



# JOINT MANAGEMENT PLAN REVIEW RECOMMENDATIONS

From JMPR Working Groups  
& Internal Teams  
to the  
Gulf of the Farallones  
SANCTUARY ADVISORY COUNCIL  
July 2003



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**JOINT MANAGEMENT PLAN REVIEW**  
**RECOMMENDATIONS**

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SANCTUARY ADVISORY COUNCIL  
JULY 2003



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## **Introduction and Background**

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## **BACKGROUND**

### 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 are part of a nationally significant marine ecosystem. Encompassing a diversity of highly productive marine habitats, the Sanctuary supports and abundance of species. 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.

### Overview of JMPR Process

The National Marine Sanctuary Act requires the National Marine Sanctuary Program to periodically review sanctuary management plans to ensure the sanctuary sites continue to best conserve, protect, and enhance their nationally significant living and cultural resources. The Gulf of the Farallones National Marine Sanctuary has not reviewed its management plan since its designation in 1989. Recent scientific discoveries, advancements in managing marine resources, and new resource management issues may not be adequately addressed in these existing plans.

The Sanctuary's management plan describes the objectives, policies, and activities for the GFNMS. It generally outlines the regulatory goals, describe boundaries, identify staffing and budget needs, set priorities and performance measures for resource protection, research and education programs. The management plan guides the development of future management activities.

The National Marine Sanctuary Program (NMSP) is reviewing the management plans of the Gulf of the Farallones National Marine Sanctuary 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 continues to provide numerous opportunities for public input, the NMSP has identified priority resource management issues to be addressed in the management plans. Through the review process, management strategies, regulations and boundaries are also being evaluated.

## **PRIORITY ISSUE WORKING GROUPS**

### Working Group Tasks and Products

This document contains recommendations developed by Sanctuary Advisory Council (SAC) working groups and internal teams that were tasked with identifying recommended strategies and activities that address specific priority issues identified during the scoping and prioritization phases of the Joint Management Plan Review. Meetings of the working groups focused on collaboratively developing a recommendation to the Sanctuary Advisory Council regarding their

specific issue. The working groups met approximately once or twice a month between December 2002 and June 2003 and focused on the development of the action plans and recommendations in this report.

## Working Group Selection and Role of GFNMS Staff

Working group members were selected individuals with a strong knowledge of the regional marine resources and management issues, have a strong interest in the Sanctuary, and who also have the ability to understand and respect diverse points of view. Staff and SAC members nominated experts from the community to participate in the working groups. GFNMS staff made the final selection of working group members after consideration of these nominations. Sanctuary staff also participated in the working groups as a stakeholder and as a source of information. As a stakeholder, the Sanctuary representative forwarded NOAA's point of view, provide advice on NOAA's authority and defined the range of acceptable outcomes for NOAA. All working group meetings were open to the public and observers were welcome.

## GFNMS Working Groups

Gulf of the Farallones National Marine Sanctuary held six working groups, three internal teams, and participated in five cross-cutting groups. The GFNMS site-specific working groups were: Education, Impacts from Fishing Activities, Introduced Species, Impacts from Vessel Spills, Water Quality, and Wildlife Disturbance. The site-specific internal teams were Administration, Boundary Modifications, and New and Emerging Issues. The cross-cutting working groups were: Ecosystem Monitoring, Maritime Heritage, and Community Outreach. The cross-cutting internal teams were: Boundary Modifications and Administration.

## Working Group Decision Making

The working groups employed consensus-based decision-making to come to agreement on decisions critical to the direction and outcome of the group. Consensus building is a process used to find the highest level of agreement without dividing the participants into factions. Everyone in the group supports, agrees to, or can accept a particular decision. In the end, everyone can say "whether or not I prefer this decision above all others, I will support it because it was reached fairly and openly." Consensus building allows a group of diverse constituent representatives to work towards a unanimous decision on complex and controversial issues. This process requires full understanding of the recommendation by all parties and constructive negotiation on any points of disagreement. The Sanctuary values consensus-based recommendations because they represent a high level of commitment from diverse stakeholder groups.

## Prioritization of Working Group Recommendations

Each working group prioritized their final recommendations into three priority levels ("Bins") through a ranking and binning process. This process conveys to the SAC and Sanctuary management the working group's priorities. Using consensus, the group evaluated each recommendation against six criteria. The resulting score was used to place the program in a "Priority Bin" between Bin 1 (the highest) and Bin 3 (the lowest).

The ranking criteria allowed the groups to consider important aspects of the recommendations such as the overall site benefits if the recommendation were implemented, the resources required for implementation, and the urgency and immediacy of the issue. When ranking the recommendations, Site Benefits and Urgency were considered more important and were weighted twice as heavy as the other three. The six ranking criteria were:

- Site Benefits
- Complexity (and resources such as expertise or equipment needed to resolve issue)
- Short-Term Feasibility (financial and staff resources needed to develop Action Plan)
- Long-Term Feasibility (financial and staff resources needed for Implementation of Action Plan over the next five years)
- Improving Coordination and Operations Between the Sites
- Urgency

The ranked recommendations were divided into 3 “Priority Bins.” Recommendations in Bin 1 and 2 were outlined in detail by the working group and forwarded to the SAC as full strategies and actions. Recommendations in Bin 3 generally required many resources and/or conveyed minimal site benefits. These recommendations were not outlined but are forwarded as-is to the SAC. It is important to note that recommendations which fell into a lower or higher bin than the group felt appropriate were transferred and noted in the ranking matrix (i.e. 3/2 means it ranked as Bin 3 but the group felt it really belonged in Bin 2). (*Please see Appendix C for detailed description of the ranking and binning process*)

## ABOUT THIS DOCUMENT

This document contains recommendations from Joint Management Plan Review working groups and internal teams to the GFNMS Advisory Council. The recommendations describe how programs and projects will be implemented, the various steps in the program or project, products to be produced, who will be accomplishing the work (GFNMS or another group), how long it should take, the resources necessary for implementation, and the recommended partners that GFNMS will be working with during implementation. Following is a brief description of the components of each recommendation.

**Working Group Members-** A list of the active working group members and their affiliation.

**Working Group Meetings-** Meeting-by-meeting overview of topics and activities undertaken by the working group

**Issue/Program Statement-** The working group collectively drafted an issue/program to describe why this issue is a problem that should be addressed by the Sanctuary.

**Issue Description-** Detailed characterization of the issue including its current status, how the Sanctuary is currently addressing it, and efforts by other organizations to address the issue.

**Jurisdictional Setting-** A summary of which agencies and organizations have jurisdiction over activities and geographic locations of concern in addressing the issue. This does not apply for programmatic recommendations (Education, Research, and Partnerships with Community Groups)

**Issue/Program Goal-** The working group drafted the issue/program goal or goals describing the long-term desired outcome of the Sanctuary addressing the issue.

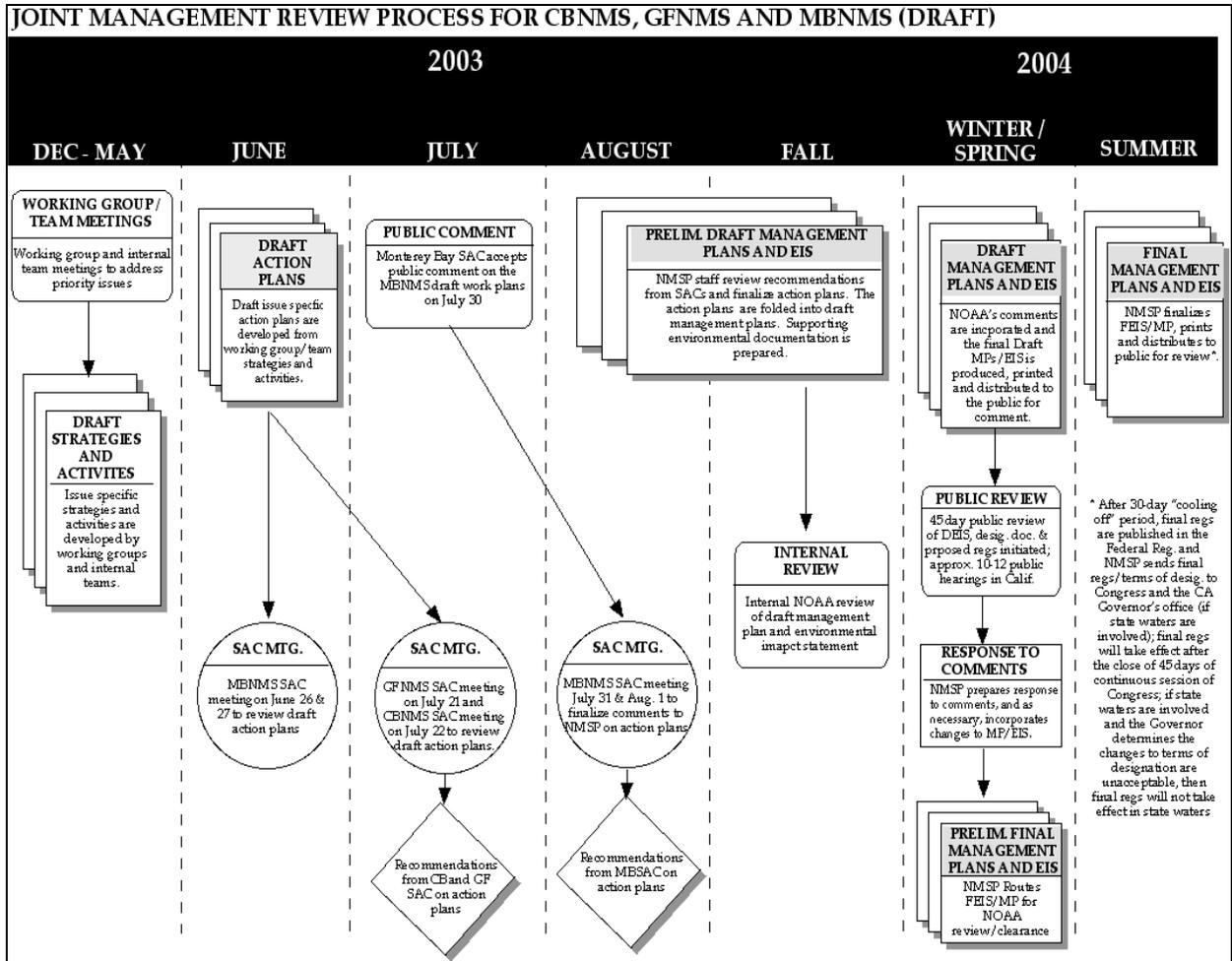
**Issue/Program Objectives-** The working group developed issue/program objectives to identify measurable outcomes that will be achieved in a specific time frame to help accomplish the goal(s)

**Recommendations-** The recommendations described in this document are those of the working group address to the Sanctuary Advisory Council. The recommendations were built from information extracted from the inventory matrix (see below) which was assembled by the working group.

**Inventory Matrix-** The inventory matrices were created by the working group as a raw inventory of all proposed programs, prior to prioritization. It includes a description of the program, potential partners and information sources to aid implementation, and a list of products to be produced. The Inventory and Ranking Matrices are included where available to track the derivation of the final written recommendations.

**Ranking Matrix-** The ranking matrices present the priority assigned to each of the programs by the working group and the rationale behind the rankings. The ranking score for each criteria and corresponding bin are listed here. In some cases, the working groups made modifications or refinements between the inventory and the ranking matrix.

**JMPR TIMELINE**



## **NEXT STEPS**

The National Marine Sanctuary Program will prepare the Draft Management Plans (DMP) and Draft Environmental Impact Statement (DEIS) after receiving input and recommendations from the Sanctuary Advisory Councils for each Sanctuary. The DMP/DEIS is expected to be released in January 2004 for public review and comment. Following review and possible changes to the management plan, a Final Management Plan should be released in the Summer of 2004.

### ***Public Comment***

Members of the public who wish to comment on the recommendations may:

1. Contact their representative on the Advisory Council (See Appendix A)
  
1. Attend the July 21-22, 2003 GFNMS Advisory Council Meeting  
public comments:  
7/21: 3:45-4pm  
7/22 11:15-11:45 and 4:30-4:45  
Green Gulch Farm  
1601 Shoreline Highway  
Sausalito CA

#### **Additional Information**

For more information regarding these Recommendations, the Joint Management Plan Review, SAC meeting times and location of meetings go to the website (<http://sanctuaries.nos.noaa.gov/jointplan/>) or contact:

Anne Walton, Management Plan Coordinator  
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## **Site-Specific Working Group Recommendations**

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- I.  
Water Quality
- II.  
Wildlife Disturbance
- III.  
Impacts from Fishing Activities
- IV.  
Impacts from Vessel Spills
- V.  
Education



ISSUE:

# WATER QUALITY

Recommendation to the GFNMS Advisory Council  
from the Water Quality Working Group

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## WORKING GROUP MEMBERS

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Third Street Light Rail

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GFNMS SAC

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**Janna Shackeroff,**  
California Coastal Commission

**Perianne Wood,**  
EPA/ Regional Water Quality Control  
Board

## WORKING GROUP MEETINGS

### MEETING 1:

- Overview of Joint Management Plan Review Process
- Decision Making Process

### MEETING 2:

- Development of Problem Statement, Issue Characterization, Goals and Objectives

### MEETING 3:

- Overview of SF Public Utilities and Tour of Oceanside Treatment Plant
- Presentation by Surfrider on Volunteer Monitoring Programs

### MEETING 4:

- Presentation by CDFG on Mariculture Activities in GFNMS
- Presentation on Hog Island Oyster Farm Operations
- Presentation by UC Davis Extension on Bi-valve Mariculture
- Tour of Crissy Field Restoration Project

### MEETING 5:

- Marine Debris and the International Coastal Clean-Up
- Central Pacific Gyre and Marine Debris

- Overview of MBNMS' Water Quality Protection Plan
- GFNMS Beach Watch Data

**MEETING 7:**

Urban Impacts:

- Region 2 Water Resources Control Authority
- MCSTOPP- Marin County Storm Water Pollution Prevention Program
- STRAW - Students and Teachers Restoring a Watershed
- Santa Rosa Ocean Outfall Proposal
- Discussion: Public Owned Treatment Plants and Impacts on the Sanctuary

**MEETING 8:**

Agricultural Impacts:

- State Water Resources Control Board - Current Activities and Projects
- Tomales Bay Watershed Protection Plan
- Point Reyes National Seashore Water Quality and Restoration Programs
- Agricultural Industry Best Management Practices
- Tour Giacomini Dairy Farm

**MEETING 8:**

- Coastside Monitoring (Areas of Special Biological Significance, Critical Coastal Areas and Mussel Watch)
- Mining and Mercury Contaminants

**MEETING 9:**

- Inventory of Existing Programs and Building of Options for the GFNMS Management Plan

**MEETING 10:**

- Prioritization and Ranking of Management Options
- Outline details of Priority Management Options

**ISSUE STATEMENT**

There are threats to water quality in the Gulf of the Farallones NMS that should be considered in revising the Management Plan. Water quality within the Sanctuary 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, past 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, past 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 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 and the Farallon Islands. The offshore areas of the Sanctuary are somewhat protected from threats to water quality by their distance from the sources of pollutants and land-based runoff; and 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. Leaks from sunken vessels have been a periodic source of 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 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 be considered.

**IMPACTS FROM THE SAN FRANCISCO BAY AREA** To the east of the Sanctuary are treated wastewater discharges from the City of San Francisco and outflow from the San Francisco Bay, potentially carrying pollution from the 8 million people living in the Bay Area including sewage outfalls, combined 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. 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 who live in the

open water who mistake plastic for food. Plastic debris has also been shown to entangle marine wildlife in the Gulf of the Farallones. The Sanctuary should evaluate the potential local efforts that could be taken to reduce the impacts on the Sanctuary.

## **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 really composed of two parts: beneficial uses and water quality objectives.

Four water quality control plans are primarily applicable to the GFNMS. These are the California Ocean Plan, 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), the Basin Plan for the North Coast Regional Water Quality Control Board (Region 1) and the Basin Plan for the San Francisco Bay Regional Water Quality Control Board (Region 2). The Ocean Plan is applicable to near shore 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 US EPA's 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 requires California to submit statewide and basin plans to the U.S. Environmental Protection Agency for approval.

California's waters only extend three miles past the coast (including the coasts of our islands). These are considered nearshore waters. Any ocean waters outside of three miles are regulated directly by the U.S. EPA, in consultation with the State and Regional Boards. Outside of three miles from the mainland or the islands, U.S. EPA's water quality standards (for the receiving waters) and effluent limitations are applicable

### State Water Quality Protection Areas

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

The Ocean Plan prohibits the discharge of wastes to ASBS. Discharges must be located a sufficient distance from ASBS to assure 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 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 assure protection of ASBS; new discharges of elevated temperature wastes must be discharged a sufficient distance from ASBS to assure the maintenance of natural temperature in these areas. Additional limitations may be imposed in individual cases if necessary for the protection of ASBS.

Under the Marine Managed Areas Improvement Act's new classification system, codified in the Public Resources Code, a State Water Quality Protection Area (SWQPA) is a marine or estuarine area, including Areas of Special Biological Significance that are 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. Effective in January of 2003, ASBS are re-classified as SWQPAs. In a SWQPA, 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.

The State Board is currently contracting with the Southern California Coastal Water Research Project and Moss Landing Marine Labs to perform a survey of discharges into all of the SWQPAs. The final results, in GIS (ArcView) format, are expected to be available 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 POTWs) 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 hydromodification 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 US EPA and the State Water Board have considered urban runoff collected in stormwater systems to be point sources of pollution. Urban stormwater systems, while they collect 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 a point source.

#### Permits

Point sources of water pollution into surface waters (ocean, bays, streams, and lakes) are issued National Pollutant Discharge Elimination System (NPDES) Permits. 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. Activities that discharge to only groundwater are only issued WDRs, since the federal Clean Water Act (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 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., ASBS/SWQPAs) is one of the factors to consider when evaluating a municipality's designation status. There are other stormwater permits in the state as well. Caltrans (highway system) 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 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"). The 1998 list was approved by both the State Board and the US 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 were listed:

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, hydromodification, 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, hydromodification, 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 sake.

#### Total Maximum Daily Loads

Under the Clean Water Act, 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, NOAA provides federal funding for the development and implementation of state Coastal Zone Management Programs. The California Coastal Commission 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 insure 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 and the California Coastal Commission have submitted to the U.S. 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 California Coastal Commission 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

#### OCEAN DUMPING ACT

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 U.S. EPA and is on top of any Clean Water Act requirements.<sup>2</sup>

## **WATER QUALITY GOAL**

To engage in corrective and proactive measures to protect and enhance water quality in the estuarine, nearshore, and offshore environments of the Sanctuary.

## **WATER QUALITY OBJECTIVE**

1. Develop a regionally-based, cooperative water quality protection plan to address point and non-point source water quality impacts. This plan will emphasize a watershed/ecosystem approach and address the range of water quality threats from chronic land-based runoff to catastrophic offshore events.
2. Propose new Sanctuary regulatory actions as necessary to achieve the water quality goal.

## **RECOMMENDATIONS**

- **OBJECTIVE 1: Develop a regionally-based, cooperative water quality protection plan to address point and nonpoint source water quality impacts. This plan will emphasize a watershed/ecosystem approach and address the range of water quality threats from chronic land-based runoff to catastrophic offshore events.**

## **IMPACTS ON ESTUARINE AND NEARSHORE 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, past 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, leaking land-based storage tanks or other sources, as well as 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.*

**STRATEGY WQ-1: Use outreach as a tool to address specific activities and impacts on estuarine and nearshore environments and encourage implementation and reward the use of Best Management Practices (BMPs).**

**Action 1.1** 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), encouraged through letters and awards of recognition to employ 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.
- A. 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 resource protection. Use criteria to evaluate those to be awarded and those areas where additional effort is needed.
- A. Coordinate with agencies and entities who 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 adjacent to the Sanctuary.

**Priority Level: 2**

**Partners:** Sonoma County, Main County, RWQCB, SWRCB, Tomales Bay Watershed Council, STRAW, MCSTOPP, UC Cooperative Extension

**Implementation Timeline:** year 1 - identify partners and formalize relationship; year 2 - profile uses; year 3 - evaluate uses and implement BMPs and/or reward; on-going thereafter

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

**Action 1.2** 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 Best Management Practices during the planning, development and alteration of upland areas:

- A. Identify specific upland areas adjacent to the Sanctuary where development activities are taking place.
- A. Coordinate with agencies and entities who 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.
- A. Continue to track and evaluate development activities in watersheds adjacent to the Sanctuary.

**Priority Level: 2**

**Partners:** Sonoma County, Main County, RWQCB, SWRCB, Tomales Bay Watershed Council, STRAW, MCSTOPP, UC Cooperative Extension

**Implementation Timeline:** year 1 - identify partners and formalize relationship; year 2 - profile uses; year 3 - evaluate uses and implement BMPs and/or reward; on-going thereafter

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

**STRATEGY WQ-2: Develop and implement an integrated water quality monitoring program to determine and track impacts on the estuarine and nearshore environment.**

**Action 2.1** 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. Steps to be taken:

- A. Inventory and evaluate existing volunteer and expert-based monitoring programs including identifying points of contact.
- A. Identify Sanctuary water quality monitoring data needs, evaluate against inventoried monitoring programs, and identify data gaps specific to Sanctuary management needs.
- A. Develop strategy to fill data gaps.
- A. 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; provide platform for data sharing.
- A. Use data to make informed management decisions specific to Sanctuary issues or concerns.
- A. Extend Tomales Bay water quality monitoring program to other estuarine areas not fully monitored including: Bolinas Lagoon, Estero Americano and Estero de San Antonio.
- A. 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.

**Priority Level: 2**

**Partners:** Tomales Bay Watershed Council, National Park Service, Beach Watch, State Health Dept. HAB Program, Snapshot Day, First Flush

**Implementation Timeline:** Fully implement by the end of year three, on-going thereafter

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

**STRATEGY WQ-3: Track and continually evaluate mariculture activities in Sanctuary waters.**

**Action 3.1** The types and levels of bivalve mariculture activities currently occurring in Sanctuary waters (confined to Tomales Bay) are considered to be compatible use. The uncertainty of future changes in technology, lease agreements and market demands for mariculture products may have impacts on Sanctuary resources greater than the current acceptable levels and should be of concern to the Sanctuary. Steps will be taken to track current, new and emerging mariculture activities in the Sanctuary:

- A. Develop understanding of background, past work, and Sanctuary issues related to the work of the Tomales Bay Shellfish Technical Advisory Council.
- A. Identify specific Sanctuary issues and concerns related to mariculture activity in Tomales Bay
- A. Obtain seat on Tomales Bay Shell Fish Technical Advisory Council
- A. Coordinate with agencies on concerns and issues related to mariculture activities in Tomales Bay: CDFG (oversight on mariculture leases and introduced species); State Health Dept. (quality control and certification on seafood sales); Regional Water Quality Board (TMDLs)  
Priority Level: 2  
Partners: Tomales Bay Shell Fish TAC, CDFG, State Health Dept., Regional Water Quality Board  
Implementation Time Line: obtain seat on the TBSFTAC by end of year one, begin coordinating with other agencies immediately, both activities on-going

**STRATEGY WQ-4: Address sources of anthropogenic pathogens and pollutants from recreational and commercial boating activities and marinas.**

**Action 4.1** 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 and 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.
- A. Become a cooperating partner with the state and make recommendations, as appropriate, on: where to locate pumpout stations; education and outreach efforts; tracking compliance; maintenance of facilities.

**Priority Level: 2**

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

**Implementation Time Line:** Immediately

**Action 4.2** Develop a combined outreach program on Best Management Practices/interpretive enforcement for recreational and commercial user groups in and around Tomales and Bodega Bays (e.g., campers, kayakers, moored vessels and liveaboards) by taking the following steps:

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

**Priority Level: 2**

**Partners:** SWQCB, RWQCBs 1 and 2, harbor masters, Boating and Waterways, Integrated Waste Management Board, kayak vendors

**Implementation Timeline:** Develop partnerships immediately, full implementation of outreach program to be complete by end of year 3

**Products:** Kiosk, printed outreach materials

**STRATEGY WQ-5: *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.***

**Action 5.1** Land based discharges from stormwater, aging and undersized septic systems, agricultural runoff, livestock grazing 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 and residual pollutants:

- A. Participate in Interagency Coordinating Committee (IACC), chaired by the SWQCB, and implements management measures on state's nonpoint source plan.
- A. Identify, cooperate, and exchange information with agencies and authorities that pertain to land-based discharges and impacts on water quality
- A. Assess levels of land-based discharges and impacts on sanctuary resources
- A. Identify water quality enforcement issues that are not being addressed adequately or appropriately and communicate to appropriate agencies

**Priority level: 1**

**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, California Coastal Commission, SWRCB, County Agriculture Commissioner

**Implementation Timeline:** Make contact and establish appropriate relationships by end of year 1

**Products:** MOAs

**IMPACTS FROM SAN FRANCISCO BAY AREA**

*To the east of the Sanctuary is the discharge of the San Francisco Bay Estuary, potentially carrying pollution from the 8 million people living in the Bay Area including sewage outfalls, combined 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 Quality 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 San Francisco Bay Estuary to degrade Sanctuary water quality needs to be evaluated.*

**STRATEGY WQ-6: *Coordinate with San Francisco Bay Area Groups on Pollution Prevention Programs.***

**Action 6.1** Pollutants from the San Francisco Bay Area are known to impact water quality in the Sanctuary. Both existing pollution sources (including legacy pollutants) and emerging pollutants are a concern and will be addressed by taking the following steps:

- A. Develop relationship with San Francisco Bay Area Pollution Prevention Group, the Clean Estuary Project, San Francisco Estuary Institute and the Regional Monitoring Program to increase information exchange, identify projects of common interest and funding opportunities.

- A. Sanctuary should become familiar with and track 303d list issues and areas (impaired waterways).
- A. Sanctuary should track emerging pharmaceuticals and endocrine disrupting pollutants that may interfere with life cycles of living marine resources.
- A. Identify and promote, through cooperative outreach efforts, the use of alternative biodegradable products (as alternatives to pesticides, plastics, etc.)

**Priority Level: 2**

**Partners:** San Francisco Bay Area Pollution Prevention Group, Clean Estuary Project, San Francisco Estuary Institute, Regional Monitoring Program

**Implementation Timeline:** Establish relationships by end of year 1, on-going thereafter

## **IMPACTS ON OPEN COASTAL ENVIRONMENT**

*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, plumes of contaminated runoff can surface at distances offshore creating toxic algal blooms in marine waters. Algal blooms can produce domoic acid, a harmful biotoxin that affects the nervous systems of both marine mammals and humans.*

**STRATEGY WQ-7: Develop ancillary monitoring program through the Ecosystem Dynamics Study (EDS) for “indepth” tracking of phytoplankton populations to detect harmful algal blooms (HAB).**

**Action 7.1** Harmful algal blooms are known to occur in areas of high nutrient runoff and can detrimentally affect a variety of marine life and potentially cause human health effects. Year round monitoring of HAB can predict events and potential impacts to marine life. The Sanctuary will take the following steps to implement year round monitoring of HAB and support the state’s biotoxin monitoring program:

- A. Maintain sampling vessel and increase staff commitment to allow for monthly sampling to understand temporal variation.
- A. Coordinate sampling efforts with state program to identify location for spatial analysis.
- A. Submit HAB samples to state for analysis.
- A. Identify pro-bono lab to provide bioaccumulation contaminants analysis on sand crab contaminants from samples collected by GFNMS high school monitoring program.

**Priority Level: 2**

**Partners:** State Health Dept., CBNMS, MBARI, UC Santa Cruz, Central Coast RWQCB, NMFS-NWFSC, The Marine Mammal Center, Marine Mammal Stranding Network, UC Davis

**Implementation Timeline:** Dependent on vessel maintenance and EDS funding, program should be implemented within one year, and on-going thereafter  
Product: Increase in long-term data

**STRATEGY WQ-8: *Ensure the continuation of the long-term data collection efforts under the Mussel Watch program.***

**Action 8.1** 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, and the Sanctuary should seek to continue this program by taking the following steps:

- 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 the GFNMS.

**Priority Level:** 1

**Partners:** CDFG, RWQCB, SWRCB

**Implementation Timeline:** Immediately

**ADDITIONAL AREAS TO BE ADDRESSED**

**STRATEGY WQ-9: *Develop a standing Water Quality Working Group, supported by Sanctuary staff.***

**Action 9.1** 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. The working group will also advise the Sanctuary 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.), and mariculture.
- A. Provide on-going advise to the Sanctuary water quality program on current research, management techniques, and issues.
- A. Provide water quality expertise to the GFNMS Research Working Group.
- A. Work with the state and county on such issues as: aging septic systems, discharge from live-aboards, urban runoff, TMDLs, Critical Coastal Areas, agricultural runoff and freshwater diversion.

**Priority Level:** 1

**Partners:** NMFS, SWRCB, RWQCB (1 and 2), City and County of San Francisco, Marin County, Sonoma County, San Mateo County, Tamales Bay Watershed Council, NGOs, EPA, CCC, OSPR, NPS, State Parks, County Parks, CBNMS, MBNMS

**Implementation Timeline:** Group to be formed by end of year one, on-going thereafter

**STRATEGY WQ-10: *Develop administrative capacity to support a comprehensive and coordinated water quality protection plan.***

**Action 10.1** Hire a full time water quality specialist/coordinator.

**Action 10.2** Create a water quality seat on the GFNMS Sanctuary Advisory Council.

Priority Level: 1

Implementation Time Line: Immediately

**STRATEGY WQ-11: *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.***

**Action 11.1** Inventory all short and long-term water quality research and monitoring programs to determine status, data gaps and Sanctuary needs. Monitoring is not only used to determine where water quality is threatened, but also to determine compliance with state and federal law from the Clean Water Act to the Porter-Cologne Water Quality Control Act.

- A. Implement SIMoN - Phase I for water quality
- A. Evaluate GFNMS' current monitoring programs and make recommendations to GFNMS research program on modifications to be made in order to better address water quality data needs
- A. Assess data needs and make recommendations to other agencies and institutions on data collection gaps.

**Priority Level: 2**

**Partners:** Tomales Bay Watershed Council, PRNS, RWQCB, SWRCB, UCCE, CDFG, Resource Conservation District, Surfrider

**Implementation Timeline:** Complete inventory and make recommendations by end of year two

**Products:** Comprehensive annotated bibliography

**STRATEGY WQ-12: *Educate local decision makers on water quality issues in the Sanctuary.***

**Action 12.1** 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.

- 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.
- A. In areas where development is being planned, facilitate watershed planning and review of local regulations to promote better water quality and watershed protection.

**Priority Level: 2**

**Partners:** CCC, UC Sea Grant, Mission Resource Conservation District

**Implementation Timeline:** Dependant on the start-up date of NEMO, Sanctuary should get in on the ground floor

■ **OBJECTIVE 2: Propose new Sanctuary regulatory actions as necessary to achieve the water quality goal.**

**STRATEGY WQ-13: *Revise GFNMS' discharge regulation to better address water quality issues/impacts from activities in and adjacent to Sanctuary waters.***

**Action 13.1** Update discharge regulation to specifically address impacts related to vessel discharge.

- A. Consider sanitary vessel discharge regulation based on capacity (population capacity threshold)
- A. Prohibit bilge water discharge
- A. Prohibit ballast water discharge
- A. Revise discharge standards in regulation to be consistent with the Clean Water Act

**STRATEGY WQ-14: *Develop regulation to address impacts from outside the Sanctuary, including impacts as a result of activities in the watershed.***

**Action 14.1** Create new “enter and injure” regulation based on regulatory language used by other sanctuaries.

**STRATEGY WQ-15: *Use regulatory terminology consistent with the State of California.***

**Action 15.1** Change “Areas of Special Biological Significance” references in Sanctuary regulations to “State Water Quality Protection Area”

**STRATEGY WQ-16: *Take preventative measures to prohibit new and emerging mariculture activities that may be inconsistent with the Sanctuary's primary goal of resource protection.***

**Action 16.1** Propose regulatory action that will insure that all new mariculture activities and lease renewals within Sanctuary waters require consultation with the (GFNMS) Director. Those mariculture activities that are allowed may require terms and conditions as part of the lease agreement.

**Priority Level: 1**

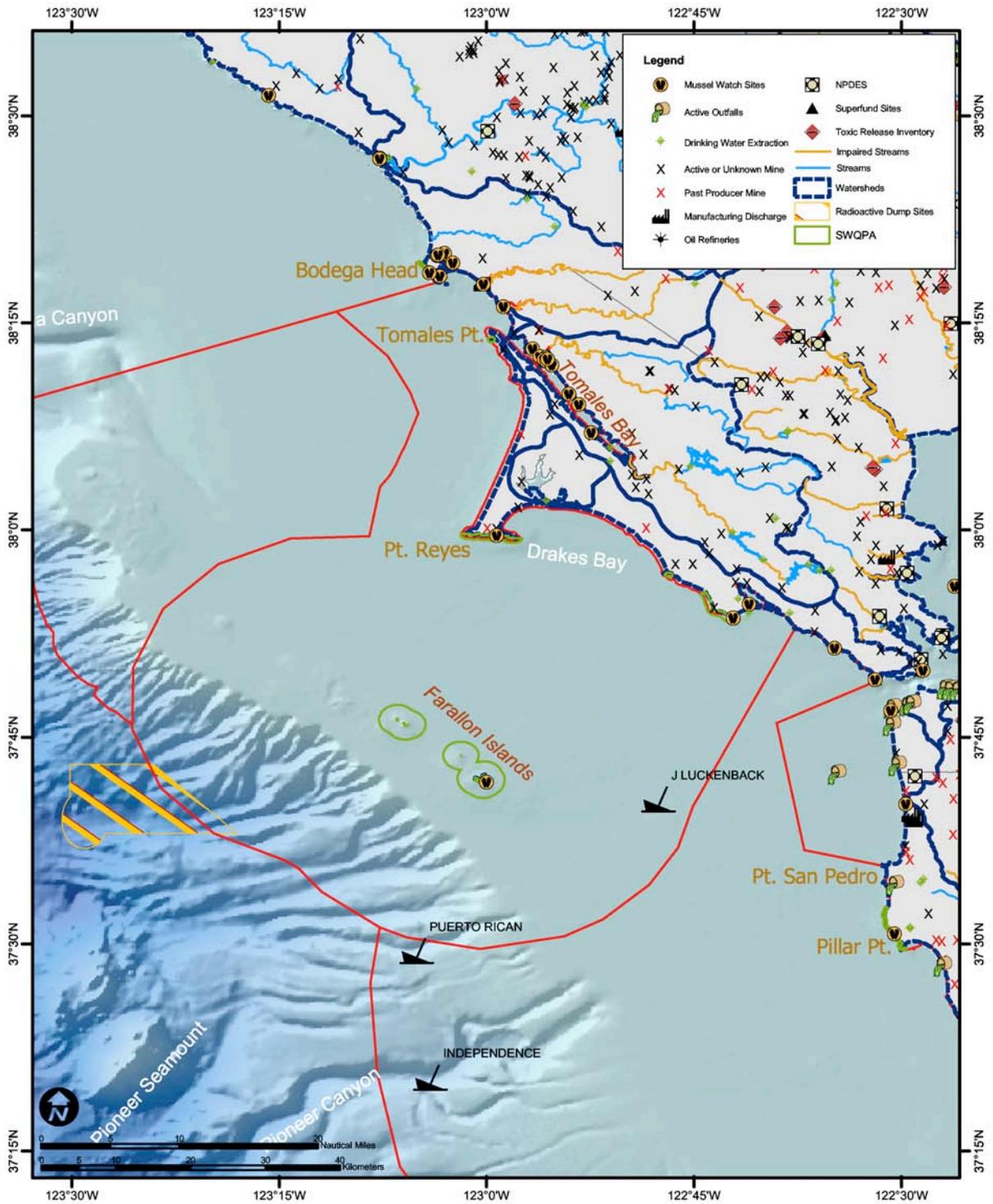
**Implementation Timeline: Immediately**

***Please note: The Water Quality has forwarded directly to the Sanctuary Advisory Council a recommendation regarding discharge from cruise ships into GFNMS. The Council will consider this urgent issue at the September 2003 meeting.***

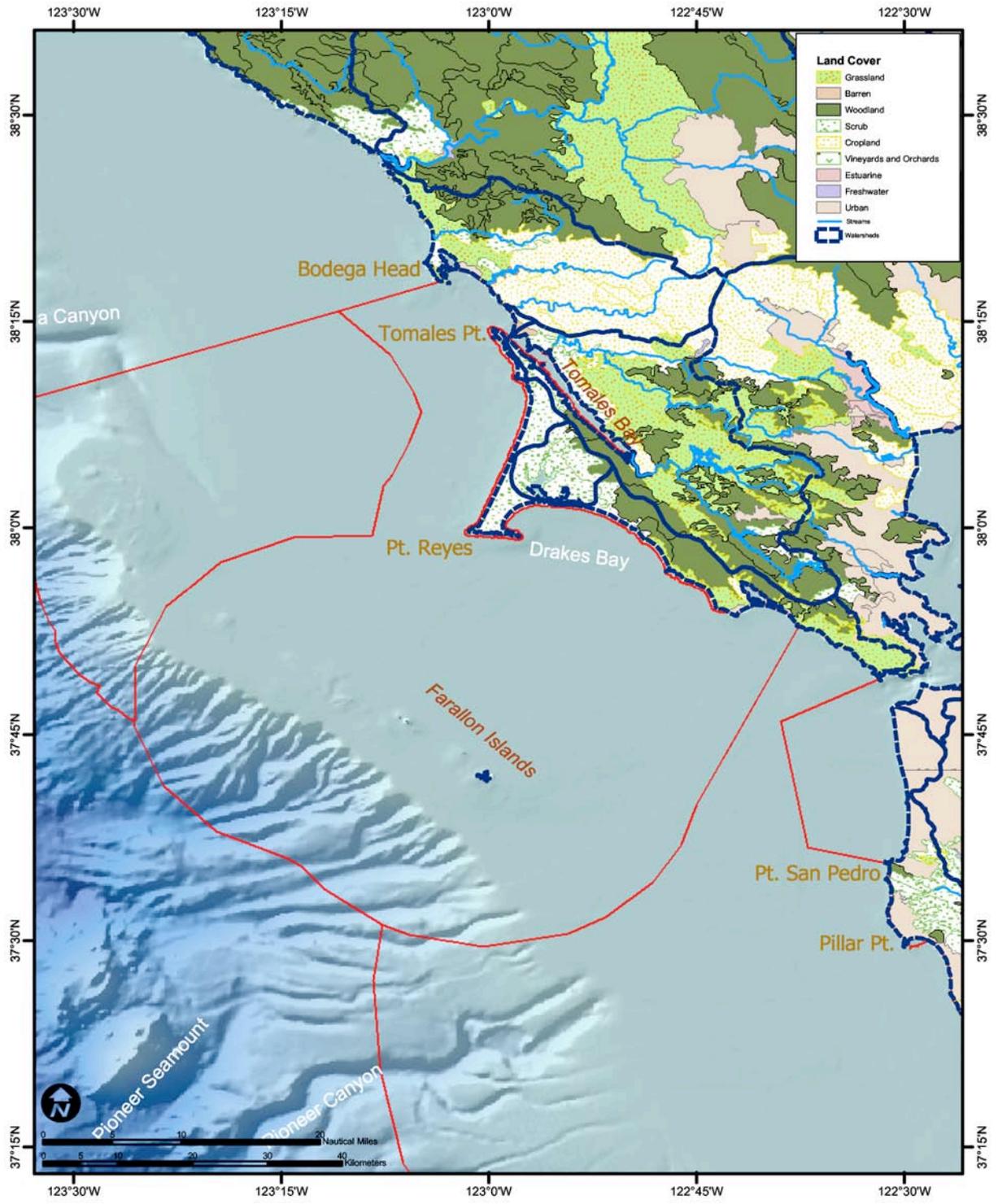
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1. Gregorio, D.E., State Water Resources Board. February 5, 2003; *A Water Quality Primer for Gulf of the Farallones National Marine Sanctuary Water Quality Working Group* (unpublished)  
2. California Department of Fish and Game. December 2001; *California's Living Marine Resources: A Status Report*; Sacramento, California

# WATER QUALITY MAP



# WATER QUALITY - LAND COVER MAP



Inventory Matrix: Gulf of the Farallones Water Quality

**Problem Statement:** There are threats to water quality in the Gulf of the Farallones NMS that should be considered in revising the Management Plan. Water quality within the Sanctuary is generally good due to the rural nature of the coastline and strong currents of the open ocean. Depending on coastal currents, the 8 million people living in the Bay Area and the outflow from the San Francisco Bay Estuary (including agricultural wastes from the Central Valley and residual sediments and metals from historical mining) will periodically have an impact on 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 urban runoff, agriculture, marinas and boating, past 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).

**Goal:** Engage in corrective and proactive measures to protect and enhance water quality in the estuarine, nearshore, and offshore environments of the Sanctuary.

**Objective 1:** Develop a regionally-based, cooperative water quality protection plan to address point and non-point source water quality impacts. This plan will emphasize a watershed/ecosystem approach and address the range of water quality threats from chronic land-based runoff to catastrophic offshore events.

PROGRAMS/ PROJECTS	Brief Description	LEAD/ PARTNERS	INFORMATION SOURCES	PRODUCTS
<b>IMPACTS FROM MARINE DEBRIS</b>				
Education and Outreach on Marine Debris (Forward to Education Group)	A variety of uses occur in the local watersheds that drain into the GFNMS. Develop a publicity program that creates a Sanctuary presence.  Include marine debris in current outreach materials/efforts. Let the public know about the potential for ecosystem impacts from improper disposal of plastics.	Lead: GFNMS Partner: TBWC, NPS, Marin County Health Dept, Sonoma County Health Dept Partners: Surfrider, Media rep, Keep CA Beautiful, County Tobacco Abatement (Dept Public	Existing videos and materials (e.g. Algalita, USCG), Fish Don't Smoke Campaign, Ocean Conservancy, STRAW	Visitor brochures, watershed posters that depict use activities and interactive effects on the Sanctuary, displays in local government offices, utilities, libraries Video/media,

	Outreach to rangers and law enforcement (NOAA Special Agents)	Health), Harbor Districts, MBNMS, CBNMS, Save our Shores, STRAW (give letter of recognition, brochure to handout)		Media Campaign?, Signage (picture of birds w/ plastic)- inside and outside at strategic locations, Website, visitor center exhibits
Marine Debris/ entanglement	Propose to Wildlife Disturbance group to investigate impacts of marine debris (Research and Outreach)	Lead: GFNMS PRBO, TMMC	Algalita, PRBO, TMMC, Beach Watch (collects data on entanglement and oyster tubes)	Outreach materials, Recommendation for MP
Outreach	Outreach to Johnson Oyster Company about their plastic “spacers” and the apparent problem of plastic spacers becoming marine debris.	Lead: PRNS	Beach Watch	
Beach Cleanup- International Coastal Cleanup	Continue participation in International Coastal Cleanup (partnership) Improve procedure/ improve use of data from this project.	Lead: Ocean Conservancy, GFNMS Partner: Surfrider, CA Coastal Commission		Manual for coordinators, record keeping of beach debris
Research plastics in marine environment	Possible GFNMS roles: <ul style="list-style-type: none"> <li>• Monitor marine debris in new sampling (on the water and on the beaches). If appropriate document Langmuir waves and trash</li> <li>• Partner: PRBO (include looking at stomach contents for plastics)</li> <li>• Work with TMMC on tracking entanglements and ingestion of marine debris (also see Beach Watch data)</li> <li>• Through Habitat Characterization</li> </ul>	Algalita (send samples), Regional Board, PRBO, TMMC  RESEARCH WG  Fishing WG	Beach Watch	

	project, track/ quantify abandoned fishing gear in Sanctuary.			
<b>IMPACTS ON ESTUARINE AND NEARSHORE ENVIRONMENTS</b>				
Problem Specific Outreach	<ol style="list-style-type: none"> <li>1. Encourage industries (dairies, agriculture, marinas) through letters and awards of recognition to employ BMPs.</li> <li>2. Pay special attention to developed and developing areas such as Bolinas and Dillon Beach. Promote use of BMPs.</li> </ol>	<p>Lead: GFNMS Partner: County, RWQCB, SWRCB</p>		Awards, letters of recognition, Fliers, press release, website
Develop and Coordinate Monitoring Programs	<p>Plan and initiate an integrated water quality monitoring program, to include assistance from citizen monitors to fill data gaps as necessary. Coordinate volunteer monitoring programs, perhaps by:</p> <ol style="list-style-type: none"> <li>1. Extend Tomales Bay Water quality monitoring program to other estuarine areas not fully monitored: outfalls into Bolinas lagoon and Duxbury reef, Estero Americano, Estero de San Antonio.</li> <li>2. Establishing a working group of all water quality volunteer monitoring groups in the area.</li> <li>3. Coordinating: a) funding identification and opportunities to pool resources, b) reduction of sampling and analysis duplication, c) Quality Assurance /Quality Control (ensure quality of data), d) information sharing</li> <li>4. Use data to inform management decisions.</li> </ol>	<p>Lead: GFNMS Partner: Federal, State and local agencies and citizen monitoring groups (e.g. TBWC (Neysa King)), SFSU-RTCES,</p> <p>Tom Ladig-plankton ID (NMFS-Santa Cruz)</p>	State Water Board Clean Water Team, NOAA Status and Trends researchers/ data	Annual Report of Data, banquet, Create a website for monitoring results, including citizen monitoring data. Response Plan, (after first storms and consistent year round monitoring), brochures, posters, volunteer recruitment

	5. Plankton Study (EDS) (also see HAB under Impacts to open coast)			
Dispersant Use Planning SEND TO VESSEL SPILLS GROUP	Offshore monitoring, detection/location/distribution and abundance of plankton (prey species) and larval fish important for management decisions on use of dispersants	Lead: GFNMS and CBNMS		Database, GIS integration, video, develop dispersion use plan
Monitoring eelgrass beds	Study extent coverage of eelgrass beds in Tomales Bay and long term impacts of mariculture activities on eelgrass beds. Long-term aerial surveys/data collection to determine current extent and future coverages, changes, etc. of eelgrass. Eelgrass beds are vulnerable to water pollution, especially high sediment loads and turbidity. They provide habitat to numerous species (herring spawn). (Recommend to GF Research Group)	Partner: CDFG sporadically does aerial surveys	Data from previous CDFG aerial surveys	
Mariculture	1. Bivalve mariculture is an acceptable and compatible activity in the GFNMS at its current levels and practices. Other types of mariculture will be reviewed by the Sanctuary as they emerge. 2. GFNMS should participate in Shellfish TAC	Lead: GFNMS Partners: Shellfish TAC		
Oily bilge pumpout	1. Capture in revision of discharge regulation 2. SF Bay pumpout stations	Lead: Oil spill trustee councils		
Oily Bilge Pump at Bodega Bay	Ensure Bodega Harbor has a bilge pump out station like at Pillar Point, Santa Cruz, Moss Landing, Monterey Harbor.	Lead: Marin Used oil program, Bodega Harbor District Partner: potentially oil spill restoration councils	Clean Boating San Diego-Leigh Johnson (marina and harbor, boating	Pump out station

			BMPs), CCC Dockwalkers	
Anthropogenic Pathogens and Pollutants from Boating and Marinas	<p>1. Sewage Pumpout station: Track state effort to survey need for waste pumpout station on Tomales Bay (and SF Bay), make recommendations as necessary. Perhaps be a cooperating partner.</p> <p>2. Outreach on BMPs to recreational and commercial users. (e.g. Kayaks, campers, moored vessels)</p>	<p>Lead: Boating and Waterways Partners:</p> <p>1)State Water Board, Dock Walkers, CA integrated Waste Mgmt Program PRNS</p> <p>2)Coordinate with Fishing, Wildlife Disturbance, and Vessel Spills WGs</p>	Dock Walkers	Outreach materials for recreational users
Urban runoff / outreach	<ul style="list-style-type: none"> <li>Establish the Sanctuary's presence in the community, e.g. by sponsoring radio and TV public service announcements for water quality. Distribute fliers and information to libraries, city hall offices, lifeguard stations, marine laboratories and aquarium facilities. Erect information kiosks at key points around Sanctuary, including areas in San Francisco Bay.</li> <li>Public Service announcements should include "good housekeeping practices"—or the simple things a person can do around the home and garden to help prevent polluted runoff.</li> <li>Participate in adopt-a-beach, adopt-a-watershed, coastal clean-up day, and snapshot day activities.</li> <li>Plaster the community—including the San Francisco general area— with images of the Sanctuary and NOAA</li> </ul>			

	<p>such that the GFNMS becomes a household name. Then plaster the community with information about polluted runoff.</p> <ul style="list-style-type: none"> <li>• Include info about NPS pollution in information kiosks around Sanctuary and in Sanctuary visitor center.</li> </ul>			
Land-based discharges into Sanctuary	Coordinate with State and Regional Board about illegal land-based discharges into Sanctuary, and SWQPA's, and other Critical Coastal Areas. (Track and comment)	Lead: SWQCB, RWRCB		Status Report, eliminate illegal discharges into the Sanctuary (SWQPA)
<b>IMPACTS FROM SAN FRANCISCO METROPOLITAN AREA AND BAY</b>				
Oily bilge pumpout	<ol style="list-style-type: none"> <li>1. Capture in revision of discharge regulation</li> <li>2. SF Bay pumpout stations</li> </ol>	Lead: Oil spill trustee councils		
Coordinate with Bay Groups	Interact with SF Bay Area Pollution Prevention Group and Clean Estuary Program to increase information sources, identify project and funding opportunities.	Lead: BAPPG, Clean Estuary Project (Andy Gunther), BACWG (Donna Dessior), BAHWRC (Bay Area Hazardous waste Reduction Committee)	SFBAPPG	Working relationship and info exchange with Bay groups
Pollution Prevention Program	<p>Work to expand Bay Area Pollution Prevention Program to screen for</p> <ol style="list-style-type: none"> <li>1. 303d list issues, emerging pharmaceuticals and endocrine disrupting pollutants that may interfere with life cycles of aquatic life. Encourage research to determine aquatic impacts.</li> <li>2. Alternative Product Use (e.g. pesticides,</li> </ol>	Lead: RWQCB/ Bay Area Clean Water Agencies, SFBAPPG Partner: UC Education system		"Marine Team" (together training and education community groups that

	brown paper, biodegradable plastics)			meet multiple times to agree to make/ learn lifestyle changes that will improve water quality- model after Sierra clubs "Green Team")
<b>IMPACTS ON OPEN COASTAL ENVIRONMENT</b>				
Harmful algal bloom (HAB) monitoring (also see plankton monitoring)	HABs are known to occur in areas of high run off (particularly iron). Year round offshore monitoring of HAB to predict HAB and prevent deaths from domoic acid Amnesic Shellfish Poisoning. Develop ancillary program for "Indepth" tracking of phytoplankton populations. Potential for volunteer monitoring (currently high school program collects sand crab and could send to lab).	Lead: State Dept Health (Greg Langlois) Partner: MBARI, NMFS, TMMC/NMFS Stranding Network		State Dept Health website
History of Radioactive Waste dumpsite (Defer to GF Radioactive WG)	Document History and scientific significance of the radioactive waste dumpsite near the Farallon Islands. Create a comprehensive document to educate the interested public on the history and impact of the dumpsite.	Lead: Navy, NOAA (perhaps contact James Kelley, too)		Document to be used as reference for press. Other

				media.
Research of Oceanography in GFNMS (defer to Research Group)	Attain better understanding of currents via assimilation of existing data and new research to fill data gaps.			1) GIS shape files of currents (seasonal) 2) Real time infor (fund current meters of link to satellite data)
Persistent organic and emerging pollutant monitoring	Identify partnerships and if funding is available, conduct organic pollutant study on marine wildlife on a periodic basis	Lead: RWQCB, Bay Area Pollution Prevention Group, US EPA		
Mussel Watch	Sanctuary should investigate mechanisms to fund or help perpetuate the State's mussel watch program within the GFNMS.			Standing water quality working group endorsement
<b>OTHER</b>				
Standing Water Quality Working Group	Create standing Water Quality WG of the Advisory Council. Also include water quality representatives on standing research and education groups.  Objective of group: (1) develop specific water quality action plans for issues including:	Lead: SAC Partners/ Member: NOAA Fisheries, State WRCB, Regional WQCB, City and County of San Francisco, Marin,		Recommendation to SAC Meet quarterly.

	<p>agriculture, urban areas, boating and marinas, marine debris, offshore impacts (radioactive materials, shipping, etc) and mariculture. (2) maintain active group to keep water quality work of the Sanctuary up to date with current research, management techniques, and issues. Since the field of Water Quality is evolving so quickly, a regularly established group with enough leeway in their objectives can help to keep the Sanctuary on top of the field and Sanctuary needs.</p> <p>Work with state and county on issues such as:</p> <ul style="list-style-type: none"> <li>- Septic systems</li> <li>- Live-aboards</li> <li>- Campers</li> <li>- Kayakers</li> <li>- Urban runoff</li> <li>- TMDLs</li> <li>- Critical coastal areas program's regional meetings</li> <li>- Track Walker Creek TMDLs (e.g. mercury)</li> <li>- Communicate with radioactive dump and leaking vessels (oil) "activities" (or working groups)</li> <li>- Agriculture sources of pollution</li> <li>- Marina sources of pollution</li> <li>- Freshwater diversion</li> </ul>	<p>Sonoma, and San Mateo Counties, Brenda, Tomales Bay Watershed Council (Neysa), Citizen at Large, NGO Surfrider, EPA, CCC, OSPR, Local, state, and Federal Parks, CBNMS, MBNMS</p>		
<p>Administration-Capacity Building</p>	<p>1. Secure funding to hire a water quality professional. Employee should have experience and knowledge of science, management, and education. 2. Water Quality Seat on the SAC</p>			

Data Survey	Survey data from other organizations for status and gaps. Assess whether the direction of existing GFNMS monitoring programs should be altered. Develop recommendations to other existing monitoring organizations.	Lead: GFNMS Partners: Tomales Bay Watershed Council RWQCB, SWRCB, NPS, UCCE, CDFG, Resource Conservation District, Surfrider	Susan Gladstone (RWQCB), Members of standard water quality working group Note: TMDLs- state would need to track existing data	Report identifying gaps and areas missing, GIS maps, plan of action to address gaps
Interagency Coordination and Participation	<ul style="list-style-type: none"> <li>(See above)</li> </ul>			
Nonpoint Education for Municipal Officials (NEMO)	GFNMS should participate on the NEMO-California planning committee. NEMO's mission is to educate municipal officials (ie, elected decision makers) about the link between land use planning decisions and the health of watersheds and coastal waters. NEMO should help facilitate watershed planning and review of local regulations to promote better water quality and watershed protection.	Leads: California Coastal Commission, Mission Resource Conservation District	Other partners: State Water Resources Control Board, Local Government Council, USC Sea Grant, NOAA/NOS, County of Ventura	Sanctuary staff provide support to education/outreach effort, Letters to help secure funding

Objective 2. Propose new Sanctuary regulatory actions as necessary to achieve the water quality goal.

PROGRAMS/ PROJECTS	BRIEF DESCRIPTION	LEAD/ PARTNERS	SANCTUARY'S ROLE	PRODUCTS
Regulation of vessel discharge	1. Consider sanitary discharge regulation based on capacity. (population capacity threshold, research to determine number) Inquire on feasibility of requiring on-board wastewater treatment devices or package plants. 2. Prohibit bilge water discharge. 3. Prohibit ballast water discharge.	Lead: GFNMS		Signed Resolution, Regulation
Regulation Consistency	Revise regulations to be consistent with Clean Water Act			
Technical Changes regarding 'SWQPAs'	Change "Areas of Special Biological Significance" references in Sanctuary regulations to "State Water Quality Protection Area."	Lead: GFNMS Partner: SWRCB		
Revise regulations	<ul style="list-style-type: none"> <li>• Create new "enter and injure" regulation.</li> <li>• Review all new mariculture activities and lease renewals</li> </ul>			
Add new tenth policy to "Purposes and polices of the NMSA"	<ul style="list-style-type: none"> <li>• SAC review and add policy/ purpose about water quality</li> </ul>			

Ranking Matrix: Gulf of the Farallones NMS Water Quality

**Objective 1:** Develop a regionally-based, cooperative water quality protection plan to address point and non-point source water quality impacts. This plan will emphasize a watershed/ecosystem approach and address the range of water quality threats from chronic land-based runoff to catastrophic offshore events.

Program Title	Program Description	Ranking Criteria						Tally	Bin
		Site Benefits	Complexity	Short term feasibility	Long term feasibility	Improved coordination	Urgency		
<b>IMPACTS FROM MARINE DEBRIS</b>									
Outreach	Outreach to Johnson Oyster Company about their plastic “spacers” and the apparent problem of plastic spacers becoming marine debris.	C	A	A	A	C	B	CAA ACB	3
Beach Cleanup- International Coastal Cleanup	Continue participation in International Coastal Cleanup (partnership) Improve procedure/ improve use of data from this project.	C	A	A	A	C	C	CAA ACC	3
<b>IMPACTS ON ESTUARINE AND NEARSHORE ENVIRONMENTS</b>									
Problem Specific Outreach	1. Encourage industries (dairies, agriculture, marinas) through letters and awards of recognition to employ BMPs. 2. Pay special attention to developed and developing areas such as Bolinas and Dillon Beach. Promote use of BMPs.	A	B	C	B	B	B	ABC BBB	3
Develop and Coordinate Monitoring Programs	Plan and initiate an integrated water quality monitoring program, to include assistance from citizen monitors to fill data gaps as necessary. Coordinate volunteer monitoring programs by: 1. Extend Tomales Bay Water quality monitoring program to other estuarine areas not fully monitored: outfalls into Bolinas lagoon and Duxbury reef, Estero Americano, Estero de San Antonio. 2. Establishing a working group of all water quality volunteer monitoring groups in the area. 3. Coordinating: a) funding identification and	A	C	C	C	A	A	ACC CAA	2

Program Title	Program Description	Ranking Criteria						Tally	Bin
		Site Benefits	Complexity	Short term feasibility	Long term feasibility	Improved coordination	Urgency		
	opportunities to pool resources, b) reduction of sampling and analysis duplication, c) Quality Assurance /Quality Control (ensure quality of data), d) information sharing 4. Use data to inform management decisions. 5. Plankton Study (EDS) (also see HAB under Impacts to open coast)								
Mariculture	1. Bivalve mariculture is an acceptable and compatible activity in the GFNMS at its current levels and practices. Other types of mariculture will be reviewed by the Sanctuary as they emerge. 1. GFNMS should participate in Shellfish TAC	B	A	A	A	C	B	BAA ACB	2
Oily Bilge Pump at Bodega Bay	Ensure Bodega Harbor has a bilge pump out station like at Pillar Point, Santa Cruz, Moss Landing, Monterey Harbor.	B	C	B	B	B	B	BCB BBB	3
Anthropogenic Pathogens and Pollutants from Boating and Marinas	1. Sewage Pumpout station: Track state effort to survey need for waste pumpout station on Tomales Bay (and SF Bay), make recommendations as necessary. Perhaps be a cooperating partner.	B	A	A	A	C	B	BAA ACB	2
	2. Outreach on BMPs to recreational and commercial users. (e.g. Kayaks, campers, moored vessels)	A	B	B	B	B	B	ABB BBB	2
Land-based discharges into	Coordinate with agencies about land-based discharges into Sanctuary, and ASBS's, and other	A	C	A	A	B	A	ACA	1

Program Title	Program Description	Ranking Criteria						Tally	Bin
		Site Benefits	Complexity	Short term feasibility	Long term feasibility	Improved coordination	Urgency		
Sanctuary	Critical Coastal Areas. (Track and comment)							ABA	
<b>IMPACTS FROM SAN FRANCISCO BAY</b>									
Coordinate with Bay Groups	Interact with SF Bay Area Pollution Prevention Group and Clean Estuary Program to increase information sources, identify project and funding opportunities.	B	A	C	B	B	A	BAC BBA	2
Pollution Prevention Program	Work to expand Bay Area Pollution Prevention Program to screen for 1. 303d list issues, emerging pharmaceuticals and endocrine disrupting pollutants that may interfere with life cycles of aquatic life. Encourage research to determine aquatic impacts. 2. Alternative Product Use (e.g. pesticides, brown paper, biodegradable plastics)	B	C	C	B	B	B	BCC BBB	3
<b>IMPACTS ON OPEN COASTAL ENVIRONMENT</b>									
Harmful algal bloom (HAB) monitoring (also see plankton monitoring)	HABs are known to occur in areas of high run off (particularly iron). Year round offshore monitoring of HAB to predict HAB and prevent deaths from domoic acid Amnesic Shellfish Poisoning. Develop ancillary program for "Indepth" tracking of phytoplankton populations. Potential for volunteer monitoring (currently high school program collects sand crab and could send to lab).	B	B	C	B	A	B	BBC BAB	3
Persistent organic and emerging	Identify partnerships and if funding is available, conduct organic pollutant study on marine wildlife on a periodic basis	A	C	C	C	A	B	ACC	3

Program Title	Program Description	Ranking Criteria						Tally	Bin
		Site Benefits	Complexity	Short term feasibility	Long term feasibility	Improved coordination	Urgency		
pollutant monitoring								CAB	
Mussel Watch	Sanctuary should investigate mechanisms to fund or help perpetuate the State's mussel watch program within the GFNMS.	B	A	A	A	A	A	BAA AAA	1
<b>OTHER</b>									
Standing Water Quality Working Group	<p>Create standing Water Quality WG of the Advisory Council. Also include water quality representatives on standing research and education groups.</p> <p>Objective of group: (1) develop specific water quality action plans for issues including: agriculture, urban areas, boating and marinas, marine debris, offshore impacts (radioactive materials, shipping, etc) and mariculture. (2) maintain active group to keep water quality work of the Sanctuary up to date with current research, management techniques, and issues. Since the field of Water Quality is evolving so quickly, a regularly established group with enough leeway in their objectives can help to keep the Sanctuary on top of the field and Sanctuary needs.</p> <p>Work with state and county on issues such as:</p>	A	C	C	C	A	A	ACC CAA	2

Program Title	Program Description	Ranking Criteria						Tally	Bin
		Site Benefits	Complexity	Short term feasibility	Long term feasibility	Improved coordination	Urgency		
	<ul style="list-style-type: none"> <li>- Septic systems</li> <li>- Live-aboards</li> <li>- Campers</li> <li>- Kayakers</li> <li>- Urban runoff</li> <li>- TMDLs</li> <li>- Critical coastal areas program's regional meetings</li> <li>- Track Walker Creek TMDLs (e.g. mercury)</li> <li>- Communicate with radioactive dump and leaking vessels (oil) "activities" (or working groups)</li> <li>- Agriculture sources of pollution</li> <li>- Marina sources of pollution</li> <li>- Freshwater diversion</li> </ul>								
Administration-Capacity Building	<p>1. Hire a water quality professional. Employee should have experience and knowledge of water quality, science, management, and education.</p> <p>2. Water Quality Seat on the SAC</p>	A	C	A	C	A	A	ACA CAA AAA AAA	2 1
Data Survey	Survey data from other organizations for status and gaps. Assess whether the direction of existing GFNMS monitoring programs should be altered. Develop recommendations to other existing monitoring organizations.	A	B	B	B	C	A	ABB BCA	2

Program Title	Program Description	Ranking Criteria						Tally	Bin
		Site Benefits	Complexity	Short term feasibility	Long term feasibility	Improved coordination	Urgency		
Interagency Coordination and Participation	(See above)								
Nonpoint Education for Municipal Officials (NEMO)	GFNMS should participate on the NEMO-California planning committee. NEMO's mission is to educate municipal officials (ie, elected decision makers) about the link between land use planning decisions and the health of watersheds and coastal waters.	A	B	A	A	B	A	ABA ABA	1



SITE-SPECIFIC ISSUE:

## WILDLIFE DISTURBANCE

Recommendation to the GFNMS Advisory Council  
from the Wildlife Disturbance Working Group

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### WORKING GROUP MEMBERS

**Christine Abraham,  
PRBO**

**Mary Jane Schramm,  
GFNMS SAC Coordinator**

**Steve Durkin,  
Fitzgerald Marine Reserve (FMR)**

**Bob Wilson,  
GFNMS SAC**

**Mick Menigoz,  
Natural History and Sport Fishing  
Vessel Operator, GFNMS SAC**

**Kathy Zagzebski,  
The Marine Mammal Center**

**Joanne Mohr,  
FMSA, Volunteer Coordinator**

### WORKING GROUP MEETINGS

**MEETING 1:**

- Overview of Joint Management Plan Review Process
- Decision Making Process

**MEETING 2:**

- Development of Problem Statement, Issue Characterization, Goals and Objectives

**MEETING 3:**

- White Shark Research at SE Farallon Island (PRBO)
- Ecotourism and White shark Interactions
- Human Disturbance to Seabirds (PRBO)
- Trampling in the Intertidal (FMR)

**MEETING 4:**

- Inventory of Existing Programs and Building of Options for the GFNMS Management Plan

**MEETING 5:**

- Prioritization and Ranking
- Priority Management Options

### ISSUE STATEMENT

The pressure on marine resources continues to grow as the human population increases around coastal areas and access to nearshore and offshore environments becomes easier. Of specific concern to GFNMS are wildlife disturbances associated with: fishing and collecting in tidepools and mudflats; trampling of the intertidal; impacts from hikers and beach users, dogs, boaters, and kayakers on birds and marine mammals; entanglements; acoustic impacts; overflights; activities

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associated with increasing ecotourism and the use of attractants or chumming (e.g. interactions with white sharks and researchers).

## **ISSUE DESCRIPTION**

The pressure on marine resources continues to grow as the human population increases around coastal areas and access to offshore environs becomes easier. With the multitude of opportunities for harvesting, observing, and interacting with nature comes the potential for wildlife disturbance.

Wildlife disturbance may be caused by direct and indirect factors. Wildlife disturbance may be a result of natural events such as storms, fluctuations in water temperature, physical/chemical changes to water. Wildlife disturbance may also stem from anthropogenic causes. 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 tidepool inhabitants; and trampling intertidal habitats.

In 1966, 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, state and local economies saw a 40% increase in spending by wildlife viewers between 1991 and 1996. New information indicates the number of wildlife viewers are increasing. Nature tourism activities include: wildlife viewing from shore, photographing scenery, wildlife viewing from aircraft, beach visitation, diving, and paddling. California is second only to Florida in nature tourism and wildlife viewing.

Of specific concern to the GFNMS are negative impacts associated with: trampling and collecting in the intertidal; interactions with white sharks; disturbances from hikers, boaters, and low flying aircraft; ocean noise; fisheries interactions; and entanglements.

## **SIGNIFICANT RESOURCES**

The area was selected and designated as the Gulf of the Farallones National Marine Sanctuary because of significant concentrations of the following marine resources: (1) seabirds and aquatic birds; (2) marine mammals (pinnipeds and cetaceans); (3) fish; (4) marine flora (algae); (5) benthic fauna; and (6) 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-tail albatross. Of particular concern to the Sanctuary are wildlife disturbance impacts on seabirds and marine mammals.

### **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 United States. These birds forage in the Gulf of the Farallons, and are highly dependant 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 Gulf of the Farallones National Marine Sanctuary: six species of pinnipeds (seals and sea lions), 28 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 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 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 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 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 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 Sanctuary between April and November, including Humpbacks and Blue whales, representing one of the largest congregation of whales in the Northern Hemisphere.

### **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, the Marine Mammal Protection Act, Migratory Bird Treaty Act, California Endangered Species Act. Site specific regulations for Gulf of the Farallones National Marine Sanctuary address wildlife disturbance through Sanctuary prohibitions such as: disturbing seabirds or marine mammals by flying motorized aircraft at less

than 1000 feet (location specific); discharging or depositing (with exceptions); and altering the seabed (with exceptions).

#### 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 5 years or less if the 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.

**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 Fishery Conservation and Management Act** This Act provides for conservation and management of fishery resources off the coast 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 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 California Department of Fish and Game to maintain viable populations of all native species. The Department has designated certain vertebrate species as “Species of Special Concern” because of 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 and/or the California Dept. of Fish and Game.

**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 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 3nm of shore.

## **GOAL**

To lessen or eliminate, and remedy impacts on the living marine resources of the Sanctuary and their habitats by encouraging responsible human behavior.

## **OBJECTIVE**

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

## **RECOMMENDATION**

### **■ OBJECTIVE 1: Evaluate levels and sources of impacts on wildlife and habitats.**

**STRATEGY WD-1: *Through the use of volunteer monitoring programs, observe and record impacts from human activity on marine resources such as marine mammals and seabirds, and key habitats such as sandy beaches and rocky intertidal.***

**Action 1.1** Under the Sanctuary Naturalist Corps umbrella, develop a coordinated and complementary set of monitoring programs to evaluate levels and sources of wildlife disturbance impacts.

- A. The SEALS program was established to document the impact of human activity on harbor seals in Bolinas Lagoon and Tomales Bay. The goal of the program is to minimize disturbance to the seal colonies and educate the community about protection of habitat.

**Priority Level: 2**

**Implementation Timeline:** In place

**Products:** SEALS Annual Report

**Partners:** FMSA, TMMC, PRNS

- B. Beach Watch is a long-term beach monitoring project to develop baseline information on the Sanctuary's biological resources. Every 4 weeks volunteers count and identify, and photo-document dead marine wildlife on shore and marine life and human activity on their beaches and immediately offshore. Volunteers also report stranding of marine mammals and collect oil samples from the beach.

**Priority Level: 1**

**Implementation Timeline:** In place

**Products:** Beach Watch Annual Report, collaborative research papers, NRDA data, Biennial Research Symposium

**Partners:** FMSA, State Parks, OSPR, FMR, USFWS, CDFG, MBNMS

- C. Develop a volunteer-based intertidal monitoring program, based on the Fitzgerald Marine Reserve Intertidal Human Impact Study, to evaluate the effects of trampling and harvesting on sensitive and high traffic areas such as Duxbury Reef. This program could be adopted by a San Francisco Bay Area high school using the Monitoring Handbook, and using materials developed by FMSA , which includes information on monitoring key species, sampling protocol, data sheets and data analysis methods.

**Priority Level: 2**

**Implementation Timeline:** By end of year 1 - gather baseline data and develop plan; By end of year 2 - implement monitoring plan

**Partners:** FMR, BML, GGNRA

- D. Coordinate and formalize support for on-going, region wide harbor seal population census. The census provides important information on changes in population distribution and abundance of harbor seals throughout the region and could make possible links to human presence and disturbance.

**Priority Level: 1**

**Implementation Timeline:** In place

**Partners:** FMSA, GGNRA, PRNS, BML, Stewards of Slavianka

**STRATEGY WD-2: *Create easily accessible centralized web-based spatial database.***

**Action 2.1** Develop a well designed information management and dissemination system to support and facilitate better resource protection from wildlife disturbance activities. The system should support the ability to carry out any type of data analysis or processing from statistical analysis to support management decisions.

- A. Using GFNMS' existing infrastructure capacity with outside software expertise, the Sanctuary will develop a system in which to integrate a large volume of data, process all in-coming data, synthesize and analyze the data.
- B. Develop a web-based spatial system widely accessible to GFNMS staff, scientists, decision makers and volunteers and available for individual querying of all available data sets.

**Priority Level: 2**

**Implementation Timeline:** Data management system in place within 18 months

**Partners:** FMSA, CSC

**STRATEGY WD-3: *Develop research and/or monitoring programs to better understand and address noise, light and visual impacts on marine mammals and seabirds from low flying aircraft.***

**Action 3.1** Modify existing monitoring programs to identify types and frequency of impacts on wildlife from low flying motorized and non-motorized aircraft both inside and outside the Sanctuary restriction zones. Low flying aircraft is known to create behavioral changes in seabirds and marine mammals 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. Observations should make distinctions

between impacts associated with motorized (e.g., fixed wing, helicopters) and non-motorized (e.g., parasails, hang gliders) aircraft, and provide valuable information on compliance with the Sanctuary's overflight regulation.

- A. Make additional observations during SEALS monitoring program to identify impacts on harbor seals from low flying aircraft (possible correlation with species distribution).
- B. Modify Beach Watch to observe impacts on marine mammals and sea birds from low flying aircraft over beaches and shorelines.
- C. Coordinate with research partners at PRBO and PRNS to document visual observations of wildlife disturbance from low flying aircraft while in the field.

**Action 3.2** Based on research and monitoring findings, take appropriate actions to address impacts on wildlife from motorized and non-motorized aircraft including:

- A. If justifiable, propose appropriate regulatory action or propose adjustments to current GFNMS' overflight regulation to address impacts from low flying aircraft.
- B. Develop interpretive enforcement /outreach program targeting pilot organizations, flight schools, flight clubs, aviation publications and airports
- C. Maintain long term monitoring program to continue to document disturbance and/or effectiveness of regulatory action and interpretive enforcement program

**Priority Level: 2**

**Implementation Timeline:** Complete implementation of monitoring programs and findings by end of year 2; if appropriate, begin proposed regulatory process and development of interpretive enforcement/outreach program beginning of year 3

**Partners:** FMSA, PRNS, GGRNA, PRBO, USFWS, CDFG

**STRATEGY WD-4: *Develop research and/or monitoring programs to better understand and address impacts on wildlife from vessel disturbance.***

**Action 4.1** Modify existing monitoring programs to identify types and frequency of impacts on wildlife from motorized and non-motorized vessels. Areas including whale migration routes, rookeries, haulout sites, nesting and feeding sites are particularly sensitive to vessel traffic. Information from monitoring programs will help to identify key geographical areas and types of vessels with high disturbance frequency to be targeted for needed outreach and enforcement. Observations should make distinctions between impacts associated with motorized (e.g., pleasure boats, whale watching vessels, commercial and recreational boats) and non-motorized (e.g., kayaks, canoes) vessels.

- A. Put more emphasis on SEALS monitoring program identifying impacts on harbor seals from vessel activities (possible correlation with species distribution).
- B. Modify Beach Watch to observe impacts on marine mammals and sea birds from vessel activities.

**Action 4.2** Based on research and monitoring findings, take appropriate actions to address impacts on wildlife from motorized and non-motorized vessels including:

- A. Develop and distribute wildlife viewing guidelines (posters, informational cards, brochures) to target audiences including:
  - kayakers (Paddlers Etiquette)
  - whale watching boats (based on Watchable Wildlife and Hawaiian Islands Humpback Whale National Marine Sanctuary guidelines)
  - private boaters (including recreational and commercial boats)
- C. Collaborate with other agencies to maintain long term monitoring/observation program to document disturbance from vessel traffic and/or effectiveness of regulatory action and interpretive enforcement program.
- D. Develop standardized reporting system for researchers, enforcement officers and agency field personnel to document wildlife disturbance from vessel activities.

**Priority Level: 2**

**Implementation Timeline:** Fully implement monitoring and outreach program by end of year 2

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

**Products:** Site-specific and activity specific wildlife viewing guidelines

**STRATEGY WD-5: *Collaborate with other research institutions and agencies on identifying sources of wildlife disturbance data collected in the Sanctuary.***

**Action 5.1** Through the use of permit conditions, reporting requirements and/or tracking system, identify wildlife disturbance related research and monitoring programs taking place in the Sanctuary.

- A. Develop tracking system to identify institutions, principal investigators and actual location of data collection efforts taking place in the Sanctuary.
- B. Use tracking system to inform researchers about responsible wildlife interactions, seasonal restrictions, GFNMS' and other agency regulations.
- C. Use tracking system to identify potential partnerships and opportunities to collect data on wildlife disturbance.
- D. Develop standardized protocols for data collection on wildlife disturbance.
- E. As appropriate, request data sets from researchers to include in web-based data base for use by resource managers in addressing wildlife disturbance issues, to be submitted through on-line reporting system.

**Priority Level: 2**

**Implementation Timeline:** Develop framework by the end of year 1, fully implement by end of year 3

**Partners:** research community, permitting agencies

**Products:** Biennial Symposium

**■ OBJECTIVE 2: Develop enforcement programs to address human behavior that is impacting wildlife and habitats.**

**STRATEGY WD-6: Through the use of interpretive enforcement and law enforcement efforts, address human behavior that may be adversely impacting wildlife.**

**Action 6.1** 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. Interpretive enforcement is intended to be both a proactive and preventative method to avert negative impacts from human behavior before they occur. Sanctuary Naturalist Corps programs are volunteer-based peer education programs that use interpretation to affect behavior and values to achieve voluntary compliance with Sanctuary regulations.

- A. The SEALS Program was established to document the impact of human activity on harbor seals in Bolinas Lagoon and Tomales Bay. The program works to minimize disturbance to the 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 volunteer teams frequently encounter curious onlookers and visitors engaged in recreational activities such as bird watching, fishing, clam digging and kayaking. SEALS volunteers: answer questions on harbor seal behavior and natural history; explain the purpose of the SEALS program and inform the public on how to recognize and minimize disturbance to the seal colonies; provide information about marine sanctuaries and how human activity affects their health.

**Priority Level: 1**

**Implementation Timeline:** In place

**Products:** SEALS Annual Report

**Partners:** FMSA, TMMC, PRNS

- B. Beach Watch is a long-term beach monitoring project to develop baseline information on the Sanctuary's biological shoreline resources. Beach Watch is a long-term beach monitoring project to develop baseline information on the Sanctuary's biological resources. Every 4 weeks volunteers count and identify, and photo-document dead marine wildlife on shore and marine life and human activity on their beaches and immediately offshore. Volunteers also report stranding of marine mammals and collect oil samples from the beach. In addition to their monitoring efforts, Beach Watch volunteers interact with the public and educate them about the coastal environment and encourage them to make a difference in protecting the beaches.

**Priority Level: 1**

**Implementation Timeline:** In place

**Products:** Beach Watch Annual Report, collaborative research papers, NRDA data, Biennial Research Symposium, interpretive enforcement materials

**Partners:** FMSA, State Parks, OSPR, FMR, USFWS, CDFG, MBNMS

- C. Create a new interpretive enforcement program to address impacts from human trampling and harvesting on rocky intertidal habitats. Based on Fitzgerald Marine Reserve's Roving Intertidal Docent Program, a similar volunteer-based program should be expanded to address trampling and harvesting on sensitive and high traffic areas such as Duxbury Reef.

**Priority Level: 1**

**Implementation Timeline:** In place

**Products:** Interpretive enforcement materials

**Partners:** FMSA, State Parks, FMR, CDFG

**Action 6.2** Develop a coordinated and cooperative Protected Resource Enforcement Plan to insure sufficient patrol presence in the Sanctuary.

- A. Through the development of partnerships and interagency cooperation, a cross-deputation program with California Dept. of Fish and Game, U.S. Fish and Wildlife Service, NOAA Fisheries and the National Park Service will be formalized.
- B. Train enforcement officers in interpretive enforcement and Sanctuary regulations.
- C. Maintain an active enforcement relationship with the United States Coast Guard and the Civil Aeronautical Patrol.
- D. Hire a dedicated sanctuary enforcement officer.
- E. Investigate the potential for training volunteer uniformed enforcement officers.

**Priority Level: 2**

**Implementation Timeline:** Fully implement Protected Resources Enforcement Plan by end of year 2

**Products:** Interpretive enforcement materials

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

**STRATEGY WD-7: *Develop wildlife viewing guidelines to reduce disturbance to wildlife from human interactions.***

**Action 7.1** Conduct an assessment of target audiences to determine 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 the Watchable Wildlife program. The Watchable Wildlife 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, and pertains 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)
  - 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 ID cards
  - 3. reach boaters through vessel registration with Department of Motor Vehicles
- B. Develop whale watching guidelines based on Hawaiian Islands Humpback Whale National Marine Sanctuary's guidelines for commercial operators.

1. hold workshops for whale watching operators
  2. develop responsible wildlife viewing certification program for whale watching boats
- C. Continue and expand distribution of PADDLER'S Etiquette and develop complementary outreach tools such as signage and animal ID cards.
1. hold workshops for kayak vendors
- D. Develop wildlife viewing and interaction guidelines for shoreline observers addressing marine mammals strandings, trampling and harvesting in the intertidal.
- 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
- F. Develop guidelines for interacting with white sharks (see proposed regulatory section below)

**Priority Level: 1**

**Implementation Timeline:** Finalize Responsibly Watching California Marine Life by end of year 1; hold workshops with user/interest groups by end of year 1; develop and distribute materials by end of year 2

**Partners:** FMSA, USFWS, CDFG, NPS, TMMC, State Parks, PRBO, harbors and marinas

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

**STRATEGY WD-8: *Develop K-12 wildlife disturbance education unit as part of the Coastal Ecosystem Education Curriculum.***

**Action 8.1** Develop wildlife disturbance curriculum as the centerpiece on which to build and expand education efforts to school groups, teachers and community groups.

- A. Hold workshop with Bay Area marine educators to inventory existing curriculum and wildlife disturbance programs; coordinate messaging; minimize overlapping and identify gaps.
- B. Develop curriculum unit that addresses human impacts on wildlife behavior, meets state curriculum standards and is a self-contained unit that can be incorporated into existing science programs.
- C. Under the Teacher Professional Development Institute, develop continuing education credit teacher workshops for training on use of curriculum and field studies.
- D. Develop volunteer-based speakers bureau to go into schools and community settings to communicate concepts captured in curriculum unit

**Priority Level: 2**

**Implementation Timeline:** Workshop, planning and development complete by year 2; full implementation by end of year 3  
**Partners:** MARE, Local educational institutions, Bay Area marine educators  
**Products:** Curriculum unit

**STRATEGY WD-9: *Maximize media venues to augment direct outreach efforts and increase public awareness of wildlife disturbance issues.***

**Action 9.1** 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 boiler plate messaging format for planned media communications and to be prepared for unplanned /emergency events (reactive) media coverage
- D. Develop media kit
- E. Identify opportunities for cooperative marketing efforts with other agencies and organizations

**Priority Level: 1**

**Implementation Timeline:** Complete media plan and be ready for implementation at the end of year 1

**Partners:** FMSA, SF Ad Council, TMMC, State Parks, USCG, NMFS, PRBO, GGNRA, MBNMS, CBNMS

**STRATEGY WD-10: *Propose regulatory action to address impacts on wildlife from sound.***

**Action 10.1** Through regulatory channels, propose a prohibition on impacts to marine wildlife from sound. A growing number of studies are documenting impacts to living resources including physical, behavioral changes and psychological effects due to exposure to anthropogenic noise and pressure waves in the marine environment. Studies have been done on marine mammals, fish and invertebrates. Sources of anthropogenic noise include: air traffic, seismic exploration, military activity, recreational and commercial boats, acoustic thermometry and low frequency active sonar (LFA).

- A. Engage in a literature search to justify the use of a decibel or megahertz level as a threshold for enforcing a prohibition on impacts on wildlife from sound.

**Priority Level: 2**

**Implementation Timeline:** Immediately

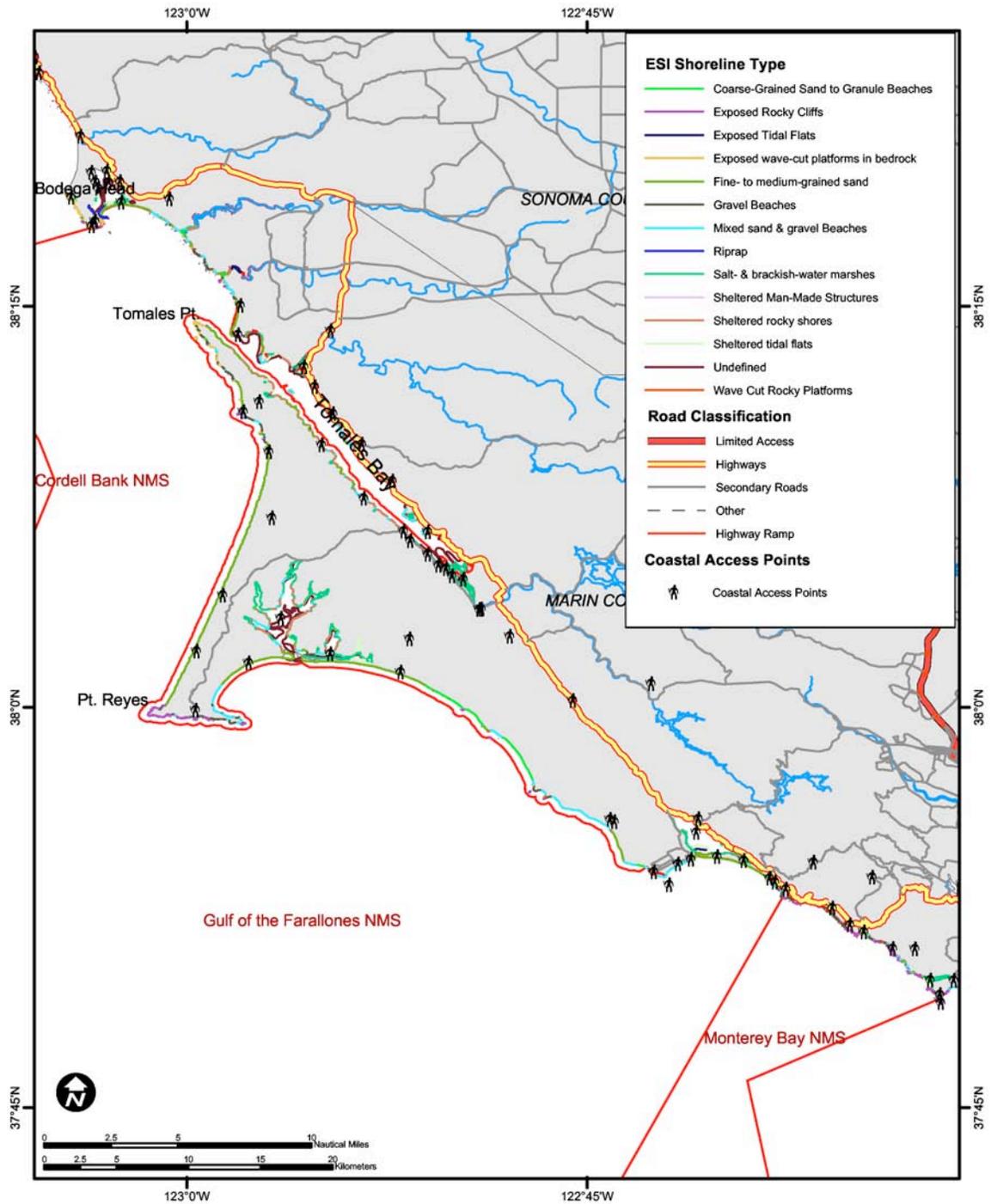
**STRATEGY WD-11: *Propose new regulations for interacting with white sharks.***

**Action 11.1** Address issues related to shark interactions by both researchers and adventure tourism operators. Regulatory actions listed below were presented to the Wildlife Disturbance Working Group as a joint proposal from PRBO researcher Peter Pyle and adventure tourism operator Lawrence Groth. The recommendation was accepted by the working group with one

unresolved issue being the location of the zones for deployment of the shark diving cage. The proposal is as follows:

- A. No vessels can approach feeding white sharks in the GFNMS within 50m without a scientific permit from GFNMS and CDFG. Scientific permits will only be issued for vessels <6m in length. No vessels can approach feeding White sharks within 5m under any circumstances. "Feeding" is defined as shark present in the vicinity of a marine mammal carcass.
- B. No decoys shall be actively trolled behind boats underway (in any form) within GFNMS. Decoys are defined as any floating object larger than 50cm and smaller than 4m in length. No deployment of motorized decoys will be permitted.
- C. Both the stationary deployment of decoys and the deployment of cages shall not be allowed within 0.5 nautical miles of Southeast Farallon Island, except as defined by the cross-hatch sections on the enclosed map (this point still under discussion). Areas in which stationary deployment of decoys will be allowed include a "station" at the Fisherman's Bay buoy and an area between Shubrick Point (to the east) and the tip of Low Arch Peninsula (to the southwest) (GFNMS to supply specific coordinates and compass direction of boundaries). Stationary deployment will only be allowed when a recreational cage is also in the water. Stationary deployment is defined as deployment from a vessel that is anchored, tied to a buoy, or drifting, but is not underway in any manner (power or sail). Deployment of neither decoys or cages will be permitted without an educational or research permit.
- D. No chumming of any type of material shall be allowed for shark-viewing or research purposes.
- E. No intentional "take" (defined as the actual or attempted harassment, hunt, capture, or kill) of white sharks by any means may occur.

# COASTAL ACCESS POINTS AND SHORELINE TYPES



Inventory Matrix: Gulf of the Farallones NMS Wildlife Disturbance

**Problem Statement:** The pressure on marine resources continues to grow as the human population increases around coastal areas and access to nearshore and offshore environments becomes easier. Of specific concern to GFNMS are wildlife disturbances associated with: fishing and collecting in tide pools and mudflats; trampling of the intertidal; impacts from hikers and beach users, dogs, boaters, and kayakers on birds and marine mammals; entanglements; acoustic impacts; overflights; and activities associated with increasing ecotourism and the use of attractants or chumming (e.g. interactions with White sharks and researchers).

**Goal:** To lessen or eliminate, and remedy impacts on the living marine resources of the Sanctuary and their habitats by encouraging responsible human behavior.

**Objective 1:** Evaluate levels and sources of impacts on wildlife and habitats

PROGRAMS/ PROJECTS	Brief Description	LEAD/ PARTNERS	INFORMATION SOURCES	PRODUCTS
Resource Monitoring: Sanctuary Naturalist/ Stewards -SEALS -Beach Watch -Intertidal (new) - Seals census	Provide volunteer monitoring of Sanctuary resources including marine mammals, seabirds, intertidal, and beaches, to determine level of human disturbance. 1) SEALS: Continue to monitor disturbances to harbor seals in Tomales Bay and Bolinas Lagoon 2) Beach Watch: Continue to monitor beaches for presence of oil and other human activities. 3) Intertidal monitoring: establish volunteer monitoring program to evaluate human impacts to the intertidal. 4) Seals Census: Formalize support of ongoing harbor seal population census, to contribute to regional understanding of changes in distribution and abundance possibly caused by human activity. As additional monitoring needs arise,	Lead: GFNMS/ FMSA Partners: PRNS, PRBO, High Schools, Volunteers, State Parks, TMMC, OSPR, FMR, USFWS, CDFG, MBNMS, local universities (SFSU), BML, Lawson’s Landing, Sea Drift, local municipalities, GGNRA, Stewards of Slavianka	FMR Intertidal Human Impact Study, Stewards of Slavianka, NMFS, CDFG, Sarah Allen (PRNS), all partners	Long term database, wildlife disturbance data, Seals Census Report, SEALS Annual Report, Beach Watch Annual Report, collaborative research papers, NRDA data, Biennial research symposium, Volunteer Intertidal Monitoring Annual Report, presentations at conferences and public forums

<b>PROGRAMS/ PROJECTS</b>	<b>Brief Description</b>	<b>LEAD/ PARTNERS</b>	<b>INFORMATION SOURCES</b>	<b>PRODUCTS</b>
	utilize these core volunteer groups.			
Data Management	Synthesize and analyze data from Sanctuary Steward programs and other research programs. Create centralized web-based spatial database that can be queried and is easily accessible.	Lead: GFNMS, FMSA, NOS Partners: SIMoN, MBNMS	SIMoN, MBNMS, OCNMS, CBNMS	Database
Research/ Monitoring- Investigate impacts to birds and mammals from low flying aircraft.	Utilize existing monitoring programs (SEALS and Beach Watch) and research partnerships (PRNS, PRBO) to document impacts of motorized and non-motorized aircraft (specifically effects of noise and visual impacts) on wildlife.	Lead: GFNMS, FMSA Partners: PRNS, PRBO, USFWS	PRNS, PRBO, CINMS, DoD	peer-reviewed research paper documenting results, periodic report on continuing monitoring
Research/ Monitoring- Investigate effects of vessel disturbance to marine mammals and birds	Utilize existing monitoring/research programs (SEALS and Beach Watch) to document impacts of vessels on marine mammals and birds and establish a threshold for disturbance. Use long-term monitoring to continue to document disturbance and possible violations.	Lead: GFNMS, FMSA Partners: MBNMS	Team Ocean (FKNMS)	
Research/ Monitoring- Gather data on wildlife disturbance through collaboration with research community	Through permit conditions, reporting requirements and/or tracking system, encourage researchers working in the Sanctuary to gather data on wildlife disturbance.	Lead: GFNMS Partner: Research community	Investigators Annual Report (NPS online reporting of all collections in parks)	Increased data on wildlife disturbance, research papers and reports

**Objective 2:** Address human behavior that is impacting wildlife and habitats

PROGRAMS/ PROJECTS	Brief Description	LEAD/ PARTNERS	INFORMATION SOURCES	PRODUCTS
Develop an interpretive enforcement program: Sanctuary Naturalist/ Stewards -SEALS -Beach Watch -Intertidal (new) - Visitor Centers - Sandy Beach (H.S.)	Provide volunteer education and outreach about Sanctuary resources including marine mammals, seabirds, intertidal, and beaches. Will address the following wildlife disturbance issues: 1) Tidepool protection: Develop Roving Intertidal Docents Program (possibly expand FMR prog. to Duxbury Reef) 2) Oil and tar impacts: Continue Beach watch to monitor for oiling incidents 3) Disturbance to harbor seals: Continue/expand SEALS outreach to clambers, hikers, dogs, kayakers, motor boaters, and other visitors. Expand to Lawson’s landing 4) Ecotourism- supply Sanctuary certified naturalists to ecotourist companies operating in GFNMS 5) Establish junior steward programs in association with all volunteer programs	Lead: GFNMS/ FMSA Partners: PRBO, High Schools, Volunteers, State Parks, TMMC, OSPR, FMR, USFWS, CDFG, MBNMS, BML, Lawson’s Landing, Sea Drift, local municipalities, Pacifica Chamber of Commerce, PRNS and GGNRA, NMFS, BASK (Bay Area Sea Kayakers), Marin Open Space District	PRBO, State Parks, TMMC, NMFS, FMR, OSPR, CDFG, USFWS, MBNMS, BML, PRNS, GGNRA	Paddlers and Walkers Etiquette, decals, posters, fliers, interpretive programs. Outreach materials, Annual Reports of programs.  Intertidal Etiquette and outreach materials.  Kiosks, visitor centers  Signage at harbors, marinas, beach accesses, airports
Media/ Marketing messaging on wildlife disturbance	Identify target audiences. Work with partners on joint media messages. Develop media relations program to help inform the public about wildlife disturbance.	Lead: GFNMS, FMSA Partners: TMMC, NMFS, PRBO, PRNS, State Parks, GGNRA, SF Ad Council, MBNMS,	Media archives, Bacon’s	Boiler plate messaging format, media communications plan, media kits

		CBNMS, media		
Educational efforts focused on wildlife disturbance	Work with partners to expand education efforts to school groups (K-12), teachers, and community groups.	Lead: GFNMS, FMFA Partners: State Curriculum standards, MARE, California Science Teachers Association, TMMC, MSI, other environmental education groups	See partners list	Teacher workshops, curriculum guide, lecture series and speaker bureau
Enforcement	1) Hire a dedicated Sanctuary enforcement officer. Might be a uniformed voluntary compliance officer. 2) Deputize State Parks officials to enforce Sanctuary regs	Lead: GFNMS, NMFS Partner: State Parks, local law enforcement, CDFG, Harbor Patrol, USCG, Sea Drift Security	MBNMS for model enforcement program, NMFS Long Beach	Enforcement actions, interpretive enforcement materials
Develop etiquettes for wildlife interactions	1) wildlife viewing (intertidal, white sharks, whale watching, marine mammals, ecotourism, strandings) 2) Harvesting activities (clamming, harvesting in the intertidal, gear disposal, fish cleaning) 3) marina and harbor activities 4) General recreational activities (boating, beach combing, flying) 5) research activities 6) Evaluate and distribute Paddlers and Walkers etiquette	Lead: GFNMS, FMFA Partners: environmental organizations, American Cetacean Society, resource management agencies, law enforcement agencies, user groups	See partners list. Ano Nuevo model. FMR model.	Responsibly Watching California's Marine Wildlife Handbook, Sanctuary specific etiquettes, Signage at harbors, marinas, beach accesses, airports
Propose new regulation on acoustic noise in Sanctuary	Investigate feasibility of prohibiting acoustic noise within thresholds within Sanctuary waters	Lead: GFNMS Partners: CINMS, NMFS, CCC	Cetacean researchers, Earth Island Institute, other environmental organizations	Reduction of noise through regulation or other (e.g. guidelines)

Propose new regulations to address white shark viewing	Investigate 1) regulating shark viewing in the Sanctuary, 2) prohibiting chumming, 3) prohibiting towing surfboard/decoy 4) Establish preserves or no research/ecotour areas around the islands	Lead: GFNMS Partners: USFWS, CDFG, NMFS	PRBO, Ecotourism operators, pelagic shark researchers	Reduction of shark disturbance through regulation or other (e.g. guidelines)
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Ranking Matrix: Gulf of the Farallones NMS Wildlife Disturbance

**Problem Statement:** The pressure on marine resources continues to grow as the human population increases around coastal areas and access to nearshore and offshore environments becomes easier. Of specific concern to GFNMS are wildlife disturbances associated with: fishing and collecting in tide pools and mudflats; trampling of the intertidal; impacts from hikers and beach users, dogs, boaters, and kayakers on birds and marine mammals; entanglements; acoustic impacts; overflights; and activities associated with increasing ecotourism and the use of attractants or chumming (e.g. interactions with White sharks and researchers).

**Goal:** To lessen or eliminate, and remedy impacts on the living marine resources of the Sanctuary and their habitats by encouraging responsible human behavior.

**Objective 1:** Evaluate levels and sources of impacts on wildlife and habitats

Program Title	Program Description	Ranking Criteria						Tally	Bin
		Site Benefits	Complexity	Short-term feasibility	Long-term feasibility	Improved coordination	Urgency		
Resource Monitoring: Sanctuary Naturalist/ Stewards -SEALS -Beach Watch -Intertidal (new) - Seals census	Provide volunteer monitoring of Sanctuary resources including marine mammals, seabirds, intertidal, and beaches, to determine level of human disturbance.							AAB BCA	20=2
	1) SEALS: Continue to monitor disturbances to harbor seals in Tomales Bay and Bolinas Lagoon	A	A	B	B	C	A	AAB ABA	22=1
	2) Beach Watch: Continue to monitor beaches for presence of oil and other human activities.	A	A	B	A	B	A	AAB ABA	22=1
	3) Intertidal monitoring: establish volunteer monitoring program to evaluate human impacts to the intertidal.	A	B	C	B	B	A	ABC BBA	19=2
	4) Seals Census: Formalize support of ongoing harbor seal population census, to contribute to	B	A	A	B	A	A	BAA	21=1

Program Title	Program Description	Ranking Criteria						Tally	Bin
		Site Benefits	Complexity	Short-term feasibility	Long-term feasibility	Improved coordination	Urgency		
	regional understanding of changes in distribution and abundance possibly caused by human activity. As additional monitoring needs arise, utilize these core volunteer groups.							BAA	
Data Management	Synthesize and analyze data from Sanctuary Steward programs and other research programs. Create centralized web-based spatial database that can be queried and is easily accessible.	A	B	C	B	A	A	ACC BAB	20=2
Research/ Monitoring- Investigate impacts to birds and mammals from low flying aircraft.	Utilize existing monitoring programs (SEALS and Beach Watch) and research partnerships (PRNS, PRBO) to document impacts of motorized and non-motorized aircraft (specifically effects of noise and visual impacts) on wildlife.	B	A	A	A	C	B	BAA ACB	18=2
Research/ Monitoring- Investigate effects of vessel disturbance to marine mammals and birds	Utilize existing monitoring/research programs (SEALS and Beach Watch) to document impacts of vessels on marine mammals and birds and establish a threshold for disturbance. Use long-term monitoring to continue to document disturbance and possible violations.	B	A	A	A	C	B	BAA ACB	18=2
Research/ Monitoring- Gather data on wildlife	Through permit conditions, reporting requirements and/or tracking system, encourage researchers working in the Sanctuary to gather data on wildlife disturbance.	B	B	B	A	A	B	BBB AAB	18=2

Program Title	Program Description	Ranking Criteria						Tally	Bin
		Site Benefits	Complexity	Short-term feasibility	Long-term feasibility	Improved coordination	Urgency		
disturbance through collaboration with research community									

**Objective 2:** Address human behavior that is impacting wildlife and habitats

Program Title	Program Description	Ranking Criteria						Tally	Bin
		Site Benefits	Complexity	Short-term feasibility	Long-term feasibility	Improved coordination	Urgency		
Develop an interpretive enforcement program: Sanctuary Naturalist/Stewards -SEALS -Beach Watch -Intertidal (new) -Sandy Beach (H.S.)	Provide volunteer education and outreach about Sanctuary resources including marine mammals, seabirds, intertidal, and beaches. Will address the following wildlife disturbance issues: 1) Tidepool protection: Develop Roving Intertidal Docents Program (possibly expand FMR program to Duxbury Reef) 2) Oil and tar impacts: Continue Beach watch to monitor for oiling incidents 3) Disturbance to harbor seals: Continue/expand SEALS outreach to clambers, hikers, dogs outreach, kayakers, boaters, and other visitors. Expand to Lawson's landing 4) Ecotourism- supply Sanctuary certified naturalists to ecotourist companies operating in GFNMS 5) Establish junior steward programs in association with all volunteer programs	A	B	C	B	B	A	ABC BBA	19=2
		A	A	A	A	A	A	AAA AAA	24=1
		A	A	B	A	B	A	AAB ABA	22=1
		C	C	C	B	B	C	CCC BBC	10=3
		B	B	C	C	A	B	BBC CAB	15=3
Media/ Marketing messaging on wildlife disturbance	Identify target audiences. Work with partners on joint media messages. Develop media relations program to help inform the public about wildlife disturbance.	A	B	B	A	A	ABB AAA	22=1	

Program Title	Program Description	Ranking Criteria						Tally	Bin
		Site Benefits	Complexity	Short-term feasibility	Long-term feasibility	Improved coordination	Urgency		
Educational efforts focused on wildlife disturbance	Work with partners to expand education efforts to school groups (K-12), teachers, and community groups.	A	B	B	B	A	B	ABB BAB	19=2
Enforcement	1) Hire a dedicated Sanctuary enforcement officer. Might be a uniformed voluntary compliance officer. 2) Deputize State Parks and NPS officials to enforce Sanctuary regs	A	B	C	C	B	A	ABC CBA	18=2
Develop etiquettes for wildlife interactions	1) wildlife viewing (intertidal, white sharks, whale watching, marine mammals, ecotourism, strandings) 2) Harvesting activities (clamming, harvesting in the intertidal, gear disposal, fish cleaning) 3) marina and harbor activities 4) General recreational activities (boating, beach combing, flying) 5) research activities 6) Evaluate and distribute Paddlers and Walkers etiquette	A	B	B	A	A	A	ABB AAA	22=1
Propose new regulation on acoustic noise in Sanctuary	Investigate feasibility of prohibiting acoustic noise within thresholds within Sanctuary waters	A	C	A	A	B	B	ACA ABB	19=2
Propose new regulations to address white	Investigate 1) regulating shark viewing in the Sanctuary, 2) prohibiting chumming,	A	A	A	A	A	A	AAA AAA	24=1

Program Title	Program Description	Ranking Criteria						Tally	Bin
		Site Benefits	Complexity	Short-term feasibility	Long-term feasibility	Improved coordination	Urgency		
shark viewing	3) prohibiting towing surfboard/decoy 4) Establish preserves or no research/ecotour areas around the islands								



SITE SPECIFIC ISSUE:

## INTRODUCED SPECIES

Recommendation to the GFNMS Advisory Council from the  
GFNMS Introduced Species Working Group

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### WORKING GROUP MEMBERS

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**Katie Zaremba,**  
Invasive Spartina Project

### WORKING GROUP MEETINGS

**MEETING 2:**

- Development of Problem Statement, Issue Characterization, Goals and Objectives

**MEETING 3:**

- How NMFS Addresses Introduced Species Issues, Natalie Constantino

**MEETING 4:**

- Sea Grant's Ballast Water Outreach Program, Karen McDowell
- California Invasive Species Legislation, Linda Sheehan
- State of California Aquatic Nuisance Species Plan, Holly Crossen
- Elkhorn Slough's "Least Wanted Aquatic Invaders" Outreach Plan, Ruth Howell and Jan Roletto

**MEETING 5:**

- PRNSA's All Taxa Biological Inventory in Tomales Bay, Ben Becker
- Utilizing Educational Tools for Management of Introduced Species, Lauren Mark
- Invasive Spartina Project, Katie Zaremba

**MEETING 6:**

- USDA's Principles, Practices and Responses to Established Invasive Species, Lars Anderson
- Introduced Planktonic Species in the San Francisco Bay Estuary, Wim Kimmerer
- UC Davis Projects Addressing Introduced Species, Ted Grosholtz

**MEETING 7:**

- Inventory of Existing Programs and Building of Options for the GFNMS Management Plan

**MEETING 8:**

- Prioritization and Ranking
- Outline Details of Priority Management Options

## **PROGRAM STATEMENT**

Introduced species have been identified in and around Gulf of the Farallones Sanctuary 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 resources. Current levels, in terms of abundance and diversity of introduced species are not well documented, nor are the impacts, existing or potential, well understood.

## **PROGRAM DESCRIPTION**

In the context of the Gulf of the Farallones National Marine Sanctuary, introduced species in the marine/estuarine environment are defined as a virus, bacteria, algae, plant, invertebrate, amphibian, reptile, fish, bird or mammal whose natural biogeographic range would not have included the waters of the Eastern Pacific without passive or active introduction through anthropogenic means. The Gulf of the Farallones National Marine Sanctuary is close to San Francisco Bay. San Francisco Bay 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, 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 the Gulf of the Farallones Sanctuary, a complete inventory is needed.

Nearshore discharge of ballast water is a common source of introduced species. Most 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 the ocean.

## **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 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, signed by the U.S. in 1975. Designed to restrict trade in listed species to protect depletion in the habitat of origin.

The International Plant Protection Convention (IPPC):  
Developed by the United Nations, signed by the U.S. in 1972 with 94 other countries. 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 18 months.

National Invasive Species Act, 1996

The Federal National Invasive Species Act strengthened the 1990 law 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.

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.

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**STATE LAW:**

In October 1999, AB703 was signed into California State law. The Bill requires mid-ocean ballast water exchange in waters more than 200 nautical miles from land and in water at least 2000 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. “Good Housekeeping” practices must be observed which includes 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 AB703 as the Sanctuary may enforce civil penalties up to \$119,000 per violation per day. The Sanctuary prohibition is applicable to Federal as well as State waters.

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 and 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**

To maintain an abundance and diversity of native marine/ estuarine species:

- 1) To prevent future introductions of introduced species in the Sanctuary.
- 2) To detect, manage, and where feasible, eradicate new and established introduced species in the Sanctuary.

## **INTRODUCED SPECIES OBJECTIVES**

- 1) To understand the current extent of introduced species in GFNMS.
- 2) To create a new program and/or coordinate with existing programs to detect and monitor new introductions.
- 3) To develop management actions to eradicate and/or control existing and new introductions.
- 4) To identify and control current and potential pathways to prevent new introductions.

## **RECOMMENDATIONS**

### **■ OBJECTIVE 1: To understand the current extent of introduced species in GFNMS.**

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

**Action 1.1** Although efforts are being made by California Department of Fish and Game, 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 the Gulf of the Farallones Sanctuary. In order to understand the current extent of introduced species in the Sanctuary the following steps will be taken:

- A. Under the proposed Resource Characterization action plan (see Fishing Impacts), perform a species abundance and distribution, all-taxa inventory (species inventory) through a meta-analysis (identifying existing literature, specimens and data).
- B. Perform an introduced species inventory literature search (mostly small pieces of 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), particularly focusing on the outer coast.

**Priority Level: 1**

**Implementation Timeline:** Start immediately, complete inventory in six months

**Partners:** PRNS, IGERT Intern Program, NCCOS, Audubon, CDFG, Smithsonian, NMFS, USFWS, CalFed

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

**Action 1.2** Develop an easily accessible and queryable database to be used by Sanctuary manager, staff, researchers and other agencies and institutions.

- A. Create a centralized web-based spatial database mapping species abundance and distribution and spatial extent of introduced species, focusing on areas of concern such as the Esteros.
- B. Ensure compatible database protocols by investigating existing database structures.

**Priority Level: 2**

**Implementation Timeline:** Start immediately, update on a bi-annual basis

**Partners:** PRNS, IGERT Intern Program, NCCOS, Audubon, CDFG, Smithsonian, NMFS, USFWS, CalFed

**Products:** Spatial web-based database

■ **OBJECTIVE 2: Create a new and/or coordinate with existing programs to detect and monitor new introductions in the Sanctuary.**

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

**Action 2.1** Currently, there are no formalized introduced species monitoring programs for estuaries in the Sanctuary. Monitoring efforts are taking place in estuarine environments in and around the Sanctuary, such as PRNS' 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. Insuring continuous monitoring of introduced species in coordination with other agencies will include the following steps:

- A. Develop 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 (possibly in conjunction with other Sanctuary monitoring programs to be developed).

- C. Adopt standardized protocols from SERC.
- D. Consult with Sanctuary Introduced Species Technical Advisory Council for advice on frequency of monitoring. Also, conduct random characterization on rotational basis.
- E. Feed data into Sanctuary's centralized database, as well as other regional and national databases.

**Action 2.2** When adding onto existing programs and developing new estuarine monitoring programs for introduced species, the following considerations will be made:

- A. Target known invasives, new species, 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 see what is being introduced, and what to start watching for.
- D. Understand the life history and tolerances of already introduced species in the region.

**Priority Level:** 1

**Implementation Timeline:** Complete implementation by end of year one, on-going thereafter

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

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

**Action 3.1** On-going since 1989 (with the exception of the last 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 indicates changes from natural events such as El Nino on the study species, the varied distribution of species, and the influence that habitat has on the abundance of species. The study includes four island and three mainland sites. GFNMS' rocky intertidal monitoring program can be modified to identify and track introduced species.

- A. Identify additional representative coastal sites to be monitored for introduced species.
- B. Adopt standardized protocols from SERC.
- 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 Sanctuary's centralized database, as well as other regional and national databases.

**Action 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 considerations will be made:

- A. Target known invasives, new species, and those with 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.
- 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.

**Priority Level: 1**

**Implementation Timeline:** Complete implementation by end of year one, on-going thereafter

**Partners:** GGNRA (slide Ranch), PISCO (looking at key indicators), PRNS, BML, California Academy of Sciences, Berkeley Herbarium, MBNMS

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

**Action 4.1** There are indications that those plankton entering San Francisco Bay (and potentially adjacent areas) are already 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' Ecosystem Dynamic Study (EDS) is to assess biological productivity (chlor-a; phytoplankton species inventory; euphausiid abundance and distribution; distribution/abundance of jellyfish; assessment of drift algae). Without any additional effort by the Sanctuary, EDS' plankton tows may also 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 NMFS' Romberg/ Tiburon lab to analyze plankton samples to identify introduced species.

**Priority Level: 2**

**Implementation Timeline:** Complete implementation by end of year one, on-going thereafter

**Partners:** NMFS

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

**Action 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.

- A. Identify other agencies in 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 spreading rapidly. Species will be chosen based on significance of size and obvious characteristics that provide the ability for them to be 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.

**Priority Level:** 2

**Implementation Timeline:** Complete implementation by end of year three, on-going thereafter

**Partners:** NMFS, CDFG, Sea Grant, GGNRA, PRNS

■ **OBJECTIVE 3: Develop management actions to eradicate and/or control existing and new introductions.**

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

**Action 6.1** Develop a technical advisory council of experts to advise GFNMS on introduced species issues. This group would meet on an as needed basis and may coordinate with the research working group on many issues.

**Priority Level:** 1

**Implementation Timeline:** Immediately

**Partners:** NMFS, CDFG, Sea Grant, USFWS, ESNERR, SWQB, RWQCB, Marin Open Space, NPS, California Coastal Conservancy, UC Davis, San Francisco State

**Action 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.

**Priority Level:** 2

**Implementation Timeline:** Complete implementation by end of year two, on-going thereafter

**Partners:** CalFed

**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.***

**Action 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.

- A. Examine existing models such as the Western Regional Plan or 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 12 new likely invaders (habitats, pathways, probable sites)
  - 2. Develop 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, who will notify them?
  - 6. Identify the pool of experts (needs to be large), who, where, what kind of availability, experts in 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. Test all components of the rapid response plan.
- F. Review relevant laws, regulations and policies to determine necessary permits that might be required in order to perform eradication and control measures. Based on findings, work with other agencies to develop a streamlined permit process.

**Priority Level:** 1

**Implementation Timeline:** Start immediately and complete by end of year five

**Partners:** NMFS, CDFG, Sea Grant, USFWS, ESNERR, SWQB, RWQCB, Marin Open Space, NPS, California Coastal Conservancy, UC Davis, San Francisco State, experts in the field

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

**Action 8.1** Propose new regulation to prohibit the introduction of introduced species in the Sanctuary.

**Action 8.2** 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”).

**Action 8.3** Require the permitting 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.

■ **OBJECTIVE 4: Identify and control current and potential pathways to prevent new introductions.**

**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.***

**Action 9.1** Develop a targeted prevention program (other than 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, landscapers, adjacent residential home owners, restaurants, aquarium stores, aquaculture industry, bait shops, etc.
- 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.

**Priority Level: 2**

**Implementation Timeline:** Complete by end of year three.

**Partners:** NMFS, CDFG, Sea Grant, USFWS

**Action 9.2** Develop outreach program to target recreational and commercial boaters on Best Management Practices. Boat anchors, hulls, props and other parts are all suitable attachment environments for introduced species and may act as vectors for intracoastal transport of introduced species.

- A. Identify potential partners (e.g. Boating and Waterways).
- B. Incorporate existing models for development of an outreach program on Best Management Practices (BMP).
- C. Identify outreach venues (harbors, yachting clubs, fuel docks, marine supply stores, etc.)

**Priority Level: 2**

**Implementation Timeline:** Complete by end of year three.

**Partners:** Boating and Waterways, harbor masters, yacht clubs, Coast Guard Auxiliary

Inventory Matrix: Gulf of the Farallones NMS Introduced Species

**Problem Statement:** Introduced species have been identified in and around Gulf of the Farallones Sanctuary 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 resources. Current levels, in terms of abundance and diversity of introduced species are not well documented, nor are the impacts, existing or potential, well understood.

**Goal:** To maintain an abundance and diversity of native marine/ estuarine species:

Goal 1: To prevent future introductions of introduced species in the Sanctuary.

Goal 2: To detect, manage, and where feasible, eradicate new and established introduced species in the Sanctuary.

**Objective 1: Understand the current extent of introduced species in GFNMS**

PROGRAMS/ PRODUCTS	BRIEF DESCRIPTION	LEAD/ PARTNERS	INFORMATION SOURCES	PRODUCTS
Species Inventory and Invasive Species Inventory Data Gap ID	Literature Search: 1)NCCOS Bibliographic Review for Esteros Habitat Characterization	Lead: GFNMS Partner: NCCOS	IGERT Internship	Literature Review Report
Inventory and Database	Create a centralized database for native and non-native species and map in Sanctuaries and adjacent areas. Focus on vulnerable areas (Esteros). Ensure compatible database protocols by investigating existing database structures. Assessments need to be done along the outer coast- most of them are done in ports and harbors and major	Lead- GFNMS, MBNMS Partners- First Level: NOAA, UC Davis/ IGERT Internship Program, CA Fish & Game, National Park Service, NMFS(N.Cosentino), SFNERR, ESNERR, Farallon National Wildlife Refuge,	PRNS-ATBI Tomales Bay, National Ballast Water Clearing House, Bollinas Lagoon Management Plan, EPA Invasive Species Database, ESNERR, IEP (sampling	1) Species list, with relative abundance, ranking system 2) Database- GIS maps of species locations 3) Literature Search (don't forget sandy beach) 4) Data gap analysis for entire Sanctuary

PROGRAMS/ PRODUCTS	BRIEF DESCRIPTION	LEAD/ PARTNERS	INFORMATION SOURCES	PRODUCTS
	estuarine environments.	Marin Open Space, SERC, National Ballast Water Clearing House	protocols) Jeb Byer's Disertation- Bolinas Lagoon	5) Website with list of links to others working on the issue , integrate with SERC database (contacts, what's being done, reporting contact)
Tomales Bay All Taxa Biological Inventory	Adopt PRNSA existing program	Lead: Ben Becker, NPS		
National Ballast Water Clearinghouse	Creating National Database of invasive species	Lead: Smithsonian Envir Research Center (Greg Ruiz)		Species Database
Species List- Bolinas Lagoon Management Plan		Lead: BLTAC		
EPA- Invasive Species Database	EPA is creating a database of introduced California species. Have incorporated data from CDFG survey (funded by the ballast water mgmt prog)	Lead: EPA <i>Henry Lee, Newport OR</i> <i>(<a href="mailto:lee.henry@epa.gov">lee.henry@epa.gov</a>);</i> Nationalatlas.gov, Debbie Reusser ( <a href="mailto:dreusser@usgs.gov">dreusser@usgs.gov</a> )		Invasive Species Database

**Objective 2: Create new and/or coordinate with existing programs to detect and monitor new introductions**

<b>PROGRAMS/ PRODUCTS</b>	<b>BRIEF DESCRIPTION</b>	<b>LEAD/ PARTNERS</b>	<b>INFORMATION SOURCES</b>	<b>PRODUCTS</b>
Estuary Monitoring	Establish monitoring program in estuarine habitats such as Tomales Bay, Bolinas Lagoon, Estero Americano and Estero de San Antonio. Special attention should be paid to: 1) continuous monitoring in coordination with other agencies, 2) targeting known invasives, new species, and those with likelihood of being established, 3) annual survey of representative areas, high profile areas and conservation areas, 4) tracking of other areas to see what is being introduced, and 5) understanding life history and tolerances of already introduced species.	Lead: GFNMS Partners: West Coast NMSs, NPS, Marin Open Space, NOAA (NCCOS), Audobon Canyon Ranch/ Cypress Grove Preserve, SERC	Track SERC's monitoring in TB, IEP (Sampling protocol), NERR, NPS (Estuary Monitoring), EMAP (Rusty Fairey)	Centralized database, standardized protocols and spatialized data
Rocky Intertidal monitoring	Expand GFNMS' existing intertidal monitoring program to monitor for invasives. (see above)	Lead: GFNMS Partners: PRNS-Ben Becker BML, MBNMS NOAA Restoration Center (?)	PISCO BML	Database
Offshore Monitoring	Integrate introduced species monitoring into EDS. Collect samples for CA State Dept Health Harmful algal bloom assessment and give to Wim Kimmerer to analyze. (see above)	Lead: GFNMS, Wim Kimmerer Partners: CA State Dept Health, IEP, SERC, RTC/SFSU, BML, CBNMS, MBNMS, MLML	Wim Kimmerer (Bay/Ballast water data)	Database
Outreach for Detection	Most introduced species are accidental finds. Need outreach and monitoring to improve early detection. Early detection	Lead: GFNMS Partners: PRNS, Audubon, NMFS, Smithsonian (SERC),	Elkhorn Slough NERR, national Sea Grant	Kiosks, brochures, posters (at boat

PROGRAMS/ PRODUCTS	BRIEF DESCRIPTION	LEAD/ PARTNERS	INFORMATION SOURCES	PRODUCTS
	program could include top ten likely invaders, pathways, how to help, reporting form.	Elkhorn Slough, CA Sea Grant, UCD, BML, SFSU, SFEI (Andy Cohen), Boating and Waterways (DMV?)	programs, CalFed program, Portland State University (inventory of all outreach programs on West Coast) (Mark Systma)	ramps), fact sheets, outreach in Visitor center, newsletters, boater license renewal forms, permit application, website information
Biological Monitoring (~3 yr cycle)	Monitoring in AB433 (Ballast Water Mgmt Program in CA). There will be funds to continue monitoring and probably expand into coastal areas. Program will probably pass and be adopted and implemented in Jan 2004.	Unknown lead- will be designated in AB433. Previously it was CDFG		

**Objective 3:** Develop management actions to eradicate and/or control existing and new introductions

<b>PROGRAMS/ PRODUCTS</b>	<b>BRIEF DESCRIPTION</b>	<b>LEAD/ PARTNERS</b>	<b>INFORMATION SOURCES</b>	<b>PRODUCTS</b>
Regulations (See also Objective 4)	Propose regulation to prohibit introductions.	Lead: Sanctuary Partners: TB mooring plan and BLTAC	CINMS, FKNMS	Integrate “Best Management Practices” with permit for Special Condition
Impaired Waters	Work with State Water Resources Board to include in the definition of “impaired waters” those waters where introduced species have been identified.	Lead: GFNMS Partners: State Water Resources Board	Linda Sheehan (OC)	
Registration of Research Activity	Require the registration of all research activity in the Sanctuary to determine: 1) the types of activities taking place that may be accidentally introducing invasive species, and 2) to understand whom might be doing research or monitoring of introduced species.	Lead: GFNMS Partners: MBNMS, CBNMS, other agencies and research institutions		
Introduced Species Advisory Group	Develop a standing working group of the GFNMS SAC of experts to advise GFNMS on introduced species issues on an as-needed basis. Technical advisory group to advice on the Rapid Response Plan, proposed regulatory actions, and other activities relating to Introduced Species.	Lead: GFNMS Partners: CalFed, UCD/ BML, NMFS Santa Rosa, State Lands Commission, Coastal Conservancy, USFWS	Linda Sheehan, Karen McDowell, Attend introduced species conferences (CalFed, IEP, Marine Bioinvasions, Western Regional Panel)	Taskforce/Team/ Advisory Board  *Cross reference with other objective categories*
GFNMS participate in CalFed NISAC.(Non- Native Invasive Species Advisory Committee)	Staff attend annual meeting of NISAC to understand region-wide introduced species activities and bring a Sanctuary perspective to the meetings.	Lead: GFNMS Partners: Cal Fed NISAC		
GFNMS Rapid	Develop Rapid Response Plan and	Lead: Sanctuary	SCCAT (Lars	Manual, info on

<b>PROGRAMS/ PRODUCTS</b>	<b>BRIEF DESCRIPTION</b>	<b>LEAD/ PARTNERS</b>	<b>INFORMATION SOURCES</b>	<b>PRODUCTS</b>
Response Plan	speedy permit process to expedite rapid response and successful control/ eradication. Use SCCAT and ISP as model. (Southern CA Caulerpa Action Team, Invasive Spartina Project). A first task of the working group	Partners: SWQCC, CDFG, State Lands, USFWS, SERC, CA State Coastal Conservancy, ISP	Anderson), ISP, Western Regional Panel State ANS plan Peggy Olofson, Katy Zaremba, Maxine Spellman	website, rapid response plan, list of agencies/ organizations to contact, Hotline (FWS) and web-based reporting system

Objective 4: Identify and control current and potential pathways to prevent new introductions

PROGRAMS/ PRODUCTS	BRIEF DESCRIPTION	LEAD/ PARTNERS	INFORMATION SOURCES	PRODUCTS
Regulations (also see objective 3)	Propose regulation to prohibit introductions.	Lead: Sanctuary Partners: TB mooring plan and BLTAC		Integrate “Best Management Practices” with permit for Special Condition. Address enforcement (see Admin plan)
Education/ Outreach for prevention for non-ballast water vectors	Identify and prioritize vectors. Identify audience. Targeted prevention: landscapers, recreational and commercial boat owners, adjacent residential home-owners, restaurants, aquarium stores, aquaculture, bait shops, target hotspots and outreach gaps. Top ten likely invaders. Integrate with SEALS. Note: Shipping/ ballast water industry is already being targeted.	Lead:GFNMS Partners: West Coast Ballast Outreach, SeaGrant, RIDNIS, MN Sea Grant, other Sanctuaries, NERRs	CalFed, SFEP, Marsha Brockbank, Western Regional Panel Display and Brochure, Great Lakes Sea Grant (Paul Heimlich, Doug Jensen), Oregon- Portland State University	Kiosks, brochures, presentations/ lectures, website, posters, fact sheets, develop visitor center display, distribute existing materials
Identify/modify/ consolidate best management practices	Educate user groups and general public of GFNMS. Educate boaters, etc on best practices to prevent introductions. Educate on pathways. (“Boater Guidelines”)	Lead: GFNMS Partners: ANS Taskforce/ Protect your Waters Campaign (FWS), TB Mooring Group	Doug Jensen (MN Sea Grant)	Signage, kiosks, brochures, posters
Prevention/ Ballast Water Regulations for Coastal Traffic	Coastal Traffic might be discharging/ exchanging in Sanctuary Waters. Participate in development of regional plan for coastal exchange (coordinated by K. McDowell). CA and Federal program might adopt coastal exchange programs (coming by the end of 2003)	Lead: West Coast Ballast Outreach Project (Karen McDowell)		Regional plan for coastal exchange



Ranking Matrix: Gulf of the Farallones NMS Introduced Species

**Objective 1: Understand the current extent of introduced species in GFNMS**

Program Title	Program Description	Ranking Criteria						Tally	Bin
		Site Benefits	Complexity	Short-term feasibility	Long-term feasibility	Improved coordination	Urgency		
Literature Search, ID data on introduced species in the Sanctuary	Sanctuary-wide literature search.	A	A	B	A	B	A	AAB ABA	22=1
Inventory and Database	Create a centralized database for native and non-native species and map in Sanctuaries and adjacent areas. Focus on vulnerable areas (Esteros). Ensure compatible database protocols by investigating existing database structures.	A	B	C	B	A	A	ABC BAA	20=2
Tomales Bay All Taxa Biological Inventory	Adopt PRNSA existing program								
National Ballast Water Clearinghouse	Creating National Database of invasive species								
Species List-Bolinas Lagoon Management Plan									
EPA- Invasive Species Database	EPA is creating a database of introduced California species. Have incorporated data from CDFG survey (funded by the ballast water mgmt prog)								

**Objective 2: Create new and/or coordinate with existing programs to detect and monitor new introductions**

Program Title	Program Description	Ranking Criteria						Tally	Bin
		Site Benefits	Complexity	Short-term feasibility	Long-term feasibility	Improved coordination	Urgency		
Estuary Monitoring	Establish monitoring program in estuarine habitats such as Tomales Bay, Bolinas Lagoon, Estero Americano and Estero de San Antonio. Special attention should be paid to: 1) continuous monitoring in coordination with other agencies, 2) targeting known invasives, new species, and those with likelihood of being established, 3) annual survey of representative areas, high profile areas and conservation areas, 4) tracking of other areas to see what is being introduced, and 5) understanding life history and tolerances of already introduced species.	A	B	C	B	A	A	ABC BAA	20=2 1
Rocky Intertidal monitoring	Expand GFNMS' existing intertidal monitoring program to monitor for invasives. (see above)	A	A	B	B	A	A	AAB BAA	22=1
Offshore Monitoring	Integrate introduced species monitoring into EDS. Collect samples for CA State Dept Health Harmful algal bloom assessment and give to Wim Kimmerer to analyze. (see above)	B	A	B	A	A	A	BAB AAA	21=4 2
Outreach for Detection	Most introduced species are accidental finds. Need outreach and monitoring to improve early detection.	A	B	C	B	B	B	ABC BBB	17=3 2

Program Title	Program Description	Ranking Criteria					Tally	Bin
		Site Benefits	Complexity	Short-term feasibility	Long-term feasibility	Improved coordination		
	Early detection program could include top ten likely invaders, pathways, how to help, reporting form. Community-based monitoring program.							
Biological Monitoring (~3 yr cycle)	Monitoring in AB433 (Ballast Water Mgmt Program in CA). There will be funds to continue monitoring and probably expand into coastal areas. Program will probably pass and be adopted and implemented in Jan 2004.							

**Objective 3: Develop management actions to eradicate and/or control existing and new introductions**

Program Title	Program Description	Ranking Criteria						Tally	Bin
		Site Benefits	Complexity	Short-term feasibility	Long-term feasibility	Improved coordination	Urgency		
Regulations	Propose regulation to prohibit introductions.	-	-	-	-	-	-	-	-
Impaired Waters	Work with State Water Resources Board to include in the definition of "impaired waters" those waters where introduced species have been identified.	-	-	-	-	-	-	-	-
Permit Research Activity	Require the permitting of all research activity in the Sanctuary to determine: 1) the types of activities taking place that may be accidentally introducing invasive species, and 2) to understand whom might be doing research or monitoring of introduced species.	-	-	-	-	-	-	-	-
Introduced Species Advisory Group	Develop a standing working group of the GFNMS SAC of experts to advise GFNMS on introduced species issues. (Note: will maintain contact with potential advisors until this group is formed)	A	A	A	A	B	B	AAA ABB	21=1
GFNMS participate in CalFed NISAC.(Non- Native Invasive Species Advisory Committee)	Staff attend annual meeting of NISAC to understand region-wide introduced species activities and bring a Sanctuary perspective to the meetings. Regional staff represent West coast sanctuaries.	B	A	A	A	A	B	BAA AAB	20=2
Rapid Response Plan	Develop Rapid Response Plan and speedy permit process to expedite rapid response and successful control/ eradication. Use SCCAT and ISP as model. (Southern CA Caulerpa Action Team, Invasive Spartina Project)	A	C	C	B	A	A	ACC BAA	19=2 1

**Objective 4: Identify and control current and potential pathways to prevent new introductions**

Program Title	Program Description	Ranking Criteria						Tally	Bin
		Site Benefits	Complexity	Short-term feasibility	Long-term feasibility	Improved coordination	Urgency		
Regulations (also see objective 3)	Propose regulation to prohibit introductions.	-	-	-	-	-	-	-	-
Education/ Outreach for Prevention	Identify and prioritize vectors. Identify audience. Targeted prevention: landscapers, recreational and commercial boat owners, adjacent residential home owners, restaurants, aquarium stores, aquaculture, bait shops, target hotspots and outreach gaps. Top ten likely invaders. Integrate with SEALS Note: Shipping/ ballast water industry is already being targeted.	A	B	B	B	B	A	ABB BBA	20=2
Identify/ modify/ consolidate best management practices	Educate user groups and general public of GFNMS. Educate boaters, etc on best practices to prevent introductions. Educate on pathways. ("Boater Guidelines")	A	B	B	B	B	A	ABB BBA	20=2
Prevention/ Ballast Water Regulations for Coastal Traffic	Coastal Traffic might be discharging/exchanging in Sanctuary Waters. Participate in development of regional plan for coastal exchange (coordinated by K. McDowell). CA and Federal program might adopt coastal exchange programs (coming by the end of 2003)								



SITE SPECIFIC ISSUE:  
**ECOSYSTEM PROTECTION:  
IMPACTS FROM  
FISHING ACTIVITIES**

Recommendation to the GFNMS Advisory Council  
from the Impacts from Fishing Activities Working Group

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**WORKING GROUP MEMBERS**

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**Barbara Emley,**  
Fisherman, GFNMS SAC

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Natural History and Sport Fishing  
Vessel Operator, GFNMS SAC

**Karen Reyna,**  
The Ocean Conservancy,  
GFNMS SAC

**WORKING GROUP MEETINGS**

**MEETING 1:**

- Overview of Joint Management Plan Review Process
- Decision Making Process

**MEETING 2:**

- Development of Problem Statement, Issue Characterization, Goals and Objectives

**MEETING 3:**

- Brian Mulvey, NMFS, Essential Fish Habitat
- Pietro Parravano, PCFFA, Report on Pew Commission's Findings
- Zeke Grader, PCFFA, The Role of PCFFA in Affecting fisheries Policy and Regulations
- Karen Garrison, NRDC, Addressing Fishing Issues from an NGO Perspective

**MEETING 4:**

REPORT FROM THE WATER: Fisherman's Experiences

- Chuck Wise, troller, Bodega Bay
- John Mellor, longliner, vertical longliner, San Francisco
- Steve Fitz, Scottish seiner, Half Moon Bay
- Barbara Emley, salmon and crab, San Francisco
- Mick Megnigoz, sport/rec, Novato
- Josh Churchman, experimental and fixed gear, Bolinas

REPORT FROM PFMC

- Cindy Thomson, SSC member, PFMC

**MEETING 5:**

ZONAL MANAGEMENT

- Brian Keller, Dry Tortugas Process, FKNMS
- Satie Airame, CINMS Marine Reserves Process
- Ralph Larson, SFSU, MLPA Master Team, The Process to Evaluate and Establish MPAs
- Astrid Scholz, Ecotrust, Spatial Tools for Marine Conservation and Fisheries Management

**MEETING 6:**

BIOLOGY OF FISHERIES MANAGEMENT

- Status of the herring fishery, Becky Otta, CDFG
- Status of the salmon fishery, Matt Erickson, CDFG
- Seabird and herring interactions, Kyra Mills, PRBO

OCEANOGRAPHIC PROCESSES

- Physical oceanography of CBNMS, Larry Breaker, MLML
- How science is integrated into fisheries management plans, Fred Wendell, CDFG
- MBNMS krill harvesting working group report, Huff McGonogal, MBNMS

**MEETING 7:**

- Discussion on potential of a krill fishery
- Laying out of options for the management plan

**MEETING 8:**

- Prioritization of options
- Final recommendation for SAC

**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 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 by the working group include: 1) impacts to trophic interactions from krill harvesting, 2) impacts from trampling and harvesting of invertebrates in the intertidal, 3) gear impacts on habitats and living resources, and 4) impacts on trophic levels from localized depletion of bait fish, and 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 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 deeper, subtidal habitats of the Sanctuary are limited. Rocky banks in deep water 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, krill and Pacific herring are also found in the Sanctuary.

King salmon and rockfish are the primary target species for sport fishing in the GFNMS. 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, 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 the Pacific Fishery Management Council (PFMC) in federal waters (3 to 200 miles), although fisheries management plans may cover both state and federal waters. In contrast, the 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 resources.

## **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>1</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 Department of Fish and Game (DFG) decided the time had come 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>1</sup>

Since the passage of the Marine Life Protection Act 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 Department. The Department 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 department and advisory groups for any necessary revisions before going to the Commission for a final decision. The legislature is involved and informed with fisheries that require legislation to implement restricted areas.<sup>1</sup>

### **FEDERAL RESTRICTED ACCESS PROGRAM**

The federal Fishery Conservation and Management Act of 1976 (Magnuson-Stevens Act) was enacted to begin phasing out foreign fishing and encouraged "Americanization" of fisheries, primarily for groundfish, within the 200 mile exclusive economic zone.

The Pacific Fishery Management Council is one of eight regional councils established by Congress, and manages the fisheries in federal waters off of 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 80 species); and 4) West Coast highly migratory species fishery (e.g., tunas and sharks).

#### MARINE LIFE MANAGEMENT ACT

The Marine Life Management Act (MLMA) requires the Department of Fish and Game and Fish and Game Commission to evaluate, every five years, existing restricted access programs. These evaluations and increase in restricted access programs will require DFG to expand capabilities to collect and analyze economic and social data related to fisheries. Socio-economic data and biological data about fisheries resources are key components in developing and evaluating restricted access policy alternatives.

#### MARINE LIFE PROTECTION ACT

State legislation requires that the Department of Fish and Game 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 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-STEVENSON 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 oversight on developing, monitoring and revising fishery management plans for each fishery within the EEZ that requires management. Every fishery management plan is approved by the Secretary of Commerce by way of the National Marine Fisheries Service.

### **FISHING ACTIVITIES GOAL**

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

- 1) To better understand the impacts from fishing activities on Sanctuary resources.
- 2) To allow for fishing that is compatible with Sanctuary goals and ecosystem protection.

### **FISHING ACTIVITIES OBJECTIVES**

1. Based on the best available scientific and socioeconomic information, the Sanctuary will: a) facilitate the evaluation of the status and trends in marine populations (and their causes) in Sanctuary waters, and b) identify and evaluate impacts on Sanctuary resources 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 important natural resources and to maintain biodiversity and the health and balance of the Sanctuary ecosystem.
3. Identify and develop appropriate actions to address any negative impacts from fishing activities on Sanctuary resources.

## **RECOMMENDATIONS**

- **OBJECTIVE 1: Based on the best available scientific and socioeconomic information, the Sanctuary will: a) facilitate the evaluation of the status and trends in marine populations (and their causes) in Sanctuary waters, and b) identify and evaluate impacts on Sanctuary resources from fishing activities.**

**STRATEGY FA-1: *Develop a resource characterization of the Sanctuary to better understand types and distributions of habitats, species and processes.***

**Action 1.1** Modify the Ecosystem Dynamic Study and develop additional research components as necessary to build a baseline characterization of the Sanctuary including: habitat, physical and biological characteristics.

- A. Ecosystem Dynamic Study will 1) systematically survey and assess the distribution and abundance of marine birds and mammals. 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.
  - 1. Habitat characterization includes mapping substrate type/bathymetry (static).
  - 2. Biological characterization includes species abundance and distribution, spatial and temporal
  - 3. Physical characterization includes oceanographic features (spatial and temporal), and pelagic (dynamic)

**Priority Level: 3**

**Implementation Timeline:** Complete by the end of year five

**Partners:** NMFS, MMS, USGS, CDFG

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

**Action 2.1** Hire contractor to profile historic and the evolution of fishing activities occurring in 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.

Priority Level: 2

Implementation Time Line: Immediately

Partners: Fishing Community, NMFS, NOAA, NCOS, CDFG, CSC

Products: Publication

**STRATEGY FA-3: *Evaluate Impacts from fishing activities on Sanctuary Resources.***

**Action 3.1** Develop a “compatibility index” to rank and evaluate types and levels of impacts from fishing activities.

- A. Develop the compatibility index based on a model similar to the Severity Ranking of Collateral Impacts<sup>2</sup> model for fishing gear types and includes consideration and rankings for different types and levels of impacts including:
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

**Priority Level:** 1

**Implementation Timeline:** Complete by end of year 2

**Partners:** SAC, stakeholder representatives, agency representatives, interest groups

**Product:** Compatability Index

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

**Action 4.1** If compatibility index indicates significant negative impacts on Sanctuary resources from fishing activities, develop a stakeholder-based, issue specific, working group to evaluate and make a recommendation on actions to be taken.

- A. Stakeholder-based working group will include: resource management agencies; interest groups; user groups; fisherman representing different gear types; scientific community.
- B. Decision making process will be based on best available scientific and socioeconomic data

**Priority Level:** 1

**Implementation Timeline:** Complete by end of year 2

**Partners:** SAC, stakeholder representatives, agency representatives, interest groups

**Action 4.2** Develop a series of management categories (policy response) based on relative level of impact as determined by the compatability index.

- A. Management responses or recommendations to the appropriate fisheries management agencies may include a range of recommendations such as:
1. substituting less ecologically damaging gears for more damaging gear types;
  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; <sup>1</sup> and
  6. using tools such as adaptive management to reintroduce closed fisheries.
- B. Develop a timeline and mechanism(s) for implementation of recommendations:
1. Establish protocols and procedures for working with fisheries management agencies when appropriate

**Priority Level: 1**

**Implementation Timeline:** Complete development of compatibility index by end of year 2

**Partners:** Fishing Community, PFMC, CDFG

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

**STRATEGY FA-5: *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.***

**Action 5.1** Determine the need for 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. This plan is not specifically directed at fishing activities, but rather ecosystem protection and applies to many resource management issues.

- A. Map out the resource characterization to identify and link species distribution with critical areas/phases of their life history. (see STRATEGY 1.1.C)
- B. Overlay socioeconomic profile of human activities taking place in the Sanctuary. (see STRATEGY 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, working group will work with Sanctuary manager to identify if and where a zonal plan would be appropriate in the Sanctuary.

**Priority Level: 3**

**Implementation Timeline:** Complete recommendation by end of year three

**Partners:** Pacific Fishery Management Council (PFMC), California State Fish and Game Commission, National Marine Fisheries Service (NMFS), Point Reyes Bird Observatory (PRBO), 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 which 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 resource, and the maintenance of ecosystem integrity in compliance with the NMSA.

■ **OBJECTIVE 2: 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.**

**STRATEGY FA-6: *Create a standing “Living Resource and Habitat Protection” working group to advise the Sanctuary on ecosystem protection issues.***

**Action 6.1** Develop a permanent standing working group of the Sanctuary Advisory Council to address ecosystem protection issues in the Sanctuary.

**Priority Level:** 3

**Implementation Timeline:** By the end of year one

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

**STRATEGY FA-7: *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.***

**Action 7.1** Develop a maritime heritage and fishing community model.

- A. Identify an appropriate harbor to profile as a living maritime community.
- B. Work together with the fishing community, businesses, Chamber of Commerce and local government to develop a marketing and outreach plan to profile the fishing community and associated working harbor, and their relationship to the Sanctuary and healthy resources. Plan could include workshops, signage, kiosks, events, attractions, activities. Plan will also articulate clear and consistent messaging.
- 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.

**Priority Level:** 3

**Implementation Timeline:** By the end of year five

**Partners:** Fishing community, visitors bureau, tourism industry and business community, FMSA

**STRATEGY FA-8: *Develop strategy to protect habitats that are known to be “special areas of concern” for fish, and/or contain fish “species of concern” (endangered or threatened species).***

**Action 8.1** Through a community-based process, make a determination on marine protected area (marine preserve) status for Estero Americano and Estero de San Antonio to protect and restore habitat for Tidewater Goby, salmon, and Steelhead. The Estero Americano and Estero de San Antonio lie within the boundaries of the Gulf of the Farallones National Marine Sanctuary, and are also part of the UNESCO Central Coast Golden Gate Biosphere Reserve. The Estero Americano and Estero de San Antonio are part of a unique resource category, in that most of the significant

estuaries along the California coast have been dredged, diked, or filled in. These two estuaries serve as critical food source and nursery areas for the marine life within the Gulf of the Farallones National Marine Sanctuary. Their estuarine environment provides habitat for the Tidewater Goby, an ESA-listed species, and both estuaries represent historically-important salmon and Steelhead habitat in need of restoration. Threats to Sanctuary resources within the 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. The GFNMS, in conjunction with local landowners, the STRAW Project, the Sonoma Land Trust, the California Coastal Conservancy, the Regional Water Quality Control Board, and California's Critical Coastal Areas (CCA) Program, will initiate a consultative process under California's Marine Life Protection Act (MLPA) in conjunction with the relevant MLPA stakeholder group of the California Department of Fish and Game to achieve designation of the Estero Americano and the Estero de San Antonio as marine preserves.
- B. The Sanctuary is the logical "lead agency" in 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, the California Department of Fish and Game, the California Coastal Conservancy, the Regional Water Quality Control Board, and California's Critical Coastal Areas (CCA) Program.
- C. Work with agriculture industry and other stakeholders to pursue the implementation of best management practices.

**Priority Level: 2**

**Implementation Timeline:** Initiate process immediately

**Partners:** 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, the California Coastal Conservancy, the Regional Water Quality Control Board, and California's Critical Coastal Areas (CCA) Program.

**Products:** An enhanced level of protection, in the form of estuarine marine preserves, which 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.

**STRATEGY FA-9: *Establish consistent and coordinated region-wide Sanctuary representation at the Pacific Fisheries Management Council and Fish and Game Commission meetings.***

**Action 1.1** Select regional sanctuary representative to attend Pacific Fisheries 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. The sanctuaries also need to listen and track issues PFMC and FGC are addressing.

- B. Create quarterly, or as appropriate, briefing packet for the Council and Commission on Sanctuary activities.

**Priority Level:** 1

**Implementation Timeline:** Immediately

**Partners:** NMSP, OCNMS, CBNMS, MBNMS, CINMS

■ **OBJECTIVE 3: Identify and develop appropriate actions to address any negative impacts from fishing activities on Sanctuary Resources.**

**STRATEGY FA-10: Address activities that fall below the acceptable threshold of the compatibility index.**

(see STRATEGY FA-4)

**STRATEGY FA-11: Take action to protect fish and invertebrates of concern (other than threatened or endangered).**

(see STRATEGY FA-3)

**STRATEGY FA-12: Work with Cordell Bank and Monterey Bay National Marine Sanctuaries on developing a recommendation to address impacts on marine ecosystems in and around Sanctuary waters from krill harvesting.**

**Action 5.1** 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 the resource. To address this issue, the fishing activities working group is recommending a total, permanent ban on krill harvesting in the EEZ (Exclusive Economic Zone) of the West Coast (Washington, Oregon and California).

- A. The Sanctuary will work with CBNMS and MBNMS to identify and pursue strategies that result in a permanent ban on krill harvesting.
- B. The Sanctuary will support the work of MBNMS on an ecological report that includes an overview of the importance of krill to the marine ecosystem within the sanctuaries, and an assessment of the potential ecological and economic impacts of a krill fishery.
- C. For the federal component, the initial phase will focus on communicating with the Pacific Fisheries Management Council and identifying issues and concerns that the sanctuaries and agencies have.
- D. The next phase will focus on approaching the National Marine Fisheries Service, Pacific Fisheries Management Council and the State Legislature with the ecological report and the objective of having these entities enact a permanent ban on krill harvesting.

**Priority Level:** 1

**Implementation Timeline:** Immediately begin working with MBNMS and PFMC

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

1. California Department of Fish and Game. December 2001; *California's Living Marine Resources: A Status Report*, Sacramento, California  
Sacramento, California;

2. Morgan, Lance E. and Chuenpagdee, Ratana. 2003; *Shifting Gears: Addressing the Collateral Impacts of Fishing Methods in U.S. Waters*, Pew Science Series

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Inventory Matrix: Gulf of the Farallones NMS Ecosystem Protection- Impacts from Fishing Activities

**Problem 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 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 by the working group include: 1) impacts to trophic interactions from krill harvesting, 2) impacts from trampling and harvesting of invertebrates in the intertidal, 3) gear impacts on habitats and living resources, and 4) impacts on trophic levels from localized depletion of bait fish, and region-wide declines in fish populations.

**Goal:** To maintain an abundance and diversity of native marine/ estuarine/intertidal species:

Goal 1: To better understand the impacts from fishing activities on Sanctuary resources.

Goal 2: To allow for fishing that is compatible with Sanctuary goals and ecosystem protection.

**Objective 1:** Based on the best available scientific and socioeconomic information, the Sanctuary will: a) facilitate the evaluation of the status and trends in marine populations (and their causes) in Sanctuary waters, and b) identify and evaluate impacts on Sanctuary resources from fishing activities.

PROGRAMS/ PROJECTS	BRIEF DESCRIPTION	LEAD/ PARTNERS	INFORMATION SOURCES	PRODUCTS
Research Project: Habitat Characterization	The Sanctuary research program will use multi-beam/ side scan sonar and submersibles for habitat characterization and benthic bottom typing	Lead- GFNMS Partners – USGS, Moss Landing		Easily accessible GIS-based data base
Develop “compatibility index”	Develop a “compatibility index” or threshold for sustainability and evaluate fishing activities in GFNMS in relationship to this standard. Index may consider factors such as: impacts on habitats, levels of bycatch, and timing of spawning events.	Lead: GFNMS Partners: CBNMS, scientific community, fishing industry, NMFS, CDFG, EFH	MCBI/Pew Commission Report	Index

<b>PROGRAMS/ PROJECTS</b>	<b>BRIEF DESCRIPTION</b>	<b>LEAD/ PARTNERS</b>	<b>INFORMATION SOURCES</b>	<b>PRODUCTS</b>
Profile Fishing Activities in GFNMS	Literature search and data mining to profile: 1) current level of fishing effort in GFNMS including actual number of boats fishing by fishery, location of fishing activity, gear types, home ports, overlay on habitat map, 2) profile potential impacts from fishing activities on: fish biomass, trophic interactions, declining fisheries, and other living marine resources (e.g. seabirds), 3) based on current knowledge, project how future fisheries may impact GFNMS' habitats and living marine resources.	Lead – GFNMS Partners- Ecotrust, PCFFA, research community, PRBO, TMMC	Ground Fish Reduction Analysis (Ecotrust)	Publication on the status of fishing activities in GFNMS, create web page, public information forum
Identify Fish and Invertebrates at Risk (other than endangered or threatened species)	Evaluate fisheries in GFNMS based on “compatibility index” and determine how they might be better managed (e.g. limits on number of crab pots to ensure a sustainable local fishery, evaluate need for permanent ban on krill fishery in EEZ, etc.)	Lead: GFNMS Partners: standing fishing working group including: fishing community, conservationists, researchers, fisheries management agencies and resource managers	Biogeographic Assessment	Sustainability Index definition and description, white paper
Protocols and Procedures for Responding to Impacts From Fishing Activities on Sanctuary Resources	When impacts from fishing activities on Sanctuary resources have been identified, clearly articulated and timely steps need to be taken to respond and make recommendations. GFNMS will establish guidelines for responding and for timing on making recommendations on actions to be taken.			Protocols
Resource Protection Planning (policy) to	Determine the value of using tools such as zoning (e.g. marine reserves, research reserves), to take a proactive approach and	Lead: GFNMS Partners: Working Group (stakeholder process)	FKNMS, PRBO, FWS, Biogeographic	

PROGRAMS/ PROJECTS	BRIEF DESCRIPTION	LEAD/ PARTNERS	INFORMATION SOURCES	PRODUCTS
minimize user conflicts and provide special areas of protection	address specific resource management issues. The plan will be built in consideration of other management strategies, both temporary and permanent. <i>(This is not solely a fishing issue, but there was no other place for this).</i>		Assessment, Socioeconomic Study of GFNMS (baseline info)	

**Objective 2:** 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.

<b>PROGRAMS/PROJECTS</b>	<b>BREIF DESCRIPTION</b>	<b>LEAD/PARTNERS</b>	<b>SANCTUARY' ROLE</b>	<b>PRODUCTS</b>
Create standing Living Resource and Habitat Protection working group.	Develop a permanent standing working group of the Sanctuary Advisory Council to address ecosystem protection issues in the Sanctuary.	Lead: GFNMS SAC Partners: stakeholders		
Develop a Maritime Heritage and the Fishing Community Model	Identify appropriate harbor to profile as a living maritime community. 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.	Lead: GFNMS Partners: Pew Commission, local community, harbor district, business community, maritime heritage community, PCFFA	Work with harbor district to develop education, outreach and marketing plan	Kiosk, signage, printed materials, video/live uplinks, community events
Develop Strategy to Address Threatened and Endangered Fish Species	Through community-based process, make determination on marine protected area (marine preserve) for Estero Americano and Estero de San Antonio to protect and restore habitat for Tidewater Goby, salmon and Steelhead. Work with agriculture industry and other land users on best management practices (see Objective 3).	Lead: GFNMS Partners: CDFG, community including fishing and agriculture industry, watershed groups, NGOs and State agencies, Sonoma and Marin Land Trusts, California Coastal Conservancy		Restoration plan, best management practices guidelines
Improve Coordination with Fisheries Management Entities	Develop relationship with PFMC and FGC to provide input from a Sanctuary perspective as fisheries management issues arise and decisions are being made.	Lead: GFNMS Partners: FGC, PFMC, NMFS, CDFG		Draft letter from Sanctuary requesting Sanctuary seat at Council

**Objective 3:** Identify and develop appropriate actions to address any negative impacts from fishing activities on Sanctuary resources.

PROGRAMS/ PROJECTS	BREIF DESCRIPTION	LEAD/PARTNERS	SANCTUARY 'S ROLE	PRODUCTS
Proactively address activities that are below the ecosystem-based compatability index	The working group, in a timely fashion, will advise the Sanctuary Program on appropriate actions and tools to measure against the compatibility index in compliance with the mandate of NMSA to preserve healthy ecosystems. If the threshold of the compatibility index has not been met, the Sanctuary program will be aggressively encouraged to prioritize implementation of such actions at the time that they are recommended.	Lead: GFNMS Partners: fishing community, conservationists, researchers, fisheries management agencies and resource managers		Find alternative gear methods/ gear types, educate fishermen on methods of sustainable fishing.
Identify Fish and Invertebrates at Risk (other than endangered or threatened species) (Also under Objective 1)	Evaluate fisheries in GFNMS based on "compatibility index" and determine how they might be better managed (e.g. limits on number of crab pots to ensure a sustainable local fishery, evaluate need for permanent ban on krill fishery in EEZ, etc.)	Lead: GFNMS Partners: standing fishing working group including: fishing community, conservationists, researchers, fisheries management agencies and resource managers		Compatibility Index, white paper

Ranking Matrix: Gulf of the Farallones NMS Ecosystem Protection- Impacts From Fishing Activities

**Objective 1:** Based on the best available scientific and socioeconomic information, the Sanctuary will: a) facilitate the evaluation of the status and trends in marine populations (and their causes) in Sanctuary waters, and b) identify and evaluate impacts on Sanctuary resources from fishing activities.

Program Title	Program Description	Ranking Criteria						Tally	Bin
		Site Benefits	Complexity	Short-term feasibility	Long-term feasibility	Improved coordination	Urgency		
Research Project: Habitat Characterization	The Sanctuary research program will use multi-beam/ side scan sonar and submersibles for habitat characterization and benthic bottom typing	A	B	B	C	B	A	19	3
Develop "compatibility index"	Develop a "compatibility index" or threshold for sustainability and evaluate fishing activities in GFNMS in relationship to this standard. Index may consider factors such as: impacts on habitats, levels of bycatch, and timing of spawning events.	A	B	B	A	A	A	22	1
Profile Fishing Activities in GFNMS	Literature search and data mining to profile: 1) current level of fishing effort in GFNMS including actual number of boats fishing by fishery, location of fishing activity, gear types, home ports, overlay on habitat map, 2) profile potential impacts from fishing activities on: fish biomass, trophic interactions, declining fisheries, and other living marine resources (e.g. seabirds), 3) based on current knowledge, project how future fisheries may impact GFNMS' habitats and living marine resources.	A	C	B	A	A	A	21	2
Identify Fish and	Evaluate fisheries in GFNMS based on	A	B	B	A	B	A	21	2

Program Title	Program Description	Ranking Criteria						Tally	Bin
		Site Benefits	Complexity	Short-term feasibility	Long-term feasibility	Improved coordination	Urgency		
Invertebrates at Risk (other than endangered or threatened species)	"sustainability index" and determine how they might be better managed (e.g. limits on number of crab pots to ensure a sustainable local fishery, evaluate need for permanent ban on krill fishery in EEZ, etc.)								
Protocols and procedures for responding to impacts from fishing activities on Sanctuary Resources	When impacts from fishing activities on Sanctuary resources have been identified, clearly articulated and timely steps need to be taken to respond and make recommendations. GFNMS will establish guidelines for responding and for timing on making recommendations on actions to be taken.	A	A	A	A	A	B	22	1
Resource protection planning (policy) to minimize user conflicts and provide special areas of protection	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. The plan will be built in consideration of other management strategies, both temporary and permanent ( <i>This is not solely a fishing issue, but there was no other place for this</i> )	A	C	B	A	B	A	20	3

**Objective 2:** 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.

Program Title	Program Description	Ranking Criteria						Tally	Bin
		Site Benefits	Complexity	Short-term feasibility	Long-term feasibility	Improved coordination	Urgency		
Create standing Living Resource and Habitat Protection working group	Develop a permanent standing working group of the Sanctuary Advisory Council to address ecosystem protection issues in the Sanctuary	A	A	C	B	C	A	19	3
Develop a Maritime Heritage and the Fishing Community Model	Identify appropriate harbor to profile as a living maritime community. 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.	A	B	C	B	A	A	20	3
Develop Strategy to Address Threatened and Endangered Fish Species	Through community-based process, make determination on marine protected area (marine preserve) for Estero Americano and Estero de San Antonio to protect and restore habitat for Tidewater Goby, salmon and Steelhead. Work with agriculture industry and other land users on best management practices (see Objective 3).	A	A	B	B	B	A	21	2
Improve coordination with Fisheries Management Entities	Develop relationship with PFMC and FGC to provide input from a Sanctuary perspective as fisheries management issues arise and decisions are being made.	A	A	A	A	A	A	24	1

**Objective 3:** Identify and develop appropriate actions to address any negative impacts from fishing activities on Sanctuary resources.

Program Title	Program Description	Ranking Criteria						Tally	Bin
		Site Benefits	Complexity	Short-term feasibility	Long-term feasibility	Improved coordination	Urgency		
Proactively address activities that are below the ecosystem-based sustainability index	The working group, in a timely fashion, will advise the Sanctuary Program on appropriate actions and tools to measure against the compatibility index in compliance with the mandate of NMSA to preserve healthy ecosystems. If the threshold of the compatibility index has not been met, the Sanctuary program will be aggressively encouraged to prioritize implementation of such actions at the time that they are recommended.	A	B	C	B	A	A	20	3
Identify Fish and Invertebrates at Risk (other than endangered or threatened species) (Also under Objective 1)	Evaluate fisheries in GFNMS based on “sustainability index” and determine how they might be better managed (e.g. limits on number of crab pots to ensure a sustainable local fishery, evaluate need for permanent ban on krill fishery in EEZ, etc.)	A	B	C	B	A	A	20	3



**SITE-SPECIFIC ISSUE:**

# VESSEL SPILLS

Recommendation to the GFNMS Advisory Council  
from the Vessel Spills Working Group

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## **WORKING GROUP MEMBERS**

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## **WORKING GROUP MEETINGS**

**MEETING 1:**

- Overview of Joint Management Plan Review Process
- Decision Making Process

**MEETING 2:**

- Development of Problem Statement, Issue Characterization, Goals and Objectives

**MEETING 3:**

Presentations on Efforts to Address Vessel Spills in GFNMS:

- OSPR (Office of Spill Prevention and Response) Purview and Responsibilities
- Area Contingency Plan for the Gulf of the Farallones
- West Coast Offshore Vessel Traffic Risk Management Project
- OCNMS Process to Designate Areas to be Avoided

**MEETING 4:**

Continue Presentations:

- MBNMS Process to Establish Vessel Traffic Recommended Tracks
- Risks from on the Water- A Bar Pilot's Perspective
- Oceanographic Circulation and Oil Spills in the Gulf of the Farallones

**MEETING 6:**

- Inventory of Existing Programs and Building of Options for the CBNMS Management Plan
- Prioritization and Ranking of Management Options
- Outline Details of Priority Management Options

## **VESSEL SPILLS STATEMENT**

There is a risk of vessel spills which could impact marine mammals, seabirds and other natural resources in and around the Gulf of the Farallones National Marine Sanctuary. Recognizing that spills can occur from any transiting vessel as they all carry crude oil, bunker fuel, and/or other hazardous material, GFNMS seeks to determine whether there is an opportunity to enhance prevention and response efforts.

## **VESSEL SPILLS DESCRIPTION**

As of 1998, approximately 6,000 commercial vessels (excluding domestic fishing craft) entered and exited the San Francisco Bay. 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% of the vessels are tankers of intermediate size (draft <50 ft.) and about 5% are large vessels (draft >50 ft.). 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 may be 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 the last year, approximately 2,000 commercial vessels were reported using the southern approach shipping lane. Large commercial vessels (LCVs) are of particular concern for spills since they can carry up to 1 million gallons of bunker fuel, a heavy, viscous fuel similar to crude oil, which they use for fuel. With Californians consuming 7 million barrels of oil annually, and producing 31,000,000 barrels annually, there is plenty of movement and risk from oil tankers carrying 543,688,350 barrels of oil annually up and down the coast of California.

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

The area was selected and designated as the Gulf of the Farallones National Marine Sanctuary because of significant concentrations of the following marine resources: (1) seabirds and aquatic birds; (2) marine mammals (pinnipeds and cetaceans); (3) fish; (4) marine flora (algae); (5) benthic fauna; and (6) 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-tail Albatross. Of particular concern to the Sanctuary are impacts on seabirds and marine mammals from human activities.

### **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 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 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.

Floating oil from vessel spills affects seabirds through ingestion, inhalation, the fouling of feathers and causes irritation of eyes and membranes. Feather contamination is the primary cause of immediate mortality because of the resulting inability to fly, avoid predators, forage underwater, and the lowering of 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 of diving in the water and flocking on the surface. To some extent, all marine birds which breed in large colonies are vulnerable to contact with floating oil during the nesting season, due to the large congregations of birds.

## **MARINE MAMMALS**

### **PINNIPEDS**

Thirty-six species of marine mammals have been observed in Gulf of the Farallones National Marine Sanctuary, 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, 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 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 accidental oil spill, 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 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 in the Sanctuary of about 1,500.

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

### **CETACEANS**

Twenty eight species of marine mammals have been sighted in the Sanctuary (whales, dolphins, porpoises). 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 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 Sanctuary between April and November, including humpback and blue whales, representing one of the largest congregation 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. Because baleen whales are filter feeders, for example, they are

susceptible to direct ingestion of oil or oil covered substances which they may ingest. It also is thought that oil may irritate the eyes of whales and possibly interfere with their breathing apparatus. It is not known whether whales will avoid an oil slick.

#### FISHERIES

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 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 deeper, subtidal habitats of the Sanctuary are limited. Rocky banks in deep water 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 also found in the Sanctuary. King salmon and rockfish are the primary target species for sport fishing in the 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 such as barnacles, limpets, black turban snails, mussels, sea anemones, abalone and urchins, which may be harvested as well.

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

A large oil spill in, or close to, valuable fishing areas could pose a potentially serious threat to commercial and recreational fisheries. The type and extent of impacts depend on timing with respect to spawning season, migration patterns, and 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**

### U.S. COAST GUARD

The USCG is the federal government's primary maritime law enforcement agency. The USGS'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 insuring 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.

#### 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 also provides grants to cities, counties, and districts for developing small craft harbors/marinas; and loans to private recreational marinas.

#### OFFICE OF OIL SPILL PREVENTION AND RESPONSE (OSPR)

OSPR was created within the CDFG by the Oil Spill Prevention and Response Act of 1990 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 22 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.

#### 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 US Coast Guard (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 (VTSSs) 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.

#### OIL POLLUTION ACT

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

### **VESSEL SPILLS IN GFNMS**

- |      |  |
|------|--|
| 1971 | 2 Boats collide under Golden Gate Bridge (840,000 gallons of Bunker C oil)   |
| 1984 | Puerto Rican (October 31, 1.4 million gallons of oil, stern sunk with 8,500 barrels of bunker fuel, estimated 2873 birds killed, 1856 Common Murres) |

1986	Apex Houston (oil barge, 20,000 gallons of oil between SF and Long Beach, 9,000 birds including 6,000 Common Murres killed)
1990	poorly documented spill from San Francisco to Monterey County
1996	Tempest (65" yacht off Dillon Beach)
1996	Cape Mohican (estimated 7,000 birds killed)
1997-8	Point Reyes Tarball Incident (Salmon Creek to Pillar Point)
1998	Command (2,500 heavy crude or bunker oil, estimated 3,000 birds killed)

## **VESSEL SPILLS GOAL**

To 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 and determine whether improvements can be made to reduce risk.
2. Based on findings of risk analysis, develop long-term monitoring programs within GFNMS to identify trends and take proactive measures to reduce risk when appropriate.
3. Review current response programs and identify areas of improvement, focusing on GFNMS resources at risk.
4. Based on risk assessment and long-term monitoring results, develop outreach program for maritime industry, fishing, and recreational boating communities.
5. Provide for continuous evaluation and leverage opportunities for improvement, including partnerships.

## **VESSEL SPILLS RECOMMENDATIONS**

**OBJECTIVE 1: Assess level of risk and determine whether improvements can be made to reduce risk.**

**STRATEGY VS-1: *Expand MBNMS drift analysis model up to Point Arena and Mendocino.***

**ACTION 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 to San Francisco Bay. Coverage north to Mendocino is necessary to protect the GFNMS.

- A. Contact Navy Postgraduate School (producers of current model) and investigate feasibility of extending model north.

**Priority level:** 1

**Partners:** Naval Postgraduate School (NPS), MBNMS, USCG, Fleet Numerical

Implementation Timeline: year 1- contact NPS and complete updated model  
**Product:** Updated drift analysis model

**STRATEGY VS-2: *Improve existing spill and drift model to increase accuracy of risk assessments.***

**ACTION 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 of the Gulf.

- A. Increase the number of CODAR- Coastal Ocean Dynamic Applications Radar 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 oceanographic model. Data should include:
  - 1. surface currents adjacent to ports
  - 2. fine-scale bathymetry of the continental slope, and
  - 3. satellite imagery for biological productivity
- C. Analyze Sea-viewing Wide Field of Vision (SeaWiF) satellite acquired ocean-color data indicating seasurface temperature and associated phytoplankton pigment (biological productivity).
- D. Integrate all data into a comprehensive web-based database with GIS capability.
- 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).

**Priority Level: 2**

**Partners:** Research Institutions such as MLML, BML, SFSU, USGS, California Coastal Conservancy, Coastal Services Center, CBNMS, NMSP, NOAA Hazmat  
**Implementation Timeline:** year 1- determine location for additional CODAR stations, year 2- install CODAR with partners, year 3-write scope of work and hire contractor for revising oceanographic model, year 2- complete circulation model and integrate into spill and drift model

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

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

**ACTION 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 Vessel Traffic System data.
- B. Use data and report from vessel activities profile for risk assessment study.

**Priority Level: 1**

**Partners:** USCG, Marine Exchange, Port of Oakland, Port of San Francisco, Boating and Waterways (licensing info), MBNMS  
**Implementation Timeline:** complete by end of year one  
**Products:** Report A (Vessel Activities Profile)

**STRATEGY VS-4: *Determine and evaluate potential risks to the GFNMS from vessels transiting the Gulf of the Farallones.***

**ACTION 4.1** Based on existing vessel traffic and risk assessment reports, determine potential risks to GFNMS and write report.

- A. Identify relevant studies, including:
  - 1. Drift groundings
  - 2. Power groundings
  - 3. Collisions
  - 4. Discharges (bilge or ballast)
  - 5. Wildlife harassment
- B. Look at causal chain of events and evaluate according to Gulf of the Farallones qualities.
- C. Build upon Profile of Vessel Activities Report (Report A- see Strategy VS-2)
- D. Look at Volpe's risk analysis for Puget Sound as example of direction and formatting.

**Priority Level:** 1

**Partners:** SF Harbor Safety Committee, CCC, OSPR, USCG, Hazmat, MBNMS  
**Implementation Timeline:** start at beginning of year 2, complete by end of year 2  
**Products:** Report B (Risk Assessment)

**STRATEGY VS-5: *Evaluate recent vessel routing changes related to the MBNMS vessel traffic study.***

**ACTION 5.1** 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 VTS data from USCG, collect information from Automated Identification System (AIS) if available, and partner with OCNMS or Washington State Coast Guard to analyze. Determine if correct lanes are being used, if not, how, why not, and does a correction need to be made (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 based on findings of the evaluation to USCG prior to port access route studies.

**Priority Level: 1**

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

**Implementation Timeline:** follow monitoring programs under Objective 2 (see Strategy VS-7 and VS-9)

**STRATEGY VS-6: Track distribution and numbers of sensitive species and habitats in relation to probable spill trajectories.**

**ACTION 6.1** 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. OSPR and 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.

**Priority Level: 2**

**Partners:** NOAA Hazmat, OSPR, PRBO, TMMC, CDFG, Glen Ford Consulting  
**Implementation Timeline:** initiate following completion of spill and drift analysis- year 3-4

**Products:** Updated model, Report C

**OBJECTIVE 2: Based on findings of risk analysis, develop long-term monitoring programs within GFNMS to identify trends and take proactive measures to reduce risk when appropriate.**

**STRATEGY VS-7: Monitor vessel patterns in the Gulf of the Farallones to identify trends and reduce risk.**

**ACTION 7.1** Continuously review and evaluate coast-wide traffic volume, local traffic volume, and vessel casualty data to identify trends and potential risk areas and areas to improve (using USCG data).

- A. Develop a program which analyzes data from existing sources (e.g. USCG, Bar Pilots) to continuously monitor vessel trends in the GFNMS. Monitor specifically for vessel proximity to navigational hazards; compliance with Vessel Traffic Separation (VTS) lanes and Areas of Biological Significance (ASBS). Identify common causes of vessel accidents.
  - 1. Base data analysis on model developed by OCNMS
- B. Use monitoring results for Port Access Route Studies (PARS)

**Priority Level: 2**

**Partners:** MBNMS, OCNMS, USCG

**Implementation Timeline:** year 1- complete plan, year 2- implementation and continue as on-going program

**Products:** Monthly GIS plots showing historical use and non-compliance vessels, Annual Report (Report C)

**STRATEGY VS-8: Re-establish US Coast Guard “Near-Miss” reporting system.**

**ACTION 8.1** Ask USCG to reinstate their “Near-Miss” reporting system. The program is a coordinated system to collect, analyze, and disseminate data on near vessel collisions which would be useful for Sanctuary decision making and integration into risk analyses.

**Priority Level:** 2

**Partners:** USCG

**Implementation Timeline:** year 1- contact USCG

**Products:** data on near misses

**STRATEGY VS-9: Expand vessel traffic monitoring capabilities within the Gulf of the Farallones.**

**ACTION 9.1** Establish remote monitoring stations using new technologies (e.g. Automatic Identification System (AIS)). Currently the extent of available data (from USCG) is limited geographically and does not adequately cover the Gulf of the Farallones region. In order to track vessel movement coast-wide, the monitoring infrastructure must be expanded.

- A. Determine appropriate technology (i.e. AIS or alternative off-the-shelf technologies) to satisfy monitoring needs.
- B. Determine geographic scope required and select appropriate sites to place monitoring equipment (receiving stations) which will satisfy needs.
- C. Monitoring measurements should include class of ship, size of ship, its speed and location.
- D. Work with USCG and other opportunities to establish monitoring infrastructure and protocol.
- E. Periodically feed monitoring data into risk assessment models and port access route studies (PARS).

**Priority Level:** 2

**Partners:** USCG (lead), DOD, State of California, Homeland Security

**Implementation Timeline:** year 1-contact USCG, Link subsequent steps to mandatory carriage of AIS internationally

**Products:** New vessel traffic monitoring infrastructures, continuous monitoring data

**OBJECTIVE 3: Review current response programs and identify areas of improvement, focusing on GFNMS resources at risk.**

**STRATEGY VS-10: Participate on Regional Response Team to address risks to Sanctuary resources.**

**ACTION 10.1** Review Regional Response Plan (RRP) and Area Contingency Plan (ACP), including location of Oil Spill Response Organization (OSRO) pre-positioned response equipment.

**Priority Level:** 1

**Partners:** CCC, OSPR, NOAA Hazmat

**Implementation Timeline:** year 1- participate on Team and review RRP and ACP

**Products:** Improved RRP and ACP

**STRATEGY VS-11: *Revise GFNMS in-house emergency response plan.***

**ACTION 11.1** Revise tasks and responsibilities for GFNMS in the event of a vessel spill in the Sanctuary. (also see Administration recommendations)

**Priority level:** 1

**Implementation Timeline:** year 1- revise in-house emergency response plan

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

**STRATEGY VS-12: *Continue to improve integration of GFNMS Beach Watch data into Area Contingency Plan.***

**ACTION 12.1** Increase frequency of integrating Beach Watch data into Area Contingency Plan (ACP). The ACP is currently based on 5-10 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 data to Incident Command on a real-time basis to inform decision making. Ideally data would be available by web-based GIS.

**Priority Level:** 1

**Partners:** FMSA, OSPR, CAS, TMMC, USCG, MBNMS, Oiled Wildlife Care Network

**Implementation Timeline:** year 1- integrate current data into ACP, year 2- integrate data into web-based GIS, year 3- on-going data entry and maintenance

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

**OBJECTIVE 4: *Based on risk assessment and long-term monitoring results, develop outreach program for maritime industry, fishing, and recreational boating communities.***

**STRATEGY VS-13: *Outreach to mariners to increase stewardship of the Sanctuary, including voluntary compliance with Vessel Traffic System and Sanctuary regulations.***

**ACTION 13.1** 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 Vessel Traffic System 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.

**Priority Level: 2**

**Partners:** MBNMS, USCG, Boating and Waterways, Coast Guard Auxillary

**Implementation Timeline:** develop and implement plan one year following completion of Reports A, B, and C

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

**ACTION 13.2** 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; 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.

**Priority Level: 2**

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

**Implementation Timeline:** publish material in Coast Pilot and give mariner-specific presentations within year 1, years 2-3- install kiosk

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

**STRATEGY VS-14: *Provide better communication between GFNMS and maritime trade industry.***

**ACTION 14.1** Recruit maritime trade industry member for GFNMS Sanctuary Advisory Council. The Maritime Trade Council member would represent the industry's interest at the SAC meetings and report Sanctuary activities to the industry.

**Priority level: 1**

**Partners:** Maritime Trade industry

**Implementation Timeline:** complete by end of year 1

**OBJECTIVE 5: Provide for continuous evaluation and leverage opportunities for improvement, including partnerships.**

**STRATEGY VS-15: *A Sanctuary representative should participate in regional forums for addressing vessel traffic issues.***

**ACTION 15.1** Sanctuary 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.

**Priority Level:** 1

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

**Implementation Timeline:** Immediately

**STRATEGY VS-16: Create a standing vessel spills working group to advise the Sanctuary on implementation of proposed action plans.**

**ACTION 16.1** Create a Vessel Spills Working Group of the Sanctuary Advisory Council.

- A. 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 SAC.
- B. Recommend to SAC that a Vessel Spills working group be created. If SAC supports, Sanctuary will support creation of the group by providing staff time.

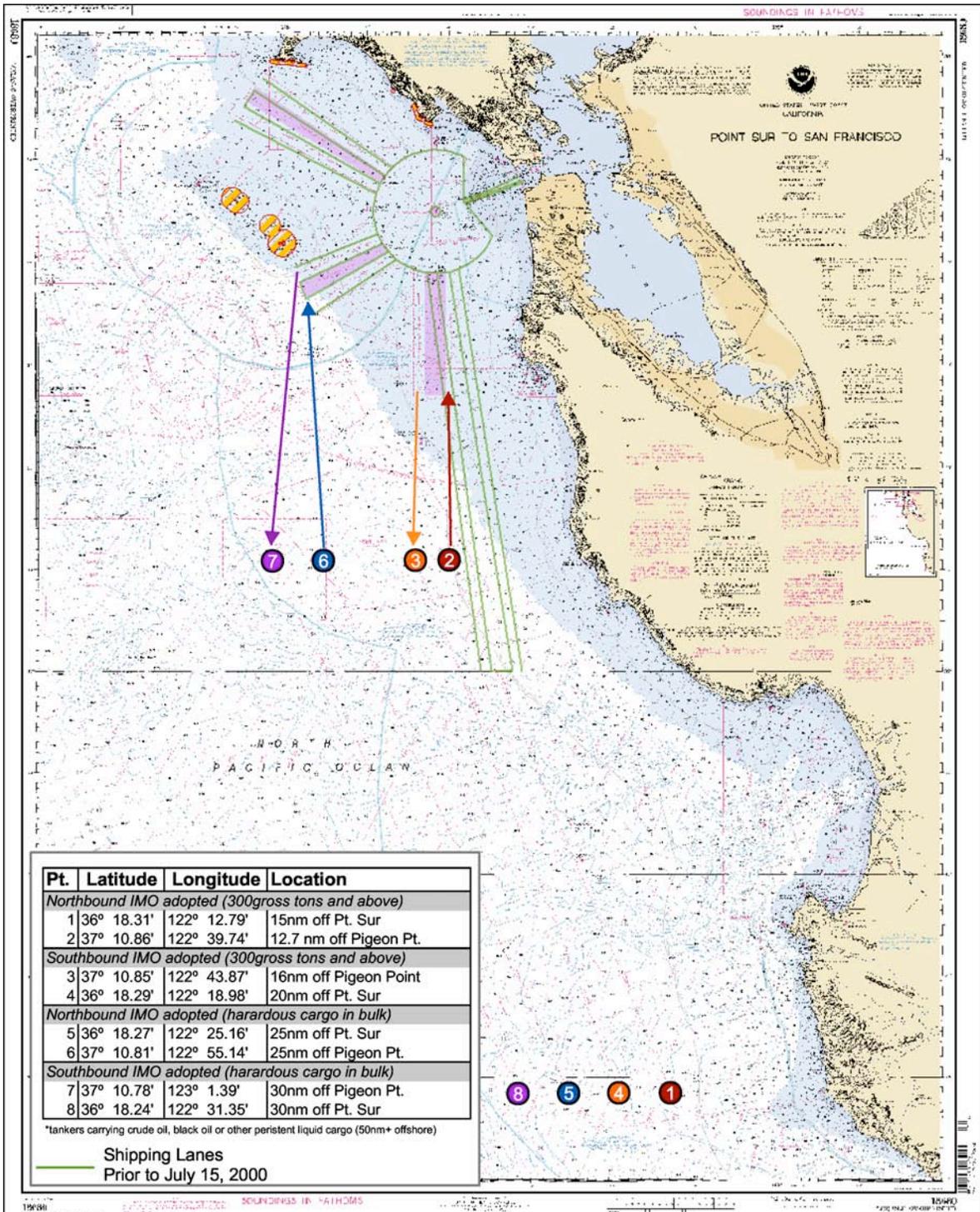
**Priority Level:** 1

**Partners:** (potential seats) USCG, NOAA SSC, OSPR, NOS (NOAA Regional Representative), Oceanographer, NGOs, NPS, Maritime Industry, Fishing Industry

**Implementation Timeline:** Six months from recommendation to establishment of working group

**Products:** Annual Report to SAC

# VESSEL TRAFFIC RECOMMENDED TRACKS



Inventory Ranking Matrix: Gulf of the Farallones NMS- Impacts from Vessel Spills

**Problem Statement:** There is a risk of spills which would impact marine mammals, seabirds and other natural resources in and around the GFNMS. Recognizing that spills can occur from any transiting vessel as they all carry crude oil, bunker fuel, and/or other hazardous material, GFNMS seeks to determine whether there is an opportunity to enhance prevention and response efforts.

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

**Objective 1:** Perform risk analysis to determine what improvements can be made to reduce risk

PROGRAMS/ PROJECTS	BRIEF DESCRIPTION	LEAD/ PARTNERS	INFORMATION SOURCES	PRODUCTS
Profile vessel activities occurring within the Gulf of the Farallones	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 Vessel Traffic System Data.	Lead: GFNMS Partners: USCG, Marine Exchange, Port of Oakland, Port of San Francisco	West Coast Offshore Vessel Traffic Risk Assessment, Marine Exchange, MBNMS Vessel Management Report	Report A, report on website
Determine and evaluate potential risks to the Gulf of the Farallones from vessel transiting the Gulf of the Farallones	Based on existing vessel traffic and risk assessment reports, determine potential risks to GFNMS	Lead: GFNMS Partners: SF Harbor Safety Committee, CCC, OSPR, USCG, Hazmat, MBNMS	West Coast Offshore Vessel Traffic Risk Assessment, Marine Exchange Review Regional Response Plan and Area Contingency Plan, Vessel Profile Report, MBNMS Vessel Management Report, Report A	Report B, report on website
Expand MBNMS drift analysis model	Expand drift analysis model up to Point Arena/ Mendocino	Lead: GFNMS Partner: MBNMS,	MBNMS Vessel Management Report	

PROGRAMS/ PROJECTS	BRIEF DESCRIPTION	LEAD/ PARTNERS	INFORMATION SOURCES	PRODUCTS
Follow up on evaluation of MBNMS Vessel Traffic Study	Ask Coast Guard to do port access route study as follow up.	USCG, Fleet Numerical Lead: USCG Partners: MBNMS		
Improve Spill and Drift modeling	Data mining and gap analysis for finer scale oceanographic model. Adapt oceanographic circulation model to take into account unique features of the Gulf of the Farallones. Use for Hazmat and Area Contingency Plan as a decision making tool (worst case scenario).	Lead: GFNMS, Hazmat Partners: Research Institutions, California Coastal Conservancy, Coastal Services Center		Drift and spill model
Refine Resources at Risk model analysis for Gulf of the Farallones	Tracks distribution and numbers of sensitive species overlaid with probable spill trajectories. Use as decision making tool for improving response activities.	Lead: NOAA Hazmat, Heather Parker Hall Partners: GFNMS, OSPR, PRBO, TMMC, DFG, etc	ESI, NCCOS Biogeography study, Beach Watch data	

**Objective 2:** Based on findings of risk analysis, develop long term monitoring programs within GFNMS to identify trends and take proactive measures to reduce risk when appropriate.

<b>PROGRAMS/ PROJECTS</b>	<b>BRIEF DESCRIPTION</b>	<b>LEAD/ PARTNERS</b>	<b>INFORMATION SOURCES</b>	<b>PRODUCTS</b>
Monitor vessel patterns within Gulf of the Farallones	Continuously review and evaluate coastwide traffic volume, local traffic volume and vessel casualty data to identify trends and potential risk areas and areas to improve.	Lead: GFNMS Partners: MBNMS, USCG, OCNMS	AIS, VTS Radar Data, waterway users, Report B	Monthly GIS plots showing historical use and non-compliance vessels, Annual Report C
Re-establish USCG Near Miss reporting system	A coordinated system to collect, analyze and disseminate near miss data.	Lead: USCG	AIS, VTS Radar Data, waterway users	
Expand vessel traffic monitoring capabilities of USCG	Establish remote monitoring stations using new off-the-shelf technologies	Lead: USCG Partners: DOD, State, Homeland Security	New technologies (i.e. portable radar), research	
Establish small boat monitoring program	Using overflights, onshore observers, and/ or pre-positioned small boats, monitor small boat activities for use patterns and potential hazards in the Gulf of the Farallones. Look at small boat-large vessel interactions in and around traffic lanes.	Lead: GFNMS Partners: USCG Auxiliary, MBNMS, CINMS, DFG, Oceanic Society	Overflights and other small boats	Easily accessible database (maybe webbased)

**Objective 3:** Review current response programs and identify areas of improvement, focusing on GFNMS resources at risk

<b>PROGRAMS/ PROJECTS</b>	<b>BRIEF DESCRIPTION</b>	<b>LEAD/ PARTNERS</b>	<b>INFORMATION SOURCES</b>	<b>PRODUCTS</b>
Participate on Regional Response Team to Address Risks to Sanctuary Resources	Review Regional Response Plan and Area Contingency Plan, including location of OSRO (Oil spill response organization)	Lead: GFNMS Partners: CCC, OSPR, NOAA Hazmat (Heather Parker Hall, Steve Thompson)	Resources at Risk model, ESI, Beach Watch data, NCCOS Biogeography Report, Drift and spill models	Improved Regional Plan and Area Contingency Plan
Revise in-house Emergency Response Plan	Revise tasks and responsibility for GFNMS Staff	Lead: GFNMS	MBNMS Plan, Resources at Risk model, ESI, Beach Watch data, NCCOS Biogeography Report, Drift and spill models	Updated in-house emergency response plan
Evaluate need for Emergency Offshore Towing Vessel Network (ie. emergency towing to prevent drift groundings)	This network would identify, inform and direct the nearest appropriate rescue/assist vessel to vessel in distress.	Lead: Harbor Safety Committee Partners: GFNMS, CCC, NGOs, Maritime Industry, USCG	Tug of opportunity reports (WA State), rescue tug studies, tug escort studies, MBNMS drift analysis modified for GFNMS, USCG near-miss report	
Continue to improve integration of Beach Watch Program into Area Contingency Plan	Provide reconnaissance force to assess the extent and distribution of oil during spill events. Aid wildlife rescue and removal of dead oiled wildlife.	Lead: GFNMS Partner: FMSA, OSPR, CAS, TMMC	longterm monitoring database, annual reports	Volunteer reconnaissance force

**Objective 4.** Based on risk assessment and long term monitoring results, develop outreach program for maritime industry, fishing, and recreational boating communities

<b>PROGRAMS/ PROJECTS</b>	<b>BRIEF DESCRIPTION</b>	<b>LEAD/ PARTNERS</b>	<b>INFORMATION SOURCES</b>	<b>PRODUCTS</b>
Develop outreach plan to increase voluntary compliance with Vessel Traffic System and Sanctuary regulations	Identify pathways for reaching out to industry. Target high risk vessels and circumstances.	Lead: GFNMS, MBNMS Partners: USCG, Boating and Waterways, Coast Guard Auxillary, etc	MBNMS, OCNMS, Boating and Waterways, monitoring data, Annual Report C, Report B	Publications, fliers, bulletins, Coast Pilot
Targeted outreach plan to Central American liner trade and non- WSPA oil tankers (bulk and container)	Identify audience and develop outreach plan to non-compliant Central American vessels.	Lead: USCG Partners: Ships agents, Marine Exchange	MBNMS Vessel Traffic Management Report, Annual Report C (monitoring data), fliers, bulletins, Coast Pilot, Report B	Open diplomatic channels, letters to vessel owners, English and multi-lingual publications, fliers, bulletins, Coast Pilot
Provide maritime industry, fishing, and recreational boating communities with information about Sanctuary	Information that allows mariner to be informed and make good decisions.	Lead: Coast Survey Partners: GFNMS, NOS MPA Center	MPA database, Report A	US Coast Pilot, POD (Print on Demand charts), Outreach program
Recruit maritime trade industry member for SAC	Provide better communication between Sanctuary and maritime trade industry.	Lead: GFNMS		SAC Member

**Objective 5:** Provide for continuous evaluation and leverage opportunities for improvement, including partnerships

PROGRAMS/ PROJECTS	BRIEF DESCRIPTION	LEAD/ PARTNERS	INFORMATION SOURCES	PRODUCTS
Participate in forums for addressing vessel traffic issues (i.e. Area Committee, Harbor Safety meetings, ad hoc panels)	<ul style="list-style-type: none"> <li>-Provide information for Geographic Response Plans</li> <li>-Participate in discussion on dispersants</li> <li>-Develop strategy diagram for all sensitive areas</li> </ul>	Lead: GFNMS Partners: Regional Response Team, Area Committee, Harbor Safety meetings, ad hoc panels	Reports A, B, C, others, and models (see above)	
Create Vessel Spills Working Group of the Sanctuary Advisory Council	This group will make recommendations on implementation of action plans, review effectiveness, advise on future direction, and report to SAC.	Lead: GFNMS/SAC Partners: Industry, USCG, other NOS offices	Action plans, Report A, B, C, other reports	

Ranking Matrix: Gulf of the Farallones NMS Impacts from Vessel Spills

**Objective 1:** Assess level of risk and determine whether improvements can be made to reduce risk

Program Title	Program Description	Ranking Criteria						Tally	Bin
		Site Benefits	Complexity	Short-term feasibility	Long-term feasibility	Improved coordination	Urgency		
Expand MBNMS drift analysis model (check with Naval Postgraduate school)	Using current data expand drift analysis model up to Point Arena/ Mendocino (Vessel drift rates and tug response times)	A	A	C	A	B	A	AAC ABA	21= 1
Improve Spill and Drift modeling	Data mining and gap analysis for finer scale oceanographic model. Adapt oceanographic circulation model to take into account unique features of the Gulf of the Farallones. Use for Hazmat and Area Contingency Plan as a decision making tool (worst case scenario).	A	C	C	C	B	B	ACC CBB	15= 2
Profile vessel activities occurring within the Gulf of the Farallones	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 Vessel Traffic System Data.	A	B	C	A	C	A	ABC ACA	1
Determine and evaluate potential risks to the Gulf of the Farallones from vessel transiting the Gulf of the Farallones	Based on existing vessel traffic and risk assessment reports, determine potential risks to GFNMS	A	B	C	A	C	A	ABC ACA	1

Program Title	Program Description	Ranking Criteria						Tally	Bin
		Site Benefits	Complexity	Short-term feasibility	Long-term feasibility	Improved coordination	Urgency		
Follow up on evaluation of MBNMS Vessel Traffic Study (Cross-reference/link to AIS)	Ask Coast Guard to do port access route study as follow up.	B	A	A	A	A	B	BAA AAB	20= 1
Refine Resources at Risk model analysis for Gulf of the Farallones	Tracks distribution and numbers of sensitive species overlaid with probable spill trajectories. Use as decision making tool for improving response activities.	A	C	C	B	B	B	ACC BBB	16= 2

**Objective 2:** Based on findings of risk analysis, develop long term monitoring programs within GFNMS to identify trends and take proactive measures to reduce risk when appropriate.

Program Title	Program Description	Ranking Criteria						Tally	Bin
		Site Benefits	Complexity	Short-term feasibility	Long-term feasibility	Improved coordination	Urgency		
Monitor vessel patterns within Gulf of the Farallones	Continuously review and evaluate coastwide traffic volume, local traffic volume and vessel casualty data to identify trends and potential risk areas and areas to improve (using USCG data).	B	B	C	B	B	B	BBC BBB	15=2
Re-establish USCG Near Miss reporting system	A coordinated system to collect, analyze and disseminate near miss data.	B	A	A	A	B	B	BAA ABB	19=2
Expand vessel traffic monitoring capabilities	Establish remote monitoring stations using new technologies (e.g. AIS). (flush out, connect to PARS)	B	C	C	B	A	B	BCC BAB	15=2
Establish small boat monitoring program	Using overflights, onshore observers, and/ or pre-positioned small boats, monitor small boat activities for use patterns and potential hazards in the Gulf of the Farallones. Look at small boat-large vessel interactions in and around traffic lanes.	B	C	C	C	C	C	BCC CCC	10=3

**Objective 3:** Review current response programs and identify areas of improvement, focusing on GFNMS resources at risk

Program Title	Program Description	Ranking Criteria						Tally	Bin
		Site Benefits	Complexity	Short-term feasibility	Long-term feasibility	Improved coordination	Urgency		
Participate on Regional Response Team to Address Risks to Sanctuary Resources	Review Regional Response Plan and Area Contingency Plan, including location of pre positioned response equipment OSRO (Oil spill response organization)	A	A	A	A	A	A	AAA AAA	24=1
Revise GFNMS Emergency Response Plan	Revise tasks and responsibility for GFNMS Staff	A	A	A	A	B	A	AAA ABA	23=1
Evaluate need for Emergency Offshore Towing Vessel Network (ie. emergency towing to prevent drift groundings)	This network would identify, inform and direct the nearest appropriate rescue/assist vessel to vessel in distress.	C	C	C	A	C	C	CCC ACC	10=3
Continue to improve integration of Beach Watch Program into Area Contingency Plan	Provide reconnaissance force to assess the extent and distribution of oil during spill events. Aid wildlife rescue and removal of dead oiled wildlife.	A	A	A	A	B	A	AAA ABA	23=1

**Objective 4: Based on risk assessment and long term monitoring results, develop outreach program for maritime industry, fishing, and recreational boating communities**

Program Title	Program Description	Ranking Criteria						Tally	Bin
		Site Benefits	Complexity	Short-term feasibility	Long-term feasibility	Improved coordination	Urgency		
Develop outreach plan to increase voluntary compliance with Vessel Traffic System and Sanctuary regulations	Identify pathways for reaching out to industry. Target high risk vessels and circumstances.	A	C	C	B	B	B	ACC BBB	16=2
Targeted outreach plan to non- WSPA oil tankers (bulk and container) (for questions on Central American liner trade ask Chris/ Holly)	Identify audience and develop outreach plan to non-compliant Non-WSPA (Central American) vessels.	B	C	C	B	A	C	BCC BAC	13=3
Provide maritime industry, fishing, and recreational boating communities with information about Sanctuary	Information that allows mariner to be informed and make good decisions.	A	B	C	B	B	B	ABC BBB	17=2
Recruit maritime trade industry member for SAC	Provide better communication between Sanctuary and maritime trade industry.	A	A	A	A	C	A	AAA ACA	22=1

**Objective 5:** Provide for continuous evaluation and leverage opportunities for improvement, including partnerships

Program Title	Program Description	Ranking Criteria						Tally	Bin
		Site Benefits	Complexity	Short-term feasibility	Long-term feasibility	Improved coordination	Urgency		
Participate in forums for addressing vessel traffic issues (i.e. Area Committee, Harbor Safety meetings, ad hoc panels)	-Provide information for Geographic Response Plans -Participate in discussion on dispersants -Develop strategy diagram for all sensitive areas	A	B	C	B	B	A	ABC BBA	1
Create Vessel Spills Working Group of the Sanctuary Advisory Council	This group will make recommendations on implementation of action plans, review effectiveness, advise on future direction, and report to SAC.	A	B	B	B	B	A	ABB BBA	20=1



ISSUE:

## EDUCATION

Recommendation to the GFNMS Advisory Council from the  
GFNMS Education Working Group

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### WORKING GROUP MEMBERS

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Education Coordinator, Crissy Field  
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**Jennifer Saltzman,**  
Education Coordinator,  
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**Christine Fontaine,**  
Field Seminar Coordinator, Point Reyes  
National Seashore Association

### WORKING GROUP MEETINGS

**MEETING 1:**

- Overview of Joint Management Plan Review Process
- Decision Making Process

**MEETING 2:**

- Development of Problem Statement, Issue Characterization, Goals and Objectives
- Overview of Current Sanctuary Education Programs (CBNMS and GFNMS)

**MEETING 3:**

- Overview of other organization's education programs
  - The Marine Mammal Center
  - Point Reyes National Seashore Association
- Overview of NMSP National Education Initiatives
- Overview of 2002 Ocean Educators Meeting

**MEETING 4:**

- Continue overview of other organization's education programs
  - Northern and Southern sections of the Golden Gate National Recreation Area
  - Point Reyes National Seashore

**MEETING 5:**

- Presentation on Monterey Bay National Marine Sanctuary's current education programs
- Presentation on teaching science to a multicultural audience

**MEETING 6:**

- Inventory of Existing Programs and Building of Options for the GFNMS Management Plan

**MEETING 7:**

- Prioritization and Ranking of Management Options

- Outline Details of Priority Management Options

### **PROGRAM STATEMENT**

Gulf of the Farallones NMS does not have 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**

GFNMS will use education as a resource management tool to address specific priority resource management issues identified in 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 programs are designed to enhance public awareness and understanding of the Sanctuary and the 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 will work to develop a long-term education strategy to raise the public’s awareness about the local and regional marine environment and how to become involved in the sanctuaries. These education programs will complement the Sanctuary’s broad-based community outreach efforts by focusing on targeted audiences such as school students, summer camp programs for youths and multicultural audiences. GFNMS and 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 training, summer camps and other education programs. FMSA is developing and implementing a Coastal Ecosystem Education Program for high school students and multicultural programs with the San Francisco Recreation and Park Department. GFNMS seeks to expand its partnerships and develop additional working relationships with other government agencies, institutions and organizations.

### **EDUCATION GOALS**

- a) Education is a management tool used to help protect the Sanctuary’s resources
- b) Education complements and promotes other Sanctuary programs such as research, monitoring and enforcement.
- c) Education continually reaches broader audiences to create an informed and connected public

### **EDUCATION 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
- 3a) Develop programs to target content builders, user/impact groups, influencers, and decision makers.

3b). Programs will target diverse audiences including various multicultural, socio-economic, age, and gender groups

## **EDUCATION RECOMMENDATIONS**

### **■ OBJECTIVE 1: Structure programs to educate along an environmental literacy continuum including developing awareness, building a knowledge base, changing behavior, and building stewardship**

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

**ACTION 1.1** Expand K-8 visitor center programs to include pre- and post-visit activities, lending kits, and presentations.

- A. Develop and distribute materials such as lending trunks which include activities and fact sheets that complement the Coastal Ecosystem Curriculum for use before and after group visits to the visitor center.
- B. Develop program to visit and outreach to a diverse cross-section of elementary schools. (also see Strategy 21.1.A)
- C. Co-create curriculum with The Marine Mammal Center and integrate into TMMC Whale Bus and GFNMS Visitor Center programs.
- D. Work with PRNS to import their Whales and Water Quality ranger-led programs to GFNMS Visitor Center.
- E. Develop GFNMS Visitor Center as a site for GGNRA Intertidal Trash Bash and work with leaders to incorporate Sanctuary messages into curriculum.

**Priority Level:** 1

**Partners:** FMSA, GGNRA, TMMC, PRNS

**Implementation Timeline:** year 1- continue Visitor Center programs, begin development of lending trunks, import PRNS programs; years 2 and 3- develop curriculum for the Whale Bus, outline elementary school outreach program

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

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

**ACTION 2.1** Continue current high school sandy beach program as part of the Coastal Ecosystem Education Program and expand. Currently it is a three- tiered program including curriculum, student monitoring, and teacher workshops.

- A. Continue sandy beach monitoring; continue exploration of domoic acid and other chemical levels in sand crabs as a water quality indicator.
- B. Expand to include a stewardship component in which students volunteer for the Sanctuary.

- C. Expand high school program to incorporate habitats and key species of the rocky intertidal habitat. Incorporate LiMPETS database.
- D. Develop a water quality component, include curriculum and monitoring.
- E. Increase enrollment to reach a broader, more diverse audience. Target SF Unified School District. (also see Objective 3b)

**Priority Level: 2**

**Partners:** FMSA

**Implementation Timeline:** year 1- continue sandy beach component, develop plan for stewardship, rocky intertidal, and increased enrollment; year 2- implement increased enrollment, stewardship and rocky intertidal components; year 3- develop plan for water quality component; year 4- implement water quality component

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

**STRATEGY ED-3: Educate diverse inner city children about the Sanctuary through summer camp experiences.**

(also see Objectives 2, 3a, and 3b)

**ACTION 3.1** Expand Sanctuary Explorer's Camp to reach a broader audience.

- A. Increase capacity and duration of the camp program.
- B. Adapt curriculum to increase stewardship ethic.
- C. Include high school coastal ecosystem student as camp counselors.
- D. Incorporate Crissy Field Center summer program into Sanctuary Explorers camp and vice versa.

**Priority Level: 1**

**Partners:** FMSA, Crissy Field Center, San Francisco Dept. Recreation and Parks

**Implementation Timeline:** on-going

**STRATEGY ED-4: Provide stewardship opportunities for high school students.**

(Also see Objective 2)

**ACTION 4.1** Develop GFNMS high school internship program.

- A. Recruit students from the high school Coastal Ecosystem Education Program to intern for summer camp, the Visitor Center, school programs, field research, and the Sanctuary Naturalist program.

**Priority Level: 2**

**Partners:** FMSA

**Implementation Timeline:** year 1- develop plan, engage 1-2 interns; year 2- first season of interns; year 2 and on- evaluate, expand, and continue

**Products:** Training Materials

**STRATEGY ED-5: Educate teachers about the resources and programs of the Sanctuary through hands-on and classroom activities.**

(also see Objective 3a)

**ACTION 5.1** As a component of the Coastal Ecosystem Education Program, develop a set of professional development programs.

- A. Re-instate local Teacher-at-Sea program to show local school teachers a typical research cruise, allow them to interact with Sanctuary staff and learn about resource management and research in the Sanctuary.

**Priority Level: 1**

**Partners:** CBNMS, teachers, NOAA fisheries, Monterey Peninsula College MATE program, MBARI

**Implementation Timeline:** year 1- contact partners, develop plan; year 2- implement; year 3 and on- evaluate and continue

**Products:** activities, web chats, interactive website

- B. Invite teachers to bi-annual research symposium to learn about Sanctuary research activities.

**Priority Level: 1**

**Partners:** CBNMS, teachers, local research institutions

**Implementation Timeline:** invite teachers to all research symposiums

**Products:** proceedings, student posters

- C. Develop series of advanced teacher workshops for veteran Sanctuary teachers. Workshops will be developed with research and resource protection staff and workshop topics will include current research and hot topics in resource protection.

**Priority Level: 2**

**Partners:** CBNMS, FMSA, Marine Science institutes (graduate students)

**Implementation Timeline:** year 2 or 3- plan and implement first workshop; year 4 and on- continue workshops with new topics, increase number and capacity

**Products:** workshop schedule, handouts

- D. Develop collaborative presentation on Bay Area marine science education programs with other marine science education groups. Presentation will allow teachers to preview programs so they can pick programs most appropriate for them and their classes. Deliver the short presentation to school teachers during trainings, in-service, and pre-service.

**Priority Level: 2**

**Partners:** CBNMS, FMSA, other bay area marine science education organizations, BASA, SWMEA, EECOM, bay area schools

**Implementation Timeline:** year 1- contact partners, plan presentation; year 2- finalize presentation and coordinate presentation schedule

**Products:** Presentations, handouts

- E. Maintain GFNMS resource library and make accessible to general public. Library contents include classroom lending kits, marine-related books, slide shows, and videos. Develop marketing plan and check-out system.

**Priority Level:** 2

**Partners:** FMSA

**Implementation Timeline:** On-going

**Products:** library; marketing, check out and tracking system

**STRATEGY ED-6: *Expand the reach of GFNMS education and outreach by deploying trained volunteers to educate about the Sanctuary at various events and locations.***

*(also see Objectives 2 and 3a)*

**ACTION 6.1** Recruit, train, and manage a diverse team of volunteers to educate about the sanctuary at visitor centers, summer camp, in the field at high use areas, at schools, and at outreach events (lectures, fairs).

- A. Reassess goals and accomplishments of the SEALS 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 Roving Docents program to interpret intertidal habitat and proper viewing guidelines to visitors.
- D. Develop a speakers bureau to provide speakers for schools and community groups.

**Priority Level:** 2

**Partners:** CBNMS, FMSA

**Implementation Timeline:** year 0-1- evaluate direction of SEALS; year 2- develop training program for volunteers in Visitor Center and schools, develop Rocky Intertidal Docents program; year 3- develop speakers bureau

**Products:** advertising materials, training materials, website, slideshows, brochure of volunteer opportunities at GFNMS

**STRATEGY ED-7: *Increase awareness and knowledge of the Sanctuary through a lecture series.***

*(Also see Objectives 2 and 3b)*

**ACTION 7.1** 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

**Priority Level:** 1

**Partners:** FMSA, CAS, Randall Museum, MBNMS

**Implementation Timeline:** accomplish above by year 1, then on-going

**Products:** Advertising materials, website

**STRATEGY ED-8: Increase awareness and build knowledge of the Sanctuary through educational programs and exhibits at the Visitor Center.**

(Also see Objective 2)

**ACTION 8.1** Maintain educational and engaging exhibits and activities at the GFNMS Coast Guard Station Visitor Center.

- A. Develop more interactive exhibits on Sanctuary resources and resource management issues.
- B. Improve and update touch tanks with additional animals and explanatory signs.
- C. Develop and/or incorporate temporary and traveling exhibits on current topics to attract new and repeat visitors.
- D. Develop scheduled 'drop in' programs such as Creature Feature and the Rocky Intertidal Picture Show to attract new and return visitors.
- E. Expand the Visitor Center's hours of operation to increase attendance.
- F. Cross advertise programs with Crissy Field Center and coordinate scheduling of drop in visitor activities.

**Priority Level:** 1

**Partners:** FMSA, Aquarium of the Bay, Crissy Field Center, CBNMS, MBNMS, PRNS

**Implementation Timeline:** year 1- coordinate with Crissy Field Center, improve touch tanks, develop drop in programs, develop interactive exhibits; year 2- install interactive exhibits, incorporate temporary exhibits, expand hours

**Products:** exhibits, touch tanks, advertising materials

**STRATEGY ED-9: Increase awareness and build knowledge of the Sanctuary through Sanctuary sponsored Ocean Fest.**

**ACTION 9.1** Expand attendance of Ocean Fest. Ocean Fest currently attracts 2,000-4,000 people to the annual one-day event with marine-related exhibitors, children's activities, and education on marine issues.

- A. Raise the profile and attendance of Ocean Fest by increasing effective use of media and advertising.
- B. Obtain additional partners and sponsors of Ocean Fest and leverage opportunities to increase advertising.

**Priority Level:** 1

**Partners:** FMSA, Exhibitors, CBNMS, MBNMS, Seafood Coalition

**Implementation Timeline:** year 0-1- increase media and advertising, obtain partners, year 2 and on- continue to grow and evolve

**Products:** advertising materials

**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.**

**ACTION 10.1** Complete production of a general video and distribute to appropriate audiences.

- A. Finalize script(s) and explore possibility of generating 2 cuts- one targeted to a general audience (8<sup>th</sup> grade and above) and one for children (7<sup>th</sup> grade and below).
- B. Develop distribution and advertising plan to reach desired audiences such as environmental education centers and county offices of education.
- C. Develop plan for additional videos on hot Sanctuary topics or in-depth profiles of aspects of the Sanctuary.

**Priority Level:** 1

**Partners:** FMSA

**Implementation Timeline:** year 1- finalize script, complete production, finalize plan for distribution; year 2- advertise and distribute; year 4- develop plan for additional videos

**Products:** video, advertising materials

**STRATEGY ED-11: Create stewards of the GFNMS by engaging middle and high school students in a large-scale, long term monitoring project.**

(Also see Objective 2)

**ACTION 11.1** 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.

- A. Implement annual teacher workshop.
- B. Maintain network of teachers and support their monitoring efforts.
- C. Maintain online database.
- D. Expand to other issues (new habitats, incorporate water quality).

**Priority Level:** 1

**Partners:** CBNMS, OCNMS, MBNMS, CINMS, FMSA, UCSC, BML

**Implementation Timeline:** Program in place, continue participation level

**Products:** Website, training workshops, database, reports, training manuals, teacher kits, curriculum, logos

**STRATEGY ED-12: Increase reach and success of all Sanctuary programs by effectively marketing, distributing, and evaluating programs and products.**

**ACTION 12.1** Develop strategy for marketing, distributing, and evaluating existing and new programs and products. *This action applies to all Sanctuary program areas (Research, Resource Protection) and should result in a comprehensive plan; therefore, the Education Working Group forwarded this recommendation to GFNMS Administration Internal Team. (see GF Administration Recommendations)*

**STRATEGY RE-13: *Increase awareness of GFNMS by using effective media and advertising techniques.***

**ACTION 13.1 Implement awareness campaign to raise the profile and recognition of the GFNMS.**

- A. Internally develop new image, messages, and target audiences. Target a wide and diverse audiences.
- B. Utilize advertising in television, radio, and print media.
- C. 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 is on all publications, newsletters, logo wear, etc.

**Priority Level: 1**

**Partners:** Oceanic Society, PRNSA, city visitor center, Convention Bureau, explore possibility of partnering with TV, radio, print media

**Implementation Timeline:** begin year 1, on-going

**Products:** partner package of brochures, public service announcements, press releases, logo wear, press kit, ad campaigns, update Sanctuary brochure

**STRATEGY: ED-14: *Increase audience by building a larger visitor center with increased exhibits, programs, and opportunities to learn about and support the GFNMS.***

**ACTION 14.1 Create a new visitor center that showcases the NMSP with exhibits, lecture hall, and classroom/lab facilities, providing a gateway to the GFNMS.**

- 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, lecture series, daily programs, and a tele-presence center.
- B. Develop telepresence to bring wildlife at Southeast Farallon Islands to the visitor center by live camera uplink. Incorporate outreach into Coastal Ecosystem Education Program and utilize facilities at the Ocean Exploration Center.

**Priority Level: 2 (Ocean Exploration Center), 3 (Telepresence)**

**Partners:** FMSA, The Presidio Trust, CAS, NPS, CDFG, SF Bay Conservation and Development Commission, Ocean Conservancy, PRBO, USFWS

**Implementation Timeline:** year 1- initial planning stages and securing funding; year 2-3 completion of planning; year 4-5 – build center and exhibits, year 6 and on- open center, develop programs and activities, integrate current education programs

**Products:** Visitor Center (Ocean Exploration Center), exhibits, programs, telepresence

**STRATEGY ED-15: Educate consumers and seafood distributors about their connection to the Sanctuary and how to make seafood choices which will protect Sanctuary resources.**

(See also Objective 3a)

**ACTION 15.1** Expand audience and impact of Sustainable Seafood Education Program.

- A. Increase efforts to educate local seafood distributors, restaurants, and consumers about protecting the Sanctuary and marine environment by making sustainable seafood choices through creative presentations, brochures, special events, and media.

**Priority Level: 2**

**Partners:** FMSA, PCFFA, IFR, Monterey Seafood Company, Aquarium of the Bay, Monterey Bay Aquarium, restaurants, grocery stores

**Implementation Timeline:**

**Products:** Outreach materials, events, website

**STRATEGY ED-16: Increase awareness of the Sanctuary through interpretive signage and exhibits at strategic locations.**

(also see Objective 3a)

**ACTION 16.1** Develop a coordinated network of signs and exhibits throughout the Sanctuary.  
(Also see signage and facilities plan in GFNMS Administration Internal Team Recommendations)

- 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.

**Priority Level: 2**

**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

**Implementation Timeline:** see GFNMS Administration Recommendations

**Products:** Signage, brochures, trail map, exhibits, kiosks, outreach materials

Cross-Referenced Strategy:

**STRATEGY ED-17: Expand the reach of Sanctuary education and outreach by training volunteers of the Sanctuary and other organizations to deliver Sanctuary messages.**

(See Objective 2 for outlined entry)

**ACTION 17.1** Develop GFNMS naturalist certification program to train volunteers and professional naturalists of the Sanctuary and of other organizations to present basic Sanctuary information.

■ **OBJECTIVE 2: Increase communication and coordination among Sanctuary programs and partners.**

**STRATEGY ED-17: *Expand the reach of Sanctuary education and outreach by training volunteers of the Sanctuary and other organizations to deliver Sanctuary messages.***

**ACTION 17.1** Develop GFNMS naturalist certification program to train volunteers and professional naturalists of the Sanctuary and of other organizations 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.

**Priority Level: 1**

**Partners:** CBNMS, FMSA, other marine interpretation organizations (PRNS, GGNRA, Pacifica Chamber of Commerce Visitor Center, ACR, Russian River Stewards, Stewards of Slavianka)

**Implementation Timeline:** year 1-2- develop certification program; year 3- certify professional naturalists and begin program for volunteers; year 4- first full certification class; year 5- evaluate and continue

**Products:** training materials, certificates, patches

**STRATEGY ED-18: *Expand the reach of Sanctuary Education and Outreach by increasing distribution of GFNMS education and outreach messages through other environmental education groups.***

**ACTION 18.1** Include Sanctuary messages in other environmental organizations' distribution plan.

- A. Increase GFNMS brochure and newsletter distribution list to include local Visitor Centers and public information kiosks, Education libraries and teacher resource venues, and specific groups including: STRAW, MARE, PRNSA, PRNS Life Boat Station, TMMC Whale Bus, Crissy Field 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 per year.
- C. Distribute curriculum to other environmental education groups as appropriate.

**Priority Level: 1**

**Partners:** see above, CBNMS

**Implementation Timeline:** Ongoing, start in year 1

**Products:** Outreach materials

**ACTION 18.2** Link The Marine Mammal Center's High School Marine Science Discovery Program to GFNMS high school internship program and incorporate experiences in GFNMS and marine-related government careers into their program.

**Priority Level: 2**

**Partners:** TMMC, NMSP

**Implementation Timeline:** year 1- contact The Marine Mammal Center and develop plan for partnership, year 2- implement

Cross-referenced Strategies:

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

(see Objectives 1 and 3)

**ACTION 1.1** Expand K-8 visitor center programs to include pre- and post-visit activities, lending kits, and presentations. Steps from this Action addressing Objective 2 are:

- F. Develop program to visit and outreach to elementary schools.
- G. Co-create curriculum with The Marine Mammal Center and integrate into TMMC Whale Bus and GFNMS Visitor Center programs.
- H. Work with PRNS to import their Whales and Water Quality ranger-led programs to GFNMS Visitor Center.
- I. Develop GFNMS Visitor Center as a site for GGNRA Intertidal Trash Bash and work with leaders to incorporate Sanctuary messages into curriculum.

**STRATEGY ED-3: *Educate diverse inner city children about the Sanctuary through summer camp experiences.***

(also see Objectives 1, 3a, and 3b)

**ACTION 3.1** Expand Sanctuary Explorer's Camp to reach a broader audience. The step from this Action which addresses Objective 2 is:

- E. Incorporate Crissy Field summer program into Sanctuary Explorers camp and vice versa.

**STRATEGY ED-4: *Provide stewardship opportunities for high school students.***

(also see Objective 1)

**ACTION 4.1** Develop GFNMS high school internship program. The step from this Action which addresses Objective 2 is:

- B. Recruit students from the high school Coastal Ecosystem Education Program to intern for summer camp, the Visitor Center, school programs, field research, and the Sanctuary Naturalist program.

**STRATEGY ED-5: *Educate teachers about the resources and programs of the Sanctuary through hands-on and classroom activities.***

(also see Objectives 1 and 3a)

**ACTION 5.1** As a component of the Coastal Ecosystem Education Program, develop a set of professional development programs including:

- A. Teacher-at-Sea
- B. Bi-annual Research Symposium

- C. Advanced Teacher Workshops
- D. Collaborative Marine Science Education Program Presentation

**STRATEGY ED-7: Increase awareness and knowledge of the Sanctuary through lecture series.**

(Also see Objectives 1 and 3b)

**ACTION 7.1** Raise the profile of and expand the GFNMS lecture series to target new audiences and increase attendance. The step from this Action which addresses Objective 2 is:

- E. Increase collaboration with partners

**STRATEGY ED-8: Increase awareness and build knowledge of the Sanctuary through educational programs and exhibits at the Visitor Center.**

(see Objective 1)

**ACTION 8.1** Maintain educational and engaging exhibits and activities at the GFNMS Coast Guard Station Visitor Center. The step from this Action which addresses Objective 2 is:

- L. Cross advertise programs with Crissy Field Center and coordinate scheduling of drop in visitor activities.

**STRATEGY ED-11: Create stewards of the GFNMS by engaging middle and high school students in a large-scale, long term monitoring project.**

(Also see Objective 1)

**ACTION 11.1** 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.

**STRATEGY ED-15: Educate consumers and seafood distributors about their connection to the Sanctuary and how to make seafood choices which will protect Sanctuary resources.**

(See also Objective 1)

**ACTION 15.1** Expand audience and impact of Sustainable Seafood Education Program. The step from this Action which addresses Objective 2 is:

- B. Increase efforts to educate seafood distributors, restaurants, and consumers about sustainable seafood choices through creative presentations, brochures, special events, and media.

**STRATEGY ED-16: Increase awareness of the Sanctuary through interpretive signage and exhibits at strategic locations.**

(also see Objective 1 and 3a)

**ACTION 16.1** Develop a coordinated network of signs and exhibits throughout the Sanctuary. (Also see signage and facilities plan in GFNMS Administration Internal Team Recommendations) The step from this Action which addresses Objective 2 is:

- B. Incorporate Sanctuary exhibits into visitor centers and museums along the coast.

■ **OBJECTIVE 3a: Develop programs to target content builders, user/impact groups, influencers, and decision makers.**

**STRATEGY ED-19: *Educate residents and visitors in inland areas of the GFNMS watersheds about their connection with the Sanctuary.***

**ACTION 19.1** Develop a traveling exhibit on Sanctuary watersheds to bring the Sanctuary to inland communities.

- A. Develop storyboard and exhibit plan featuring the connection between inhabitant of watersheds and the resources of 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.

**Priority Level: 1**

**Partners:** libraries, community centers, schools, local museums

**Implementation Timeline:** year 1-3 –Developing and planning; year 3-5 Lending, coordinating schedule and transporting

**Products:** exhibit, activities/curriculum

Cross-referenced Strategies:

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

**ACTION 1.1** Expand K-8 visitor center programs to include pre- and post-visit activities, lending kits, and presentations.

(Also see Objective 1)

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

**ACTION 2.1** Integrate current high school sandy beach program into the Coastal Ecosystem Education Program and expand. Currently it is a three- tiered program including curriculum, student monitoring, and teacher workshops.

(Also see Objective 1)

**STRATEGY ED-3: *Educate diverse inner city children about the Sanctuary through summer camp experiences.***

(also see Objectives 1, 3a, and 3b)

**ACTION 3.1** Expand Sanctuary Explorer's Camp to reach a broader audience.

**STRATEGY ED-5: Educate teachers about the resources and programs of the Sanctuary through hands-on and classroom activities.**

(Also see Objective 1)

**ACTION 5.1** As a component of the Coastal Ecosystem Education Program, develop a set of professional development programs.

**STRATEGY ED-6: Expand the reach of GFNMS education and outreach by deploying trained volunteers to educate about the Sanctuary at various events and locations.**

(also see Objectives 1 and 2)

**ACTION 6.1** Recruit, train, and manage a diverse team of volunteers to educate about the sanctuary at visitor centers, summer camp, in the field at high use areas, at schools, and at outreach events (lectures, fairs).

**STRATEGY ED-16: Increase awareness of the Sanctuary through interpretive signage and exhibits at strategic locations.**

(also see Objective 1)

**ACTION 16.1** Develop a coordinated network of signs and exhibits throughout the Sanctuary. (Also see signage and facilities plan in GFNMS Administration Internal Team Recommendations)

**STRATEGY ED-17: Expand the reach of Sanctuary education and outreach by training volunteers of the Sanctuary and other organizations to deliver Sanctuary messages.**

(See Objectives 2 and 1)

**ACTION 17.1** Develop GFNMS naturalist certification program to train volunteers and employees of other organizations to present basic Sanctuary information.

■ **OBJECTIVE 3b: Programs will target diverse audiences including various multicultural, socio-economic, age, and gender groups.**

**STRATEGY ED-21: Build existing and new programs to target diverse audiences (multicultural, socio-economic, age, gender) and engage them in Sanctuary awareness and stewardship.**

**ACTION 21.1** Develop a framework to modify existing and new programs to target diverse audiences, including multicultural, socio-economic, age, and gender groups, using targeted messages and marketing. This framework should include the following recommended program modifications as listed above and cross-referenced here:

- A. Develop program to visit and outreach to a diverse cross-section of elementary schools. (see Strategy ED-1.1.B)
- B. Increase enrollment of Sandy Beach Coastal Ecosystem Education Program to reach a broader, more diverse audience. Target SF Unified School District. (see Strategy ED- 2.1.B)
- C. Expand Sanctuary Explorer's Camp to reach a broader audience. (see Strategy ED-3)

- D. Expand audience of Sanctuary Lecture Series by holding lectures in inland communities and diverse communities not already reached (see Strategy 7.1.C)
- E. Train staff and docents to work successfully with multicultural and other diverse audiences.

Inventory Matrix: Gulf of the Farallones NMS Education

**Problem Statement:** Gulf of the Farallones NMS does not have 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.”

- Goals:** a) Education is a management tool used to help protect the Sanctuary’s resources  
 b) Education complements and promotes other Sanctuary programs such as research, monitoring and enforcement.  
 c) Education continually reaches broader audiences to create an informed and connected public

- Objective 1:** A 1. develop awareness  
 A 2. build knowledge base  
 A 3. change behavior  
 A 4. build stewardship

PROGRAMS/ PROJECTS	Brief Description	LEAD/ PARTNERS	INFORMATION SOURCES	PRODUCTS	OTHER/ TARGET AUDIENCE
Walking the Watershed	Program on pollution in the watersheds (3-6 grades)- Note that this age group and topic is being served. Explore incorporation Sanctuary messages, especially in post-sites.	Lead: CFC/ GGNRA- Nancy Caplan Partners: Potentially GFNMS	GFNMS	Post-site lessons	(NC)
PRNS Whales Program	Ranger led Whales program (4-8 grades). Explore possibility of Sanctuary importing program to GFNMS Visitor Center.	Lead: GFNMS Partner: PRNS	GFNMS, PRNS	Activities	(NC)
PRNS Water Quality Program	Ranger led (6-8 grades). Explore possibility of Sanctuary importing program to GFNMS Visitor Center.	Lead: GFNMS Partner: PRNS	GFNMS, PRNS	Activities	
Intertidal Trash Bash, Adopt a Beach Program	Beach stewardship program, curriculum guide, field and classroom components, currently NOAA funded, look into incorporating Sanctuary message into program content. Expand to Sanctuary Visitor Center.	Lead: NPS- Trina Kvale Partner: GFNMS		Make sure GF logo in brochure	
<i>Develop Visitor</i>		<i>Lead: GFNMS</i>			

PROGRAMS/ PROJECTS	Brief Description	LEAD/ PARTNERS	INFORMATION SOURCES	PRODUCTS	OTHER/ TARGET AUDIENCE
<i>Center and signs for other visitor centers</i>					
Whale Bus outreach program					(NC)
Create video	Distribute to libraries, county offices of education, environ education centers, can be checked out. 2 cuts: 1) targeted for elementary students 2) use same visuals, target 8 <sup>th</sup> grade and up. General overview.	Lead: GFNMS Partners: Pixar (?) Antennea Theater Lucas Films (?)		Accompanying brochure	(CF) Elementary School students, General public
Expand lecture series	Expand audience of lecture series through working with other organizations. Make content relevant to reach broader public.	Lead: GFNMS Partners: PRNSA Field Seminars, Park Service, CAS, Oakland Museum, Chabot Science Center, Romberg-Tiburon, BML, Lawrence Hall of Science, Coyote Point Museum, Common Wealth Club, Maritime Museum (NPS), Randall Museum, Junior College, State Colleges, local universities, hobby groups, user groups, etc.			(CF) General public, and tailor for targeted groups
Speakers Bureau	1) Train volunteers to present for classes and clubs about Sanctuary in general 2) Provide contact information for potential expert or professional speakers	Lead: GFNMS Partners: Expert Professional Speaker (ex: Oceanic Society, PRBO, etc)	BASA (Bay Area Science Alliance)	Volunteer Database, Database of Professional speakers, evaluations, Sanctuary	(JS) 1) K-14 2) schools, associations, businesses, research organizations

<b>PROGRAMS/ PROJECTS</b>	<b>Brief Description</b>	<b>LEAD/ PARTNERS</b>	<b>INFORMATION SOURCES</b>	<b>PRODUCTS</b>	<b>OTHER/ TARGET AUDIENCE</b>
				Naturalist credential program,	Advertise with BASA
Awareness campaign	<p>Mass media campaign (“you need to go where they are”):</p> <ol style="list-style-type: none"> <li>1) Advertising- radio, tv, print</li> <li>2) Hooking media- Develop good pitches so that media write articles (especially series). Hit all regional newspapers (environmental writers) and retain presence. Possible topics: “Life in GFNMS” “Science and monitoring” “Importance of and threats to GFNMS” “Conservation and Stewardship”</li> <li>3) Distribution of Materials- including to our partner (“partner package”)</li> <li>4) Branding- Make sure our logo is on everything. We are going for “Instant recognition”</li> </ol>	<p>Lead: GFNMS Partners: Oceanic society, PRNSA (seminars), city visitor center, Convention bureau, explore possibility of partnering with radio, tv, print media</p>	TMMC, Marketing and Distribution Strategy (see below)	Partner package of brochures, etc. Mailing list for partners, Public service announcements, Ad campaigns (like TMMC), magazines, update sanctuary brochure-make dynamic	(CF) The 8 million residents and visitors of the SF Bay Area
Visitor Center at Coast Guard Station	<p>Continue and improve upon:</p> <ol style="list-style-type: none"> <li>1) Make exhibits more engaging, more touch tanks</li> <li>2) Develop scheduled programs in the visitor center to attract new and return visitors.</li> </ol>	<p>Lead: GFNMS Partners: Collaborations with Crissy Field Center (coordinate scheduling and advertising- theme based), Cordell Bank (sharing mobile/ rotating exhibits)</p>		Exhibits, docent led programs	Visitors and Residents of the SF Bay Area
Visitor Center at Pacifica	<p>Continue and improve upon:</p> <ol style="list-style-type: none"> <li>1) Develop programs (with docents)</li> <li>2) Share rotating exhibits</li> </ol>	<p>Lead: GFNMS Partners: Pacifica Chamber of Commerce, FMR Seashore docents, NPS</p>		Exhibits, docent led programs	Visitors and Residents of the SF Bay Area

<b>PROGRAMS/ PROJECTS</b>	<b>Brief Description</b>	<b>LEAD/ PARTNERS</b>	<b>INFORMATION SOURCES</b>	<b>PRODUCTS</b>	<b>OTHER/ TARGET AUDIENCE</b>
Ocean Exploration center	Create a new visitor center that showcases the NMSP with exhibits, lecture hall, and classroom/lab facilities, providing a gateway to the GFNMS. Special features could include interactive programs, permanent exhibits, traveling exhibits, lecture series, daily programs, and a tele-presence center.	Lead: GFNMS Partners: For example, CAS, NPS, CDFG, SF Bay Conservation and Development Commission, Ocean Conservancy, PRBO	Booz Allen Hamilton, Research partners, education partners, Econsult, Inc (visitor use center), BAR (architects), focus groups, NMSP, others	Visitor center, Exhibits, programs	Visitors and Residents of the SF Bay Area, K-adult school groups, volunteers, teachers, researchers,
Sanctuary Naturalist Program	Recruit, train, and manage diverse team of volunteers to educate about the sanctuary at visitor centers, summer camp, in the field at high use areas, at schools, on-site school visits, field adventures, office work, and at outreach events (lectures, fairs).	Lead: GFNMS Partners: Volunteer Centers of Marin, SF, San Mateo, and Sonoma; Marin Nexus	Volunteer Centers of Marin, SF, San Mateo, and Sonoma; Marin Nexus, CINMS, SBNMS	Brochure of volunteer opportunities at GFNMS	(JS) Target diverse populations for volunteer recruitment
High school naturalist program	Expand to other schools. High school students interpret marine environment to elementary school students and their parents and visitors at FMR. Creates great community support.	Lead: GFNMS Partners: Environmental Museums, Junior Colleges to provide credit, county parks, School districts, other labs in the area to do classes for the students, teachers	Bob Breen, FMR	Naturalist notes paper, curriculum	(BB) High School students (11-12 grades), elementary students and parents
Rocky Intertidal Roving Naturalists	Roving intertidal docents answering questions from visitors. Expand to other beaches/ intertidal areas. Model after seashore docents at FMR. Would be a	Lead: GFNMS/ FMSA Partners: FMR, Marin County Open Space, GGNRA, PRNS, Sonoma	FMR, Marin County Open Space, GGNRA,	Training Program, Manual, interpretive	(BB)

<b>PROGRAMS/ PROJECTS</b>	<b>Brief Description</b>	<b>LEAD/ PARTNERS</b>	<b>INFORMATION SOURCES</b>	<b>PRODUCTS</b>	<b>OTHER/ TARGET AUDIENCE</b>
	part of Sanctuary Naturalist Program.	County Parks (Pinnacle Gulch)	PRNS, Sonoma County Parks (Pinnacle Gulch)	materials, notification announcements, signage	
FMR Junior Rangers	Incorporate Sanctuary message into summer day camp led by grad student (week long program)	Lead: FMR Partners: GFNMS, FMSA	GFNMS, FMSA		
Junior Naturalists	Incorporate Sanctuary message. For children 11-17, help with beach watch or answering questions	Lead: FMR Partners: GFNMS, FMSA	GFNMS, FMSA		
Junior Beach Watch	Provide Beach Watch experience to High School students. Could be portion of High School Internship program.	Lead: GFNMS/ FMSA Partners: High School students and teachers	GFNMS, FMSA, Educators, Beach Watch manual, GFNMS Research Coordinator	Unit within Coastal Ecosystem curriculum, Database	
Continue Ocean Fest	Annual public event to raise awareness of the Sanctuary. Including children's activities, marine issue education, environmental exhibitors fair.	Lead: GFNMS, FMSA Partners: PCFFA, IFR, Exhibitors		Outreach materials	(JS)
LiMPETS	Long term Monitoring Project- Experiential Training for Students. Collaborative program with West Coast NMS that focuses on long term monitoring of Sanctuary habitats by high school students and volunteers.	Lead: West Coast Sanctuaries Partners: FMSA, UC Santa Cruz (John Pearse lab)	Lead and partners	Website, training workshops, database, reports, training manuals	(JS)
Develop Marketing/ Distribution/ Communications	Develop strategy for marketing, distributing materials, communicating, and evaluating existing and new programs.	Lead: GFNMS Partners: FMSA	Christine Fontaine (PRNSA), Susan	Strategy	(JS)

<b>PROGRAMS/ PROJECTS</b>	<b>Brief Description</b>	<b>LEAD/ PARTNERS</b>	<b>INFORMATION SOURCES</b>	<b>PRODUCTS</b>	<b>OTHER/ TARGET AUDIENCE</b>
/ Evaluation Plan		SEND TO ADMIN	Andres		
Sustainable Seafood Education Program	Educate seafood distributors, restaurants, and consumers about sustainable seafood choices. Target cooking magazines. Presentations to restaurant staff, contact grocery stores, distribute information to consumers.	Lead: GFNMS Partners: FMSA, PCFFA, IFR, Monterey Seafood Co, Aquarium of the Bay, Monterey Bay Aquarium, restaurants, grocery stores	Monterey Bay Aquarium, PCFFA, IFR, Seafood Choices Alliance, Chefs Collaborative	Outreach materials, events, website	(MB)

**Objective 2:** Increase communication and coordination among Sanctuary programs and partners

<b>PROGRAMS/ PROJECTS</b>	<b>Brief Description</b>	<b>LEAD/ PARTNERS</b>	<b>INFORMATION SOURCES</b>	<b>PRODUCTS</b>	<b>OTHER/ TARGET AUDIENCE</b>
Expand local Teacher at Sea and run other teacher workshops with Research Coordinator and Resource Protection Coordinator	Provide opportunities for teachers to interact with Sanctuary staff. Teachers learn about resource management and research in the Sanctuary. Also A,C objectives	Lead: GFNMS Partners: Teachers, CBNMS, NOAA fisheries juvenile rockfish cruise, Monterey Peninsula College MATE program, MBARI	Monterey Peninsula College MATE program, MBARI, MLML	Activities (lab ideas), web chats, interactive website	(NC)
Research Symposium	Should be utilized as Education venue- invite teachers. Teachers learn about Sanctuary research activities.	Lead: GFNMS Partners: Local research institutions		Proceedings, student posters	
Education Symposium	Develop Education symposium (just for educators, but similar to research symposium). Hold concurrently with Research Symposium.	Lead: GFNMS, FMSA Partners: local education institutions		Proceedings, student posters	
Sanctuary Naturalist Certification	Provide training on basic Sanctuary information to volunteers of other organizations (get Sanctuary certified). So that sanctuary messages get out through other groups, activities	Lead: GFNMS, FMSA Partners: Oceanic Society Expedition, kayak outfitters, other docent programs, FMR	National Association of Interpretation	Training materials, certificates, patches	
National Ocean Science Bowl	Host national program for high school students, host in SF or collaborate with MB. \$25000 total, would need to raise \$15000.	Lead: CORE Partner: GFNMS Aquarium of the Bay, CAS	CORE, The Otter Bowl (MB)	Awards, prizes	(JS)
Ocean Voyagers	Afterschool program in city parks. Marine science education groups rotate with	Lead: GFNMS, FMSA Partner: City parks (SF Rec and Parks), other marine	Park Voyagers in Chicago	Activities, T-shirts	(JS)

PROGRAMS/ PROJECTS	Brief Description	LEAD/ PARTNERS	INFORMATION SOURCES	PRODUCTS	OTHER/ TARGET AUDIENCE
	through city parks to deliver fun marine science messages.	education institutions			
Distribute Sanctuary Education/Outreach Materials to other environmental education organizations	Offer Sanctuary materials to: 1) PRNSA summer camp naturalists and teachers at Clem Miller Environmental Education Center 2) PRNS -Life Boat station users, Whales and Water Quality curriculum materials 3) TMMC Whale Bus 4) Crissy Field Environmental Center 5) Headlands Institute 6) GGNRA North District 7) Headlands YMCA	Lead: GFNMS Partners: PRNSA, Environmental Education Center, PRNS, TMMC Whale Bus, Crissy Field Environmental Center, Headlands Institute, Headlands YMCA, GGNRA North District		Outreach materials, activities	(MB)
Whale bus	Collaboratively develop a marine mammal unit in the Coastal Ecosystem Curriculum Offer curriculum to TMMC Whale bus to distribute	Lead: GFNMS, FMSA Partners: TMMC	TMMC	Sanctuary materials, unit in coastal ecosystem curriculum	
TMMC High School program- Marine Science Discovery Program	Incorporate GFNMS/ Marine-related government careers into their program, link to GF High school internship program	Lead: TMMC, GFNMS Partners: NOAA	GFNMS, NOAA	Interns, Marine Careers Fact Sheet, video from NOAA	
Crissy Field Environmental Center	1)Explore possibility of offering classes at the center. 2) Cross advertise programs. (coordinate schedule and advertising of drop in visitor	Lead: GFNMS Visitor Center, Crissy Field Env Center	GFNMS Visitor Center, Crissy Field Env Center	Classes, advertising materials, drop-in programs	

<b>PROGRAMS/ PROJECTS</b>	<b>Brief Description</b>	<b>LEAD/ PARTNERS</b>	<b>INFORMATION SOURCES</b>	<b>PRODUCTS</b>	<b>OTHER/ TARGET AUDIENCE</b>
	activities) 3) Incorporate Crissy Field summer program into Sanctuary summer camp and vice versa.				
Interpretive Signs	GFNMS work with FMR to create signage along bluff and at Pillar Point marsh.	Lead: FMR Partners: FFMR, GFNMS, MBNMS	GFNMS, MBNMS	Signage, brochures	(BB)
Sanctuary Trail	Develop a Sanctuary trail(multi-use and/or vehicular) along the coast with wayside exhibits and interactive kiosks	Lead: GFNMS Partners: NPS, State Parks, PRNS, County Parks, MBNMS, California Coastal Trail, Green Belt Alliance, Coastal Conservancy	MBNMS Trail Brochure, State Coastal Trail, Green Belt Alliance, City of Half Moon Bay	Symbol on trail posts, exhibits, signage, kiosks, trail map	(MB)
Sanctuary Exhibits	Incorporate sanctuary exhibits into existing VC, museums	Lead: GFNMS Partners: Oakland museum, BML, point Reyes lighthouse, Bear Valley visitor center, cliff house, maritime museum, aquarium of the Bay , CA Academy of Sciences, Bay model		Exhibits, outreach materials	
Build Sanctuary Watershed Traveling Exhibit	Exhibit to travel within our watershed, go to schools (during Oceans week) and museums	Lead: GFNMS, FMSA Partner:	Central Valley schools, museums, and visitor centers	Traveling exhibit and outreach materials, activities	
Presidio Educational Programs brochure	Develop brochure to highlight educational programs within the Presidio.	Lead: Presidio Trust/ NPS Partners: Park partners	Headlands brochure	Brochure	
Collaborative presentation on Marine Science Education	Take short presentation (~2 hours) featuring Bay Area marine science programs to	Lead: GFNMS Partners: Other Bay Area marine science education	Kathleen O'Sullivan from SF State	Presentation	

<b>PROGRAMS/ PROJECTS</b>	<b>Brief Description</b>	<b>LEAD/ PARTNERS</b>	<b>INFORMATION SOURCES</b>	<b>PRODUCTS</b>	<b>OTHER/ TARGET AUDIENCE</b>
Programs	school teachers during trainings, in- service, and pre-service. Allow teachers to preview programs so they can pick programs most appropriate for them and their classes.	organizations, BASA, SWMEA, EECOM			
Advanced Teacher Workshop	Course for teachers “who know their science, or think they do”. Have more in-depth course- on hot topics, Sanctuary issues, current research (graduate students)	Lead: GFNMS, FMSA Partners: Marine Science institutes at universities	EPA and Duke Power grant (MLML), MBARI (George Matsumoto)	Workshop, possibly a packaged lab with power point presentation	

**Objective 3:** a) Develop programs to target content builders, user/impact groups, influencers, and decision makers b) Programs will target diverse audiences including various multicultural, socio-economic, age, and gender groups.

<b>PROGRAMS/ PROJECTS</b>	<b>Brief Description</b>	<b>LEAD/ PARTNERS</b>	<b>INFORMATION SOURCES</b>	<b>PRODUCTS</b>	<b>OTHER/ TARGET AUDIENCE</b>
Coastal Ecosystem Education Program (Obj a, b, c)	Integrate all formal education programs into Coastal Ecosystem Education Program. Target SF Unified School district (automatically very diverse socio-economically and ethnic)	Lead: GFNMS, FMSA		Brochure	
High School component of Coastal Ecosystem education program	The high school program is a three tiered program with a curriculum, student monitoring and teacher workshops. Expand to look at Rocky intertidal, look at habitats, key species, and issues. Also expand to 4-tiered and include stewardship component.	Lead: GFNMS, FMSA Partner: Teachers		Curriculum, database, workshops, tattoos, website, slideshows, teacher checkout kits	
K-8 component of the Coastal Ecosystem Education Program	Expand K-8 visitor center programs. Pre- and Post- activities including lending kits and presentations.	Lead: FMSA, GFNMS		Activities, lending kits, presentations	
Telepresence	Seabird live camera uplink to website and visitor centers and museums. Develop strong outreach component and incorporate into Coastal Ecosystem curriculum.	Lead: GFNMS, FMSA Partners: USFWS, PRBO, NPS, Museums and visitor centers	Immersion Institute, Ano Nuevo State Park	Web page, exhibit, activities, curriculum	
Sanctuary Explorers camp component of the Coastal Ecosystem Education Program	Increase capacity and duration of intercity summer camp for kids to experience the sanctuary. Include high school interns to mentor campers.	Lead: GFNMS, FMSA Partners: SF Parks and Recreation		Activities	

<b>PROGRAMS/ PROJECTS</b>	<b>Brief Description</b>	<b>LEAD/ PARTNERS</b>	<b>INFORMATION SOURCES</b>	<b>PRODUCTS</b>	<b>OTHER/ TARGET AUDIENCE</b>
Student Summit component of the Coastal Ecosystem Education Program	Re-institute one day program where students discuss projects or research. Keynote speaker, discussions, presentations, workshops	Lead: GFNMS, FMSA Partners: Aquarium of the Bay, CAS		Summit	
High School Intern Program	Recruit high school students from Coastal Ecosystem Education Program to intern in visitor center, give school programs, be instructors at summer camp, after school programs (Teach other diverse students) Potential mentorship program with Sanctuary Naturalist program.	Lead: GFNMS, FMSA Partners:	Crissy Field Center (IYEL Inspiring young emerging leaders) Headlands program- TEAM (Teen environmental action mentorship), San Rafael High Excel Program (Brenda Goeden)		

Ranking Matrix Gulf of the Farallones NMS Education

- Objective 1:** A 1. develop awareness  
 A2. build knowledge base  
 A3. change behavior  
 A 4. build stewardship

Program Title	Program Description	Ranking Criteria						Tally	Bin
		Site Benefits	Complexity	Short-term feasibility	Long-term feasibility	Improved coordination	Urgency		
PRNS Whales Program	Ranger led Whales program (4-8 grades). Explore possibility of Sanctuary importing program to GFNMS Visitor Center.	C	A	A	A	C	C	CAA ACC	14=3
PRNS Water Quality Program	Ranger led (6-8 grades). Explore possibility of Sanctuary importing program to GFNMS Visitor Center.	B	A	A	A	C	C	BAA ACC	16=2
Intertidal Trash Bash, Adopt a Beach Program	Beach stewardship program, curriculum guide, field and classroom components, currently GFNMS funded, look into incorporating Sanctuary message into program content. Expand to Sanctuary Visitor Center.	A	A	A	A	C	A	AAA ACA	22=1
Create video	Distribute to libraries, county offices of education, environ education centers, can be checked out. 2 cuts: 1) targeted for elementary students 2) use same visuals, target 8 <sup>th</sup> grade and up. General overview.	A	B	A	B	C	A	ABA BCA	20=1
Expand lecture series	Expand audience of lecture series through working with other organizations. Make content relevant to reach broader public.	B	A	A	A	B	A	BAA ABA	21=1
Sanctuary Naturalist-	1) Train volunteers to present for classes and clubs about Sanctuary in general	A	C	C	B	B	B	ACC BBB	16=2

Program Title	Program Description	Ranking Criteria						Tally	Bin
		Site Benefits	Complexity	Short-term feasibility	Long-term feasibility	Improved coordination	Urgency		
Speakers Bureau	2) Provide contact information for potential expert or professional speakers								
Awareness campaign	Mass media campaign (“you need to go where they are”): 1) Advertising- radio, tv, print 2) Hooking media- Develop good pitches so that media write articles (especially series). Hit all regional newspapers (environmental writers) and retain presence. Possible topics: “Life in GFNMS” “Science and monitoring” “Importance of and threats to GFNMS” “Conservation and Stewardship” 3) Distribution of Materials- including to our partner (“partner package”) 4) Branding- Make sure our logo is on everything. We are going for “Instant recognition”	A	C	C	B	C	A	ACC BCA	17=2
Visitor Center at Coast Guard Station	Continue and improve upon: 1) Make exhibits more engaging, more touch tanks 2) Develop scheduled programs in the visitor center to attract new and return visitors.	A	B	A	B	B	A	ABA BBA	21=1
Visitor Center at Pacifica	Continue and improve upon: 1) Develop programs (with docents) 2) Share rotating exhibits	B	C	C	B	B	B	BCC BBB	14=3
Ocean Exploration center	Create a new visitor center that showcases the NMSP with exhibits, lecture hall, and classroom/lab facilities, providing a gateway to the GFNMS. Special features could include interactive programs, permanent	A	C	B	C	A	B	ACB CAB	17=2

Program Title	Program Description	Ranking Criteria						Tally	Bin
		Site Benefits	Complexity	Short-term feasibility	Long-term feasibility	Improved coordination	Urgency		
	exhibits, traveling exhibits, lecture series, daily programs, and a tele-presence center.								
Sanctuary Naturalist Program	Recruit, train, and manage diverse team of volunteers to educate about the sanctuary at visitor centers, summer camp, in the field at high use areas, at schools, on-site school visits, field adventures, office work, and at outreach events (lectures, fairs).	A	C	C	B	B	A	ACC BBA	18=2
High school naturalist program	Expand to other schools. High school students interpret marine environment to elementary school students and their parents and visitors at FMR. Creates great community support.	B	C	C	B	C	B	BCC BCB	13=3
Sanctuary Naturalists-Rocky Intertidal Roving Naturalists	Roving intertidal docents answering questions from visitors. Expand to other beaches/ intertidal areas. Model after seashore docents at FMR. Would be a part of Sanctuary Naturalist Program.	A	C	C	B	C	A	ACC BCA	17=2
Continue Ocean Fest	Annual public event to raise awareness of the Sanctuary. Including children's activities, marine issue education, environmental exhibitors fair.	A	B	A	A	B	A	ABA ABA	22=1
LiMPETS	Long term Monitoring Project-Experiential Training for Students. Collaborative program with West Coast NMS that focuses on long term monitoring of Sanctuary habitats by high school students and volunteers.	B	A	A	A	A	A	BAA AAA	22=1
Develop	Develop strategy for marketing, distributing materials,	A	C	B	A	B	A	ACB	20=1

Program Title	Program Description	Ranking Criteria						Tally	Bin
		Site Benefits	Complexity	Short-term feasibility	Long-term feasibility	Improved coordination	Urgency		
Marketing/ Distribution/ Communications/ Evaluation Plan	communicating, and evaluating existing and new programs.							ABA	
Sustainable Seafood Education Program	Educate seafood distributors, restaurants, and consumers about sustainable seafood choices. Target cooking magazines. Presentations to restaurant staff, contact grocery stores, distribute information to consumers.	B	B	B	B	B	B	BBB BBB	16=2

**Objective 2:** B1. Increase communication and coordination among Sanctuary programs and partners

Program Title	Program Description	Ranking Criteria						Tally	Bin
		Site Benefits	Complexity	Short-term feasibility	Long-term feasibility	Improved coordination	Urgency		
Expand local Teacher at Sea and run other teacher workshops with Research Coordinator and Resource Protection Coordinator	Provide opportunities for teachers to interact with Sanctuary staff. Teachers learn about resource management and research in the Sanctuary.  Also A,C objectives	B	A	A	A	B	B	BAA ABB	19=1
Research Symposium	Should be utilized as Education venue- invite teachers. Teachers learn about Sanctuary research activities.	B	A	A	A	B	A	BAA ABA	21=1
Education Symposium	Develop Education syposium (just for educators, but similar to research symposium). Hold concurrently with Research Symposium.	B	C	B	B	B	B	BCB BBB	15=3
Sanctuary Naturalist Certification	Provide training on basic Sanctuary information to volunteers and staff of other organizations (get Sanctuary certified). So that sanctuary messages get out through other groups, activities.	A	B	A	B	B	B	ABA BBB	19=1
National Ocean Science Bowl	Host national program for high school students, host in SF or collaborate with MB. \$25000 total, would need to raise \$15000.	B	C	C	C	B	B	BCC CBB	13=3
Ocean	Afterschool program in city parks. Marine science	C	C	B	B	B	B	CCB	13=3

Program Title	Program Description	Ranking Criteria						Tally	Bin
		Site Benefits	Complexity	Short-term feasibility	Long-term feasibility	Improved coordination	Urgency		
Voyagers	education groups rotate through city parks to deliver fun marine science messages.							BBB	
Distribute Sanctuary Education/Outreach Materials to other environmental education organizations	Offer Sanctuary materials to: 1) PRNSA summer camp naturalists and teachers at Clem Miller Environmental Education Center 2) PRNS -Life Boat station users, Whales and Water Quality curriculum materials 3) TMMC Whale Bus 4) Crissy Field Environmental Center- Walking the Watersheds 5) Headlands Institute 6) GGNRA North District 7) Headlands YMCA 8) FMR Junior Rangers summer camp and Junior Naturalists	A	A	A	B	C	A	AAA BCA	21=1
Whale bus	Collaboratively develop a marine mammal unit in the Coastal Ecosystem Curriculum Offer curriculum to TMMC Whale bus to distribute	B	B	A	B	B	B	BBA BBB	17=2
TMMC High School program- Marine Science Discovery Program	Incorporate GFNMS/ Marine- related government careers into their program, link to GF High school internship program	B	A	A	A	C	B	BAA ACB	18=2

Program Title	Program Description	Ranking Criteria						Tally	Bin
		Site Benefits	Complexity	Short-term feasibility	Long-term feasibility	Improved coordination	Urgency		
Crissy Field Environmental Center	1)Explore possibility of offering classes at the center. 2) Cross advertise programs. (coordinate schedule and advertising of drop in visitor activities) 3) Incorporate Crissy Field summer program into Sanctuary summer camp and vice versa.	B	A	A	B	C	A	BAA BCA	19=1
Interpretive Signage	Develop and place interpretive signage along GF Coast. (GFNMS work with FMR to create signage along bluff and at Pillar Point marsh.)	A	B	A	C	B	B	ABA CBB	18=2
Sanctuary Trail	Develop a Sanctuary trail(multi-use and/or vehicular) along the coast with wayside exhibits and interactive kiosks	B	C	C	C	B	B	BCC CBB	13=3
Sanctuary Exhibits	Incorporate sanctuary exhibits into existing VC, museums	A	B	A	C	B	B	ABA CBB	18=2
Build Sanctuary Watershed Traveling Exhibit	Exhibit to travel within our watershed, go to schools (during Oceans week) and museums	A	B	B	B	C	A	ABB BCA	19=1
Presidio Educational Programs brochure	Develop brochure to highlight educational programs within the Presidio.	C	B	A	B	C	C	CBA BCC	12=3
Collaborative presentation on Marine	Take short presentation (~2 hours) featuring Bay Area marine science programs to school teachers during trainings, in- service, and pre-service. Allow teachers	B	B	A	B	B	B	BBA BBB	17=2

Program Title	Program Description	Ranking Criteria						Tally	Bin
		Site Benefits	Complexity	Short-term feasibility	Long-term feasibility	Improved coordination	Urgency		
Science Education Programs	to preview programs so they can pick programs most appropriate for them and their classes.								
Advanced Teacher Workshop	Course for teachers “who know their science, or think they do”. Have more in-depth course- on hot topics, Sanctuary issues, current research (graduate students)	C	A	A	A	B	B	CAA ABB	17=2

**Objective 3:** C1. Develop programs to target content builders, user/impact groups, influencers, and decision makers.  
 C2. Programs will target diverse audiences including multicultural, socio-economic, ages, and gender groups.

Program Title	Program Description	Ranking Criteria						Tally	Bin
		Site Benefits	Complexity	Short-term feasibility	Long-term feasibility	Improved coordination	Urgency		
Coastal Ecosystem Education Program (Obj a, b, c)	Integrate all formal education programs into Coastal Ecosystem Education Program. Target SF Unified School district (automatically very diverse socio-economically and ethnic)	A	A	A	A	C	A	AAA ACA	22=1
High School component of Coastal Ecosystem education program	The high school program is a three tiered program with a curriculum, student monitoring and teacher workshops. Expand to look at Rocky intertidal, look at habitats, key species, and issues. Also expand to 4-tiered and include stewardship component.	A	B	C	C	B	A	ABC CBA	18=2
K-8 component of the Coastal Ecosystem Education Program	Expand K-8 visitor center programs. Pre- and Post-activities including lending kits and presentations.	B	A	A	B	B	A	BAA BBA	20=1
Telepresence	Seabird live camera uplink to website and visitor centers and museums. Develop strong outreach component and incorporate into Coastal Ecosystem curriculum.	A	C	B	C	C	B	ACB CCB	15=3
Sanctuary Explorers camp	Increase capacity and duration of intercity summer camp for kids to experience the sanctuary. Include high school interns to mentor campers.	B	A	A	B	C	A	BAA BCA	19=1

Program Title	Program Description	Ranking Criteria						Tally	Bin
		Site Benefits	Complexity	Short-term feasibility	Long-term feasibility	Improved coordination	Urgency		
component of the Coastal Ecosystem Education Program									
Student Summit component of the Coastal Ecosystem Education Program	Re-institute one day program where students discuss projects or research. Keynote speaker, discussions, presentations, workshops	C	A	A	B	C	B	CAA BCB	15=3
High School Intern Program	Recruit high school students from Coastal Ecosystem Education Program to intern in visitor center, be instructors at summer camp, after school programs (Teach other diverse students) Potential mentorship program with Sanctuary Naturalist program.	B	B	A	B	C	B	BBA BCB	16=2
Junior Beach Watch	Provide Beach Watch experience to High School students. Could be portion of High School Internship program or part of Coastal Ecosystem Education Program.	C	B	C	B	C	B	CBC BCB	12=3



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**Site-Specific  
Internal Team  
Recommendations**

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- I.  
Administration
- II.  
New and Emerging Issues
- III.  
Boundary Modifications



SITE-SPECIFIC ISSUE:

## ADMINISTRATION

Recommendation to the GFNMS Advisory Council from the  
Administration Internal Team

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### **PROGRAM STATEMENT**

In order for Gulf of the Farallones National Marine Sanctuary 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, Gulf of the Farallones National Marine sanctuary has grown from a staff of three with a budget of under \$300,000, to a current staff of five and budget of \$1,029,000. Until 1998, GFNMS office managed the GFNMS, CBNMS, and the northern portion of MBNMS.

The National Marine Sanctuary Program 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 manager 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 research, education, and marine resource protection programs, and 2) regulations, for controlling or restricting human behavior that is not compatible with resource protection. The Sanctuary manager establishes who is responsible for implementing specific programs, provides an administrative framework to ensure that all resource management activities are coordinated, and provides and manages an appropriate infrastructure to meet the goals and objectives of the management plan. The Sanctuary manager reports directly to the National Marine Sanctuary Program. In this capacity, the Sanctuary manager represents the National Marine Sanctuary Program and is the primary spokesperson for Gulf of the Farallones National Marine Sanctuary.

The National Marine Sanctuary Program and the Gulf of the Farallones National Marine Sanctuary 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 resources of this region, while considering the demands of multi-use interests. Because of the complexity of managing the activities and resources 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 management. 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 National Marine Sanctuary Program (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. On an annual basis, the NMSP reviews and adjusts funding priorities and requirements to reflect resource management needs at each of the thirteen National Marine Sanctuaries. The NMSP and the site manager coordinate efforts to protect and manage Sanctuary resources with other federal, state, regional and local agencies.

### **SANCTUARY MANAGER**

The Gulf of the Farallones National Marine Sanctuary manager recommends to the National Marine Sanctuary Program priorities for annual allocation of funds for site specific resource protection needs. The manager reports to the NMSP on surveillance and enforcement activities, violations and emergencies, and program activities. The manager coordinates with the NMSP on evaluating, processing and issuing of permits; monitors and evaluates research, education, and marine resource management 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 manager evaluates overall progress toward the resource protection objectives of the National Marine Sanctuary Program and prepares regular reports highlighting progress made in realizing these goals.

### **SANCTUARY STAFF**

Under the direction of the Sanctuary manager, 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 management issues.

### **SANCTUARY ADVISORY COUNCIL**

The Sanctuary Advisory Council (SAC) has been structured in accordance with the Federal Advisory Committee Act (FACA). The SAC, with its expertise, and broad based representation, offers advice to the Sanctuary manager on resource management issues and decisions. Gulf of the Farallones National Marine Advisory Council representation includes eight agency and stakeholder representatives, each seat has an alternate. The SAC is representative of a broad based constituency to ensure that the manager has a broad information base upon which to make management decisions.

### **IMPLEMENTATION OF THE MANAGEMENT PLAN**

Each of Gulf of the Farallones National Marine Sanctuary's program areas: education and outreach; research and monitoring; and marine resource protection, have outlined action plans for implementing management plan strategies. These action plans are designed to directly address resource management issues and guide management of the Gulf of the Farallones National Marine Sanctuary 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 management issues identified as priorities by the Sanctuary during the three-year 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; cooperation and coordination among many federal, state and local government agencies, as well as private organizations and individuals.

Gulf of the Farallones Sanctuary's 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 National Marine Sanctuary System. These funds cover expenses such as personnel salaries, vessel maintenance, property rental, equipment and supplies.

In addition to calculating operating costs, Gulf of the Farallones National Marine Sanctuary 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 ecosystem management of Gulf of the Farallones National Marine Sanctuary. The Gulf of the Farallones Sanctuary manager may draw from a selection of standard management tools to formalize relationships with other federal, state and local agencies or the private sector. The partnership mechanisms listed below require approval by General Counsel Ocean Services, with oversight by the Sanctuary manager:

#### MEMORANDUM of UNDERSTANDING (MOU)/

#### MEMORANDUM of AGREEMENT (MOA)

establishes 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

is an informal mechanism 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

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

provides funding to a non-Federal entity for a project/product that benefits the public. Cooperative agreements are the primary mechanism used for financial assistance. NOAA must serve as the Program officer on the cooperative agreement with financial oversight maintained by the Grants Management Division.

#### GRANT

provides 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

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) 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) has responsibility along with the California Dept. of Fish and Game, under the Magnuson Fishery Conservation Act (MFCMA), on approving and enforcing Fishery Management Plans (FMPs) prepared by regional fishery management councils to ensure protection of fishery resources. NMFS also shares responsibility with the Fish and Wildlife Service 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) has regulatory responsibilities with regard to sewage outfalls (under the Clean Water Act) 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

The U.S. Fish and Wildlife Service (FWS) 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 RECREATIONAL AREA

The National Park Service along with the California Department of Parks and Recreation are responsible for the management of the Golden Gate National Recreation Area (GGNRA). The GGNRA includes 34,938 acres of both inland and coastal natural resources, and spans a portion of San Francisco and Marin counties.

### POINT REYES NATIONAL SEASHORE

The National Park Service is responsible for the management of the Point Reyes National Seashore (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 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.

##### STATE LANDS COMMISSION

The 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 sub-merged lands (located below the mean low tide line and extending 3 nmi seaward). These sovereign state lands are held by the state "in trust" for the benefit of the public.

##### DEPARTMENT OF FISH AND GAME

The Dept. of Fish and Game (DFG) regulates commercial fishing, including the taking of tidal invertebrates for commercial purposes, under a licensing system. DFG 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. DFG also leases state water bottoms for the purpose of mariculture To build a strong foundation which supports the development of: effective program areas, a strong regulatory framework and an array of partnerships, that allows for growth in addressing the priority issues and recommendations laid out in the management plan.

### **ADMINISTRATION GOAL**

To 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 and qualities of the Gulf of the Farallones National Marine Sanctuary.

### **ADMINISTRATION OBJECTIVES**

1. Develop a structured administrative framework to continuously evaluate, maintain and expand, when necessary, 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

### **RECOMMENDATIONS**

#### **■ OPERATIONS**

**STRATEGY AD-1: Gulf of the Farallones National Marine Sanctuary's main office is located at Crissy Field, in the Golden Gate National Recreation Area, in San Francisco, California. GFNMS maintains visitor centers at Crissy Field and Pacifica. In addition to the current visitor centers, additional visitor centers will be located throughout the region as deemed necessary. New Sanctuary facilities will be developed through various partnerships with both the public and private sector.**

**Action 1.1:** Expand the current main office space to accommodate additional staffing needs and allow for future growth.

**Action 1.2:** Continue to maintain the Crissy Field and Pacifica visitors centers.

**Action 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 Phoecena, serves as a day-use platform supporting research efforts of the Sanctuary and its partners.

**Action 1.4:** Complete priorities and implement 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 Cordell Bank Sanctuary. Outreach and interpretive exhibit venues being considered include:

- A. Bear Valley Visitors Center at Pt. Reyes National Seashore 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. Bodega Marine Lab is the marine research arm of UC Davis, and the center of marine research on the north coast. GFNMS, in partnership with CBNMS, is proposing to update and expand its interpretive panels at the Lab.
- C. Fort Ross State Park celebrates the Russian presence in northern California in the 19th century during the heydays of the Russian-American Company. It also tells the story of local Native American tribes who fished and hunted in the area. CBNMS and GFNMS are proposing to develop wayside signage themed on wildlife watching, including tidepool etiquette and marine mammal viewing.
- D. Bodega Head State Park is the best vantage for getting a perspective of GFNMS and CBNMS. This is a popular whale-watching 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.
- E. Maintain Duxbury Reef's two-paneled sealed kiosk interpreting the intertidal habitats, intertidal etiquette and a description of the Sanctuaries (CBNMS and GFNMS).
- F. The Sanctuary will partner with USFWS to upgrade Southeast Farallon Island facility and add a field laboratory to support monitoring and research efforts on the Farallon Islands.
- 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. 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 learning and experiential visitor center. The Ocean Exploration Center will feature hands-on, interactive exhibits on GFNMS, temporary exhibits on the marine environment, and exhibits for the National Marine Sanctuary Program. The Ocean Exploration Center will also have a theater for films, lectures, telepresence and seminars. The Center will also have classrooms and office space.
- J. GFNMS will develop interpretive signs at 47 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.

## ■ STAFFING

**STRATEGY AD-2: *The primary focus of the Gulf of the Farallones National Marine Sanctuary is marine resource protection. Basic staffing requirements must provide support for administration and the program areas of research/monitoring, education/outreach, and marine resource management.***

(also see Working Group recommendations)

**Action 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. The actual number and expertise of staff will depend on budget allocations and the operating priorities of Gulf of the Farallones Sanctuary. In order to meet the objectives of this management plan, minimum staffing requirements have been laid out (see Staffing Chart). Administration will support the following:

- A. Building leadership in the field
- B. Increase exposure of the staff

**Action 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 Gulf of the Farallones Sanctuary manager will allocate 1.5% of the base budget, and offer and encourage staff participation in professional development such as:

- A. Continuous training
- B. Advancement opportunities
- C. Professional development and attendance at professional meetings, workshops,
- D. Staff exchanges with other sanctuaries

**Action 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 the Sanctuary’s resources and qualities. Through administration the following support will be provided:

- A. Team building
- B. Define relationship and nature of interactions between staff and management
- C. Clarify job responsibilities
- D. Support internal coordination between program areas
- E. Develop structured staff 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

**Action 2.4:** Through the administrative framework, the Sanctuary will work to create a positive working environment that encourages trust and clear accountability.

- A. Hold all hands Sanctuary meeting with headquarters and site staff to learn others expertise, learn roles, exchange information and engage in discussion of how to improve communication and productivity between sites and headquarters.
- B. Retreats (see above)
- C. Develop channels of clear communication to all staff members.
- D. Hire consultant to assist the site in developing a positive work environment that encourages trust and team building
- E. Hold regular, well planned staff meetings with activities to build trust

**Action 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

## ■ PARTNERSHIPS

**STRATEGY AD-3: *With limited staff and financial resources, Gulf of the Farallones National Marine Sanctuary will need to develop partnerships, and identify outside funding sources, and in-kind services to assist in the implementation of the management plan.***

**Action 3.1:** Continue to maintain and build on existing partnerships.

- A. Continue the Memorandum of Understanding with the Farallones Marine Sanctuary Association to carry out education and outreach programs and maintain visitor centers for the Sanctuary.
- B. Continue the Memorandum of Agreement with Golden Gate National Recreation Area for office space and services.
- C. Revise the Memorandum of Agreement with Point Reyes National Seashore for enforcement of Sanctuary regulations.
- D. Develop a Memorandum of Understanding with Pt. Reyes National Seashore to renovate the facility and dock at Sacramento Landing in Tomales Bay.

**Action 3.2:** Expand informal working relationship with National Marine Fisheries Service and United States Geological Survey. 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 resource management should be more clearly defined. With experience, the SAC will develop and can draw on a historical framework for on-going community-based decision making as they assume a leading role in providing advice to the Sanctuary manager.***

**Action 4.1:** In consultation with the SAC, strengthen the structure of the SAC by: evaluating and amending as necessary the SAC charter; evaluating and developing organizational strategies to enhance the SAC's level of participation and effectiveness; evaluating and adjusting if necessary the representation of SAC membership; and providing support to help the SAC develop a respected voice in the community.

**Action 4.2:** Identify the role of the SAC in addressing resource management issues by developing a format for assisting in the building of GFNMS policies and procedures.

**Action 4.3:** Provide support, resources, and guidance to help the SAC engage and educate the public about current, new, and emerging resource management issues in the Sanctuary.

**Action 4.4:** SAC members will be asked to serve on various SAC working groups. Working groups will be convened by the SAC to focus on specific issues and to allow for participation by additional stakeholders and community experts.

**Action 4.5:** Review the working group recommendations to add standing working groups and seats to the SAC.

## ■ INTERAGENCY COORDINATION

**STRATEGY AD-5: NOAA and Gulf of the Farallones National Marine Sanctuary recognize all other authorities in and around Sanctuary waters as important components of effective ecosystem management. 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.**

**Action 5.1:** GFNMS will engage other agencies in reviewing each other's actions, responding to Environmental Impact Statements, 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.

**Action 5.2:** Formalize agreements with federal/state co-trustee managers signaling that the cooperative and integrated management approach established for Gulf of the Farallones National Marine Sanctuary 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, Memorandums of Understanding, Memorandums of Agreement, and Consultation.

**Action 5.3:** Gulf of the Farallones National Marine Sanctuary seeks to formalize agreements for the following programs: 1) Protected Resources Enforcement Plan (USCG, NMFS) (see below), and 2) Emergency Response Plan (local, State and Federal emergency response agencies).

## ■ PROTECTED RESOURCES ENFORCEMENT PLAN

**STRATEGY AD-6: Strive to achieve resource protection through compliance with Sanctuary regulations and other applicable State and Federal statutes.**

**Action 6.1:** Ensure sufficient patrol presence in the Sanctuary through the development of partnerships and interagency coordination. Additionally, GFNMS needs to maintain an active enforcement relationship with the United States Coast Guard (USCG).

**Action 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 take the right action. Interpretive enforcement efforts will include:

- A. Train law enforcement entities to use interpretive enforcement.
- B. Develop signage program 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. Presentations at yacht clubs, and the Coast Guard Auxiliary.

- E. Follow-up letters to possible violators with “you may be in violation” notices that inform the boater about Sanctuary regulations.

**Action 6.3:** Work with other West Coast sanctuaries on developing a coordinated and consistent regional outreach theme about discharges in sanctuaries from cruise ships.

- Use Sanctuary Program regional representative to communicate with cruise line industry on compliance with sanctuary discharge regulations and identify satisfactory alternatives to the discharge of sewage, solid waste and other material from cruise ships transiting sanctuary waters.

## ■ EMERGENCY RESPONSE

**STRATEGY AD-7:** *Be prepared to respond to an emergency in or adjacent to the Sanctuary by developing a plan for a seamless operation in cooperation with other federal, state and local emergency response agencies in California.*

**Action 7.1:** GFNMS will review and revise its emergency response plan, based on the Incident Command System (ICS) and the U.S. Coast Guard’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. Layouts emergency response notification (including all relevant agencies, user groups and media) and preparation procedures.
- B. Identifies specific duties for Sanctuary staff.

**Action 7.2:** All Sanctuary staff will be trained on an on-going basis with regular updates and refresher courses, and ready to respond in the case of an emergency. Staff training to include:

- A. Understanding the Incident Command System.
- B. Familiarization with the area contingency plan.
- C. Assigned emergency response duties.
- D. Taking part in emergency response drills.
- E. Developing resource damage assessment skills.

## ■ PLANNING AND EVALUATION

**STRATEGY AD-8:** *Gulf of the Farallones National Marine Sanctuary will continuously measure and evaluate the successes and challenges of the strategies put forth in the five-year management plan. 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 resource protection.*

**Action 8.1:** Use the Site Report Card developed by the National Marine Sanctuary Program as a tool for quickly measuring the overall management performance of the site. Using a series of indicators, the report card allows the Sanctuary manager and staff to evaluate site effectiveness

in a variety of management categories such as “species protection” and “ecosystem management”.

**Action 8.2:** Work with National Marine Sanctuary headquarters staff to develop performance indicators for program areas (research/monitoring; education/outreach; and resource protection) identified in the management plan. The performance indicators are designed to measure “desired outcomes” of specific actions, and identify a specific target or objective for the particular program area. The purpose of the performance measures are to:

- A. Highlight successful (and not so successful) efforts of site management.
- B. Improve accountability.
- C. Keep the public, other resource managers, regional interests, and Congress informed of Sanctuary effectiveness.
- D. Help sites identify specific resource management needs.
- E. Ensure the site is always connected to current management issues.

**Action 8.3:** Gulf of the Farallones National Marine Sanctuary administrative framework will not only provide a foundation and support for carrying out current Sanctuary programs, but is preparing for, and strengthening the infrastructure for the future. Based on the results of the Site Report Card and performance indicators, the Sanctuary manager will provide oversight and guidance for the future of the site through the following measures:

- A. Reviewing resource management strategies.
- B. Identifying emerging resource management issues.
- C. Identifying and securing additional funding sources.
- D. Providing support for strengthening program areas.
- E. Strengthening existing and securing new partners.
- F. Providing support for staff development.
- G. Taking a leadership role in marine resource management policy development.

## ■ REGULATIONS AND PERMITTING

**Strategy AD-9:** *Evaluate the appropriateness and effectiveness of current Sanctuary regulatory language (prohibitions) (15 CFR ss922) in addressing the priority resource management issues identified in the management plan review process.*

**Action 9.1:** Gulf of the Farallones National Marine Sanctuary uses two complementary and strategic tools to carry out an ecosystem management approach: 1) programs, or action plans, which address resource management issues through the use of education and outreach, research, and resource protection, and 2) regulations, which help establish priorities for guiding or restricting human behavior that may not be compatible with resource protection (see Appendix).

The Sanctuary will propose to update current regulatory language and propose new regulatory actions recommended by the working groups, as appropriate. The following proposed regulatory changes are being considered:

#### PROPOSED CHANGES TO EXISTING REGULATIONS

- A. Exploring for, developing and producing oil and gas except the pipelines related to hydrocarbon operations outside the Sanctuary may be placed at a distance greater than 2 nmi from the Farallon Islands, Bolinas Lagoon, and ASBS where certified to have no significant effect on Sanctuary resources in accordance with ss922.84.)
  - include developing and producing minerals
  - take out exception for pipelines, since there are no proposals, this would help to simplify regulation
  
- B. Discharging or depositing any material or other matter except: (i) Fish or parts and chumming materials (bait). (ii) Water (including cooling water) and other biodegradable effluents incidental to vessel use of the Sanctuary generated by: (A) Marine sanitation devices; (B) Routine vessel maintenance, e.g., deck wash down; (C) Engine exhaust; or (D) Meals on board vessels. (iii) Dredge material disposed of at the interim dumpsite now established approx. 10 NM south of the southeast Farallon Island and municipal sewage provided such discharges are certified in accordance with Section ss922.84.
  - change language to be consistent with the Federal Water Pollution Control Act
  - eliminate exception for interim dredge site (relic)
  
- C. Except in connection with the laying of pipelines or construction of an outfall if certified in accordance with Section ss922.84: (i) Constructing any structure other than a navigation aid, (ii) Drilling through the seabed, and (iii) Dredging or otherwise altering the seabed in any way other than by anchoring vessels or bottom trawling from a commercial fishing vessel, except for routine maintenance and navigation, ecological maintenance, mariculture, and the construction of docks and piers in Tomales Bay.
  - the exception for mariculture will only apply to Tomales Bay
  - routine maintenance of docks and piers must be within original foot print
  - ecological maintenance to be removed as an exception
  
- D. Removing or damaging any historical or cultural resource.
  - add: possessing, removing, injuring, or attempting to move, remove or injure

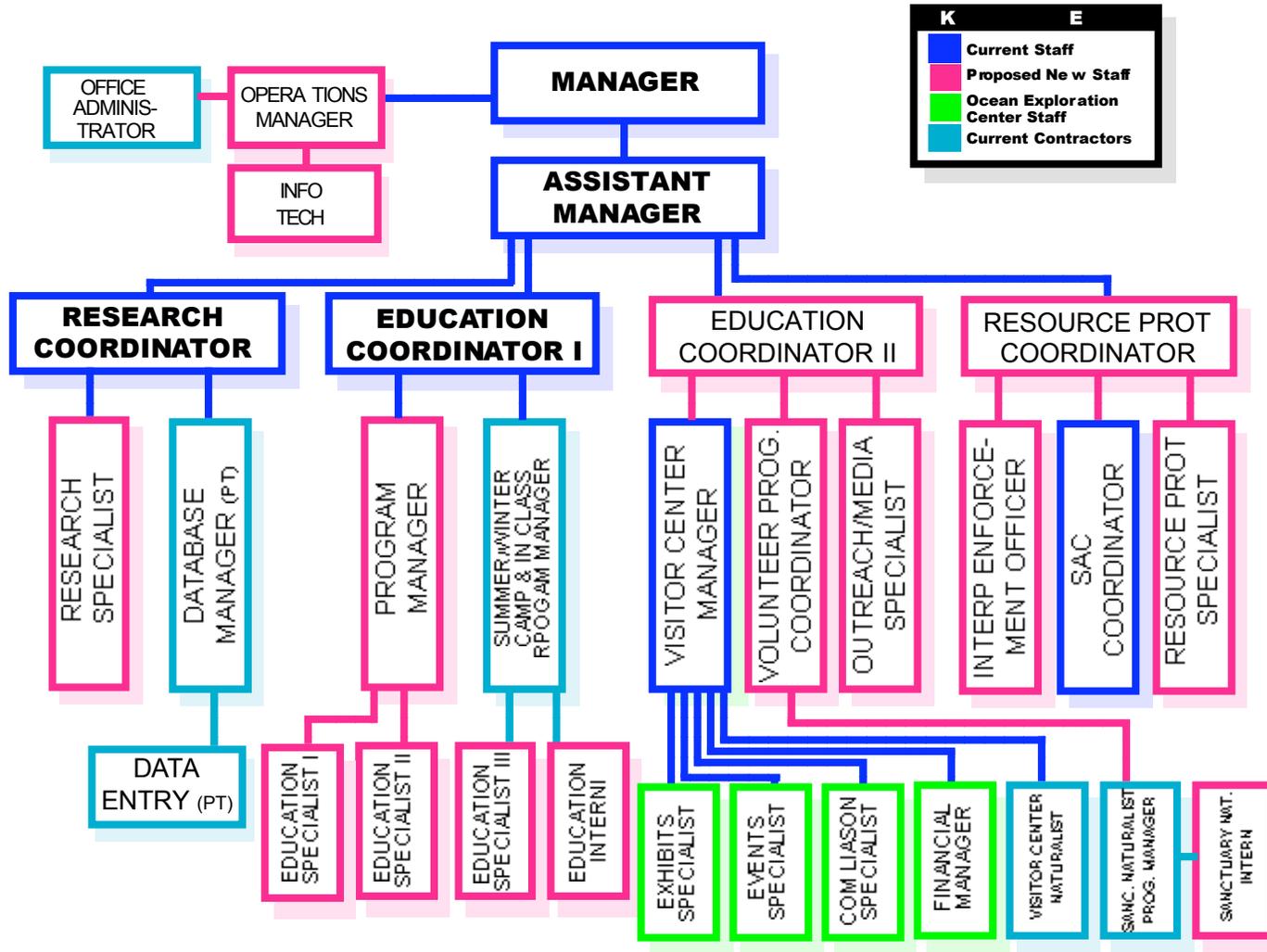
#### PROPOSED CHANGES TO BOUNDARY DESCRIPTION

- E. Change the boundary description from “area of marine waters” to “area of submerged lands” to be consistent with other newer sanctuaries.

#### PROPOSED NEW REGULATIONS

- F. Depositing or discharging, from any location beyond the boundaries of the Sanctuary
- G. Lightering in the Sanctuary.
- H. Introducing an exotic species or genetically modified species.
- I. Intentionally feeding or attracting a living resource, except for lawful fishing.
- J. Adopt a cruise ship discharge prohibition consistent with MBNMS' new proposal.
- K. Overlay regulation for Migratory Bird Treaty Act, Marine Mammal Protection Act and Endangered Species Act.

## Gulf of the Farallones National Marine Sanctuary PROPOSED STAFFING CHART





SITE-SPECIFIC ISSUE:

## NEW AND EMERGING ISSUES

Recommendation to the GFNMS Advisory Council from the  
Emerging Issues Internal Team

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### **PROGRAM STATEMENT**

The Gulf of the Farallones National Marine Sanctuary's responsibility is to track existing, emerging and potential future activities and their impacts on the living and non-living resources of the Sanctuary. In an effort to take a proactive ecosystem approach to resource management, GFNMS needs to examine and evaluate these activities that take place inside and outside of Sanctuary boundaries to better understand multiple use impacts on Sanctuary resources.

### **PROGRAM DESCRIPTION**

The goals and objectives set forth by the National Marine Sanctuaries Act (NMSA) direct each of the thirteen National Marine Sanctuaries to take an ecosystem approach to managing these marine areas of special significance. The ecosystems include habitat structure, species assemblages and ecological processes, as well as the many interactions with humans and their activities. Gulf of the Farallones Sanctuary needs to develop a mechanism for long term sustainability of these resources and processes, and develop a systematic approach to identifying and addressing emerging issues in order to meet the Sanctuary's primary goal of resource protection.

Although a wide range of issues have been included in the JMPR recommended action plans, many other issues are not addressed. These include: issues which are currently considered to have relatively small impacts, but which may grow to have large impacts in the future; activities which may be occurring in similar environments, but not actually in the Sanctuary; and/or 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, increase pressures on the coast, etc. This plan focuses on the development of a framework to identify, prioritize and address future resource protection issues.

### **EMERGING ISSUES GOAL**

To increase protection of Gulf of the Farallones National Marine Sanctuary's resources and qualities by proactively anticipating, and responding appropriately and in a timely manner to new and emerging issues

### **EMERGING ISSUES OBJECTIVES**

1. Develop a system to identify, track and appropriately respond to new and emerging issues.

2. Develop a coordinated communication system amongst all National Marine Sanctuaries and other resource management agencies in regards to new and emerging issues.
3. Continue to track issues from JMPR that are not directly addressed in the management plan.

## RECOMMENDATIONS

### ■ **OBJECTIVE 1: Develop a system to identify, track and appropriately respond to new and emerging issues.**

#### **Strategy EI-1: *Establish a framework for identifying and addressing emerging issues.***

**Action 1.1:** Set up an electronic web-based cataloging system to capture information on new and emerging issues (including sources and references). This (parking lot) system should be easily accessible by Sanctuary staff to add and access information.

- A. Information for this system should be reamed from (and be specific to relevant new and emerging issues in the marine environment):
  1. NMSP Daily News Clips
  2. NMSP sit reps
  3. News articles, news services
  4. Leadership Team calls and meetings
  5. National Coordinators meetings
  6. Interactions with other resource management agencies
- 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, the staff person maintaining the system will send out electronic messaging to the staff to inform and exchange information.

**Action 1.2:** Establish an evaluation system for determining if the issue is relevant to the site and steps for addressing issue 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?
- F. What are the potential impacts to Sanctuary resources?
- G. Might this activity be in violation of GFNMS' regulations?

- H. Are there similar activities 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 the 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 addressing this issue?
- L. Has headquarters been involved in dealing with 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, permit, education, research, etc.)?

■ **OBJECTIVE 2: Develop a coordinated communication system amongst all National Marine Sanctuaries and other resource management agencies in regards to new and emerging issues.**

**STRATEGY EI-2: *Establish a dynamic and up-to-date electronic system to inform one another of new and emerging issues, share information, and provide a forum for exchange and policy discussion.***

**Action 2.1:** NOAA, National Ocean Service and the National Marine Sanctuary Program 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.
- B. Would provide an information source and record of position or policy from within NOAA.
- C. Would provide for an information exchange forum (chat room) to share ideas and experience.

**Action 2.2:** GFNMS will establish an informal communication system and leverage opportunities with other resource management agencies to exchange ideas on new and emerging issues.

- A. California Coastal Zone Managers quarterly meetings
- B. Annual meeting in Washington, D.C.
- C. Conferences and professional meetings

■ **OBJECTIVE 3: Continue to track issues from JMPR that are not directly addressed in the management plan.**

**STRATEGY EI-3: As GFNMS' priorities shift, due to both availability of resources and priority of resource management issues, all current, new and emerging issues need to be continually tracked and re-evaluated.**

**Action 3.1:** Due to the sheer number and range of resource management issues that surfaced during the 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:

STRATEGY 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.

Action 1: 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. This plan is not specifically directed at fishing activities, but rather ecosystem protection and applies to many resource management issues.

STRATEGY 2: Carefully review and consult on activities that may produce sound impacts on living marine resources.

Action 2: 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, 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 1000 Hz) are generated by many human activities. Communication by many marine mammals 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.

STRATEGY 3: Marine Bioprospecting is a new issue for the Gulf of the Farallones Sanctuary 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.

Action 3: The following questions need to be understood before the Gulf of the Farallones Sanctuary 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, and 5) can a clear distinction be made between scientific research and commercial investigative activities.



SITE-SPECIFIC ISSUE:

## BOUNDARY MODIFICATIONS

Recommendation to the GFNMS Advisory Council from the  
Boundary Internal Team

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### ISSUE STATEMENT

Taking into account public interest in boundary modifications, Gulf of the Farallones National Marine Sanctuary will look at areas beyond the current Sanctuary boundary to determine what would be gained by expanding the boundary. NOAA recognizes the diversity and interconnectedness of the marine resources beyond the ecological unit defined by Gulf of the Farallones Sanctuary, and may find it necessary to protect an enlarged area that is consistent with, and provides ecosystem support for the marine waters surrounding the current Sanctuary. At this time, additional information is required to evaluate the need for boundary modifications and determine the value of including these areas in an expanded boundary.

### ISSUE DESCRIPTION

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 added value of sanctuary designation in addressing these issues. The management plan review process provides an opportunity 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.

If a boundary modification is proposed, it would be redefined to be consistent with Sec.301. of the National Marine Sanctuaries Act (NMSA) as amended by public law 106. NOAA would take an ecosystem approach in proposing a redefined boundary to better reflect the statutory guidelines described in the Act that include: "the area's natural resource and ecological qualities, including its contribution to biological productivity, maintenance of ecosystem structure, maintenance of ecologically or commercially important threatened species or species assemblages, maintenance of critical habitat of endangered species, and the biogeographic representation of the site" (NMSA). Included in any proposed boundary would be additional biological, ecological, geological and physical features that make a significant contribution to defining the ecosystem of the current Gulf of the Farallones National Marine Sanctuary.

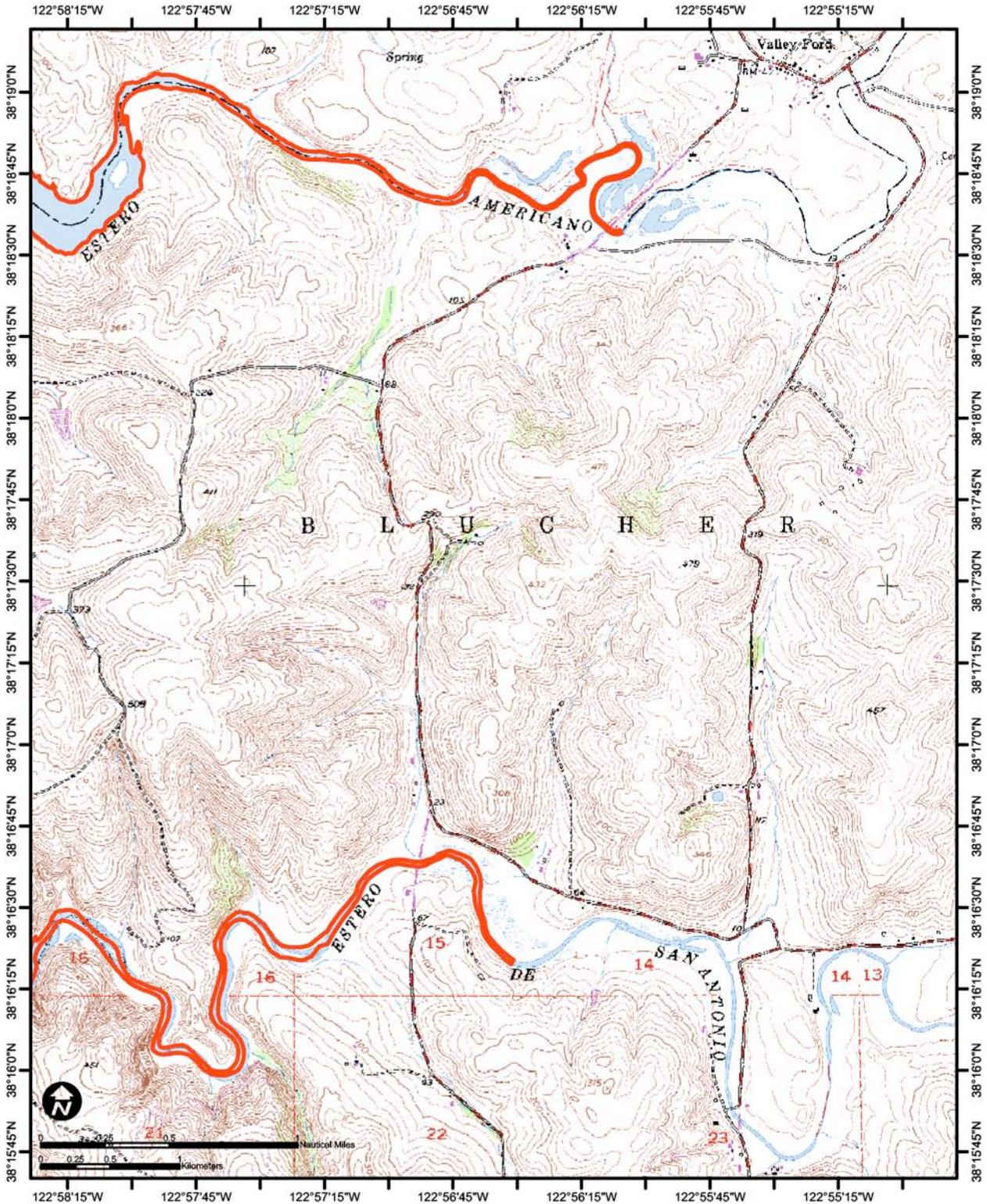
### JURISDICTIONAL SETTING

Gulf of the Farallones coordinates activities with many federal, state and local agencies including:

#### FEDERAL AGENCIES

UNITED STATES COAST GUARD (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

# ESTEROS BOUNDARY MAP



National Contingency Plan for removal of oil and hazardous substances in the event of a spill that threatens Sanctuary resource or qualities.

NATIONAL MARINE FISHERIES SERVICE (NMFS) has responsibility along with the California Dept. of Fish and Game, under the Magnuson Fishery Conservation Act (MFCMA), on approving and enforcing Fishery Management Plans (FMPs) prepared by regional fishery management councils to ensure protection of fishery resources. NMFS also shares responsibility with the Fish and Wildlife Service 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) has regulatory responsibilities with regard to sewage outfalls (under the Clean Water Act) 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

The U.S. Fish and Wildlife Service (FWS) 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 murrelets, auklets, guillemots, puffins, and other birds, and secondarily, to protect seal, sea lion, and other marine mammal assemblages.

#### GOLDEN GATE NATIONAL RECREATIONAL AREA

The National Park Service along with the California Department of Parks and Recreation are responsible for the management of the Golden Gate National Recreation Area (GGNRA). The GGNRA includes 34,938 acres of both inland and coastal natural resources, and spans a portion of both San Francisco and Marin counties.

#### POINT REYES NATIONAL SEASHORE

The National Park Service is responsible for the management of the Point Reyes National Seashore (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 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.

##### STATE LANDS COMMISSION

The 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 nmi seaward). These sovereign state lands are held by the state "in trust" for the benefit of the public.

##### DEPARTMENT OF FISH AND GAME

The Dept of Fish and Game (DFG) regulates commercial fishing, including the taking of tidal invertebrates for commercial purposes, under a licensing system. DFG 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. DFG also leases state water bottoms for the purpose of mariculture

## **BOUNDARY GOALS**

Gulf of the Farallones National Marine Sanctuary will bring together key National Marine Sanctuary staff and partners to work through a process, designed by the group, to generate a framework for evaluating boundary modifications using clear and concise analytical thinking and teamwork.

Based on the outcome of the evaluation process, a supportable and logical recommendation will be implemented.

## **BOUNDARY OBJECTIVES**

To develop and implement an analytical process designed to evaluate boundary alternatives relative to GFNMS using the best available information and resources.

To prepare an appropriate set of boundary recommendations, evaluations of each or any options, and recommendations for action to be presented to the Sanctuary Advisory Council for their review and comment.

## **BOUNDARY RECOMMENDATIONS**

### **STRATEGY B-1: *Develop a framework for identifying and analyzing boundary options.***

**Action 1.1:** Through an incremental process gather information, analyze the 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 warrant 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.
- E. Conduct a literature search (contract) to identify additional data sets (also see research recommendations).
- F. 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.
- G. Process data.
- H. Assemble a working group with broad-based stakeholder representation and scientific expertise.
- I. Develop a framework for quantitative analysis and evaluation of data by working group.
- J. Working group should strive to come to consensus on building a recommendation(s) on boundary options.

- K. Working group to forward recommendation to Sanctuary Advisory Council for their review and comments before forwarding it to the Sanctuary manager.

**Action 1.2:** The following recommended criteria will be used by the working group to evaluate different boundary options:

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 resource and ecological qualities, 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.

***STRATEGY B-2: Incorporate technical boundary delineations undertaken by the National Marine Sanctuary Program into the legal description of the GFNMS boundary.***

**Action 2.1:** In 1981, at the time of designation of the Gulf of the Farallones National Marine Sanctuary, the location of Sanctuary boundaries were more descriptive, rather than based on accurate coordinates (see CFR 922.80 Boundary in Appendix). Since that time, technology has allowed for more precise identification of coordinates and location of boundary points. In addition to identification of coordinates, boundary locations based on land points require further delineation. The following boundary discrepancies are recommended to be proposed through the JMPPR process:

- A. The end point of the Sanctuary boundary at de San Antonio will be identified both by coordinate and through a description. Through direct observation by the boundary internal team, and conversations with local ranchers, indicate that this is the most identifiable point for mean high tide in the Estero.
- B. The end point of the Sanctuary boundary at Estero Americano will be identified both by coordinate and through a description. Through direct observation by the boundary internal team, and conversations with local people, indicate that this is the most identifiable point for mean high tide in the estero. Additionally, this particular location is an entry point for kayakers into the estero and provides significant opportunities for Sanctuary outreach.

- C. There was discussion on the inclusion of the entire area identified as Walker Marsh into the Sanctuary boundary. This area is biologically rich in both vegetation and birds, an important roosting area for shore and land birds. The marsh also has high concentrations of mercury from historic upstream mining activity. After further investigation, the team realized the marsh only becomes entirely submerged seasonally, during very high tides, and usually associated with storm events. As a result, the only area of the marsh that fall within the mean high water mark are recommended for inclusion in the Sanctuary boundary (see map).
- D. Due to the recent inclusion of Hog Island into the Point Reyes National Seashore boundary, GFNMS boundary will be adjusted to remain at the “seaward limit of Point Reyes National Seashore”, per the original terms of designation.
- F. In regards to specific areas of Tomales Bay where the mean high tide mark is changing due to erosion, restoration, or alteration of the landscape, these areas will be included in the boundary as the mean high tide line naturally adjusts itself.
- G. The GFNMS is also investigating the possibility of over lapping boundaries (to the mean high water mark) with point Reyes National Seashore. This is still under discussion as to the value of joint authority.

2 Boundary maps (Estero, walker creek)

