BC - Mex
	<i>Scypha sp.</i>			
	<i>Spongia idia</i>			
Sponge	<i>Stelletta clarella</i>			
Sponge	<i>Suberites sp.</i>			
Sponge	<i>Tedania gurjanovae</i>			
Sponge	<i>Tethya aurantia</i>	Co	Co	BC - Mex+
Sponge	<i>Toxidocia sp.</i>			
Sponge	<i>Xestospongia vanilla</i>			
Sponge	<i>Zygherpe hyaloderma</i>			
<b>Sipuncula</b>				
	<i>Phascolosoma agassizii</i>			
<b>Urochordata</b>				
	<i>Archidistoma ritteri</i>			
	<i>Styela montereyensis</i>	Co	Co	BC - Baja
	<i>Styela truncata</i>	Co	Co	AK - s.CA

**Algae**

COMMON NAME & CLASSIFICATION	SCIENTIFIC NAME	POPEST (Sanctuary)	POPEST (N.E. Pacific)	RANGE
<b>CHLOROPHYTA</b>				
	<i>Acrosiphonia coalita</i>			
	<i>Blidingia minima var. vexata</i>			
Moss-like algae	<i>Bryopsis corticulans</i>	Co	Co	BC - Baja
Pin cushion algae	<i>Cladophora columbiana</i>	Co	Ab	BC - Baja
	<i>Cladophora graminea</i>			
	<i>Cladophora sp.</i>			

**Algae**

COMMON NAME & CLASSIFICATION	SCIENTIFIC NAME	POPEST (Sanctuary)	POPEST (N.E. Pacific)	RANGE
Dead man's fingers	<i>Codium fragile</i>	UnCo	Co	AK - Baja
Sponge weed	<i>Codium setchellii</i>	UnCo	Co	AK - Baja
	<i>Derbesia marina</i>			
	<i>Endocladia viridis</i>			
	<i>Endophyton ramosum</i>			
	<i>Enteromorpha flexuosa</i>			
	<i>Enteromorpha clathrata</i>			
	<i>Enteromorpha compressa</i>			
Intestine algae	<i>Enteromorpha intestinalis</i>	Co	Co	AK - Mex
	<i>Halicystis ovalis</i>			
	<i>Prasiola meridionalis</i>			
	<i>Ulothrix flacca</i>			
	<i>Ulothrix laetevirens</i>			
	<i>Ulothrix pseudoflacca</i>			
	<i>Ulva californica</i>			
	<i>Ulva conglobata</i>			
	<i>Ulva expansa</i>			
	<i>Ulva lactuca</i>			
	<i>Ulva lobata</i>			
Sea lettuce	<i>Ulva</i> spp.	Co	Co	BC - Baja
	<i>Ulva taeniata</i>			
	<i>Urophoro</i> sp.			
<b>HETEROKONTO-PHYTA</b>				
Winged kelp	<i>Alaria marginata</i>	Ab	Ab	AK - c. CA
Barefoot, Matsumo	<i>Analipus japonicus</i>	Co	Co	AK -c.CA
	<i>Coilodesme californica</i>			
	<i>Colpomenia peregrina</i>			
	<i>Compsomena serpens</i>			
	<i>Costaria costata</i>			
Bladder chain	<i>Cystoseira osmundacea</i>	Ab	Co	OR - Baja
	<i>Desmarestia herbacea</i>			
Acid seaweed	<i>Desmarestia ligulata</i>	Ab	Ab	AK - S. Am
	<i>Desmarestia munda</i>			
Nerve net	<i>Dictyoneurum californicum</i>	Co	Co	BC - c. CA
Feather Boa	<i>Egregia menziesii</i>	Ab	Co	AK - Baja
Rock weed	<i>Fucus gardneri</i>	Co	Ab	N. WA - c. CA
	<i>Hinckesia sandriana</i>			
	<i>Laminaria ephemera</i>			
	<i>Laminaria farlowii</i>			
Split blade oarweed/Kombu	<i>Laminaria setchellii</i>	Co	Co	AK-MEX

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**Algae**

COMMON NAME & CLASSIFICATION	SCIENTIFIC NAME	POPEST (Sanctuary)	POPEST (N.E. Pacific)	RANGE
Oar weed/Kombu	<i>Laminaria sinclarii</i>	Ab	Ab	BC - s.CA
	<i>Laminaria sp.</i>			
	<i>Leathesia difformis</i>			
	<i>Macrocystis integrifolia</i>			
Giant Kelp	<i>Macrocystis pyrifera</i>	UnCo	Co	AK - Baja
	<i>Melanosiphon intestinalis</i>			
Bull whip kelp	<i>Nereocystis luetkeana</i>	Co	Co	c.CA-AK
Bull Kelp	<i>Nereocystis luetkeana</i>	Unco	Co	AK - c. CA
Little rock weed	<i>Pelvetia fastigiata</i>	Co	Ab	BC - Baja
Tiny rock weed	<i>Pelvetiopsis limitata</i>	Co	Co	BC - c. CA
	<i>Petalonia fascia</i>			
	<i>Phaeostrophion irregulare</i>			
	<i>Pilayella sp.</i>			
Sea palm	<i>Postelsia palmaeformis</i>	Co	Ab	BC - c. CA
	<i>Pterygophora californica</i>			
Tar spot	<i>Ralfsia pacifica</i>	Co	Co	OR - Baja
	<i>Ralfsia sp.</i>			
	<i>Sargassum muticum</i>			
Leather tube	<i>Scytosiphon simplicissimus</i>	Co	Ab	AK - Baja
	<i>Scytosiphon dotyii</i>			
	<i>Scytosiphon lomentaria</i>			
	<i>Scytosiphon simplicissimus</i>			
	<i>Soranothera ulvoidea</i>			
	<i>Spongonema tomentosum</i>			
	<i>Streblonema sp.</i>			
<b>RHODOPHYTA</b>				
Dreadlock algae	<i>Acrochaetium prophyrae</i>	Ab	Ab	AK - c. CA
Epiphytic algae	<i>Acrochaetium sp.</i>	Ab	Ab	BC - c. CA
Garlic algae	<i>Ahnfeltia cornucopiae</i>	Co	Co	AK - c. CA
Mastocarpus crust	<i>Ahnfeltia fastigiata</i>	Ab	Co	BC - Baja
	<i>Ahnfeltiopsis leptophylla</i>			
	<i>Ahnfeltiopsis linearis</i>			
Red membrane	<i>Anotrichium furcellatum</i>	Ab	Co	BC - MX
	<i>Antithamnion dendroidum</i>			
	<i>Antithamnion densum</i>			
Tooth branch	<i>Audouinella subimmersa</i>	Co	Ab	BC - c. CA
Braided hair algae	<i>Bangia sp.</i>	Co	Co	BC - MX
	<i>Bornetia californica</i>			
	<i>Bossiella corymbifera</i>			
	<i>Bossiella dichotoma</i>			
	<i>Bossiella plumosa</i>			

**Algae**

COMMON NAME & CLASSIFICATION	SCIENTIFIC NAME	POPEST (Sanctuary)	POPEST (N.E. Pacific)	RANGE
	<i>Bossiella schmittii</i>			
	<i>Branchioglossum bipinnatifidum</i>			
	<i>Branchioglossum undulatum</i>			
	<i>Calliarthron tuberculosum</i>			
	<i>Callithamnion biseriatum</i>			
	<i>Callithamnion pikeanum</i>			
	<i>Callophyllis cheilosporioides</i>			
	<i>Callophyllis crenulata</i>			
	<i>Callophyllis flabellulata</i>			
	<i>Callophyllis heanophylla</i>			
	<i>Callophyllis linearis</i>			
	<i>Callophyllis obtusifolia</i>			
	<i>Callophyllis pinnata</i>			
	<i>Callophyllis sp.</i>			
	<i>Callophyllis violacea</i>			
	<i>Centroceras clavulatum</i>			
	<i>Ceramium gardneri</i>			
	<i>Ceramium pacificum</i>			
	<i>Chiharaea bodegensis</i>			
	<i>Chondracanthus canaliculatus</i>			
	<i>Chondracanthus corymbiferus</i>			
	<i>Chondracanthus exasperatus</i>			
	<i>Chondracanthus harveyanus</i>			
	<i>Chondracanthus spinosus</i>			
	<i>Cirriliarpus sp.</i>			
	<i>Clathromorphum parcum</i>			
	<i>Constantinea simplex</i>			
	<i>Corallina officinalis</i>			
	<i>Corallina pinnatifolia</i>			
	<i>Corallina vancouveriensis</i>			
	<i>Corallophila eatoniana</i>			
	<i>Crustose corallines</i>			
	<i>Cryptopleura farlowiana</i>			
	<i>Cryptopleura corallinara</i>			
	<i>Cryptopleura violacea</i>			
	<i>Cryptopleura crispa</i>			
	<i>Cryptopleura lobulifera</i>			
	<i>Cryptopleura rosacea</i>			
	<i>Cryptopleura ruprechtiana</i>			
	<i>Cumagloia andersonii</i>			
	<i>Delesseria decipiens</i>			

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**Algae**

COMMON NAME & CLASSIFICATION	SCIENTIFIC NAME	POPEST (Sanctuary)	POPEST (N.E. Pacific)	RANGE
	<i>Dilsea californica</i>			
Beautifully jointed	<i>Endocladia muricata</i>	Ab	Co	AK - Baja
	<i>ErythroGLOSSUM californicum</i>			
Wool weed	<i>Erythrophyllum delesseriodes</i>	Ab	Co	AK- s.CA
	<i>Erythrotrichia carnea</i>			
	<i>Erythrotrichia pulvinata</i>			
	<i>Farlowia compressa</i>			
	<i>Farlowia conferta</i>			
	<i>Farlowia mollis</i>			
	<i>Faucheia fryeana</i>			
	<i>Faucheia laciniata</i>			
	<i>Faucheocolax attenuata</i>			
Beautiful leaf	<i>Gastroclonium subarticulatum</i>	Co	Ab	WA - Baja
	<i>Gastroclonium subarticulatum</i>			
Candy cane seaweed	<i>Gelidium coulteri</i>	Co	Co	WA - Baja
Arrow weed	<i>Gelidium purpurascens</i>	Co	Co	OR - Baja
	<i>Gelidium pusillum</i>			
	<i>Gelidium robustum</i>			
	<i>Gelidium sp.</i>			
	<i>Gloiosiphonia verticillaris</i>			
	<i>Goniotrichopsis sublittoralis</i>			
	<i>Gracilariophila oryzoides</i>			
Turkish towel	<i>Gracilariopsis sjoestedtii</i>	Co	Co	WA - Baja
	<i>Gracilariopsis lemaneiformis</i>			
	<i>Grateloupia doryphora</i>			
	<i>Grateloupia filicina</i>			
	<i>Griffithsia pacifica</i>			
	<i>Gymnogongrus chiton</i>			
Turkish towel	<i>Halosaccion glandiforme</i>	Ab	Co	BC - Baja
	<i>Halymenia schizymenioides</i>			
	<i>Halymenia templetonii</i>			
	<i>Herposiphonia parva</i>			
	<i>Herposiphonia plumula</i>			
	<i>Hildenbrandia occidentalis</i>			
	<i>Hildenbrandia rubra</i>			
Narrow turkish towel	<i>Hildenbrandia spp.</i>	Co	Ab	WA - Baja
	<i>Hommersandia palmatifolia</i>			
	<i>Hymenena coccinea</i>			
	<i>Hymenena flabelligera</i>			
	<i>Hymenena multiloba</i>			
	<i>Janczewskia gardneri</i>			

**Algae**

COMMON NAME & CLASSIFICATION	SCIENTIFIC NAME	POPEST (Sanctuary)	POPEST (N.E. Pacific)	RANGE
	<i>Leachiella pacifica</i>			
	<i>Lithophyllum dispar</i>			
	<i>Lithophyllum grumosum</i>			
	<i>Lithophyllum proboscideum</i>			
Narrow turkish towel	<i>Lithothamnium sp.</i>	Unco	Co	c.CA - Baja
Cup and saucer algae	<i>Lithothrix aspergillum</i>	Co	Ab	BC - c. CA
	<i>Maripelta rotata</i>			
Small coral	<i>Mastocarpus jardinii</i>	Ab	Ab	AK - S. Am
Hidden ribs	<i>Mastocarpus papillatus</i>	Co	Ab	BC - Baja
	<i>Mazzaella affinis</i>			
	<i>Mazzaella californica</i>			
	<i>Mazzaella cordata</i>			
Nail brush	<i>Mazzaella cornucopiae</i>	Ab	Ab	AK - Baja
Red leaf	<i>Mazzaella flaccida</i>	Ab	Co	AK - c. CA
Belly branch	<i>Mazzaella heterocarpa</i>	Ab	Co	BC - Baja
	<i>Mazzaella leptorhynchos</i>			
	<i>Mazzaella linearis</i>			
	<i>Mazzaella rosea</i>			
Agarweed	<i>Mazzaella splendens</i>	Ab	Ab	WA - Baja
	<i>Mazzaella volans</i>			
	<i>Melobesia marginata</i>			
Agarweed	<i>Melobesia mediocris</i>	Ab	Co	WA - Baja
	<i>Membranoptera dimorpha</i>			
	<i>Mesophyllum conchatum</i>			
	<i>Mesophyllum lamellatum</i>			
Spaghetti weed	<i>Microcladia borealis</i>	Co	Co	BC- c.Am
Sea sac	<i>Microcladia coulteri</i>	Co	Ab	WA - c. CA
	<i>Myriogramme sp.</i>			
	<i>Myriogramme spectabilis</i>			
	<i>Myriogramme variegata</i>			
	<i>Neoptilota densa</i>			
	<i>Neoptilota hypnoides</i>			
	<i>Neoptilota sp.</i>			
Wine crust	<i>Neorhodomela larix</i>	Co	Co	BC - Baja
	<i>Nienburgia andersoniana</i>			
	<i>Nitophyllum sp.</i>			
	<i>Nitophyllum sp.</i>			
crustose coralline	<i>Odonthalia floccosa</i>	Co	Co	BC - Baja
Stone hair	<i>Opuntiella californica</i>	Co	Ab	BC - Baja
Little turkish towel	<i>Osmundea spectabilis</i>	Co	Co	BC - c. CA
Little turkish towel	<i>Petrocelis franciscana</i>	Ab	Co	AK - Baja

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**Algae**

COMMON NAME & CLASSIFICATION	SCIENTIFIC NAME	POPEST (Sanctuary)	POPEST (N.E. Pacific)	RANGE
	<i>Petrospongium rugosum</i>			
	<i>Peyssonelliopsis epiphytica</i>			
	<i>Peyssonnelia meridionalis</i>			
	<i>Peyssonnelia pacifica</i>			
	<i>Phycodryas setchellii</i>			
	<i>Pikea californica</i>			
	<i>Pikea pinnata</i>			
	<i>Pleonosporium vancouverianum</i>			
Bunny ears algae	<i>Plocamium cartilagineum</i>	Co	UnCo	AK- n. CA
	<i>Plocamium cartilagineum var. pacificum</i>			
	<i>Plocamium oregonum</i>			
	<i>Plocamium pacificum</i>			
	<i>Plocamium sp.</i>			
	<i>Plocamium violaceum</i>			
Iridesent seaweed	<i>Polyneura latissima</i>	Ab	Ab	AK - Baja
Warty algae	<i>Polysiphonia hendryi</i>	Co	Co	AK- s.CA
	<i>Polysiphonia pacifica</i>			
	<i>Polysiphonia saraticeri</i>			
	<i>Polysiphonia sp.</i>			
Many veined algae	<i>Porphyra gardneri</i>	Ab	Ab	BC - Baja
Many siphon algae	<i>Porphyra lanceolata</i>	Ab	Ab	OR - Baja
Nori/laver	<i>Porphyra nereocystis</i>	Co	Co	AK - Baja
Iridesent seaweed	<i>Porphyra perforata</i>	Co	Ab	BC - Baja
Serrated red weed	<i>Porphyra sp.</i>	Ab	Co	BC - Baja
	<i>Prionitis angusta (formerly filiformis)</i>			
	<i>Prionitis australis</i>			
	<i>Prionitis cornea</i>			
Phyllospadix crust	<i>Prionitis lanceolata</i>	Co	Co	BC - Baja
	<i>Prionitis linearis</i>			
	<i>Prionitis lyallii</i>			
	<i>Prionitis filiformis</i>			
	<i>Prionitis sp.</i>			
	<i>Pseudolithophyllum neofarlowii</i>			
	<i>Pterochondria woodii</i>			
	<i>Pterocladia caloglossoides</i>			
	<i>Pterocladia capillacea</i>			
	<i>Pterocladia caloglossoides</i>			
	<i>Pterocladia capillacea</i>			
	<i>Pterosiphonia baileyi</i>			
	<i>Pterosiphonia bipinnata</i>			
	<i>Pterosiphonia dendroidea</i>			

**Algae**

COMMON NAME & CLASSIFICATION	SCIENTIFIC NAME	POPEST (Sanctuary)	POPEST (N.E. Pacific)	RANGE
	<i>Pterothamnion villosum</i>			
	<i>Ptilota filicina</i>			
	<i>Ptilothamnionopsis lejolisea</i>			
Cactus weed	<i>Rhodochorton purpureum</i>	UnCo	Co	AK - Baja
Small branch	<i>Rhodymenia californica</i>	Co	Co	AK - c. CA
	<i>Rhodymenia callophyllidoides</i>			
	<i>Rhodymenia pacifica</i>			
	<i>Rhodymeniocolax botryoides</i>			
	<i>Sahlingia subintegra</i>			
	<i>Sarcodiotheca gaudichaudii</i>			
	<i>Schimmelemannia plumosa</i>			
	<i>Schizymenia pacifica</i>			
	<i>Scinaia confusa</i>			
	<i>Smithora naiadum</i>			
	<i>Stenogramma interrupta</i>			
	<i>Stylonema alsidii</i>			
	<i>Tiffaniella snyderae</i>			
	<i>Titanoderma dispar</i>			
	<i>Weeksia reticulata</i>			
<b>VASCULAR</b>				
Surf grass	<i>Phyllospadix scouleri</i>	Ab	Ab	BC - Baja
	<i>Phyllospadix torreyi</i>			
Eel grass	<i>Zostera marina</i>	Ab	Ab	OR -s.CA

## Appendix III G: Introduced species

### GULF OF THE FARALLONES NATIONAL MARINE SANCTUARY

#### INVERTEBRATES AND ALGAE

Compiled by Jarrett Byrnes  
Center for Population Biology  
University of California, Davis, California  
jebyrnes@ucdavis.edu

The Introduce Species list is for species in and around the Gulf of the Farallones National Marine Sanctuary (GFNMS), the Northern Management Area, and the Cordell Bank National Marine Sanctuary (CBNMS). The list was obtained by comparing lists of species within and around sanctuary waters to lists of known invaders within California, Bodega Harbor, Tomales Bay, and Elkhorn Slough. The list should therefore be regarded as conservative, including some species that may not yet be within Sanctuary waters per se, but given their geographic proximity, have a high probability of invading in the near future. Some of these species (e.g. *Ficopomatus enigmaticus*), may therefore qualify for the so-called “dirty-dozen” status based on impacts in other habitats despite not being found within Sanctuary waters. The sources used and their abbreviations are noted in column “Listing Sources(s).”

- cb Current species list for CBNMS as provided by Dan Howard (2002)
- nma Current species list for the Northern Management Area (2002)
- bird Species list from the Bird Rock Area of Special Biological Significance (ASBS) Report
- nas The USGS Nonindigenous Aquatic Species listing for California, found at <http://nas.er.usgs.gov>
- bth List of species identified during the all taxa biological inventory by Leslie Harris
- gf Current species list for GFNMS as provided by Jan Roletto (2002)
- bod Listing of introduced species in Bodega Harbor by Jim Carlton
- neers Listing of introduced species within the Elkhorn Slough National Estuarine Research Reserve System (NERRS) site
- cdfg California Department of Fish and Game’s (CDFG) Nonindigenous Aquatic Species list
- amer Species list from the Estero Americano and Estero de San Antonion ASBS report (1977)
- fitz Species list from the Fitzgerald Reserve ASBS report (1979)
- elk Updated list of invasive species in and around the Elkhorn Slough NERRS site provided by Kirsten Wasson
- bth CDFG’s amended list of introduced species in Bodega Bay and Tomales Bay

\* Entries marked with a \* indicate that while the species may not have been included in a given list, there was an entry for the genus listed as a “sp.”. Entries who only have starred listing sources should be viewed with caution.

## INTRODUCED SPECIES

### Algae

CLASSIFICATION & COMMON NAME	SCIENTIFIC NAME	Synonyms	Listing Source(s)	Invasive Status Source(s)
	<i>Aglaothamnion cordatum</i>		btc	btc
Dead Man's Fingers	<i>Codium fragile tomentosoides</i>	btc	btc, cdfg	
	<i>Gelidium vagum</i>	<i>Gelidium sp.</i>	btc, nma*	btc, cdfg
Red Siphonweed	<i>Polysiphonia denudata</i>	<i>Polysiphonia sp.</i>	nma*	cdfg
British Wireweed	<i>Sargassum muticum</i>		nma, elk	elk, cdfg
Wakame	<i>Undaria pinnatifida</i>		elk	elk, cdfg

### Marsh Plants

CLASSIFICATION & COMMON NAME	SCIENTIFIC NAME	Synonyms	Listing Source(s)	Invasive Status Source(s)
Brassbuttons	<i>Cotula coronopifolia</i>		bod	bod
European Sea Rocket	<i>Cakile maritima</i>		bod	bod
Russian Thistle	<i>Salsola soda</i>		bod	cdfg, bod

### Sponges

CLASSIFICATION & COMMON NAME	SCIENTIFIC NAME	Synonyms	Listing Source(s)	Invasive Status Source(s)
	<i>Cliona celata</i>	<i>Cliona sp.</i>	neers, nma, elk, bird*	neers, elk, neers*
	<i>Cliona lobata</i>	<i>Cliona sp.</i>	neers	neers
	<i>Halichondria bowerbanki</i>	<i>Halichondria panicea</i> , <i>Halichondria coalita</i> , <i>Halichondria sp.</i>	btc, bird, neers, elk, cb*, nma*	btc, cdfg, neers, elk
	<i>Haliclona loosanoffi</i>	<i>Haliclona sp.</i>	neers, elk, bod, bird*, gf*, nma*	cdfg, neers, elk, bod, nas*
	<i>Hymeniacidon sinapium</i>	<i>Hymeniacidon sp.</i>	neers, elk, bird*	neers, elk, cdfg*
	<i>Prosuberites sp.</i>		bird	cdfg

### Cnidarians

CLASSIFICATION & COMMON NAME	SCIENTIFIC NAME	Synonyms	Listing Source(s)	Invasive Status Source(s)
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**Appendix III G: Introduced species  
GFNMS Management Plan**

	<i>Amphinema sp.</i>		bod	bod
Moon Jelly	<i>Aurelia aurita</i>	<i>Aurelia dubia</i> , <i>Aurelia</i> <i>flavidula</i>	gf, nma	cdfg
	<i>Cordylophora caspia</i>		neers, elk	cdfg, neers, elk
San Francisco Anemone	<i>Diadumene franciscana</i>		btc, neers, elk	btc, cdfg, neers, elk
White Anemone	<i>Diadumene leucolena</i>	<i>Cylista leucolena</i>	neers, elk	cdfg, neers, elk
	<i>Haliplanella lineata</i>	<i>Diadumene lineata</i>	bod, neers, elk	cdfg, bod, neers, elk
Doubletoothed Hydroid	<i>Obelia bidentata</i>	<i>Obelia sp.</i>	bird*, gf*, nma*	cdfg, nas
Sea Thread Hydroid	<i>Obelia dichotoma</i>	<i>Obelia sp.</i>	bod, bird*, gf*, nma*	nas, cdfg, bod
Clapper Hydromedusa	<i>Sarsia tubulosa</i>	<i>Oceania tubulosa</i>	neers	cdfg, neers
	<i>Tubularia crocea</i>	<i>Ectopleura crocea</i>	amer, gf, nma, neers, elk	cdfg, neers, elk

**Platyhelminthes**

CLASSIFICATION & COMMON NAME	SCIENTIFIC NAME	Synonyms	Listing Source(s)	Invasive Status Source(s)
	<i>Cercaria batillariae</i>		neers, elk	cdfg, neers, elk
<b>Annelids</b>				
	<i>Apoprionospio pygmaea</i>		btc	btc
Bristleworm	<i>Capitella capitata</i> Complex	<i>Capitella sp.</i>	btc, tmh*	btc,
	<i>Ctenodrilus serratus</i>	<i>Parthenope serratus</i>	btc	btc
	<i>Dipolydora socialis</i>		btc, tmh	btc
	<i>Euchone limnicola</i>		btc, tmh	btc
	<i>Exogone lourei</i>		btc, tmh	btc
Tube Worm	<i>Ficopomatus enigmaticus</i>	<i>Mercierella enigmatica</i>	neers, elk	cdfg, neers, elk
polychate	<i>Glycera americana</i>		btc	btc
polychate	<i>Harmothoe imbricata</i>	<i>Aphrodita imbricata</i>	btc, bird	btc
polychate	<i>Heteromastus filiformis</i>		neers, elk	cdfg, neers, elk
polychate	<i>Mediomastus ambiseta</i>		btc	btc
polychate	<i>Neanthes succinea</i>	<i>Nereis succinea</i> , <i>Nereis limbata</i>	btc	btc, cdfg
polychate	<i>Notomastus hemipodus</i>		btc	btc
polychate	<i>Platynereis bicanaliculata</i>		btc, bird, nma	btc
spionid	<i>Polydora amarincola</i>	<i>Polydora sp.</i>	bird*, amer*	cdfg
Mud Worm	<i>Polydora cornuta</i>	<i>Polydora sp.</i>	bod, bird*, amer*	nas, cdfg, bod
Mud Worm	<i>Polydora ligni</i>	<i>Polydora sp.</i>	neers, elk, bird*, amer*	cdfg, neers, elk

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spionid	<i>Pseudopolydora kemp</i>		btc, bod, tmh	btc, cdfg, bod,
spionid	<i>Pseudopolydora paucibranchiata</i>	btc, neers, elk, bod	btc, cdfg, neers, elk, bod	
spionid	<i>Streblospio benedicti</i>		btc, amer, neers, elk, bod, tmh	btc, cdfg, neers, elk, bod,

**Crustaceans**

CLASSIFICATION & COMMON NAME	SCIENTIFIC NAME	Synonyms	Listing Source(s)	Invasive Status Source(s)
	<i>Ampelisca abdita</i>		btc	btc, cdfg
	<i>Ampelisca agassizi</i>	<i>Ampelisca compressa</i> , <i>Ampelisca vera</i>	btc	btc
	<i>Ampithoe lacertosa</i>	<i>Ampithoe sp.</i>	btc, bird*	btc
	<i>Ampithoe valida</i>	<i>Ampithoe sp.</i>	neers, elk, bod, tmh, bird*	cdfg, neers, elk, bod, nas
	<i>Caprella acanthogaster</i>		btc	btc, cdfg
	<i>Caprella californica</i>		btc, gf, nma	btc
Skeleton Shrimp	<i>Caprella mutica</i>		btc, neers	btc, cdfg, neers
	<i>Corophium acherusicum</i>		elk, bod	cdfg, elk, bod
	<i>Corophium alienense</i>		btc, bod	btc, cdfg, bod
	<i>Corophium insidiosum</i>		btc, elk, bod	btc, cdfg, elk, bod
	<i>Corophium uenoi</i>		elk	cdfg, elk
	<i>Erichthonius brasiliensis</i>		btc	btc, cdfg
	<i>Grandidierella japonica</i>		btc, neers, elk	btc, cdfg, neers, elk
	<i>Jassa carltoni</i>		btc	btc
	<i>Jassa marmorata</i>		btc, neers, elk, bod	btc, cdfg, neers, elk, bod
	<i>Jassa slatteryi</i>		btc	btc
	<i>Leucothoe alata</i>		btc	btc, cdfg
	<i>Melita nitida</i>		neers, elk	cdfg, neers, elk
	<i>Monocorophium acherusicum</i>	btc, neers	btc, cdfg, neers	
	<i>Monocorophium insidiosum</i>		neers	neers
	<i>Monocorophium uenoi</i>		neers	neers
	<i>Parapleustes derzhavini</i>		btc, neers, elk	btc, cdfg, neers, elk
	<i>Sinocorophium alienense</i>		btc	btc, cdfg
	<i>Sinocorophium heteroceratum</i>	btc	btc, cdfg	
	<i>Iais californica</i>		neers, elk, bod, tmh	cdfg, neers, elk, bod,
	<i>Ianiropsis tridens</i>		btc	btc, cdfg
	<i>Laticorophium baconi</i>		btc, tmh	btc
	<i>Limnoria quadripunctata</i>		neers	cdfg, neers
	<i>Limnoria tripunctata</i>		bod	cdfg, bod
	<i>Paranthura elegans</i>		btc, nma, tmh	btc, cdfg

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Sphaeromatid Isopod	<i>Sphaeroma quoyanum</i>		btc, neers, elk	btc, cdfg, neers, elk
mysid	<i>Acanthomysis aspera</i>	<i>Acanthomysis sp.</i>	gf*, nma*	cdfg, nas
mysid	<i>Acanthomysis bowmani</i>	<i>Acanthomysis sp.</i>	gf*, nma*	cdfg, nas
barnacle	<i>Balanus amphitrite</i>	<i>Balanus sp.</i>	nma, nma*	cdfg, cdfg
barnacle	<i>Balanus improvisus</i>	<i>Balanus sp.</i>	neers, elk, nma*	cdfg, neers, elk, nas
Green Crab	<i>Carcinus maenas</i>	<i>Carcinides maenas</i>	btc, neers, bod	btc, cdfg, neers, bod
cumacean	<i>Cumella vulgaris</i>		btc	btc
tanaid	<i>Leptochelia dubia</i>	<i>Leptochelia affinis,</i> <i>Leptochelia algicola,</i> <i>Leptochelia corsica,</i> <i>Leptochelia durbanensis,</i> <i>Leptochelia edwardsii,</i> <i>Leptochelia incerta ,</i> <i>Leptochelia lifuensis ,</i> <i>Leptochelia neapolitana ,</i> <i>Leptochelia savignyi ,</i> <i>Paratanais algicola ,</i> <i>Paratanais edwardsii ,</i> <i>Paratanais kroyerii ,</i> <i>Paratanais savignyi ,</i> <i>Tanaiomera columbina ,</i> <i>Tanais dubius ,</i> <i>Tanais durbanensis ,</i> <i>Tanais edwardsi ,</i> <i>Tanais filum</i>	btc	btc
Red Worm (copepod)	<i>Mytilicola orientalis</i>		neers, elk	cdfg, neers, elk
Asian cumacean	<i>Nippoleucon hinumensis</i>		btc	btc, cdfg
Korean Shrimp	<i>Palaemon macrodactylus</i>		neers	cdfg, neers
copepod	<i>Pseudodiaptomus marinus</i>		btc	btc, cdfg
tanaid	<i>Sinelobus sp.</i>		neers, elk	cdfg, neers, elk

**Molluscs**

CLASSIFICATION & COMMON NAME	SCIENTIFIC NAME	Synonyms	Listing Source(s)	Invasive Status Source(s)
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Pacific Giant Oyster	<i>Crassostrea gigas</i>		gf, nma	cdfg
Amethyst Gemclam	<i>Gemma gemma</i>		btc, neers, bod	btc, cdfg, neers, bod
Blacktip Shipworm	<i>Lyrodus pedicellatus</i>		neers, elk	cdfg, neers, elk
Baltic Macoma	<i>Macoma balthica</i>		bod	cdfg, bod
Northern Quahog	<i>Mercenaria mercenaria</i>	<i>Venus mercenaria</i>	btc	btc, cdfg
Green Mussel	<i>Musculista senhousia</i>		btc, neers, bod	btc, cdfg, neers, bod
Softshell Clam	<i>Mya arenaria</i>		btc, amer, neers, bod	btc, cdfg, neers, bod
Mediterranean mussel	<i>Mytilus galloprovincialis</i>		neers, elk, bod	cdfg, neers, elk, bod
Mahogany Clam	<i>Nuttallia nutallia</i>		elk	elk
Purple-Mahogany Clam	<i>Nuttallia obscurata</i>		neers	neers
Edible oyster	<i>Ostrea edulis</i>		btc	btc, cdfg
Olympia Oyster	<i>Ostrea lurida</i>		gf, nma	cdfg
Wing Oyster	<i>Pteria sterna</i>		btc	btc, cdfg
Asian semele	<i>Theora lubrica</i>		btc	btc, cdfg
Japanese Littleneck Clam	<i>Venerupis philippinarum</i>		btc, neers, bod	btc, cdfg, neers, bod
Japanese False Cerith	<i>Batillaria attramentaria</i>		btc, gf, neers, nma, elk	btc, cdfg, neers, elk
Japanese oyster drill	<i>Ceratostoma inornatum</i>		btc	btc, cdfg
European Melampus	<i>Myosotella myosotis</i>		neers, elk, bod	cdfg, neers, elk, bod
Eastern Mud Snail	<i>Nassarius obsoletus</i>	<i>Ilyanassa obsoleta</i> , <i>Nassa obsoleta</i>	btc	btc, cdfg
Flat Okenia	<i>Okenia plana</i>		neers, elk	cdfg, neers, elk
nudibranch	<i>Philine auriformis</i>		btc, neers, bod	btc, cdfg, neers, bod
nudibranch	<i>Philine orientalis</i>		bod	bod
Miniature Aeolis	<i>Tenellia adspersa</i>	<i>Embletonia pallida</i>	neers, elk	cdfg, neers, elk
Atlantic Oyster Drill	<i>Urosalpinx cinerea</i>		btc, neers	btc, cdfg, neers

**Bryozoans**

CLASSIFICATION & COMMON NAME	SCIENTIFIC NAME	Synonyms	Listing Source(s)	Invasive Status Source(s)
	<i>Alcyonidium gelatinosum</i>		btc	btc, cdfg
	<i>Alcyonidium parasiticum</i>		btc	btc
	<i>Alcyonidium polyoum</i>		btc	btc, cdfg
	<i>Amathia vidovici</i>		neers, elk	cdfg, neers, elk
	<i>Barentsia benedeni</i>		gf, neers, nma, elk	cdfg, neers, elk

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	<i>Bowerbankia gracilis</i>		btc, neers, elk, bod	btc, cdfg, neers, elk, bod
	<i>Bugula neritina</i>		btc, bird, neers, elk, bod	btc, cdfg, neers, elk, bod
	<i>Bugula stolonifera</i>		neers, elk	cdfg, neers, elk
	<i>Conopeum tenuissimum</i>		neers, elk	cdfg, neers, elk
	<i>Cryptosula pallasiana</i>		btc, neers, elk, bod	btc, cdfg, neers, elk, bod
Single Horn Bryozoan	<i>Schizoporella unicornis</i>	<i>Lepralia unicornis</i>	btc, neers, elk, bod	btc, cdfg, neers, elk, bod
	<i>Victorella pavida</i>		btc	btc, cdfg
	<i>Watersipora subtorquata</i>		btc, neers, elk, bod	btc, cdfg, neers, elk, bod

**Chordates**

CLASSIFICATION & COMMON NAME	SCIENTTIFIC NAME	Synonyms	Listing Source(s)	Invasive Status Source(s)
tunicate	<i>Ascidia zara</i>		btc	btc, nas, cdfg
tunicate	<i>Botrylloides perspicuum</i>		btc	btc, nas, cdfg
tunicate	<i>Botrylloides violaceus</i>		btc, neers, elk, bod	btc, nas, neers, elk, bod
tunicate	<i>Botryllus schlosseri</i>		btc, gf, bod	btc, cdfg, bod
tunicate	<i>Ciona intestinalis</i>	<i>Ascidia intestinalis</i>	btc, gf	btc, cdfg
tunicate	<i>Ciona savignyi</i>		btc	btc, nas, cdfg
tunicate	<i>Didemnum lahillei</i>	<i>Didemnum vexillum</i>	--	nas
tunicate	<i>Diplosoma listerianum</i>		btc	btc, cdfg
tunicate	<i>Molgula manhattensis</i>	<i>Ascidia manhattensis</i> , <i>Gymnocystis manhattensis</i>	btc, neers, elk	btc, cdfg, neers, elk
tunicate	<i>Polyandrocarpa zorritensis</i>		btc	btc, cdfg
tunicate	<i>Styela clava</i>		btc, neers, elk	btc, cdfg, neers, elk
Yellowfin goby	<i>Acanthogobius flavimanus</i>		gf, nma, elk	cdfg, elk
Atlantic Shad	<i>Alosa sapidissima</i>		gf, nma, elk	cdfg, elk
European Carp	<i>Cyprinus carpio</i>		amer	cdfg
Mosquitofish	<i>Gambusia affinis</i>	<i>Gambusia patruelis</i>	elk, amer	cdfg, elk
Rainwater Killifish	<i>Lucania parva</i>		amer	cdfg
Striped Bass	<i>Morone saxatilis</i>	<i>Roccus saxatilis</i>	gf, nma, elk	cdfg, elk
North American Bullfrog	<i>Rana catesbeiana</i>		amer	cdfg

**Chordates**

CLASSIFICATION & COMMON NAME	SCIENTTIFIC NAME	Synonyms	Listing Source(s)	Invasive Status
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NAME				Source(s)
ciliate	<i>Prionospio pygmaea</i>	<i>Ancistrocoma pelseneeri</i>	btc	btc, cdfg
foraminifera	<i>Trochammina hadai</i>		bod	cdfg, bod