GULF OF THE FARALLONES

NATIONAL MARINE SANCTUARIES

STATE OF THE SANCTUARY REPORT

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NATIONAL MARINE SANCTUARIES™

GULF OF THE FARALLONES

The National Marine Sanctuary Program

The National Marine Sanctuary Program, a network of 13 marine protected areas, encompasses marine and freshwater resources from Washington State to the Florida Keys and from Lake Huron to the Gulf of Mexico, American Samoa, and places in between. The National Oceanic and Atmospheric Administration's National Ocean Service has managed marine sanctuaries since the passage of the Marine Protection, Research, and Sanctuaries Act of 1972. Title III of that Act is now called the National Marine Sanctuaries Act.

Today, our marine sanctuaries contain deep ocean gardens, near-shore coral reefs, whale migration corridors, deep-sea canyons, and underwater archaeological sites. They range in size from one-quarter square mile in Fagatele Bay, American Samoa, to more than 5,300 square miles off Monterey Bay, California — one of the largest marine protected areas in the world. Together, these sanctuaries protect nearly 18,000 square miles of coastal and open ocean waters and habitats. While some activities are managed to protect resources, certain multiple uses, such as recreation, commercial fishing, and shipping, are allowed to the extent that they are consistent with a sanctuary's resource protection mandates. Research, education, and outreach activities are other major components in each sanctuary's program of resource protection.

The National Marine Sanctuary Program is a world leader in effective management, placing a primary emphasis on the protection of living marine resources and our nation's submerged cultural resources.

National Oceanic and Atmospheric Administration

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Front Cover: Nudibranchs inhabit the subtidal areas of the Sanctuary and are found in a variety of shapes and colors. This shell-less snail is about 2 inches in length. Photographer: GFNMS Library

Back Cover: Sunset over the Sanctuary from the Farallon Islands. Photographer: Kip Evans

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The Gulf of the Farallones National Marine Sanctuary

The Gulf of the Farallones National Marine Sanctuary protects an area of 948 square nautical miles (1,255 square miles) off the northern and central California coast. Located just a few miles from San Francisco, the waters within the Gulf of the Farallones National Marine Sanctuary are part of a nationally significant marine ecosystem. Encompassing a variety of highly productive marine habitats, the Sanctuary supports an abundance of species. The Sanctuary contains nursery and spawning grounds for commercially valuable fish and shellfish. At least 36 species of marine mammals have been observed, and 54 species of birds use the Sanctuary during breeding. Twenty-five endangered and threatened species live within its borders. The Sanctuary is a destination feeding ground for endangered blue and humpback whales, and is the breeding area for over one-fifth of California's harbor seals. The Farallon Islands are home to the largest concentration of breeding seabirds in the contiguous United States. Since its designation in 1981, the Sanctuary has provided educational and stewardship opportunities, reduced wildlife disturbances, and protected marine resources.

"An ocean wilderness beyond the Golden Gate"

GULF OF THE FARALLONES
NATIONAL MARINE SANCTUARY
20th ANNIVERSARY

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Contents

p. 1
- The National Marine Sanctuary Program

p. 2
- Gulf of the Farallones National Marine Sanctuary

p. 3
- Executive Summary

p. 4
- About this document
- Management Plan Review
- How To Get Involved

p. 5
- Background

p. 7
- Sanctuary Management Activities and Operations
- Implementation Success for Management Plan

p. 10
- Accomplishments and Current Issues

p. 14
- Jurisdictions and Management Responsibilities

p. 16
- Emerging Issues and Opportunities

p. 17
- Sanctuary Resources

p. 22
- The Future of the Sanctuary

p. 23
- Appendix: Federally listed species

Sanctuary Volunteers

Last year, 247 volunteers contributed more than 30,000 hours to Sanctuary programs. This included research and monitoring programs such as SEALS, High School Intertidal Monitoring, and Beach Watch, as well as education programs and staffing the Sanctuary Visitor Center. Without the support of volunteers, the Sanctuary would be unable to continue many of these programs. In contributing their skills and time, volunteers provided the Sanctuary with approximately $600,000 in services.

Volunteers are essential to helping protect the Sanctuary. Photographer: Jan Roletto

Executive Summary

As we celebrate the 20th Anniversary of the Gulf of the Farallones National Marine Sanctuary, we look forward to involving the community in the Management Plan Review. During the past two decades, we have accomplished many of the Sanctuary's objectives in the areas of research, education, and resource protection. The Sanctuary's ecosystem is recognized internationally, by the United Nations Man in the Biosphere program, as a major part of the Golden Gate Biosphere Reserve. Bolinas Lagoon is the only designated Wetland of International Importance (Ramsar Site) in California, Oregon, and Washington. Tomales Bay is the only wetland in the same area currently proposed for Ramsar designation.

Altogether, the Gulf of the Farallones National Marine Sanctuary office manages several marine sanctuaries, and is the only office to do so in the National Marine Sanctuary Program. It manages the Gulf of the Farallones and Cordell Bank National Marine Sanctuaries, and shares certain management responsibilities for the northern portion (north of Santa Cruz County) of the Monterey Bay National Marine Sanctuary.

The Sanctuary has been a leader in the protection of its living resources through citizen involvement. The Sanctuary established one of the National Oceanic and Atmospheric Administration's (NOAA) first volunteer-based monitoring programs, Beach Watch and SEALS. Beach Watch monitors almost 125 miles of beach, from Año Nuevo in San Mateo County, north to Bodega Head in Sonoma County, with more than 100 highly trained beach surveyors. These surveyors are an integral part of the Bay Area Oil Spill Contingency Plan.

The SEALS program set the standard for success in protecting harbor seals. The program has resulted in the successful protection of seal pups in Tomales Bay. SEALS bridged the gap between resource use and resource protection. Pupping success has been achieved through partnerships and public education, not through the cessation of activities or regulatory intervention.

A preeminent accomplishment was the establishment of the nonprofit Farallones Marine Sanctuary Association. The Association has garnered support, recognition, and awards for its highly successful work with SEALS, Beach Watch, marine education, community outreach, and student habitat-monitoring programs. Each year, the Association has contributed services equal to or exceeding the federal funding allocated to the Sanctuary.

The Gulf of the Farallones National Marine Sanctuary looks forward to even greater cooperation with its partnership organizations and the citizens of the San Francisco Bay Area.

About This Document

The *State of the Sanctuary* document is an overview on the current status of the Sanctuary to use as a basis for revising the management plan. This document discusses the ecosystem of the Gulf of the Farallones National Marine Sanctuary, management activities and issues, and accomplishments since its designation in 1981.

Management Plan Review

Management plans are sanctuary-specific planning and management documents required by law for all National Marine Sanctuaries. These plans describe regulations, boundaries, resource protection, research, and education programs to guide future management activities. They specify how sanctuaries can continue to conserve, protect, and enhance their nationally significant living and cultural resources.

The Gulf of the Farallones National Marine Sanctuary management plan dates back to 1987. Since then significant scientific discoveries and resource issues have emerged. Using a community-based process that will provide numerous opportunities for public input, the Sanctuary will determine whether current issues and threats to the resources are the same as when the initial management plan was developed and whether the management put in place at that time is protecting current sanctuary resources. The review will also evaluate management strategies, regulations, and boundaries. Ultimately, this review ensures that the Gulf of the Farallones National Marine Sanctuary will better protect, conserve, and enhance its marine resources for current and future generations.

How To Get Involved

Public participation is vital to the management plan review. This is a chance to provide input regarding the future of the Gulf of Farallones National Marine Sanctuary. The management plan review will begin with a series of scoping meetings in late 2001 and early 2002. These meetings will identify the issues to be addressed in the updated plan.

A Draft Management Plan and Draft Environmental Impact Statement will be developed, and additional public comment will be solicited. Public meetings will be advertised through various media outlets, including local papers and the Sanctuary Web page. To get on the mailing list, write:

The Sanctuary educates the public about the marine environment through outreach events such as community fairs and festivals.
Photographer: Karina Racz

Public Input Opportunities

- **Public Scoping meetings**
- **Sanctuary Advisory Council meetings**
- **Public Workshops**
- **Draft Management Plan hearings**

Visit the Sanctuary

There are many ways to get out and see the Sanctuary. Visitors walk its shores, kayak its bays, fish and swim its waters, and enjoy its wide vistas. Additionally, the visitor centers provide opportunities to learn about and observe this beautiful marine environment. The Crissy Field Visitor Center is located at the Sanctuary office in the Golden Gate National Recreation Area in San Francisco and is a cooperative effort with the Farallones Marine Sanctuary Association. In Pacifica, the Sanctuary has a cooperative visitor center with the National Park Service, Golden Gate National Parks Association, Pacifica Chamber of Commerce, and Farallones Marine Sanctuary Association.

The office and main visitor center for the Sanctuary are located at Crissy Field in San Francisco. Photographer: P. Wong

Gulf of Farallones National Marine Sanctuary, Fort Mason, Building 201, San Francisco, CA 94123. The Sanctuary can also be contacted by calling the office at (415) 561-6622 or by e-mail: farallones@noaa.gov

Background

Purpose

National marine sanctuaries are special places and have been established for their natural and/or cultural significance. One of the richest and most diverse marine environments in the world, The Gulf of the Farallones National Marine Sanctuary was established due to its unique biological, geological, oceanographic, and cultural resources.

Designation

The Sanctuary was designated in 1981, in response to public concerns about oil drilling in the Gulf. Local environmentalists and researchers were concerned about the threat of major oil spills polluting the waters and damaging the resources around the Farallon Islands and Point Reyes, which are home and migratory feeding grounds to more than 500,000 seabirds and thousands of marine mammals. The Sanctuary was originally designated as the Farallon Islands-Point Reyes National Marine Sanctuary, and later changed its name to Gulf of the Farallones National Marine Sanctuary to reflect the body of water it protects.

Regional Context: The San Francisco Bay Area

The Sanctuary is influenced by the San Francisco Bay metropolitan area, home to more than 8 million people. Located near some of California's most urbanized areas, the Sanctuary has experienced an increase in the number of users and demands on its resources. The Sanctuary also lies within one of the nation's busiest shipping corridors. Existing land use policies, including the California Coastal Act call for limited development in Sonoma and Marin Counties. Because the Sanctuary is large and includes adjacent rural and urban areas, management must be responsive and equipped to deal with a broad range of concerns.

Sanctuary Uses

A wide variety of uses occur within the Sanctuary due to its proximity to major urban and rural areas. Major uses include recreation, commercial fishing, mariculture, shipping, research, and military operations.

Numerous recreational activities occur within the Sanctuary's waters and along its 100 miles of shoreline. 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. Access for private and chartered recreational vessels destined for the Sanctuary are found at marinas in San Francisco Bay, Bodega Harbor, Tomales Bay, and Half Moon Bay.

Sportfishing 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, and oceanic birding excursions account for several thousands of visitors venturing offshore. The major onshore recreational uses include beach-related activities, bird watching, coastal hiking, wildlife viewing, tidepooling, surfing, kayaking, canoeing, boardsailing, clamming, abalone diving, surf fishing, and duck hunting. On some weekend days, more than 1,000 clam diggers harvest gaper, Washington, and littleneck clams.

The most important commercial harvests include Pacific herring, salmon, rockfish, flatfish, albacore tuna, and Dungeness crab. 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 raise oysters.

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 4,881 arrivals in calendar year 2000. This represents an average of over three tankers and ten other types of vessels per day.

In addition to the programs initiated and directed by the Sanctuary, several governments and nongovernmental organizations have ongoing marine research programs in the area. The Sanctuary collaborates with these and other institutions on conducting research to help characterize the resources of the Sanctuary, and to help understand natural and human factors responsible for causing changes in the marine environment.

The U.S. Navy and the U.S. Coast Guard regularly use the Gulf of the Farallones for operations. The U.S. Navy's Third Fleet conducts surface, air, and submarine maneuvers. The U.S. Coast Guard flies

A fishing boat in Tomales Bay during herring season. Photogrpaher: R. Allen

Kayaking the calm waters of the esteros.
Photographer: Maria Brown

Sanctuary Partners

Education and Research Institutions

California Academy of Sciences
College of Marin
San Francisco State University
Stanford University
University of California

Federal Agencies

U.S. Environmental Protection Agency
U.S. National Park Service
U.S. Army Corps of Engineers
U.S. Coast Guard
U.S. Fish and Wildlife Service
U.S. Geological Survey

Local and State Agencies

Bodega Harbor District
California Coastal Commission
California Coastal Conservancy
California Department of Fish and Game
California Department of Parks and Recreation
California State Lands Commission
Marin County Department of Parks, Open Space and Cultural Services
Pillar Point Harbor District
Regional Water Quality Control Boards
San Francisco Bay Conservation And Development Commission
San Francisco Recreation and Parks
San Mateo County Parks and Recreation Division

maintenance personnel by helicopter to the lighthouse on Southeast Farallon Island for periodic servicing. They also conduct regular helicopter flights within the Sanctuary for enforcement and search-and-rescue missions.

Sanctuary Management Activities and Operations

The primary role of the Gulf of the Farallones National Marine Sanctuary is to protect the ecosystem's natural resources and cultural artifacts while allowing people to use and enjoy the ocean. The Sanctuary's habitats, wildlife, and cultural artifacts are protected through regulations, monitoring programs, and public education about the marine environment.

Since 1990, the Sanctuary has grown from a staff of one and a budget of just under $300,000 to a current staff of four and a budget of $975,000. To expand the Sanctuary's network of awareness and stewardship, solid partnerships have been developed with a number of federal, state, and local agencies and organizations. Cooperative activities include research, monitoring, education, outreach, and enforcement.

The main Sanctuary headquarters and main visitor center are located at Crissy Field in the Golden Gate National Recreation Area adjacent to the Presidio of San Francisco. This location provides access to the region's government agencies, private organizations, and the public.

Until 1998, the Gulf of the Farallones National Marine Sanctuary office managed the Gulf of the Farallones, Cordell Bank and the northern portion of Monterey Bay (Santa Cruz County north) National Marine Sanctuaries. Since then, most of the management duties for this region were shifted back to the Monterey Bay National Marine Sanctuary, but certain management responsibilites are still cooperatively managed between the Gulf of the Farallones and Monterey Bay National Marine Sanctuary offices.

Implementation Success for Management Plan

Since the Management Plan for the Sanctuary was developed in 1987, a significant number of issues have been addressed. Specific actions from the Management Plan are listed in the following table along with the tools used in their implementation.

Resource Protection

Actions	Implementation
Identify resources at risk	Ecosystem Dynamics Study Radioactive Waste Site Evaluation Rocky Intertidal Monitoring Programs SEALS, Beach Watch
Emergency response and contingency planning	Beach Watch Emergency Response Plan
Initiate assessment of capability	Area Contingency Plan
Monitor oiling incidence	Beach Watch
Enforce regulations and assess discharge violation patterns	Enforcement actions Permit process
Provide technical advice on gill netting impacts	Provided advice to National Marine Fisheries Service
Monitor use impact on invertebrates and harbor seals	Rocky Intertidal Monitoring Programs SEALS
Disseminate information on human disturbance	Rocky Intertidal Monitoring Programs SEALS Watchable Wildlife program
Review coastal and offshore development proposals	Permits Project evaluation EIR/EIS/EA review
Develop interagency network to maximize use of the Sanctuary as a site for management-oriented research and monitoring	See “Sanctuary Partners” sidebar (top right) Biennial Research Workshop
Collect and organize all existing data and studies relevant to Sanctuary resources and prepare data atlas	Data and document library U.S. Geological Survey publishing atlas GIS data set

Sanctuary Partners

Nongovernmental Organizations

Americorps
Audubon Canyon Ranch
Coastal America
Farallones Marine Sanctuary Association
Marin Agricultural Land Trust
Ocean Conservancy
Oceanic Society
Oiled Wildlife Care Network
Pacific Coast Federated Fishermen’s Associations
Pacifica Chamber of Commerce
PRBO (Point Reyes Bird Observatory)
Save Our Shores
Sonoma Land Trust
The Marine Mammal Center

A tidepooling walk introduces visitors to the diversity of marine life found along the shores of the Sanctuary. Photographer: Maria Brown

Regulations

To protect its natural wonders, activities that could harm the health of the Sanctuary are prohibited. Uses compatible with the goals of resource protection are allowed, but may be regulated. The following activities are prohibited within the Sanctuary:

1. Oil and gas exploration and development.
2. Discharging or depositing any materials (with the exception of fish or fish chumming materials; water and other biodegradable effluents incidental to vessel use generated by marine sanitation devices, routine vessel maintenance, engine exhaust, and dredge materials at an established dredge site).
3. Dredging, drilling, constructing or altering the seabed (with the exception of anchoring, bottom trawling from a commercial fishing vessel, installing navigation aids, mariculture, and the construction of docks and piers in Tomales Bay).
4. Oil tankers, barges, and other cargo vessels are prohibited within two nautical miles of the Farallon Islands, Bolinas Lagoon, and Areas of Special Biological Significance (ASBS) (with the exception of fishing, recreational, and enforcement vessels).
5. Disturbing seabirds or marine mammals by flying motorized aircraft at less than 1,000 over the waters within one nautical mile of the Farallon Islands, Bolinas Lagoon, or any ASBS.
6. Removing or damaging historical or cultural resources.
7. Operation of motorized personal watercraft

This is a summary of the activities prohibited by the National Marine Sanctuary Program regulations and is intended for easy reference only. The summary does not include all exemptions or other activities regulated within the Sanctuary under other local, state, or federal authorities. The full text of the regulations is published at 15 CFR Part 922.

Research and Monitoring

Actions	Implementation
Assess adequacy of baseline for management	Ecosystem Dynamics Study Rocky Intertidal Monitoring SEALS, Beach Watch
Support scientific investigations that address baseline gaps for cetaceans, fish, intertidal invertebrates, seabirds, marine mammals	Marine Mammal Population Assessment Ecosystem Dynamics Study Rocky Intertidal Monitoring SEALS, Beach Watch Pollutants Assessment Murre Restoration Project
Investigate ecological relationships such as feeding and movement patterns	Beach Watch Ecosystem Dynamics Study
Undertake impact studies	Rocky Intertidal Monitoring Program SEALS, Beach Watch
Establish procedures for emergency research	Manager's Permit

Education

Implement Sanctuary awareness program	Outreach events (fairs, schools) Visitor centers and exhibits
Develop publications	Annual reports Book: Beached Marine Birds and Mammals of the North Pacific West Coast Brochures, newsletters, posters, website
Develop media program	Press releases
Implement educational activities (lecture series)	Annual lecture series School programs Curriculum
Establish a cooperating association	Farallones Marine Sanctuary Association established in 1995

Accomplishments And Current Issues

Several successful programs and partnerships have been developed to address some of the major issues facing the Sanctuary. Following is a summary of accomplishments and current issues as they apply to resource protection, research and monitoring, and outreach and education.

Resource Protection

The highest priority for management is to protect the marine environment and resources within the Sanctuary.

Waste Disposal. The Sanctuary area's proximity to San Francisco Bay made it a convenient location in which to dump dredge spoils. The Sanctuary has worked closely with the Port of Oakland, the U.S. Army Corps of Engineers, and the U.S. Environmental Protection Agency to develop a plan that defines appropriate locations outside of the Sanctuary for the disposal of clean dredge material, since it is prohibited in the Sanctuary. Clean dredge material must be transported beyond the Sanctuary or used to restore wetlands. The California Department of Transportation's (CalTrans) disposal of highway spoils along the Sanctuary shoreline has ceased as a result of Sanctuary efforts.

Sewage Discharges. Sanctuary staff worked for more than 10 years with the City of Santa Rosa to develop alternate uses of sewage. As a result, the City's tertiary treatment system processes discharges that can be used to irrigate agricultural crops, recharges the aquifer for the Geyser electric generating facility, and serves other beneficial municipal uses.

Wildlife Disturbances. Human activities continually pose a threat to the health of Sanctuary wildlife. Typical disturbances are caused by foot traffic (hikers, picnickers, clam diggers, etc.), vessel traffic (including kayaks, and other watercraft), and low-flying aircraft. The Sanctuary has responded to these threats in a variety of ways, including initiating volunteer education and monitoring programs, such as, SEALS and Beach Watch (see sidebars, p. 11 and p. 12), and finalizing regulations that ban personal watercraft.

Teacher Kathy Soave shares her knowledge of the marine environment with her students.
Photographer: P. Wong

The Sanctuary is a destination feeding ground for the endangered blue whale, *Balaenoptera musculus*. Photographer: Dan Shapiro

SEALS (Sanctuary Education, Awareness, and Long-term Stewardship)

In 1997, the Sanctuary and Farallones Marine Sanctuary Association initiated SEALS, a harbor seal monitoring and interpretation program. SEALS is intended to achieve the following goals:

- Minimize disturbance to harbor seals.
- Maintain the integrity of rookery and feeding areas in the Sanctuary.
- Increase stewardship.
- Educate the public about harbor seals, their habitat, and other natural resources.

To achieve these goals, local citizens are trained to interpret and monitor harbor seal behavior in Tomales Bay and Bolinas Lagoon, record human disturbances to the seal population, and educate boaters, clammers and fishermen so as to reduce disturbance to wildlife (see map on p. 22). The Sanctuary now has a better understanding of the factors causing disturbances, and has taken steps to curtail them.

SEALS volunteers monitor a group of harbor seals resting at Bolinas Lagoon.
Photographer: Maria Brown

Habitat Destruction. While oil spills pose the major threat to the sensitive habitats of the Sanctuary, additional sources of potential habitat destruction are also cause for concern. Naturalists, sightseers, school groups, and fishermen regularly visit the rocky shores of the Sanctuary, often trampling the plants and animals. Trampling, bait and food harvesting, and boat groundings can alter species composition, diversity, abundance, and habitat structure. In conjunction with the Farallones Marine Sanctuary Association and Branson High School, the Sanctuary has developed a student intertidal monitoring project to study Duxbury Reef.

Pollutants. In addition to oil spills, the Sanctuary is vulnerable to offshore and land-based pollution, including livestock grazing, agricultural runoff, improperly treated effluent, dumping, and mercury from abandoned mines. These pollutants affect the biological, recreational, economic, and aesthetic resources of the Sanctuary. Sanctuary staff have begun to locate the sources of the impacts, to describe and quantify the impacts, and to plan restoration efforts with the Point Reyes National Seashore, the U.S. Fish and Wildlife Service, and the U.S. Coast Guard.

Sanctuary Management and Coordination. Since designation, the northern portion of the Monterey Bay National Marine Sanctuary has been under some form of co-management with the Gulf of the Farallones National Marine Sanctuary. This remains the case even now. The management plan review for these sanctuaries will explicitly consider this arrangement.

Enforcement Operations. A working group has been established to enforce the regulations of the Sanctuary. It includes the National Marine Fisheries Service, U.S. Fish and Wildlife Service, National Park Service, U.S. Coast Guard, California State Parks and Recreation, California Department of Fish and Game, and California Coastal Commission. NOAA's Office of Enforcement conducts most enforcement operations in the Sanctuary.

Restoration Projects. As a member of five natural resource trustee councils and as a participant in CalTrans mitigation activities, the Sanctuary management remains actively involved in the planning, implementation, and monitoring of a significant number of restoration projects. Completed and current projects include population enhancement for three species of seabirds; land acquisition to protect threatened and endangered species; the removal of toxic fill material from Bolinas Lagoon; and the restoration of a breeding colony of Common Murres at Devil's Slide Rock.

Dredging. Before the establishment of the Sanctuary, dredging was performed on a regular basis at the mouths of the Estero Americano and Estero de San Antonio. This activity is prohibited by Sanctuary regulation, and thus ceased in 1990.

Habitat Protection. To monitor, reduce and restore damage by human impacts to Tomales Bay and other biologically important areas within the Sanctuary, the staff works cooperatively with federal, state and local agencies, landowners, and private organizations.

Bolinas Lagoon Management Plan. To address local concerns that Bolinas Lagoon is filling with silt, the U.S. Army Corps of Engineers has acquired federal funding to prepare a management plan for the Lagoon. The plan is evaluating the feasibility of all remedial activities and is also examining the watershed to identify the causes of sedimentation. The Sanctuary, as part of the project executive team, is working to ensure the protection of Bolinas Lagoon.

Mariculture. Oysters are grown on tracts of tidelands in Tomales Bay leased from the State Lands Commission and regulated by the Department of Fish and Game. Sanctuary resources can be impacted by the mariculture industry from the potential threat of invasive species.

Research and Monitoring

Research and monitoring programs are developed to address specific management problems and to enhance resource protection efforts. The Sanctuary coordinates numerous research projects with its partners. In recent years, investigations initiated as part of the research program have added to the understanding of the Sanctuary. Following are some of the Sanctuary's research projects.

Monitoring Programs. Over the past 20 years, the Sanctuary has supported several seabird and marine mammal monitoring programs. These include the investigation of pollutants in breeding seabirds and Steller sea lions, and surveys of the number and distribution of pinnipeds, harbor porpoises, and humpback, gray, blue, and minke whales. Current projects include an assessment of gray whale populations and causes of mortality, and a study of humpback and blue whale feeding patterns and their relationship to upwelling. Monitoring efforts are also ongoing along the Sanctuary

Beach Watch

Beach Watch, a volunteer-based shoreline monitoring program began, in 1993 (see map on p. 22). The objectives of the program are to:

- Provide baseline information on live and dead beach-cast marine organisms.
- Assist Sanctuary management in the early detection of environmental disturbances, such as El Niño events and oil spills.
- Develop a network of expert shoreline surveyors to respond to an oil spill.
- Educate people about the coastal environment.
- Encourage people to help protect their beaches.

Beach Watch volunteers receive over 80 hours of training on how to survey a beach for live and dead organisms. Photographer: Leslie Grella

Rocky Intertidal Monitoring

The rocky intertidal habitat within the Sanctuary is home to a diverse array of marine life. Threats from human-induced stresses, such as collecting, trampling, and oil spills, can seriously impair these algae and invertebrates communities. In response to these threats, the Sanctuary initiated a long-term rocky intertidal monitoring program on the South Farallon Islands in 1992. The program was later expanded to include the mainland coast, from Bodega Head in Sonoma County to Pigeon Point in San Mateo County. The Sanctuary monitors a total of 12 sites several times a year (see map on p. 22). The project has identified more than 300 intertidal organisms, discovered range extensions, and documented important population trends. In 1998, the first recorded observation was made of a sand-tube building worm – an unexpected warm water species from Southern California in the Farallon Islands.

Sanctuary staff monitor marine invertebrates and algae in the rocky intertidal habitat.
Photographer: GFNMS

shoreline through the Beach Watch and Rocky Intertidal Monitoring programs (see sidebars on this page and on p.14). A new program has begun to investigate shorebird and coastal ecology, and predator-prey interactions in the sandy beach environment of the Sanctuary.

Water Quality Monitoring. Currently, the Sanctuary assists the California State Department of Health with the collection of water samples for harmful algal blooms (HAB) and biotoxin monitoring. The program provides scientific information to the Regional Water Quality Board and the public, to develop management strategies to protect, restore, and enhance water quality within the Sanctuary. Future plans include volunteer monitoring of the condition of Sanctuary waters.

Habitat Characterization. A study has been initiated to survey and describe the different habitats of the Sanctuary. To collect this information, the Sanctuary uses remotely operated vehicles (ROVs), manned submersibles, and deploys oceanographic and acoustic equipment.

Radioactive Waste. From 1946 to 1970, a variety of government agencies and private research institutions were allowed to dump more than 50,000 55-gallon drums containing products with low and special levels of radioactivity. Working with the U.S. Geological Survey, U.S. Navy, and the U.S. Environmental Protection Agency, the Sanctuary has conducted limited exploratory testing of substrates and groundfish in the dump sites.

Outreach and Education

Outreach and education programs are designed to enhance public awareness and understanding of marine natural and cultural resources of the Sanctuary. Education and outreach are essential to achieving many of the Sanctuary's management objectives, and are an important component in promoting the Sanctuary's research and restoration projects.

The Sanctuary, in cooperation with the Farallones Marine Sanctuary Association, sponsors lectures, exhibits, student summits, teacher trainings, events, summer camps, interpretive trips, and education programs. Sanctuary staff frequently make presentations to agencies, organizations, and schools. The Sanctuary and Association also publish posters, brochures, fact sheets, and newsletters.

Facilities - In partnership with the Association, the Sanctuary has established visitor centers in Pacifica and San Francisco. Sanctuary information is also available at Point Reyes National Seashore,

Golden Gate National Recreation Area, and Bodega Marine Laboratory (see map on p. 22). These visitor facilities provide information on Sanctuary activities, resources and management issues, and describe ways in which people can get involved. Currently, the Sanctuary and Association are developing a wet/dry lab for classes to use in studying the marine environment. This will provide an opportunity for hands-on marine science learning.

Curriculum. With support from the Sanctuary, the Association is developing a Coastal Ecosystem curriculum for high school students. Students from around the Bay Area will learn about the marine environment by monitoring rocky intertidal and sandy beach habitats within the Sanctuary.

Multicultural Outreach. Expanding the Sanctuary's education and outreach programs to multicultural populations is a priority. The Sanctuary, with support from the Association, hosts a Sanctuary Explorers Camp for children from culturally diverse and economically disadvantaged backgrounds. This is a cooperative program with the San Francisco Parks and Recreation Department and the California Coastal Commission.

Jurisdictions and Management Responsibilities

The Sanctuary overlaps and borders the jurisdictions of several other agencies. Coordination and cooperation among the responsible agencies have been important. These agencies, and their role in assisting management of the Sanctuary, are described below.

Two other National Marine Sanctuaries share boundaries with the Gulf of the Farallones National Marine Sanctuary. To the north and west is Cordell Bank National Marine Sanctuary; To the south and east is Monterey Bay National Marine Sanctuary.

The National Park Service is a significant collaborator with the Sanctuary. The Golden Gate National Recreation Area (GGNRA) and Point Reyes National Seashore (PRNS) 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. Point Reyes National Seashore represents the largest stretch of shoreline adjacent to the Sanctuary. It includes certain state

Farallones Marine Sanctuary Association

The Farallones Marine Sanctuary Association (FMSA) works collaboratively with the Gulf of the Farallones National Marine Sanctuary to implement various education, interpretation, outreach, and research programs. As a nonprofit organization, the Association was created to increase public appreciation and guardianship of the ocean and to provide a vital link between local citizens and the Sanctuary. For more information on the Association and its programs, visit the web site at www.farallones.org.

FMSA
The Presidio
P.O. Box 29386
San Francisco, CA 94129
(415) 561-6625

The Farallones Marine Sanctuary Association is instrumental in developing Sanctuary exhibits like this one at the visitor center in Pacifica. Photographer: P. Wong

The shores of Drakes Beach. Photographer: Dan Howard

The Farallon Islands are a major breeding area for Western Gulls, *Larus occidentalis*.
Photographer: Jeff Foott

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.

The U.S. Fish and Wildlife Service manages the Farallon National Wildlife Refuge to protect migratory birds, seals, sea lions, sea otters, and other marine mammals. Only those portions of the Islands that are above the mean high-water mark are included in the Refuge. The South Farallon Islands are the largest of the Islands, with an area of 109 acres. The remaining islands in the Farallon chain stretch northwesterly for 11 miles.

Other Federal agencies with management responsibility in the Sanctuary include NOAA's National Marine Fisheries Service (marine fisheries, marine mammals, sea turtles, and habitats), the U.S. Coast Guard (marine safety, oil spill response), and the U.S. Environmental Protection Agency (ocean dumping).

The California Department of Fish and Game (DDFG) is responsible for the management of living marine resources in California, including the three-mile state waters' portion of the Sanctuary. 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. Within these areas, the agency has the authority to prohibit or restrict activities that may harm the 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.

The California State Water Resources Control Board has designated five Areas of Special Biological Significance in and near the waters of the Sanctuary: Bird Rock at Tomales Point, Point Reyes Headlands, Double Point, Duxbury Reef, and the Farallon Islands. These areas are designated to preserve and maintain high water quality in special biological communities by prohibiting discharges of elevated-temperature wastes and point-source sewage of industrial wastes.

Other agencies with management responsibility in the Sanctuary or in coastal areas adjacent to it include the California State Lands Commission, California Department of Parks and Recreation, and the Counties of San Francisco, Marin, and Sonoma. All of these counties have Local Coastal Plans certified by the California Coastal Commission.

Many public and private nonprofit organizations have been actively involved with the establishment of the Sanctuary. These include the Bodega Marine Laboratory, the College of Marin, the Point Reyes Bird Observatory, and the California Academy of Sciences. Local environmental education groups, such as the Ocean Conservancy, Oceanic Society, Farallones Marine Sanctuary Association, and many others, provide assistance in carrying out the Sanctuary's educational programs.

Emerging Issues and Opportunities

New challenges and responsibilities continually present themselves. Following are emerging issues that may impact the Sanctuary.

Invasive Species. San Francisco Bay is considered to be the most invaded aquatic ecosystem in North America, containing more than 200 introduced species. The spread of invasive marine plants and invertebrates is one of the most serious ecological threats facing the Sanctuary. These invaders can be introduced through the dumping of ballast water and aquaria.

Species Range Extensions. Sanctuary staff has documented the extension of the range of protected species of marine mammals and other organisms. These changes could potentially have important impacts on management requirements and monitoring.

Bioprospecting. Inquiries about collecting Sanctuary resources for biochemical analysis are an indication of the current expansion in this field. Active harvesting of sponges, algae, and shark cartilage for medicinal use and research is under way.

Harvesting Impacts. The impacts of equipment and gear associated with different fishing activities in the Sanctuary are not well known. Of special concern are lost gear of all types, and large or heavy gear that is pulled along the ocean floor.

Marine Reserves/Zoning. The California Department of Fish and Game, under the Marine Life Protection Act, is currently developing a plan to restructure existing marine managed areas and establish new areas. The Pacific Fisheries Management Council is directed to determine essential fish habitats as a fishery management tool. Independent of management plan review, Sanctuary staff will coordinate with these agencies. During the Management Plan Review process, the Sanctuary, with input from the community, and working with these other agencies, will look at how well the existing management plan currently protects Sanctuary resources.

Commercial Submerged Cables. Rapid expansion of communication technology has created a sudden demand for installation of cables on the seafloor. To ensure consistency, the National Marine

A white shark, *Carcharodon carcharias*, searches for prey near the Farallon Islands.
Photographer: Howard Hall

Sport fishing is popular in the Sanctuary during salmon season. Phorographer: GFNMS

Stinson Beach shelters Bolinas Lagoon from the Pacific Ocean. Photographer: Dan Howard

The Sanctuary contains one-fifth of California's population of harbor seals, *Phoca vitulina*.
Photoprapher: Jamie Hall

Sanctuary Program is drafting a policy paper addressing cable deployment in Sanctuaries.

Salvage of Cultural Resources. The abundance of shipwrecks in Sanctuary waters suggests that future underwater exploration of these resources is likely. Improving technology, such as sonar, remotely operated vehicles, and manned submersibles, has reduced some constraints to exploration.

Sanctuary Resources

Knowledge of the Sanctuary's resources, especially in the Farallon Islands and Point Reyes, is extensive in comparison to other areas in northern California. A major portion of the Gulf of the Farallones is within the Sanctuary, with other waterbodies contributing to its habitat diversity. Unique geology, ocean currents, and climate contribute to the Sanctuary's complex ecosystem, which is home to an abundance of living marine resources.

Environmental Conditions

California's coast is one of the major upwelling regions in the world. 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.

The variability in currents within the Sanctuary is influenced by the local topography. Currents can exert a significant effect on resource management activities in the Sanctuary. Some currents are poorly understood and often vary from year to year; they are unpredictable and difficult to forecast. Knowledge of local currents is important for predicting oil-spill trajectories and planning oil-spill containment.

The Gulf of the Farallones is a broad, shallow extension of the continental shelf, and is the most extensive sandy area in California's offshore waters probably the result of the Sacramento and San Joaquin Rivers discharging through San Francisco Bay over thousands of years. Depths within the Gulf average only 180 feet. The Farallon Islands are located about 27 miles from San Francisco, along the western edge of the Gulf. Southwest of the Islands, the continental shelf drops abruptly to depths of

2,400 feet.

The underwater topography tends to be more complex near the coast, creating a diversity of intertidal and near-shore habitats. Several small bays are located within the Sanctuary. Bolinas Lagoon and Drakes and Bodega Bays are open to the ocean, but are sheltered from coastal currents by Duxbury Point, Point Reyes, and Bodega Head, respectively. Estuaries within the Sanctuary include Estero Americano, Estero de San Antonio, Tomales Bay and Bolinas Lagoon. Tomales Bay and Bolinas Lagoon are part of a submerged rift valley formed by the San Andreas Fault.

Cool, foggy summers and mild, stormy winters characterize the Sanctuary climate. Fog is most prevalent during the summer as a result of warm, moist air meeting the cold ocean surface waters during the upwelling season. Fog is an important climatic variable. It maintains low summer temperatures and provides moisture to the watersheds adjacent to the Sanctuary.

Water Quality

Oceanic water quality along central California generally ranges from very good to high, except in areas adjacent to population centers. Studies of the near-shore water chemistry of the central California coast are insufficient to characterize any specific area. The Sanctuary works with federal and state agencies to monitor near-shore and estuarine areas of the Sanctuary for pollutants, oxygen and nutrient levels, and algal blooms. Of special concern are the estuarine habitats of Bolinas Lagoon, Tomales Bay, Estero Americano, and Estero de San Antonio. The watersheds of these rural areas are subject to runoff from agriculture, historic mining, and development.

Since 1970, there have been regular reports of birds with oil on them at the Farallon Islands. The Sanctuary's shoreline monitoring program, Beach Watch, and the state's Office of Spill Prevention and Response, have shown that hydrocarbons found on bird feathers and in tarball samples are not from local sources. This suggests that vessels cleaning tanks or discharging their bilges prior to entering the Bay are a primary source of chronic oil pollution.

Living Marine Resources and Habitats

The area was selected and designated as the Gulf of the Farallones National Marine Sanctuary because

Body boarding is a favorite activity in the cool waters of the Sanctuary. Photographer: Joe Heath

Estero Americano is a unique estuarine habitat that is part of the Sanctuary. Photoprapher: Ed Ueber

The population of Common Murres, *Uria aalge*, in the Sanctuary is rebounding from historic egg harvesting, oil spills, pollution, and gill netting.
Photographer: GFNMS

The Sanctuary is the southern breeding range of Tufted Puffins, *Lunda cirrhata*.
Photographer: Kevin Shaffer

of significant concentrations of the following living marine resources: (1) seabirds and aquatic birds; (2) marine mammals (pinnipeds and cetaceans); (3) fish; (4) marine flora (algae); (5) benthic fauna; and (6) unique 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. Bays, estuaries, and coastal streams provide essential habitat as breeding, nursery, and feeding areas for most marine species. The Sanctuary's diverse habitats are home to a number of species that are federally listed as endangered or threatened. The appendix (p.23) lists these species, including rarities at the Farallon Islands, and all lagoons, estuaries, and adjacent riparian areas. The list includes highly recognized species such as blue and humpback whales, Marbled Murrelets, and coho and chinook salmon, as well as such lesser known species as the tidewater goby and Short-tailed Albatross. A complete species list with associated natural-history information on population, breeding status, range, and seasonality, is available from the Sanctuary's main office in San Francisco.

Seabirds

The nesting seabird population is a significant resource of the Sanctuary. The Farallon Islands support the largest concentrations 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 16 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 breeding season.

Marine Mammals

Thirty-six species of marine mammals have been observed in the Gulf of the Farallones NMS: Six

species of pinnipeds (seals and sea lions), 28 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 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 30,000 in 1999. A small colony of 6 to 20 Northern fur seals have 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 through 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 an accidental oil spill, because they depend largely on their fur for insulation.

Threatened Steller sea lion occurs year-round throughout the Sanctuary. This population has decreased dramatically in the southern part of its range, which include the Farallon Islands. The decline has amounted to 30% over the past 30 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% each year. The northern elephant seal is the largest pinniped species in the Sanctuary, with a total breeding population of about 1,500 in the Sanctuary.

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 residing throughout its waters.

Gray whales and other large baleen and toothed 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.

An increasing number of other species have been seen feeding in the Gulf of the Farallones. The numbers of humpback and blue whales that feed in the Sanctuary between April and November represents one of the largest concentrations of whales in the Northern Hemisphere.

Invertebrates, Fish, and Marine Plants

The high diversity and abundance of fish and invertebrate species within the Sanctuary are due

Ecosystem Dynamics Study

Monitoring Our Offshore Resources

The abundance and distribution of biological resources within the Sanctuary are critical information for effective management practices. Since 1995, biologists have conducted research and monitoring cruises in the Gulf of the Farallones (see map on p. 22). Plankton nets and oceanographic instruments are used to sample zooplankton and ocean conditions. Krill are a critical link in the Gulf of the Farallones food web and are the prey of choice for the blue and humpback whales that migrate to the Sanctuary each summer to feed. The Sanctuary hopes to understand what is affecting the distribution and abundance of krill, and how these factors are tied to the presence of birds, fish and marine mammals.

A researcher aboard the NOAA Ship McARTHUR takes a water sample for analysis. Photographer: Jamie Hall

More than 40 species of rockfish, *Sebastes spp.*, are found in the Sanctuary. Photographer: GFNMS

The sea palm, *Postelsia palmaeformis*, is a species of concern due to overharvesting for food. Photographer: Joe Heath

largely to the variety of habitats, including intertidal mudflats, estuaries, rocky shorelines, and deeper, subtidal areas. The intertidal mudflats support large concentrations of burrowing organisms (clams, snails, and crabs) that are a main food source for shorebirds and wading birds. Eelgrass beds occur on the more extensive flats in Tomales Bay, Bolinas Lagoon and within the esteros. Pacific herring, invertebrates, and birds depend on eelgrass beds in the Bay to spawn and feed. Eelgrass is also critical for the once declining but now stable population of Brant. 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 of gravel to complete their reproductive process.

Very different species are found along the exposed rocky coasts of the Sanctuary, such as Duxbury Reef. Marine algae dominates the Sanctuary's rocky intertidal community. It provides cover and food for a diverse population of marine invertebrates. The tidal community contains a wide diversity of invertebrates, such as barnacles, limpets, black turban snails, mussels, sea anemones, and urchins.

Accurate characterizations of the deeper, subtidal habitats of the Sanctuary are limited. At depths of about 60 feet, the lack of adequate light penetration limits kelp growth. Encrusting coralline algae, brittle stars, and serpulid worms are among the life forms found. Rocky banks in water deeper than 180 feet are inhabited, for the most part, by large populations of rockfish, more than 40 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 a critical food source for birds and marine mammals. From July through December, the Sanctuary also has one of the largest concentrations of white sharks in the world.

Cultural Resources

Archaeological and historical investigations have found more than 100 onshore archaeological sites within Point Reyes National Seashore. Onshore historic sites adjacent to the Sanctuary (e.g., the Point Reyes and Point Bonita Lighthouses) document the strategic importance of San Francisco Bay, other estuaries, the Farallon Islands, and the Gulf of the Farallones.

Point Reyes and Drakes Bay were important during the early exploration and development of the region. At least 72 marine disasters were recorded between 1840 and 1940, resulting in at least 30 shipwrecks. In 1989, the National Park Service and NOAA performed an assessment of submerged cultural resources in the Sanctuary and adjoining parklands.

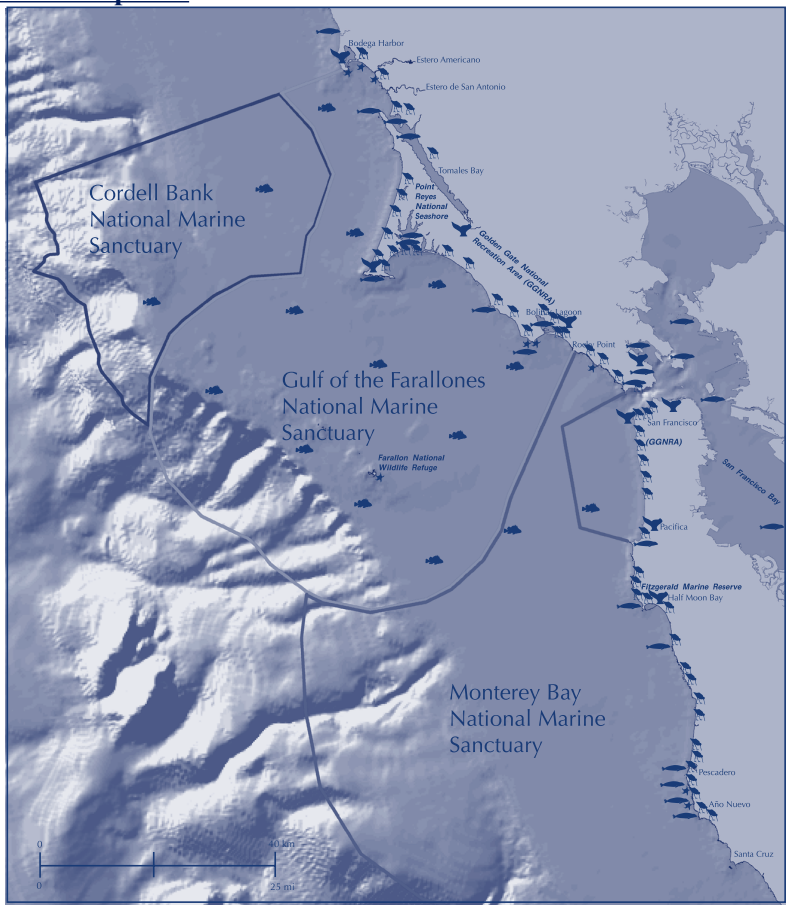
The Future of the Sanctuary

Since the Gulf of the Farallones National Marine Sanctuary was established 20 years ago, the Sanctuary has learned that cooperative efforts, partnerships, and citizen support are paramount in resource protection. Nevertheless, the challenge to protect the Sanctuary, through increasing our understanding of natural and human impacts, is ongoing.

The Sanctuary will continue to look toward citizen involvement to monitor the health of the Sanctuary. New water-quality and ocean-monitoring efforts will require funding and partnerships with other agencies and the public. Through the Management Plan Review, the Sanctuary hopes to engage people in participating in its future, and thus, developing more committed stewards of our unique marine resources.

Appendix

Federally Listed Species



MAP KEY:
- Ecosystem Dynamics Study Stations
- Beaches Surveyed Through Beach Watch
- Intertidal Monitoring Sites
- SEALS Monitoring and Census Locations
- Current & Proposed Visitor Centers

Sandy beaches are one of the many habitats of the Sanctuary. Photographer: Richard Frear

The Gulf of the Farallones is the southernmost breeding area for the threatened Steller sea lion, *Eumatopias jubatus*. Photographer: Bob Wilson

The Sanctuary is a major roosting area for the endangered California Brown Pelican, *Pelecanus occidentalis*. Photographer: GFNMS

This list includes species that may occur in the Sanctuary, including rarities at the Farallon Islands and in all lagoons, estuaries, and adjacent riparian areas.

T = Threatened Species
E = Endangered Species
D = Delisted Species
SC = Species of Concern
* = Critical Habitat designated

Birds

Aleutian Canada Goose,
Brant canadensis leucopareia (T)
American Peregrine Falcon,
Falco peregrinus anatum (D)
Ashy Storm-petrel,
Oceanodroma homochroa (SC)
Baird's Sparrow,
Ammodramus bairdii (SC)
Bald Eagle,
Haliaeetus leucocephalus (T)
Bell's Sage Sparrow,
Amphispiza belli (SC)
Black Rail,
Laterallus jamaicensis coturniculus (SC)
Black Tern,
Chlidonias niger (SC)
Bristle-thighed Curlew (SC)
Numenius tahitiensis (SC)
Burrowing Owl,
Athene cunicularia (SC)
California Brown Pelican,
Pelecanus occidentalis californicus (E)
California Least Tern,
Sterna albifrons browni (E)
Cerulean Warbler,
Dendroica cerulea (SC)
Dark-rumped Petrel,
Pterodroma phaeopygia (E)
Elegant Tern,
Sterna elegans (SC)
Golden-cheeked Warbler,
Dendroica chrysoparia (E)
Harlequin Duck,
Histrionicus histrionicus (SC)
Least Bell's Vireo,
Vireo bellii (E)
Loggerhead Shrike,
Lanius ludovicianus (SC)
Marbled Murrelet,
*Brachyramphus marmoratus (T)**
Saltmarsh Common Yellowthroat,
Geothlypis trichas sinuosa (SC)
Short-tailed Albatross,
Diomedea albatrus (E)
Tricolored Blackbird,
Agelaius tricolor (SC)
Western Snowy Plover,
Charadrius alexandrinus nivosus (T)
White-faced Ibis,
Eudocimus albus (SC)
Willow Flycatcher,
Empidonax traillii (SC)
Xantus's Murrelet,
Synthliboramphus hypoleucus (SC)

Fish

Central California steelhead,
Oncorhynchus mykiss (T)
Central Valley fall/late fall-run chinook salmon,
Oncorhynchus tshawytscha (C)
Central Valley spring-run chinook salmon,
*Oncorhynchus tshawytscha (T)**
Coho salmon - central CA coast,

*Oncorhynchus kisutch (T)**

Green sturgeon,
Acipenser medirostris (SC)

Longfin smelt,
Spirinchus thaleichthys (SC)

Northern California steelhead,
Oncorhynchus mykiss (T)

Pacific lamprey,
Lampetra tridentata (SC)

So. OR/No. CA coastal chinook salmon,
*Oncorhynchus tshawytscha (T)**

Tidewater goby,
Eucyclogobius newberryi (E)

Winter-run chinook salmon,
*Oncorhynchus tshawytscha (E)**

Mammals

Blue whale,
Balaenoptera musculus (E)

Fin whale,
Balaenoptera physalus (E)

Gray whale,
Eschrichtius robustus (D)

Guadalupe fur seal,
Arctocephalus townsendi (T)

Humpback whale,
Megaptera novaeangliae (E)

Long-eared myotis bat,
Myotis evotis (SC)

Pacific western big-eared bat,
Corynorhinus (Plecotus) townsendii (SC)

Point Reyes mountain beaver,
Aplodontia rufa phaea (SC)

Right whale,
Eubalaena glacialis (E)

Sei whale,
Balaenoptera borealis (E)

Small-footed myotis bat,
Myotis ciliolabrum (SC)

Southern sea otter,
Enhydra lutris nereis (T)

Sperm whale,
Physeter macrocephalus (E)

Steller (northern) sea lion,
*Eumetopias jubatus (T)**

Reptiles

Green turtle,
Chelonia mydas (include agassizi) (T)

Hawksbill turtle,
Eretmochelys imbricata (E)

Leatherback turtle,
Dermochelys coriacea (E)

Loggerhead turtle,
Caretta caretta (T)

Olive (Pacific) Ridley turtle,
Lepidochelys olivacea (T)

Invertebrates

Sandy beach tiger beetle,
Cicindela hirticollis gravida (SC)

Plants

Beach layia,
Layia carnosa (E)

Northcoast sand verbena,
Abronia umbellata ssp. breviflora (SC)

Sea palm,
Postelsia palmaeformis (SC)

Sanctuary Staff

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Paul Wong

Program Support Assistant
Mary Jane Schramm

Humpback whales, *Megaptera novaengliae,* are often seen near the Farallon Islands during the summer and fall. Photographer: Jim Cubbage