

STRUCTURE OF THE ACTION PLANS

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

DEVELOPMENT OF ACTION PLANS

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

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

OUTLINE OF ACTION PLANS

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

Issue Statement/ Program Statement

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

Issue Description/ Program Description

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

Goals

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

Objectives

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

Strategies

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

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

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

Timeline

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

Budget

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

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

Performance Measures

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

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

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

OVERVIEW MATRIX OF PROGRAM AREA STRATEGIES

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

IMPLEMENTATION OF THE MANAGEMENT PLAN

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

Limitations

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

Incremental Funding Scenarios

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

1. Status of strategy implementation

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

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

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

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

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

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Table 1: Estimated Cost for Action Plans

Action Plan	Estimated Annual Cost (1000's)*					Total Est. ,5-Year Cost (1000's)
	YR 1	YR 2	YR 3	YR 4	YR 5	
Issue-Based Action Plans						
Water Quality	\$0	\$104.2	\$93.7	\$89.7	\$76.7	\$364.3
Wildlife Disturbance	\$51	\$71	\$80	\$80	\$190	\$472
Introduced Species	\$12	\$30	\$89	\$139	\$118	\$388
Ecosystem Protection: Impacts from Fishing Activities	\$663	\$343	\$315	\$301	\$296	\$1,918
Impacts from Vessel Spills	\$145	\$218	\$191	\$219	\$185	\$958
Program-Based Action Plans						
Education and Outreach	\$990	\$823	\$978	\$1,262	\$1,193.9	\$5,246.8
Conservation Science	\$204	\$156	\$180	\$142	\$186	\$868
Resource Protection	\$187	\$162	\$172	\$198	\$218	\$937
Administration	\$400	\$940	\$1,240	\$1,490	\$1,740	\$5,817
Cross-Cutting Action Plans						
Administration and Operations	\$288	\$276	\$264	\$264	\$264	\$1356
Community Outreach	\$144	\$180	\$180	\$180	\$216	\$900
Ecosystem Monitoring	\$381	\$525	\$567	\$531	\$471	\$2473
Maritime Heritage	\$237	\$237	\$246	\$270	\$270	\$1260
Northern Management Area Transition Plan	\$332	\$451	\$546	\$603.5	\$591	\$2523.5
Total Estimated Annual Cost	\$4034	\$4516.2	\$5141.7	\$5769.2	\$6015.6	\$25476.7
The sanctuary's base budget is available each year from appropriated funds.						
There is both availability of and opportunity to receive additional funding from appropriated funds.						
The estimates do not take into account increasing personnel costs each year or inflation.						
The estimates do not take into account unexpected events or emergencies or unforeseen projects.						

Table 2: Incremental Funding Scenarios

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

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

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



ISSUE-BASED ACTION PLANS

GFNMS DRAFT MANAGEMENT PLAN

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



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

ISSUE STATEMENT

Water quality within Gulf of the Farallones National Marine Sanctuary (GFNMS) is generally good due to the rural nature of the coastline and strong currents of the open ocean. Nevertheless, depending on coastal currents, the 8 million people living in the Bay Area and the discharge of the San Francisco Bay Estuary (including agricultural wastes from the Central Valley and residual sediments and metals from historic mining), periodically impact the sanctuary. The coastal waters of the sanctuary, particularly the estuarine habitats of Bolinas Lagoon, Tomales Bay, Estero Americano, and Estero de San Antonio, are vulnerable to land-based nonpoint source pollution. Sources of concern include runoff, agriculture, marinas and boating activities, 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 by poorly regulated small-scale discharges such as oily bilge water, detergents from deck wash, runoff from shipyards, or sewage from boats, septic systems, or leaking sewers. Residual pollutants from past practices such as mining operations and diversion of freshwater have the greatest potential impact in restricted waterways such as estuaries and creeks. Several of these sources of impact have occurred in Tomales Bay, which has been identified by the State Water Resources Control Board as not in compliance with state water quality standards for mercury (from an abandoned mine), pathogens, sediment, and nutrients.

Impacts on Open Coastal Environments

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

Impacts on Offshore Environments

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

Persistent organic pollutants such as DDT and PCBs were widely used nationwide before the mid-1970s, and residuals of these chemicals still remain in sediments and organisms within the sanctuary. Elevated levels of pollutants have been reported for fish, seabirds, and marine mammals found within the sanctuary. The sanctuary should evaluate these reports to determine if they warrant recommendations for additional water quality protection efforts. Additionally, there are emerging pollutants whose effects should also be considered.

Impacts From the San Francisco Bay Area

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

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

Marine debris that threatens sanctuary resources may come from the San Francisco Bay outflow and local watersheds that drain into the sanctuary or from across the Pacific Ocean. The impact of plastic debris is a world-wide problem due to the many potential sources of debris, longevity of plastic in the marine environment, and impacts caused by plastics even as they degrade to

smaller and smaller particles. Plastic particles may be ingested by marine organisms that select food by sight, filter feeders or animals that live in the open water who mistake plastic for food. Plastic debris has also been shown to entangle marine wildlife. The sanctuary should evaluate the potential local efforts that could be taken to reduce the impacts of marine debris on sanctuary wildlife.

JURISDICTIONAL SETTING

Water Quality Standards

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

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

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

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

California's waters only extend three miles past the coastline (including the coasts of its islands). These are considered nearshore waters. Any ocean waters outside of three miles are regulated directly by the EPA, in consultation with the state and regional boards. Outside of three miles from the mainland or the islands, EPA's water quality standards (for the receiving waters) and effluent limitations are applicable.

Areas of Special Biological Significance

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

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

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

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

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

Pollution Sources

Generally, sources of water pollution are divided into two different categories: point source and nonpoint source. Point sources of pollution are those that have a fixed discharge point. For example, sewage treatment plants (also called publicly owned treatment works) or industrial facilities (such as power plants or oil refineries) are considered point sources. The EPA definition is as follows:

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

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

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

Permits

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

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

A draft Phase II general stormwater NPDES permit has been proposed to cover certain designated smaller municipalities in California serving populations of fewer than 100,000 people. Discharge to sensitive water bodies (e.g., ASBSs) is one of the factors to consider when evaluating a municipality's designation status. There are other stormwater permits in the state as well. The California Department of Transportation (CalTrans) currently operates under a

statewide permit covering both municipal and construction related storm water discharges. Statewide general permits also are currently in effect for industrial and construction related storm water discharges.

Water Quality Impairments

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

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

Total Maximum Daily Loads

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

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

The Coastal Zone Management Act

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

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

The CCC addresses water quality issues through additional programs including:

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

Ocean Dumping Act

Title 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

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)

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

Sanctuary Regulations

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

WATER QUALITY GOAL

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

WATER QUALITY OBJECTIVES

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

WATER QUALITY ACTION PLANS

IMPACTS ON ESTURINE AND NEARSHORE ENVIRONMENTS

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

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

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

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

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

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

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

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

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

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

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

Complementary Strategies: GFNMS DMP, Water Quality, STRATEGY WQ-3

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

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

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

Products: Kiosk, printed outreach materials

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

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

Activity 3.1 Land-based discharges from stormwater, aging and undersized septic systems, agricultural runoff, livestock grazing, 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 the Interagency Coordinating Committee (IACC), chaired by the SWRCB, and implement management measures on state's nonpoint source pollution plan.
- B. Identify, cooperate, and exchange information with agencies and authorities that pertain to land-based discharges and impacts on water quality.
- C. Assess levels of land-based discharges and impacts on sanctuary resources.
- D. Identify water quality enforcement issues that are not being addressed adequately or appropriately and communicate to appropriate agencies.

Potential Partners: Regional Water Quality Boards 1 and 2, Marin County Storm Water Pollution Prevention Program, Sonoma County, Environmental Health Dept., UC Cooperative Extension, Bolinas Lagoon Technical Advisory

Committee, Bolinas Bay Watershed Council, Tomales Bay Watershed Council, CCC, SWRCB, County Agriculture Commissioner

Products: Memorandums of Agreement

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

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

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

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

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

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

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

- A. Identify and map specific upland areas adjacent to the sanctuary where development activities are taking place.

- B. Coordinate with agencies and entities that have developed BMPs on the implementation of effective management practices for land-use development. Collaborate with agencies and entities on evaluating and rewarding for successful integration of BMPs in land development adjacent to the sanctuary.
- C. Continue to track and evaluate development activities in watersheds adjacent to the sanctuary.

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

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

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

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

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

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

Potential Partners: RWQCB, SWRCB

Complementary Strategies: GFNMS DMP, Water Quality, STRATEGY WQ-3

IMPACTS ON OPEN OCEAN COASTAL ENVIRONMENT

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

Activity 5.1 The Mussel Watch program represents one of the longest term national efforts to track the impacts from nonpoint source pollution on bioaccumulation in the marine environment. Originally spearheaded by NOAA, the state adopted the program and has been a major source of support, although the program has been eroded in recent years by funding cutbacks. Mussel

Watch has supplied critical data on the health of coastal, bay, and estuarine waters of the state. The sanctuary should seek to continue this program by taking the following step:

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

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

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

ADDITIONAL AREAS TO BE ADDRESSED

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

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

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

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

Complementary Strategies: GFNMS DMP, Water Quality, STRATEGY WQ-1, STRATEGY WQ-3, STRATEGY WQ-4, STRATEGY WQ-7, STRATEGY WQ-9

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

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

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

Complementary Strategies: All Water Quality Strategies

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

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

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

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

Products: Comprehensive annotated bibliography

Complementary Strategies: GFNMS DMP, Water Quality, STRATEGY WQ-1, STRATEGY WQ-5

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

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

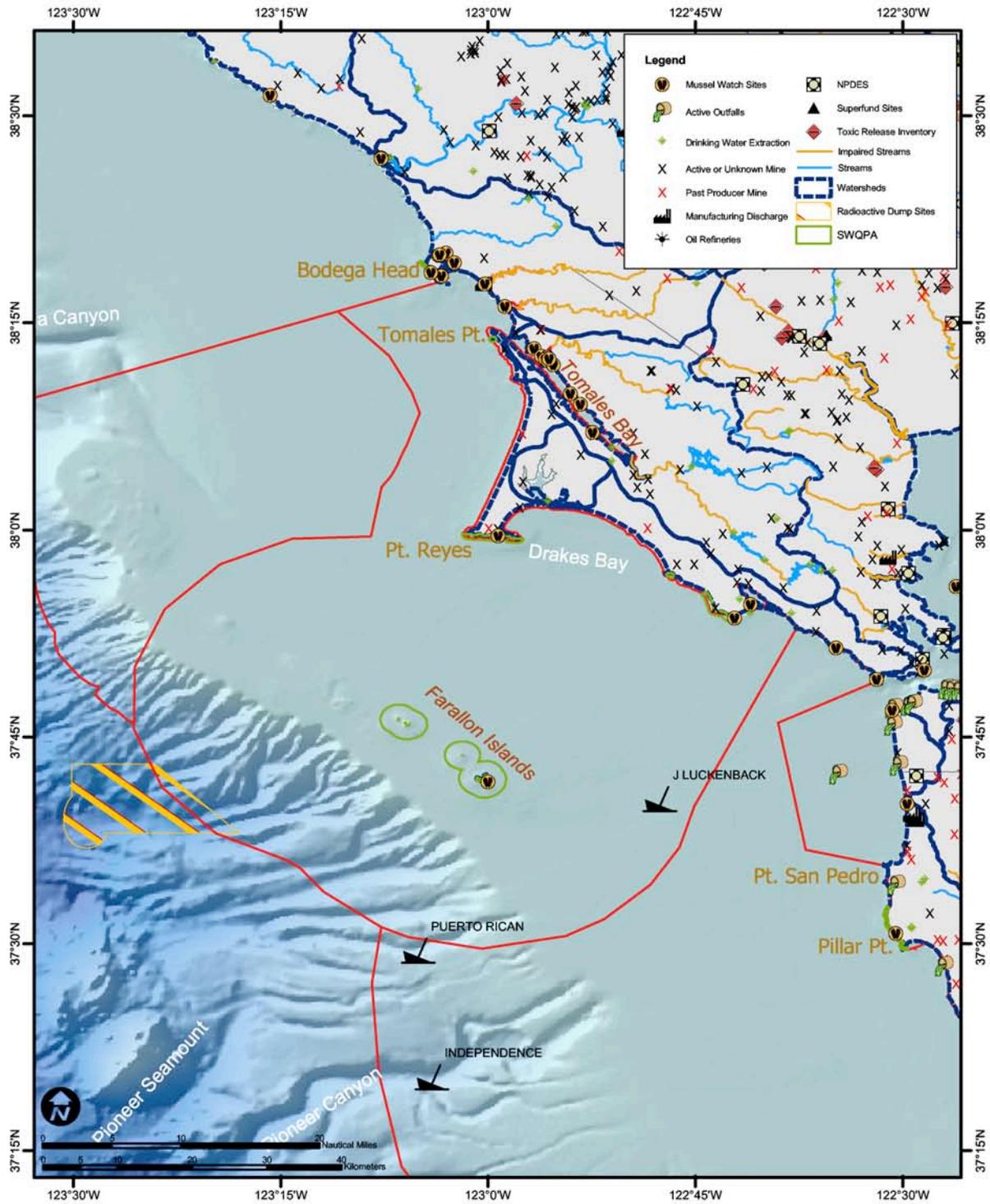
- A. Educate elected officials about the link between land use planning and the health of watersheds and coastal waters. Provide up-to-date and accurate information about specific issues and facts that pertain to water quality in the sanctuary.

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

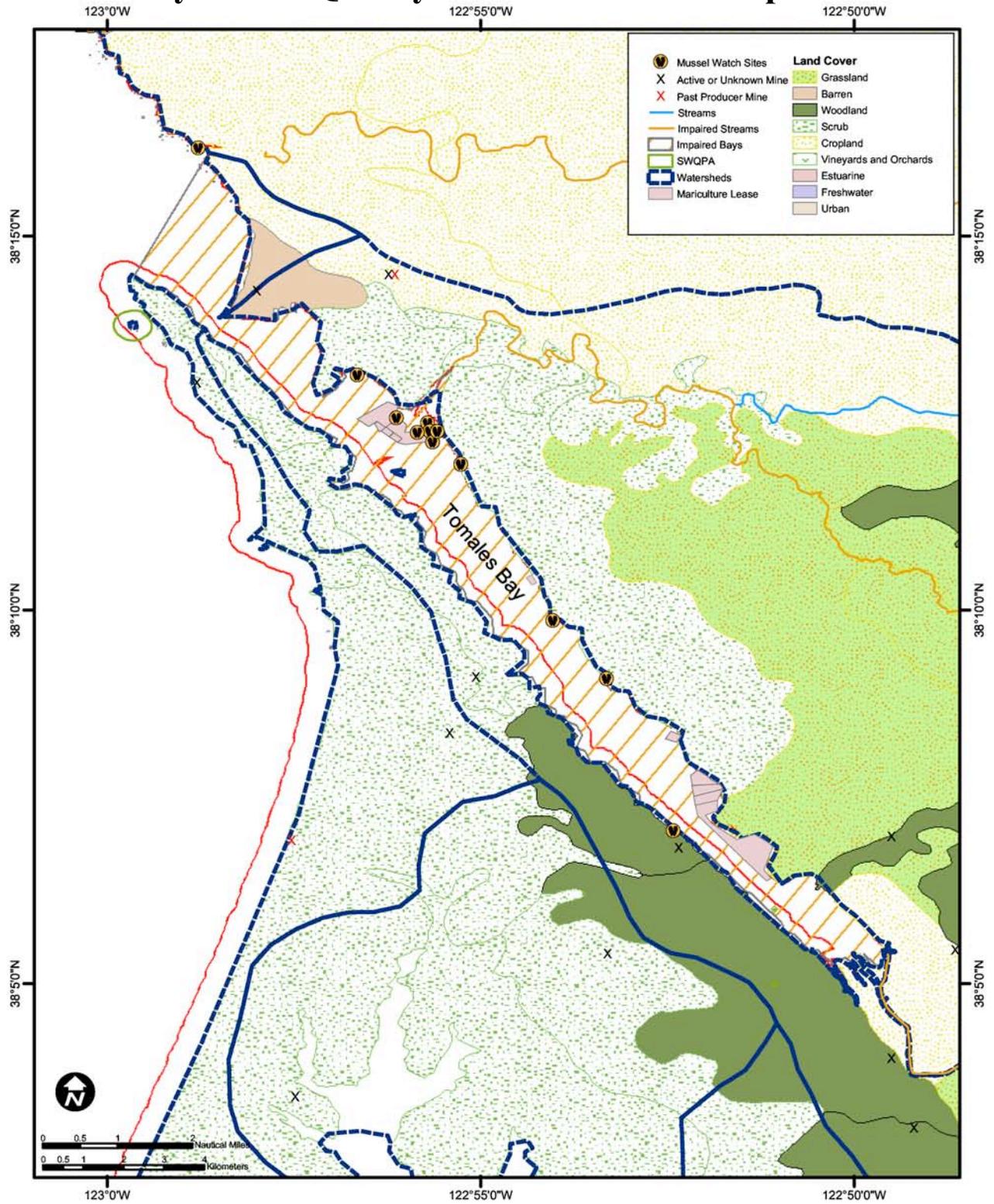
Potential Partners: CCC, UC Sea Grant, Marin Resource Conservation District, PRNS, SF Bay Conservation and Development Commission

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

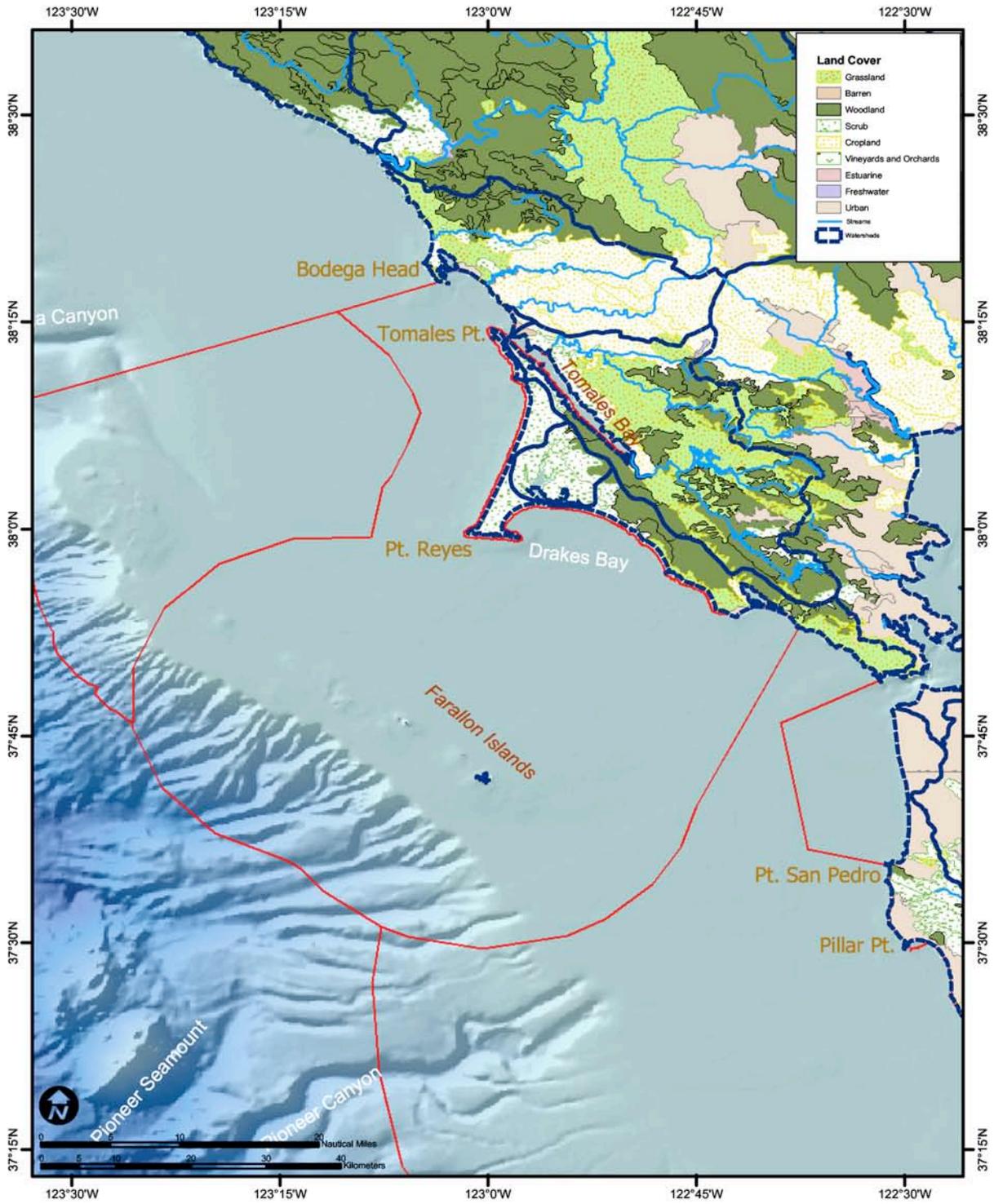
Water Quality Map



Tomales Bay Water Quality and Mariculture Map



Land Cover Map



Water Quality Action Plan
GFNMS Draft Management Plan

GFNMS WATER QUALITY

Timeline

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

Legend:

- Ongoing Activity
-→ Planning Stage
- ◆ Completed

GFNMS WATER QUALITY

Budget

Strategy	Estimated Annual Cost (1000's)*					Total Est. 5-Year Cost (1000's)
	YR 1	YR 2	YR 3	YR 4	YR 5	
STRATEGY WQ-1: Coordinate partnerships in implementing water quality monitoring program	\$0	\$18	\$15	\$15	\$15	\$63
STRATEGY WQ-2: Address sources of anthropogenic pathogens and pollutants from recreational and commercial boating activities and marinas	\$0	\$25	\$24	\$24	\$25	\$98
STRATEGY WQ-3: Coordinate with other agencies to address land-based discharges into the estuarine and nearshore areas of the sanctuary	\$0	\$16	\$20.2	\$20.2	\$20.2	\$76.8
STRATEGY WQ-4: Evaluate the need for no vessel discharge in SWQPAs	\$0	\$0	\$13	\$14	\$0	\$27
STRATEGY WQ-5: Ensure the continuation of the state's Mussel Watch program	\$0	\$4	\$0	\$0	\$0	\$4
STRATEGY WQ-6: Develop a standing Water Quality Working Group	\$0	\$0	\$11	\$6	\$6	\$23
STRATEGY WQ-7: Develop administrative capacity to support water quality protection plan	\$0	\$0	\$0	\$0	\$0	\$0
STRATEGY WQ-8: Develop an annotated bibliography of water quality research and monitoring programs	\$0	\$30.5	\$0	\$0	\$0	\$30.5
STRATEGY WQ-9: Educate local decision makers on water quality issues in the sanctuary	\$0	\$10.5	\$10.5	\$10.5	\$10.5	\$42
Total Estimated Annual Cost	\$0	\$104.2	\$93.7	\$89.7	\$76.7	\$364.3

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

Water Quality Action Plan
GFNMS Draft Management Plan

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

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

GFNMS WATER QUALITY

Performance Measures

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

Water Quality Action Plan
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Strategy Title(s)	Performance Goal	Desired Outcome (Objective)	Outcome Measure	How Measured	Who Measures	Output Measure
STRATEGY WQ-3: Coordinate with other agencies to address land-based discharges into the estuarine and nearshore environments of the sanctuary.	Engage in corrective and proactive measures to protect and enhance water quality in the estuarine, nearshore and other environments of the sanctuary.	Emphasize a watershed/ecosystem approach and address the range of water quality threats from chronic land-based runoff to catastrophic offshore events.	Decrease discharge of land-based pathogens, sediments, nutrients and residual pollutants on estuarine and nearshore environments in the sanctuary.	1) Establish formal relationship with water quality agencies and authorities to implement the state's nonpoint source plan. 2) Take corrective action on enforcement issues related to land-based discharges into the sanctuary. 3) Coordinate with agencies and entities that have developed BMPs on the implementation and evaluation of effective management practices.	Sanctuary Superintendent, Resource Protection Coordinator	1) Outreach and recognition materials related to BMPs 2) Successful prosecution of sanctuary discharge violations 3) Decrease in number of violations
STRATEGY WQ-7: Develop an annotated bibliography of water quality research and monitoring programs in and adjacent to the sanctuary to evaluate if the data are complete enough to determine the overall health of the sanctuary's ecosystem.	Engage in corrective and proactive measures to protect and enhance water quality in the estuarine, nearshore and other environments of the sanctuary.	Develop a regionally-based, cooperative water quality protection plan to address point and nonpoint source water quality impacts.	Ensure data is sufficient to determine where water quality is both threatened, and where there is compliance with state and federal standards.	Inventory all short- and long-term water quality research and monitoring programs to determine status, data gaps and sanctuary needs.	Research Coordinator, Resource Protection Coordinator	Comprehensive annotated bibliography



SITE-SPECIFIC ISSUE

WILDLIFE DISTURBANCE ACTION PLAN

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 Gulf of the Farallones National Marine Sanctuary (GFNMS) are wildlife disturbances associated with: harvesting and collecting in tide pools and mudflats; trampling of the intertidal zone; impacts from hikers and beach users, dogs, boaters, and kayakers on birds and marine mammals; entanglements; acoustic impacts; overflights; activities associated with increasing ecotourism; and the use of attractants or chumming.

ISSUE DESCRIPTION

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

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

SIGNIFICANT RESOURCES

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

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

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

Seabirds

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

Aquatic Birds

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

Marine Mammals

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

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

Threatened Steller sea lions occur year-round in the sanctuary. This population has decreased dramatically in the southern part of its range, which includes the Farallon Islands. The decline

has amounted to 30 percent of the total population over the past thirty years. The California sea lion is the most conspicuous and widely distributed pinniped in the sanctuary. It is found year-round in the sanctuary with the population increasing at about 8 percent each year. The Northern elephant seal is the largest pinniped species found in the sanctuary, with a total breeding population in the sanctuary of about 1,500.

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

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

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

JURISDICTIONAL SETTING

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

Federal Law

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

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

Wildlife Disturbance Action Plan
GFNMS Draft Management Plan

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

Magnuson-Stevens Fishery Conservation and Management Act: 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 (CDFG) has sufficient information on biological vulnerability and threats to support proposals to list them as endangered or threatened.

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

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

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

WILDLIFE DISTURBANCE GOAL

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

WILDLIFE DISTURBANCE OBJECTIVES

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

WILDLIFE DISTURBANCE ACTION PLAN

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

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

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

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

Products: Web-based spatial database

Complementary Strategies: GFNMS Draft management Plan (DMP), Introduced Species, STRATEGY IS-1; Research, STRATEGY RE-1; Water Quality, STRATEGY WQ-2, STRATEGY WQ-8; Introduced Species, STRATEGY IS-1, STRATEGY IS-2, STRATEGY IS-3; Fishing Activities, STRATEGY FA-1; Vessel Spills, STRATEGY VS-6, STRATEGY VS-12; Education, STRATEGY ED-2; Administration, STRATEGY AD-2

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

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

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

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

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

Complementary Strategies: GFNMS DMP, Education, STRATEGY ED-7; Introduced Species, STRATEGY IS-3; Monterey Bay National Marine Sanctuary (MBNMS) DMP, Tidepool Protection, STRATEGY TP-1, STRATEGY TP-2

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

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

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

Potential Partners: PRBO Conservation Science (Point Reyes Bird Observatory) (PRBO), Point Reyes National Seashore (PRNS), FMSA

Products: Data collection and reporting system

Complementary Strategies: GFNMS DMP, Vessel Spills, STRATEGY VS-3; Administration, STRATEGY AD-3; MBNMS DMP, Marine Mammal Seabird and Turtle Disturbance, STRATEGY MMST-2

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

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

Potential Partners: Research community, permitting agencies

Products: Biennial symposium, tracking and reporting system

Complementary Strategies: GFNMS DMP, Research, STRATEGY RE-3; MBNMS DMP, Marine Mammal Seabird and Turtle Disturbance, STRATEGY MMST-2

Activity 3.3 Based on research and monitoring findings, take appropriate actions to address impacts on wildlife from vessels and low-flying aircraft including:

- A. If justifiable, propose appropriate regulatory action or propose adjustments to current GFNMS' overflight and boat restrictions to address impacts from low flying aircraft and vessels.
- B. Maintain long-term monitoring program to document disturbance and/or effectiveness of regulatory action and interpretive enforcement program.

Potential Partners: FMSA, PRNS, GGNRA, PRBO, United States Fish and Wildlife Service (USFWS), CDFG, *COMMAND* Restoration Plan and Trustee Council

Products: Regulation(s) if necessary

Complementary Strategies: GFNMS DMP, Education, STRATEGY ED-7; MBNMS DMP, Marine Mammal Seabird and Turtle Disturbance, STRATEGY MMST-2

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

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

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

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

Products: Annual reports, interpretive enforcement materials

Complementary Strategies: GFNMS DMP, Wildlife Disturbance, STRATEGY WD-1, STRATEGY WD-3; Education, STRATEGY ED-7

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

- A. Through the development of partnerships and interagency cooperation, a cross-deputization program with the CDFG, U.S. Fish and Wildlife Service (USFWS), National Oceanic and Atmospheric Administration (NOAA) Fisheries, and the National Park Service (NPS) 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 (USCG) and the Civil Air Patrol (CAP).
- D. Hire a dedicated sanctuary enforcement officer.
- E. Investigate the potential for training volunteer uniformed interpretive enforcement officers.

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

Products: Interpretive enforcement materials

Complementary Strategies: GFNMS DMP, Resource Protection, STRATEGY RP-6; MBNMS DMP, Marine Mammal Seabird and Turtle Disturbance, STRATEGY MMST-8

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

Activity 5.1 Conduct an assessment of target audiences to determine appropriate messaging, products and avenues for communicating to wildlife viewers about responsible interactions with wildlife. Wildlife viewing guidelines will be developed in concert with NOAA's *Responsibly Watching California Marine Life* handbook and the 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, pertaining specifically to marine species and habitats. Other wildlife viewing models to be considered include: Paddler's Etiquette, The Marine Mammal Center's Stranded Mammal Etiquette and Marine Mammal Viewing Guidelines, and Audubon's Standards for Bird Viewing.

- A. Develop viewing guidelines and outreach materials for boaters based on species-specific behavioral responses and vessel approach and speed guidelines (to be consistent with whale watching guidelines).
 - 1. Develop volunteer program based on *Dockwalkers* model to reach boaters at harbors and marinas.
 - 2. Develop kiosk at key harbors to display wildlife viewing guidelines and animal identification cards.

3. Reach boaters through vessel registration with Department of Motor Vehicles.
- 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 identification 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 rocky intertidal zone.
- E. Develop guidelines for wildlife interactions for researchers conducting research in the sanctuary.
 1. Include outreach materials in research permit package
 2. Distribute outreach materials to other agencies and institutions conducting research in the sanctuary that does not require a permit

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

Products: Handbook, signage, brochures, website, kiosk

Complementary Strategies: GFNMS DMP, Education, STRATEGY ED-7

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

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

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

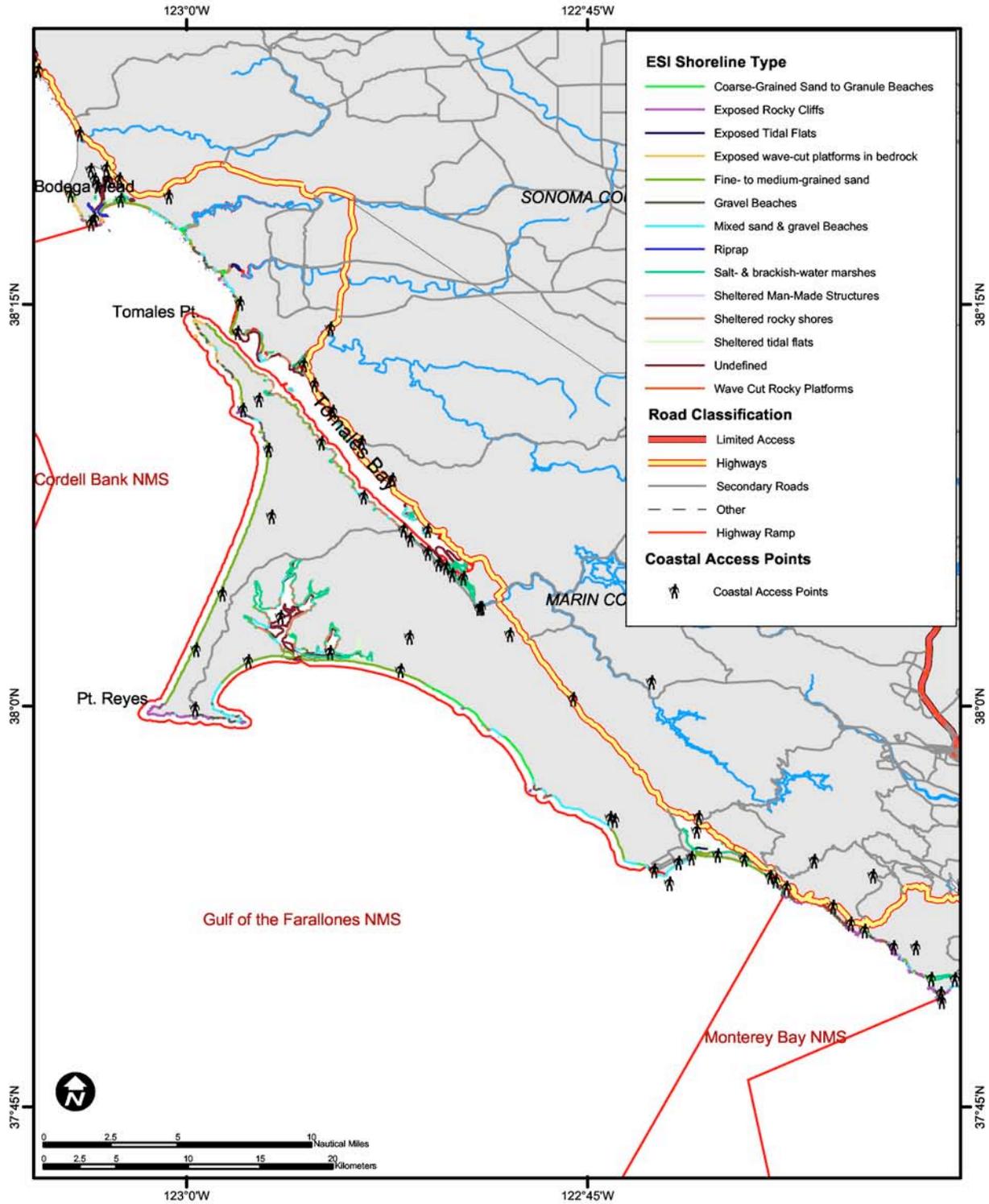
- E. Identify opportunities for cooperative marketing efforts with other agencies and organizations.

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

Products: Wildlife disturbance media kit

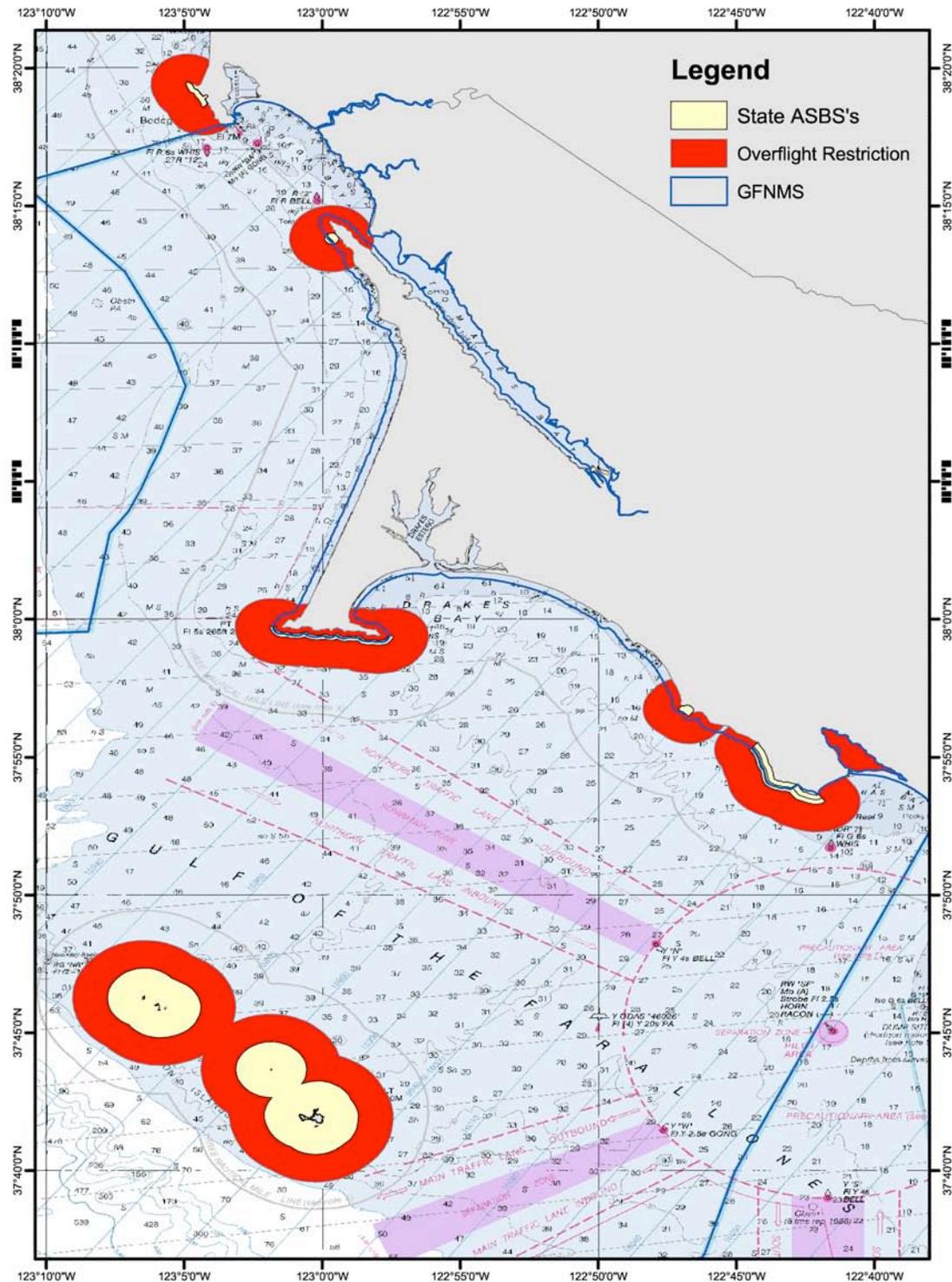
Complementary Strategies: GFNMS DMP, Education, STRATEGY ED-11

Coastal Access Points and Shoreline Types Map



Overflight Restriction Map

Preliminary Look: 1nm Overflight Restriction



GFNMS regulations prohibit airplane flights below 500 feet within 2 nautical miles of Areas of Special Biological Significance.

GFNMS WILDLIFE DISTURBANCE

Timeline

Wildlife Disturbance Strategy	Year 1	Year 2	Year 3	Year 4	Year 5
STRATEGY WD-1: Create easily accessible centralized Web-based spatial database to house information pertaining to wildlife disturbance.		—————▶	
STRATEGY WD-2: Using volunteer monitoring programs, observe and record impacts from human activity on rocky intertidal.			—————▶	
STRATEGY WD-3: Develop research and/or monitoring programs to better understand and address impacts on wildlife from vessels and low flying aircraft.	—————▶	—————▶		
STRATEGY WD-4: Using interpretive enforcement and law enforcement efforts, address human behavior that may be adversely impacting wildlife.		—————▶	—————▶	
STRATEGY WD-5: Develop wildlife viewing guidelines to reduce disturbance to wildlife from human interactions.	—————▶	—————▶			
STRATEGY WD-6: Maximize media venues to augment direct outreach efforts and increase public awareness of wildlife disturbance issues.	—————▶	—————▶		

Legend:

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

GFNMS WILDLIFE DISTURBANCE

Budget

Strategy	Estimated Annual Cost (1000's)*					Total Est. 5-Year Cost (1000's)
	YR 1	YR 2	YR 3	YR 4	YR 5	
STRATEGY WD-1: Create easily accessible centralized Web-based spatial database to house information pertaining to wildlife disturbance	\$0	\$20	\$18	\$18	\$18	\$74
STRATEGY WD-2: Using volunteer monitoring programs, observe and record impacts from human activities on marine resources and key habitats of the sanctuary, such as the rocky intertidal	\$0	\$0	\$10	\$10	\$120	\$140
STRATEGY WD-3: Develop research and/or monitoring programs to better understand and address impacts on wildlife from vessels and low flying aircraft	\$23	\$23	\$23	\$23	\$23	\$115
STRATEGY WD-4: Through interpretive enforcement and law enforcement efforts, address human behavior that may adversely impact wildlife	\$8	\$8	\$8	\$8	\$8	\$40
STRATEGY WD-5: Develop wildlife viewing guidelines to reduce disturbance to wildlife from human interactions	\$15	\$15	\$16	\$16	\$16	\$78
STRATEGY WD-6: Maximize media venues to augment directed outreach efforts and increase public awareness of wildlife disturbance issues	\$5	\$5	\$5	\$5	\$5	\$25
Total Estimated Annual Cost	\$51	\$71	\$80	\$80	\$190	\$472

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

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

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

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

GFNMS WILDLIFE DISTURBANCE

Performance Measures

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



SITE-SPECIFIC ISSUE

INTRODUCED SPECIES ACTION PLAN

ISSUE STATEMENT

Introduced species have been identified in and around Gulf of the Farallones National Marine Sanctuary (GFNMS) waters and have the potential to cause ecological and economic degradation to the affected coastal areas. If detection, prevention, and eradication efforts are not taken, further introduction and spread of introduced species will continue in and adjacent to the sanctuary and potentially impact sanctuary 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.

ISSUE DESCRIPTION

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

Nearshore discharge of ballast water is a common source of introduced species. 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 nearshore or open ocean environments.

JURISDICTIONAL SETTING

International

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

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

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

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

Federal Law

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

National Invasive Species Act, 1996: The federal National Invasive Species Act (NISA) strengthened the 1990 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.

State Law

AB 703: In October 1999, AB 703 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 2,000 meters deep or retention of all ballast water on board the vessel for all U.S. and foreign vessels that enter California waters after operating outside the U.S. Exclusive Economic Zone (EEZ). “Good housekeeping” practices must be observed, which include the avoidance of discharge or uptake near marine sanctuaries, reserves, parks, coral reefs, and other areas.

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

Other state regulations governing introduced species include:

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

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

INTRODUCED SPECIES GOALS

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

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

INTRODUCED SPECIES OBJECTIVES

1. Understand the current extent of introduced species in GFNMS.

2. Create a new program and/or coordinate with existing programs to detect and monitor new introductions.
3. Develop management actions to eradicate and/or control existing and new introductions.
4. Identify and control current and potential pathways to prevent new introductions.

INTRODUCED SPECIES ACTION PLAN

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

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

- A. As a component of STRATEGY FA-1, update current species list and integrate introduced species into this list. Perform a species abundance and distribution assessment, and an all-taxa inventory (species inventory) through a meta-analysis (identifying existing literature, specimens, and data).
- B. Perform an introduced species inventory literature search (mostly grey literature) and develop an annotated bibliography. Where possible, collect documents and catalog in library.
- C. Identify data gaps for native and introduced species (areas surveyed) inventories, particularly focusing on the outer coast.

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

Products: Species inventory, introduced species inventory

Complementary Strategies: GFNMS Draft Management Plan (DMP), Ecosystem Protection, STRATEGY FA-1

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

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

- B. Ensure compatible database protocols by investigating existing database structures.

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

Products: Spatial Web-based database

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

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

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

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

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

Complementary Strategies: GFNMS DMP, Wildlife Disturbance, STRATEGY WD-1; Introduced Species, STRATEGY IS-1, STRATEGY IS-6; Fishing Activities, STRATEGY FA-1; MBNMS DMP, Introduced Species, STRATEGY IS-4

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

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

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

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

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

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

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

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

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

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

Complementary Strategies: GFNMS DMP, Education, STRATEGY ED-4; MBNMS DMP, Introduced Species, STRATEGY IS-4

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

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

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

Potential Partners: NMFS, SFSU Romberg Tiburon Center, State Department of Health Services, Monterey Bay Aquarium Research Institute (MBARI), PRNS, Farallon National Wildlife Refuge, Cordell Bank National Marine Sanctuary (CBNMS), NMSP Regional Monitoring (Channel Islands National Marine

Sanctuary [CINMS]), Olympic Coast National Marine Sanctuary [OCNMS], MBNMS)

Complementary Strategies: GFNMS DMP, Ecosystem Protection, STRATEGY FA-1; MBNMS DMP, Introduced Species, STRATEGY IS-4

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

Activity 5.1 Since most introduced species are accidental finds, GFNMS will develop an early detection program to widely disseminate information about introduced species to local citizens and visitors who frequent areas of the sanctuary where invaders could become established. Using Elkhorn Slough National Estuarine Research Reserve's (ESNERR) *Least Wanted Aquatic Invaders Programs* model, the sanctuary will partner with other agencies to develop a similar program. Steps to develop this program include:

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

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

Complementary Strategies: GFNMS DMP, Education, STRATEGY ED-7; Introduced Species, STRATEGY IS-1, STRATEGY IS-2, STRATEGY IS-3; MBNMS DMP, Introduced Species, STRATEGY IS-4

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

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

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

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

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

Potential Partners: CalFed, CBNMS, MBNMS, CINMS

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

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

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

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- E. Review relevant laws, regulations, and policies to determine necessary permits that might be required in order to perform.
- F. Test all components of the rapid response plan.

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

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

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

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

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

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

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

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

Potential Partners: NMS, CDFG, Sea Grant, USFWS

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

GFNMS INTRODUCED SPECIES

Timeline

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

Legend:

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

GFNMS INTRODUCED SPECIES

Budget

Strategy	Estimated Annual Cost (1000's)*					Total Est. 5-Year Cost (1000's)
	YR 1	YR 2	YR 3	YR 4	YR 5	
STRATEGY IS-1: Develop a native and introduced species inventory and database for the sanctuary	\$9.5	\$7.5	\$7	\$8.5	\$7	\$39.5
STRATEGY IS-2: Develop a program to detect introduced species in <u>estuarine</u> environments of the sanctuary	\$0	\$0	\$18	\$14	\$17	\$49
STRATEGY IS-3: Develop a monitoring program to detect and monitor introduced species in the <u>rocky intertidal</u> areas of the sanctuary	\$0	\$20.5	\$15	\$17	\$16	\$68.5
STRATEGY IS-4: Develop a monitoring program to detect and monitor <u>introduced species</u> in the pelagic environment of the sanctuary	\$0	\$0	\$0	\$0	\$0	\$0
STRATEGY IS-5: Develop a volunteer-based outreach and monitoring program to improve early detection of introduced species	\$0	\$0	\$0	\$22.5	\$0	\$22.5
STRATEGY IS-6: Develop partnerships with other agencies and organizations that are involved in introduced species management	\$0	\$0	\$16	\$16	\$16	\$48
STRATEGY IS-7: Develop a rapid response plan and streamlined permit process	\$0	\$0	\$0	\$32	\$29	\$61
STRATEGY IS-8: Take regulatory action to control new introductions	\$2	\$2	\$2	\$2	\$2	\$10
STRATEGY IS-9: Outreach to targeted audiences and industry about pathways to prevent methods	\$0	\$0	\$31	\$27	\$31	\$89
Total Estimated Annual Cost	\$12	\$30	\$89	\$139	\$118	\$388

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

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GFNMS Draft Management Plan***

GFNMS INTRODUCED SPECIES

Performance Measures

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

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



SITE-SPECIFIC ISSUE

**ECOSYSTEM PROTECTION:
IMPACTS FROM FISHING
ACTIVITIES
ACTION PLAN**

ISSUE STATEMENT

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

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

ISSUE DESCRIPTION

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

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

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

Management of commercial and recreational fisheries in California is the responsibility of the California Department of Fish and Game (CDFG) in state waters (0-3 nautical miles), and National Oceanic and Atmospheric Administration (NOAA) Fisheries in federal waters (3 to 200 miles), although fisheries management plans may cover both state and federal waters. In contrast, the National Marine Sanctuary Program (NMSP) does not manage fisheries, but it does have a mandate to protect the entire sanctuary ecosystem and has authority to manage human uses that may impact sanctuary 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.²

California's Restricted Access Program

In 1977, California focused its first limited access program on the abalone fishery, followed in 1979 with legislation requiring salmon limited entry permits. In the 1990s, industry began to demand more restricted access programs, so the California Department of Fish and Game (CDFG) began to address restricted access in a comprehensive manner. In 1996, a limited entry review committee was formed to develop a standard restricted access policy for the Fish and Game Commission. The commission approved the restricted access policy in June 1999.³

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

Marine Life Management Act

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

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

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

Marine Life Protection Act (MLPA)

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

Magnuson-Stevens Fishery Conservation and Management Act

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

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

ECOSYSTEM PROTECTION: FISHING ACTIVITIES GOALS

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

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

ECOSYSTEM PROTECTION: FISHING ACTIVITIES OBJECTIVES

1. Based on the best available scientific and socioeconomic information, the sanctuary will facilitate the evaluation of the status and trends in marine populations (and their causes) in sanctuary waters; and identify and evaluate impacts on sanctuary 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. The sanctuary will identify and develop appropriate actions to address any negative impacts from fishing activities on sanctuary resources.

ECOSYSTEM PROTECTION: FISHING ACTIVITIES ACTION PLAN

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

Activity 1.1 Modify the Ecosystem Dynamic Study (EDS) and develop additional research components as necessary to build a baseline characterization and regional monitoring of the sanctuary including habitat, physical, and biological characteristics.

- A. The Ecosystem Dynamic Study will systematically survey and assess the distribution and abundance of marine birds and marine mammals. The primary region of interest is within GFNMS, north to the Russian River and west to the Farallon Escarpment. The study will simultaneously assess ocean habitat, and biological productivity. Additional components will include:
 1. Habitat characterization including mapping substrate type/bathymetry (static)
 2. Biological characterization including species abundance and distribution, spatial and temporal
 3. Physical characterization including oceanographic features (spatial and temporal) and pelagic (dynamic)

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

Complementary Strategies: GFNMS Draft Management Plan (DMP), Introduced Species, STRATEGY IS-2; Ecosystem Protection, STRATEGY FA-3, STRATEGY FA-4, STRATEGY EP-1, STRATEGY EP-3; Vessel Spills, STRATEGY VS-8

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

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

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

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

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

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

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

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

Products: Publication, database

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

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

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

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

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

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

Potential Partners: Sanctuary advisory council (SAC), stakeholder representatives, agency representatives, interest groups

Product: Compatibility index

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

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

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

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

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

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

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

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

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

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

Products: Response categories and mechanisms for implementation

Complementary Strategies: GFNMS DMP, Ecosystem Protection, STRATEGY FA-3

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

Activity 5.1 Develop a maritime heritage and fishing community model.

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

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

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

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

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

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

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

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

Activity 7.1 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 this resource. To address this issue, the fishing activities working group recommended that the sanctuary superintendent work with the PFMC to take action on a total, permanent ban on krill harvesting in West Coast sanctuaries off of Washington, Oregon and California.

- A. GFNMS will work with CBNMS, MBNMS, and the PFMC to identify and pursue strategies that result in a permanent ban on krill harvesting.
- B. GFNMS 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 three

adjacent California sanctuaries, and an assessment of the potential ecological and economic impacts of a krill fishery.

- C. GFNMS, CBNMS, and MBNMS will work with the NMFS, PFMC, and the state legislature on evaluating the ecological report with the objective of having these entities enact a permanent ban on krill harvesting.

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

Complementary Strategies: CBNMS DMP, Ecosystem Protection, STRATEGY FA-5

ECOSYSTEM PROTECTION ACTION PLAN

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

Activity 1.1 Determine the need for using tools such as zoning (e.g., marine reserves, research reserves) 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 it may apply to many resource management issues.

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

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

Products: The product will consist of a potential network of zonal designations within sanctuary waters that will enable managers to minimize space-use conflicts, determine the appropriate level or type of human use in each area, and avoid adverse interactions between scientific research, public enjoyment of the

resource, and the maintenance of ecosystem integrity in compliance with the National Marine Sanctuaries Act (NMSA)

Complementary Strategies: GFNMS DMP, Ecosystem Protection, STRATEGY FA-3, STRATEGY FA-4, STRATEGY EP-2; MBNMS DMP, Marine Protected Areas, STRATEGY MPA-2

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

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

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

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

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

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

- A. GFNMS, in conjunction with local landowners, the Students and Teachers Restoring a Watershed (STRAW) Project, the Sonoma Land Trust, the California Coastal Conservancy, the Regional Water Quality Control Board (RWQCB), and California’s Critical Coastal Areas (CCA) Program, will initiate a consultative process (MLPA) to coordinate with the relevant MLPA stakeholder group of the CDFG, as appropriate, to achieve designation of the Estero Americano and Estero de San Antonio as marine preserves.
- B. The sanctuary will serve as the “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 (MALT), the CDFG, the California Coastal Conservancy, the RWQCB, and the CCA Program.

- C. Work with agriculture industry and other user groups to pursue the implementation of best management practices (BMPs) in the esteros.

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

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

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

GFNMS IMPACTS FROM FISHING ACTIVITIES

Timeline

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

Legend:

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

GFNMS IMPACTS FROM FISHING ACTIVITIES

Budget

Strategy	Estimated Annual Cost (1000's)*					Total Est. 5-Year Cost (1000's)
	YR 1	YR 2	YR 3	YR 4	YR 5	
Strategy FA-1: Develop a resource characterization to understand types and distributions of habitats, species and processes	\$396	\$209	\$204	\$206	\$201	\$1,216
Strategy FA-2: Develop a socioeconomic profile of fishing activities and communities in and adjacent to the sanctuary	\$110	\$0	\$0	\$0	\$0	\$110
Strategy FA-3: Evaluate impacts from fishing activities on sanctuary resources	\$4	\$4	\$4	\$4	\$4	\$20
Strategy FA-4: Develop management action(s) to address impacts from fishing activities on sanctuary resources	\$80	\$25	\$0	\$0	\$0	\$105
Strategy FA-5: Bring public awareness to the relationship between maritime communities and healthy sanctuary waters	\$25	\$25	\$25	\$25	\$25	\$125
Strategy FA-6: Establish sanctuary representation at the PFMC and FGC meetings	\$4	\$4	\$4	\$4	\$9	\$25
Strategy FA-7: Work with CBNMS and MBNMS to address impacts in the sanctuary from krill harvesting	\$10	\$0	\$0	\$0	\$0	\$10
ECOSYSTEM PROTECTION						
Strategy EP-1: Develop a resource protection plan (policy) to protect sensitive habitats, living resources and other unique sanctuary features	\$30	\$30	\$30	\$32	\$30	\$152

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Strategy	Estimated Annual Cost (1000's)*					Total Est. 5-Year Cost (1000's)
	YR 1	YR 2	YR 3	YR 4	YR 5	
Strategy EP-2: Create a standing "Living Resource and Habitat Protection" working group	\$4	\$4	\$4	\$5	\$5	\$22
Strategy EP-3: Protect habitats that are known to be "special areas of concern"	\$0	\$42	\$44	\$25	\$22	\$133
Total Estimated Annual Cost	\$663	\$343	\$315	\$301	\$296	\$1,918
The sanctuary's base budget is available each year from appropriated funds.						
There is both availability of and opportunity to receive additional funding from appropriated funds.						
The estimates do not take into account increasing personnel costs each year or inflation.						
The estimates do not take into account unexpected events or emergencies or unforeseen projects.						

GFNMS ECOSYSTEM PROTECTION: IMPACTS FROM FISHING ACTIVITIES

Performance Measures

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

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

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



SITE-SPECIFIC ISSUE

IMPACTS FROM VESSEL SPILLS ACTION PLAN

ISSUE STATEMENT

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

ISSUE DESCRIPTION

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

Historically, the total number of spills from transiting vessels is small, but the potential impacts are enormous, given the number and volume of vessels and the hazardous cargo lane's proximity to the Farallon Islands and major seabird and marine mammal populations. During recent years, approximately 2,000 commercial vessels have been reported using the southern approach shipping lane. Large commercial vessels (LCVs) are of particular concern for spills because they can carry up to 1 million gallons of bunker fuel, a heavy, viscous fluid similar to crude oil, which they use for fuel. With Californians producing 31 million barrels annually and consuming 7 million barrels of oil annually, there is plenty of movement and risk from oil tankers carrying approximately 544 million barrels of oil annually up and down the coast of California.

SIGNIFICANT RESOURCES AND IMPACTS FROM VESSEL SPILLS

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

The sanctuary has diverse biological communities in close proximity to one another. Habitats within the sanctuary include rocky intertidal, sandy beach, estuarine, pelagic (open ocean),

benthic (sea floor), and islands. The variety and size of habitats support a high diversity and abundance of species. The sanctuary's habitats are home to a number of species that are federally listed as endangered or threatened. The list includes highly recognized species such as blue and humpback whales, Marbled Murrelets, and coho and chinook salmon, as well as lesser-known species such as the tidewater goby and Short-tailed Albatross. Of particular concern to the sanctuary are impacts on seabirds and marine mammals from vessel spills.

Seabirds

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

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

Marine Mammals

Pinnipeds

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

Harbor seals breed on the Farallon Islands and in mainland rookeries. The Gulf of the Farallones region contains one-fifth of the California population of harbor seals, which was estimated at 28,000 in 2003. A small colony of six to twenty northern fur seals has recently resumed breeding on the South Farallon Islands during the summer. Prior to 1997, fur seals had not been known to breed on the Farallon Islands for over 170 years. From November to June, thousands of female and immature fur seals migrate through the western edge of the sanctuary along the continental shelf. Of all the marine mammals in the sanctuary, fur seals are the most sensitive to 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 includes the Farallon Islands. The decline throughout the Gulf of the Farallones and California has amounted to 80 percent over the past thirty years. The California sea lion is the most conspicuous and widely distributed pinniped in the sanctuary. It is found year-round in the Gulf with the population increasing at about 8 percent each year. The northern elephant seal is the largest pinniped species in the sanctuary, with a total breeding population in the sanctuary of about 1,500 individuals.

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

Cetaceans

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

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

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

Socioeconomic Impacts

The diversity and abundance of fish and invertebrate species within the sanctuary are largely due to the variety of habitats, including intertidal mudflats, estuaries, rocky reefs and deeper subtidal areas. The intertidal mudflats support large concentrations of burrowing organisms such as clams, snails, and crabs. Seagrass beds occur on the more extensive flats of Tomales Bay, Bolinas Lagoon and also within the esteros. Pacific herring and invertebrates depend on seagrass beds in the Bay to spawn and feed. The shallow, protected waters of the bays and estuaries are critical habitat for salmon and several species of perch and flatfish. In their journey from the ocean through Tomales Bay and into Lagunitas Creek, the federally listed, threatened coho salmon depend on clear water, riparian vegetative cover, and a certain size gravel to complete their reproductive process.

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

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

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

JURISDICTIONAL SETTING

Oil Pollution Act

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

U.S. Coast guard (USCG)

The USCG is the federal government's primary maritime law enforcement agency. The USCG's missions include maritime law enforcement, national security, maritime safety, and marine environmental protection. For ocean and coastal activities, the USCG manages maritime transportation activities in order to minimize loss of life and damage to the environment. The USCG has historically held the primary responsibility for ensuring cleanup of any oil spill or other pollutants in the marine environment. To avert oil spills and promote safety, the USCG inspects vessels carrying oil and other hazardous materials. The USCG requires vessels to have approved response plans detailing owner and operator response to an oil spill and ensuring

proper response activities. Pursuant to OPA, which defines ground rules for dealing with oil pollution events and recommends pollution prevention measures, the USCG has responsibility for preparing most of the regulations necessary to implement OPA. Additionally, the USCG must be consulted in the development of oil spill contingency plans for marine oil and gas facilities and terminals. OPA also allows for natural resource damage recovery and restoration by federal and state resource trustees.

Ports and Waterways Safety Act

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

Department of Boating and Waterways

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

Office of Spill Prevention and Response (OSPR)

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

Sanctuary Regulations

The sanctuary site-specific regulations addressing vessel spills in the GFNMS are currently under revision as a part of the management plan review. The draft regulations will be available for review as a part of the Draft Management Plan/Draft Environmental Impact Statement

(DMP/DEIS). The final regulations will be included in the Final Management Plan and Final Environmental Impact Statement (FMP/FEIS).

VESSEL SPILLS IN THE GULF OF THE FARALLONES

1971	2 vessels collide under Golden Gate Bridge (840,000 gallons of Bunker C oil)
1984	<i>T/V PUERTO RICAN</i> (1.4 million gallons of oil, stern sunk with 8,500 barrels of bunker fuel, estimated 2,873 birds killed, including 1,856 Common Murres)
1986	<i>T/V APEX HOUSTON</i> (oil barge, 20,000 gallons of oil between SF and Long Beach, 9,000 birds including 6,000 Common Murres killed)
1990	Spill from San Francisco to Monterey County
1996	R/V <i>TEMPEST</i> (65' yacht off Dillon Beach)
1996	<i>SS CAPE MOHICAN</i> (estimated 96,000 gallons of oil, 7,000 birds killed)
1997-8	<i>SS JACOB LUCKENBACH</i> / Point Reyes Tarball Incident (oil washes onto beaches from Salmon Creek to Pillar Point; sunk in 1952)
1998	<i>T/V COMMAND</i> (3,000 gallons heavy crude or bunker oil, estimated 11,193 birds killed, 75 percent of which were Common Murres)
2001-5	<i>SS JACOB LUCKENBACH</i>

VESSEL SPILLS GOAL

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

VESSEL SPILLS OBJECTIVES

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

5. Provide for continuous evaluation and leverage opportunities for improvement in coordination with partners.

VESSEL SPILLS ACTION PLAN

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

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

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

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

Products: Updated drift analysis model

Complementary Strategies: GFNMS Draft management Plan (DMP), Vessel Spills, STRATEGY VS-2, STRATEGY VS-3, STRATEGY VS-4

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

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

- A. Increase the number of Coastal Ocean Dynamic Applications Radar (CODAR) receiving stations around the Gulf of the Farallones. CODAR allows for the real time observation of the evolution of surface currents. Work with partners to determine sites and data management.
- B. Analyze historical data including satellite images and circulatory patterns on a fine scale. Conduct gap analysis and mine data for fine-scale (seasonal, monthly, weekly, 3-5 period) oceanographic model. Data should include:
 1. Surface currents adjacent to ports
 2. Fine-scale bathymetry of the continental shelf and slope, and
 3. Satellite imagery for biological productivity (upwelling index, sea surface temperature, chlorophyll a)

- C. Analyze Sea-viewing Wide Field of Vision (SeaWiF) satellite acquired ocean-color data indicating sea surface temperature and associated phytoplankton pigment (biological productivity).
- D. Integrate all data into a comprehensive Web-based database with geographic information systems (GIS) capability (Sanctuaries Hazardous Incident Emergency Logistics Database System [SHIELDS]).
- E. Integrate new fine-scale oceanographic circulation model into spill and drift model and use as a decision-making tool for HAZMAT and the Area Contingency Plan (ACP).

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

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

Complementary Strategies: GFNMS DMP, Vessel Spills, STRATEGY VS-1, STRATEGY VS-3, STRATEGY VS-4

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

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

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

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

Products: Report A (Vessel Activities Profile)

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

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

- A. Identify relevant studies, including:

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

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

Products: Report B (Risk Assessment)

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

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

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

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

Potential Partners: MBNMS, USCG, Fleet Numerical

Product: Evaluation Report

Complementary Strategies: GFNMS DMP, Vessel Spills, STRATEGY VS-1

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

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

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

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

Products: Updated model, Report C

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

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

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

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

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

STRATEGY VS-6: *Participate on Regional Response Team to address risks to sanctuary resources.*

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

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

Potential Partners: CCC, OSPR, NOAA HAZMAT

Products: Improved RRP and ACP

Complementary Strategies: GFNMS DMP, Vessel Spills, STRATEGY VS-1, STRATEGY VS-2, STRATEGY VS-4, STRATEGY VS-5, STRATEGY VS-8

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

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

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

Potential Partners: CBNMS, MBNMS

Products: Updated in-house emergency response plan

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

STRATEGY VS-8: *Continue to improve integration of GFNMS Beach Watch and Ecosystem Dynamic Study (EDS) data into Area Contingency Plan.*

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

- A. GFNMS will participate in ACP meetings including meetings of the Wildlife Operations and Planning sub-committees.

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

- B. Link Beach Watch and EDS data to incident command on a real-time basis to inform decision making. Ideally, data would be available by Web-based GIS.
- C. Link Beach Watch and EDS with SHIELDS to provide real-time data and mapping of sensitive resources to incident command and unified command.

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

Products: Web-based GIS with online data entry

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

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

Activity 9.1 Develop outreach plan based on results of vessel activities profile, risk assessment, and resources-at-risk assessment (see STRATEGIES VS-3, VS-4, and VS-6) to increase voluntary compliance with VTS and sanctuary regulations (container ships, bulk carriers, chemical carriers, military vessels, research vessels, cruise ships, and tugs).

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

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

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

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

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

- A. Work with Coast Survey and NOAA Marine Protected Areas Center to publish information about the sanctuary in the *Coast Pilot*.

- B. Develop Web-based, shore-side, real-time kiosk with information about the sanctuary as well as links to weather conditions and advisories.
- C. Give presentations specifically targeted to mariner groups.

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

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

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

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

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

Potential Partners: Maritime trade industry

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

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

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

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

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

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

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

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

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- A. Recommend to council that a vessel spills working group be created. If sanctuary advisory council supports this recommendation, the sanctuary will support creation of the group by providing staff time and support.

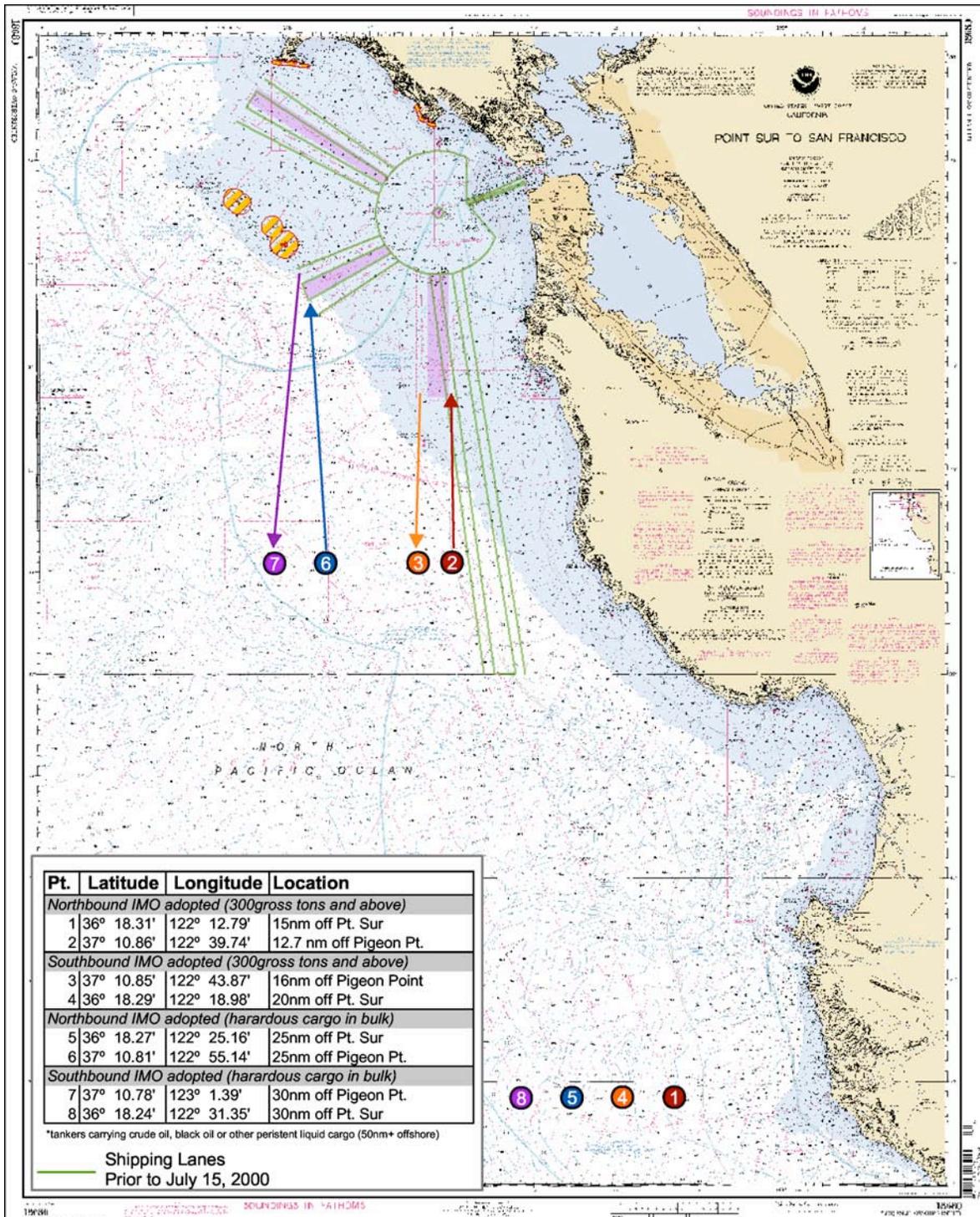
- B. The vessel spills working group will make recommendations on implementation of proposed action plans, review effectiveness, advise on future direction, and report findings to the sanctuary advisory council.

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

Products: Annual Report to sanctuary advisory council (SAC)

Complementary Strategies: GFNMS DMP, Vessel Spills, STRATEGY VS-9, STRATEGY VS-10, STRATEGY VS-11

Vessel Traffic Recommended Lanes Map



GFNMS IMPACTS FROM VESSEL SPILLS FIVE-YEAR

Timeline

Impacts From Vessel Spills Strategy	Year 1	Year 2	Year 3	Year 4	Year 5
STRATEGY VS-1: Expand MBNMS drift analysis model up to Point Arena and Mendocino.	—◆				
STRATEGY VS-2: Refine spill and drift model to increase accuracy of risk assessments.		—▶			
STRATEGY VS-3: Evaluate vessel activities in the GFNMS as a first step to assessing the risk of spills.		—▶			
STRATEGY VS-4: Evaluate recent vessel routing changes related to the MBNMS vessel traffic study.		—◆			
STRATEGY VS-5: Track distribution and numbers of species of concern and habitats in relation to probable spill trajectories.		—▶			
STRATEGY VS-6: Participate on regional response team to address risks to sanctuary resources.		—▶			
STRATEGY VS-7: Revise GFNMS in-house emergency response plan.	—◆				
STRATEGY VS-8: Continue to improve integration of GFNMS Beach Watch and Ecosystem Dynamic Study (EDS) data into Area Contingency Plan.▶				
STRATEGY VS-9: Outreach to mariners to increase stewardship of the sanctuary, including voluntary compliance with Vessel Traffic System (VTS) and sanctuary regulations.	▶			
STRATEGY VS-11: Provide better communication between GFNMS and maritime trade industry.	—▶				
STRATEGY VS-12: A sanctuary representative should participate in regional forums for addressing vessel traffic issues.	▶			
STRATEGY VS-13: Create a standing vessel spills working group.▶				

Legend:

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

GFNMS IMPACTS FROM VESSEL SPILLS

Budget

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

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

Strategy	Estimated Annual Cost (1000's)*					Total Est. 5-Year Cost (1000's)
	YR 1	YR 2	YR 3	YR 4	YR 5	
STRATEGY VS-11: Participate in regional forums for addressing vessel traffic issues	\$10	\$7	\$5	\$5	\$5	\$32
STRATEGY VS-12: Vessel spills working group	\$4	\$4	\$4	\$4	\$4	\$20
Total Estimated Annual Cost	\$145	\$218	\$191	\$219	\$185	\$958

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

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

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

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

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

GFNMS IMPACTS FROM VESSEL SPILLS

Performance Measures

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

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

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



PROGRAM AREA ACTION PLANS

GFNMS DRAFT MANAGEMENT PLAN

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



PROGRAM AREA
**EDUCATION AND OUTREACH
ACTION PLAN**

PROGRAM STATEMENT

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

PROGRAM DESCRIPTION

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

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

GFNMS uses education as a resource management tool to address specific priority 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 AND OUTREACH GOALS

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

EDUCATION AND OUTREACH OBJECTIVES

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

EDUCATION AND OUTREACH ACTION PLAN

SCHOOL PROGRAMS

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

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

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

Potential Partners: FMSA

Products: Curriculum, lending trunks, elementary school outreach plan

Complementary Strategies: GFNMS Draft Management Plan (DMP), Education, STRATEGY ED-5, STRATEGY ED-9, STRATEGY ED-10, STRATEGY ED-11

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

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

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

Potential Partners: FMSA

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

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

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

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

- A. Increase capacity and duration of the camp program. Incrementally expand camp to six weeks with simultaneous sessions to reach a broader audience.
- B. Adapt curriculum to increase stewardship ethic.
- C. Include high school Coastal Ecosystem Education Program students as camp counselors.

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

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

Products: Curriculum, outreach materials

Complementary Strategies: GFNMS DMP, Education, STRATEGY ED-5

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

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

- A. Invite teachers to bi-annual research symposium to learn about sanctuary research activities.
- B. 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 those most appropriate for themselves and their classes. Deliver the short presentation to school teachers during trainings, in-service, and pre-service.
- C. Use volunteers to maintain GFNMS resource center and make accessible to sanctuary constituents such as teachers, volunteers, students, staff, and partners. Resource center contents include classroom lending kits, marine-related books, slide shows, videos, and research library. Develop marketing plan and check-out system.

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

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

Complementary Strategies: GFNMS DMP, Conservation Science, Strategy CS-3

STEWARDSHIP

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

Activity 5.1 Develop GFNMS high school internship program.

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

Potential Partners: FMSA

Products: Training materials

Complementary Strategies: GFNMS DMP, Education, STRATEGY ED-2, STRATEGY ED-7

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

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

- A. Implement annual teacher workshop. Host the workshop jointly with CBNMS and Monterey Bay National Marine Sanctuary (MBNMS).
- B. Maintain network of teachers and support their monitoring efforts.
- C. Maintain online databases.
- D. Expand monitoring program to include other key species.

Potential Partners: CBNMS, Olympic Coast National Marine Sanctuary (OCNMS), MBNMS, Channel Islands National Marine Sanctuary (CINMS), FMSA, University of California Santa Cruz (UCSC), Bodega Marine Laboratory (BML)

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

Complementary Strategies: GFNMS DMP, Education, STRATEGY ED-2; Introduced Species, STRATEGY IS-3, STRATEGY IS-9; Water Quality, STRATEGY WQ-2; MBNMS DMP, Tidepool Protection, STRATEGY TP-1

VOLUNTEER PROGRAMS

STRATEGY ED-7: *Expand the reach of GFNMS education and outreach programs by expanding Sanctuary Naturalist Corps program to deploy trained volunteers to educate about the sanctuary at various events and locations.*

Activity 7.1 Under the Sanctuary Naturalist Corps, recruit, train, and manage a diverse team of volunteers to engage, educate, and outreach about the sanctuary at visitor center, summer camp, in the field at high use areas, schools, and outreach events (lectures, fairs).

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- A. Reassess goals and accomplishments of the Sanctuary Education Awareness and Long-term Stewardship (SEALS) volunteer program and modify as appropriate for current management needs.
- B. Develop program for training volunteer naturalists to lead sanctuary programs at the visitor center and schools.
- C. Develop a Rocky Intertidal Docents program to interpret intertidal habitat, reduce trampling, and to teach responsible wildlife viewing techniques.
- D. Develop a speakers' bureau to provide speakers for schools and community groups.
- E. Develop program for training volunteers to represent the sanctuary at outreach fairs and events.
- F. Train staff and docents to work successfully with multicultural and other diverse audiences.

Potential Partners: CBNMS, FMSA

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

Complementary Strategies: GFNMS DMP, Introduced Species, STRATEGY IS-2, STRATEGY IS-3, STRATEGY IS-5; Education, STRATEGY ED-5; CBNMS DMP, Education, STRATEGY ED-2; MBNMS DMP, Operations and Administration, STRATEGY OA-2, STRATEGY OA-4; Beach Closures, STRATEGY BC-2; Tidepool Protection, STRATEGY TP-2

Activity 7.2 Develop GFNMS naturalist certification program to train volunteers and professional naturalists 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.

Potential Partners: CBNMS, FMSA, other marine interpretation organizations (Point Reyes National Seashore [PRNS], Golden Gate National Recreation Area [GGNRA], Pacifica Chamber of Commerce Visitor Center, Audubon Canyon Ranch [ACR], Stewards of the Coast and Redwoods)

PUBLIC PROGRAMS

STRATEGY ED-8: *Increase awareness and knowledge of the sanctuary through a lecture series.*

Activity 8.1 Raise the profile of and expand the GFNMS lecture series to target new audiences and increase attendance.

- A. Increase collaboration with partners.
- B. Increase effective use of media and press.
- C. Hold lectures in inland communities and diverse communities not already reached (i.e., East Bay, South Bay).
- D. Investigate sponsorship.

Potential Partners: FMSA, California Academy of Sciences (CAS), Randall Museum, MBNMS, CBNMS

Products: Outreach materials, website

Complementary Strategies: GFNMS DMP, CBNMS DMP, Education, STRATEGY ED-6; MBNMS DMP, Sanctuary Integrated Monitoring Network (SIMoN), STRATEGY SI-3

STRATEGY ED-9: *Increase awareness and build knowledge of the sanctuary through educational programs and exhibits at the visitor center.*

Activity 9.1 Maintain engaging educational exhibits and activities at the GFNMS Coast Guard Station visitor center.

- A. Improve and expand visitor center exhibits. This will include renovating existing exhibits and creating new exhibits and activities on sanctuary resources and resource management issues.
- B. Develop scheduled drop-in programs such as “Creature Feature” to attract new and return visitors. These programs will be scheduled during high visitation periods (summer, holidays).
- C. Increase attendance at the visitor center by marketing its programs and services. Cross market programs with Crissy Field Center and coordinate scheduling of drop in visitor activities.

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

Products: Exhibits, touch tanks, outreach materials

Complementary Strategies: GFNMS DMP, Education, STRATEGY ED-1, STRATEGY ED-11

STRATEGY ED-10: *Increase awareness of the sanctuary and reach a large audience through production and distribution of videos on the sanctuary and its resources.*

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

- A. Finalize script(s) and explore possibility of generating two cuts—one targeted to a general audience (8th grade and above), and one for children (7th grade and below).
- B. Develop distribution and marketing plan to reach desired audiences such as environmental education centers and county offices of education.

Potential Partners: FMSA

Products: Video, marketing materials

Complementary Strategies: GFNMS DMP, Education, STRATEGY ED-1, STRATEGY ED-7

STRATEGY ED-11: *Increase awareness of GFNMS by using effective media and marketing techniques.*

Activity 11.1 Implement awareness campaign to raise the profile and recognition of the GFNMS.

- A. Internally develop new image, messages, and target audiences. Target wide and diverse audiences. Designate a media/public affairs point of contact.
- B. Utilize marketing in television, radio, and print media.
- C. Establish relationships with key local reporters (collaboratively with MBNMS and CBNMS where territories overlap) and develop pitches for press releases so that media will write articles.
- D. Identify key publications for sanctuary articles.
- E. Develop media plan and release schedule.
- F. Ensure logo is on all publications and printed materials.
- G. Develop shared outreach materials/products/programs with CBNMS and MBNMS based on established priorities that inspire stewardship.

Potential Partners: FMSA, Oceanic Society, PRNSA, city visitor centers, chambers of commerce, Convention Bureau, explore possibility of partnering with TV, radio, print media

Products: Partner package of brochures, public service announcements, press releases, logo wear, press kit, ad campaigns, update sanctuary brochure

Complementary Strategies: GFNMS DMP, Water Quality, STRATEGY WQ-1; Wildlife Disturbance, STRATEGY WD-6; Introduced Species, STRATEGY IS-9; Impacts from Vessel Spills, STRATEGY VS-13; MBNMS DMP, Operations and Administration, STRATEGY OA-4; CBNMS DMP, Education, STRATEGY ED-3.3

Activity 11.2 Increase reach and success of all sanctuary programs by increasing distribution of GFNMS education and outreach messages through other environmental education groups.

- A. Increase GFNMS brochure and newsletter distribution list to include local visitor centers and public information kiosks, education libraries and teacher resource venues, and specific groups including: Students and Teachers Restoring a Watershed (STRAW), Marine Activities, Resources, and Education (MARE), Point Reyes National Seashore Association (PRNSA), Point Reyes National Seashore (PRNS) Life Boat Station, The Marine Mammal Center (TMMC) Whale Bus, Crissy Field Center, Headlands Institute, GGNRA North District, and the Headlands YMCA.
- B. Work individually with partners (including those listed above) to incorporate sanctuary messages into their materials/programs and vice versa. Prioritize organizations and aim for two collaborations per year.

Potential Partners: See above, CBNMS

Products: Outreach materials

Activity 11.3 Increase reach and success of all sanctuary programs by effectively marketing, distributing, and evaluating all sanctuary programs and products.

- A. Develop strategy for marketing, distributing, and evaluating existing and new programs and products.

Potential Partners: FMSA, partners for each project

Products: Marketing and evaluation materials, program reports

STRATEGY ED-12: *Increase audience by building a larger visitor center with increased exhibits, programs, and opportunities to learn about and support GFNMS.*

Activity 12.1 Create a new visitor center that showcases the National Marine Sanctuary Program (NMSP) with exhibits, lecture hall, and classroom/lab facilities, providing a gateway to the GFNMS.

- 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 telepresence center.

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- B. Develop telepresence to bring wildlife at Southeast Farallon Island to the visitor center by live camera uplink. Incorporate outreach into Coastal Ecosystem Education Program and utilize facilities at the Ocean Exploration Center.

Potential Partners: FMSA, The Presidio Trust, CAS, National Park Service (NPS), California Department of Fish and Game (CDFG), SF Bay Conservation and Development Commission, Ocean Conservancy, PRBO Conservation Science (Point Reyes Bird Observatory) (PRBO), United States Fish and Wildlife Service (USFWS)

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

STRATEGY ED-13: Increase awareness of the sanctuary through interpretive signage and exhibits at strategic locations.

Activity 13.1 Develop a coordinated network of signs and exhibits throughout the sanctuary.

- A. Install and maintain interpretive signs at strategic locations along the coast including sites of high traffic and high educational value.
- B. Incorporate sanctuary exhibits into visitor centers and museums along the coast.
- C. Develop a sanctuary multi-use and/or vehicular trail along the coast linking signs, wayside exhibits, museum exhibits, and interactive kiosks.
- D. Coordinate and collaborate with CBNMS and MBNMS on sanctuary-sponsored signage and visitor center displays along the coast.

Potential Partners: FMR, MBNMS, NPS, state parks, PRNS, county Parks, California Coastal Trail, Green Belt Alliance, Coastal Conservancy, Oakland Museum, BML, Maritime Museum, Aquarium of the Bay, California Academy of Science, The Bay Model

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

Complementary Strategies: GFNMS DMP, Administration, STRATEGY AD-1; MBNMS DMP, Interpretive Facilities, STRATEGY IF-2; CBNMS DMP, Education, STRATEGY ED-5

STRATEGY ED-14: Outreach to residents and visitors in inland areas of the GFNMS watersheds and educate them about their connection with the sanctuary.

Activity 14.1 Develop a traveling exhibit on sanctuary watersheds to bring the sanctuary to inland communities.

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

Potential Partners: Libraries, community centers, schools, local museums

Products: Exhibit, activities/curriculum

Complementary Strategies: GFNMS DMP, Education, STRATEGY ED-2; MBNMS DMP, Fishing Related Education and Research, FRER-7

ISSUE SPECIFIC EDUCATION STRATEGIES

Note: These strategies are cross-referenced from the issue-based action plans to show the entire suite of Education and Outreach strategies to be implemented by Education and Outreach sanctuary staff.

WATER QUALITY STRATEGIES

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

For the full strategy text, please see page 55.

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

For the full strategy text, please see page 60.

WILDLIFE DISTURBANCE STRATEGIES

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

For the full strategy text, please see page 75.

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

For the full strategy text, please see page 78.

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

For the full strategy text, please see page 79

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

For the full strategy text, please see page 80.

INTRODUCED SPECIES STRATEGIES

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

For the full strategy text, please see page 96.

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

For the full strategy text, please see page 98

IMPACTS FROM FISHING ACTIVITIES STRATEGIES

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

For the full strategy text, please see page 111.

VESSEL SPILLS STRATEGIES

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

For the full strategy text, please see page 134.

GFNMS EDUCATION AND OUTREACH

Timeline

Education and Outreach Strategy	Year 1	Year 2	Year 3	Year 4	Year 5
STRATEGY ED-1: Educate K-8 students about the sanctuary through visitor center, classroom, and field activities.					▶
STRATEGY ED-2: Educate high school students and teachers about the sanctuary through classroom and field activities.					▶
STRATEGY ED-3: Educate diverse inner city children about the sanctuary through summer camp experiences.					▶
STRATEGY ED-4: Educate teachers about the resources and programs of the sanctuary.					▶
STRATEGY ED-5: Develop high school internship program for high school students.		⋯			▶
STRATEGY ED-6: Create stewards of the GFNMS by engaging middle and high school students in LiMPETS.					▶
STRATEGY ED-7: Expand the reach of GFNMS education and outreach by expanding Sanctuary Naturalist Corps program.					▶
Action 7.1 A SEALS program	◆				
Action 7.1 B Volunteer Naturalist Training Program		⋯			▶
Action 7.1 C Rocky intertidal roving docents		⋯			▶
Action 7.1 D Speakers' bureau					⋯▶
Action 7.1 E Outreach fair volunteers					▶
Action 7.1 F Diversity training for staff and volunteers					▶
STRATEGY ED-8: Increase awareness and knowledge of the sanctuary through a lecture series.					▶
STRATEGY ED-9: Increase awareness and build knowledge of the sanctuary through visitor center.					▶
STRATEGY ED-10: Increase awareness of the sanctuary through production and distribution of videos on the sanctuary and its resources.					▶
STRATEGY ED-11: Increase awareness of GFNMS by using effective media and advertising techniques.					▶
STRATEGY ED-12: Increase audience by building a larger visitor center.		⋯			▶
STRATEGY ED-13: Increase awareness of the sanctuary through interpretive signage and exhibits at strategic locations.					▶
STRATEGY ED-14: Outreach to inland areas of the GFNMS watersheds about connection with sanctuary.					⋯▶

Legend:

- ▶ Ongoing Activity
- ⋯▶ Planning Stage
- ◆ Completed Activity

GFNMS EDUCATION AND OUTREACH

Budget

Strategy	Estimated Annual Cost (1000's)*					Total Est. 5-Year Cost (1000's)
	YR 1	YR 2	YR 3	YR 4	YR 5	
STRATEGY ED-1: Educate K-8 students about the sanctuary through visitor center, classroom, and field activities	\$109	\$109	\$114	\$114	\$114	\$560
STRATEGY ED-2: Educate high school students and teachers about the sanctuary through classroom and field activities	\$118	\$124	\$123	\$131	\$134	\$630
STRATEGY ED-3: Educate culturally diverse inner city children about the sanctuary through summer camp experiences	\$13	\$13	\$17	\$17	\$25	\$85
STRATEGY ED-4: Educate teachers about the resources and programs of the sanctuary	\$3	\$3	\$5	\$10	\$6.5	\$27.5
STRATEGY ED-5: Develop high school internship program for high school students	\$0.5	\$0.5	\$0.5	\$0.5	\$14.5	\$16.5
STRATEGY ED-6: Create stewards of the GFNMS by engaging middle and high school students in LiMPETS	\$6	\$6	\$6	\$8	\$8	\$34
STRATEGY ED-7: Sanctuary Naturalist Corps program	\$0	\$0	\$0	\$0	\$0	\$0
ACTIVITY 7.1A: SEALS program	\$9	\$0	\$0	\$0	\$0	\$9
ACTIVITY 7.1B: Volunteer naturalist training program	\$104	\$110	\$116	\$119	\$122	\$571
ACTIVITY 7.1C: Rocky intertidal roving docents	\$98	\$10.2	\$8.2	\$8.2	\$7.6	\$132.2
ACTIVITY 7.1D: Speakers' bureau	\$0	\$0	\$0	\$0	\$5	\$5
ACTIVITY 7.1E: Outreach fair volunteers	\$37	\$27	\$27	\$27	\$27	\$145

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Strategy	Estimated Annual Cost (1000's)*					Total Est. 5-Year Cost (1000's)
	YR 1	YR 2	YR 3	YR 4	YR 5	
ACTIVITY 7.1F: Diversity training for staff & docents	\$5	\$5	\$5	\$5	\$5	\$25
STRATEGY ED-8: Sanctuary lecture series	\$14	\$11	\$11	\$11	\$11	\$58
STRATEGY ED-9: Educational programs and exhibits at the visitor center	\$105	\$75	\$80	\$136	\$76	\$472
STRATEGY ED-10: Production and distribution of videos on the sanctuary	\$12	\$0.3	\$0.3	\$0.3	\$0.3	\$13.2
STRATEGY ED-11: Use effective media and marketing techniques	\$71.2	\$44.2	\$30	\$30	\$30	\$205.4
STRATEGY ED-12: Increase audience by building a larger visitor center	\$170	\$170	\$320	\$530	\$430	\$1,620
STRATEGY ED-13: Interpretive signage and exhibits at strategic locations	\$115	\$115	\$115	\$115	\$115	\$575
STRATEGY ED-14: Outreach to inland watersheds about connection with the sanctuary	\$0	\$0	\$0	\$0	\$63	\$63
Total Estimated Annual Cost	\$990	\$823	\$978	\$1,262	\$1,193.9	\$5,246.8
The sanctuary's base budget is available each year from appropriated funds.						
There is both availability of and opportunity to receive additional funding from appropriated funds.						
The estimates do not take into account increasing personnel costs each year or inflation.						
The estimates do not take into account unexpected events or emergencies or unforeseen projects.						

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GFNMS EDUCATION AND OUTREACH

Performance Measures

Strategy Title(s)	Performance Goal	Desired Outcome (Objective)	Outcome Measure	How Measured	Who Measures	Output Measure
STRATEGY ED-1: Educate K-8 students about the sanctuary. STRATEGY ED-2: Educate high school students about the sanctuary. STRATEGY ED-3: Educate diverse inner city children about the sanctuary. STRATEGY ED-4: Educate teachers about the sanctuary.	Use education as a tool to help protect the sanctuary's resources.	1) Structure programs to educate along an environmental literacy continuum including developing awareness, building a knowledge base, changing behavior, and building stewardship. 2) To target diverse audiences including various multicultural, socio-economic, age, and gender groups.	Increase number and diversity of students and teachers exposed to messages about the sanctuary in an effort to increase awareness about sanctuary resources and issues.	1) Track numbers of children reached in K-8 programs. 2) Track number of youth reached in high school programs. 3) Track number of children reached through summer camp program. 4) Evaluate increase in students' knowledge about the sanctuary.	Sanctuary Superintendent, Education Coordinator, FMSA	1) K-8 program and resources, elementary school outreach plan 2) High school curriculum, website, database, workshops, outreach materials, slide shows, teacher lending kits 3) Summer camp curriculum 4) Assessment and evaluation
STRATEGY ED-5: Provide stewardship opportunities for high school students. STRATEGY ED-6: Create stewards by engaging middle and high school students in monitoring.	Use education as a tool to help protect the sanctuary's resources.	Structure programs to educate along an environmental literacy continuum including developing awareness, building a knowledge base, changing behavior, and building stewardship.	Increase in effectiveness of high school education programs whereby the literacy continuum is fully realized from awareness building to stewardship building.	1) Track increase in number of high school students participating in internship program. 2) Track increase in number of high school students participating in high school monitoring programs. 3) Track student-directed stewardship projects implemented.	Sanctuary Superintendent, Education Coordinator, FMSA	1) Formal framework for internship program including training materials, and evaluation standards 2) Case studies of student-directed stewardship projects

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Strategy Title(s)	Performance Goal	Desired Outcome (Objective)	Outcome Measure	How Measured	Who Measures	Output Measure
STRATEGY ED-7: Expand the reach of GFNMS education and outreach by creating Sanctuary Naturalist Corps.	Continually reach broader audiences to create an informed and connected public.	Target diverse audiences including various multicultural, socioeconomic, age and gender groups.	Expand outreach programs throughout region, through diverse venues, to increase the general public's awareness about the sanctuary, and increase sanctuary stewardship.	1) Increase in number and diversity of volunteers trained through the Sanctuary Naturalist Corps and actively participating in outreach, monitoring, and restoration efforts (in hours). 2) Measurable increase in types and locations of venues used for delivering sanctuary messages.	Sanctuary Superintendent, Education Coordinator, FMSA	1) Training manual and program for volunteers 2) Outreach materials to be disseminated to public
STRATEGY ED-8: Increase awareness through a lecture series. STRATEGY ED-9: Increase awareness through educational programs and exhibits at the visitor center STRATEGY ED-10: Increase awareness through video. STRATEGY ED-11: Increase awareness through effective media and marketing. STRATEGY ED-12: Increase audience by building larger visitor center. STRATEGY ED-13: Increase awareness through interpretive signage and exhibits.	a) Continually reach broader audiences to create an informed and connected public. b) Ensure education complements and promotes other sanctuary programs such as research, monitoring and resource protection.	a) Target diverse audiences including various multicultural, socioeconomic, age and gender groups. b) To develop programs to target content builders, user/impact groups, influencers, and decision makers.	Target new audiences and increase participation in sanctuary programs in order to raise the profile and recognition of GFNMS within the broader region.	Increase the reach and success of all sanctuary programs by developing an overall marketing strategy, distribution plan, and evaluation of all sanctuary products and programs. Marketing plan directed at: 1) increasing number of tools used to reach different audiences and interest groups. 2) increasing attendance in sanctuary programs 3) increasing press coverage of the sanctuary.	Sanctuary Superintendent, Education Coordinator, FMSA	1) Outreach materials 2) Exhibits, touch tank 3) Video, marketing materials 4) Public service announcements, press releases, ad campaign, outreach materials



PROGRAM AREA
**CONSERVATION SCIENCE
ACTION PLAN**

PROGRAM STATEMENT

Characterization, monitoring, and research assist in the protection of sanctuary resources by promoting understanding of ecosystem structure and function; detecting environmental problems; tracking health and trends of the various habitats and resources in the sanctuary; and contributing to solutions to management issues throughout Gulf of the Farallones National Marine Sanctuary (GFNMS). An updated long-term conservation science plan has been developed to coordinate current and future characterization, monitoring, and research efforts. The following three specific areas are the focus of the research and monitoring plan: (1) baseline and characterization studies for populations and habitats whose presence were critical in the sanctuary's designation, yet whose distributions and other basic characteristics remain poorly understood; (2) directed monitoring studies focusing on indicator species and representative habitats and undertaken jointly with other sanctuaries and agencies; and (3) analytical studies aimed at determining the cause of a condition or impacts and predictive studies to understand trends and variability (e.g., in a specific population).

PROGRAM DESCRIPTION

GFNMS is a complex region with high biological diversity; nationally significant wildlife breeding and feeding areas; significant commercial and recreational fishing; estuarine habitats; numerous federally, state, and locally protected marine and estuarine waters; watershed influences and impacts from the 8 million San Francisco Bay Area residents. Conservation science will help in solving specific management problems, enhancing resource protection efforts, and assisting in the interpretation of the resources for the general public. The conservation science program will ensure that science activities address management issues and are effectively integrated into the education and resource protection programs of the sanctuary and those of other resource trustee agencies.

CURRENT RESEARCH AND MONITORING PROGRAM

Since 1997, Gulf of the Farallones and Cordell Bank national marine sanctuaries have been involved in exploration and investigation of the marine life and habitat of the site through an Ecosystem Dynamics Study (EDS). This long-term study focuses on krill, a critical building block in the food chain for this area. Through the use of acoustics and sampling, krill and juvenile and schooling fish are located and identified. The parameters influencing their distribution in the water column are investigated. These data are analyzed along with oceanographic parameters, chlorophyll, seabird, and marine mammal sightings to better

understand the causes and dynamics of marine life concentrations in particular areas of the sanctuary.

The GFNMS Conservation Science program also currently oversees other projects, including Beach Watch and intertidal monitoring. Beach Watch is now in its eleventh year of monitoring coastal marine life (alive and dead) and human activities along the GFNMS shoreline. Beach Watch collects baseline data on sanctuary resources and maintains a long-term database used by the sanctuary and other resource management agencies to answer management questions. The rocky intertidal program monitors species abundance and distribution within several locations throughout the sanctuary, and spatio-temporal changes within the rocky intertidal habitat.

RESEARCH AND MONITORING GOALS

1. Increase our knowledge and understanding of the estuarine, nearshore, and offshore ecosystems in GFNMS.
2. Develop monitoring programs to understand long-term status and trends, detect emerging issues, and guide management decisions.
3. Develop research programs to identify and address specific resource management issues and assess effectiveness of management solutions.

RESEARCH AND MONITORING OBJECTIVES

1. Assess the sanctuary's information base to identify gaps in knowledge that can affect our ability to manage the area.
2. Conduct studies of species or marine communities to identify resources most at risk or in need of management attention.
3. Promote the sanctuary as a site for management-related marine research by providing financial and logistical support for scientific investigations that address critical marine resource protection issues.
4. Design research and monitoring projects that are responsive to management concerns and contribute to improved management of the sanctuary.
5. Make effective use of research and monitoring results by incorporating them into education and resource protection programs.
6. Encourage information exchange and cooperation among all organizations and agencies undertaking management-related research in the sanctuaries to promote more timely and informed management.

RESEARCH AND MONITORING ACTION PLAN

STRATEGY CS-1: *Maintain Beach Watch program to monitor marine life and human activities on sanctuary beaches, and provide baseline information to assist sanctuary management decisions.*

Activity 1.1 As a part of the Sanctuary Naturalist Corps, maintain Beach Watch volunteer monitoring program to gather baseline information about the resources of the sanctuary and expand the long-term dataset.

- A. Beach Watch is a long-term beach monitoring program to develop baseline information on the sanctuary's biological resources. Surveys are conducted every two to four weeks, collecting data on live and dead vertebrates onshore and marine life and human activity on sanctuary beaches and immediately offshore. Surveys are conducted by trained volunteers who also report stranding of marine mammals and collect oil samples from wildlife and the beach.
- B. Revise beached bird book to support the efforts of Beach Watch volunteers by making available most current information on identification of beached birds and mammals.
- C. Integrate data entered online with Sanctuaries Hazardous Incident Emergency Logistics Database System (SHIELDS) data and ArcView. Data should be available for access by staff during emergency response.
- D. Integrate Beach Watch data with West Coast Regional Monitoring Program and United States Fish and Wildlife Service (USFWS) seabird populations assessment, harmful algal bloom events, Long-term Monitoring Program and Experiential Training for Students (LiMPETS), and Sandy Beach monitoring program.

Potential Partners: Farallones Marine Sanctuary Association (FMSA), state parks, (Office of) Oil Spill Prevention and Response (OSPR), Fitzgerald Marine Reserve (FMR), USFWS, California Department of Fish and Game (CDFG), Monterey Bay National Marine Sanctuary (MBNMS), National Oceanographic Data Center (NODC), Central Observation and Seabird Survey Team (COASST), National Marine Sanctuary Program (NMSP)-SHIELDS, National Marine Fisheries Service (NMFS)

Products: Beach Watch Biennial Report, collaborative research papers, National Resource Damage Assessment and Restoration (NRDA) data, Web-based database

Complementary Strategies: GFNMS Draft management Plan (DMP), Vessel Spills, STRATEGY VS-6, STRATEGY VS-8; Introduced Species, STRATEGY IS-1; Impacts from Fishing Activities, STRATEGY FA-1

STRATEGY CS-2: *Conduct research to guide permit conditions for white shark viewing and assess effectiveness of new regulations.*

Activity 2.1 Following promulgation of new regulations restricting boater interactions with white sharks, conduct research to determine appropriate permit conditions and effectiveness of new regulations in reducing disturbance to white sharks.

- A. Develop and implement a white shark behavioral study to assess the impacts of motorized vessels in the vicinity of feeding and milling sharks. Study will assess shark behavior in relation to numbers of vessels and approach distances during various shark predator-prey interactions. Study analysis shall be targeted to recommend acceptable number of vessels, vessel size(s), and approach distances. Study will be conducted August through January during the seasonal migration of sharks to the Farallon Islands.
- B. Periodically review effectiveness of special permit conditions and revise as appropriate.

Potential Partners: PRBO Conservation Science (Point Reyes Bird Observatory) (PRBO) Conservation Science, USFWS

STRATEGY CS-3: *Host a biennial research workshop to facilitate information exchange between researchers conducting research in GFNMS.*

Activity 3.1 Every other year, the sanctuary will continue to host a research workshop with local researchers and educators to highlight research in and around the sanctuary.

- A. Host workshop every other year. Workshop proceedings will include oral presentations, poster sessions, and printings of proceedings and abstracts.
- B. Compile a comprehensive list of research being conducted in and around GFNMS. Produce map of sampling locations and study areas.

Potential Partners: Cordell Bank National Marine Sanctuary (CBNMS), FMSA, MBNMS-Sanctuary Integrated Monitoring Network (SIMoN), San Francisco State University (SFSU)

Products: Workshop proceedings, website, SIMoN listing

ISSUE SPECIFIC SCIENCE STRATEGIES

Note: These strategies are cross-referenced from the issue-based action plans to show the entire suite of conservation science strategies to be implemented by conservation science sanctuary staff.

WATER QUALITY STRATEGIES

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

For the full strategy text, please see page 60.

WILDLIFE DISTURBANCE STRATEGIES

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

For the full strategy text, please see page 75.

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

For the full strategy text, please see page 75.

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

For the full strategy text, please see page 76.

INTRODUCED SPECIES STRATEGIES

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

For the full strategy text, please see page 92.

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

For the full strategy text, please see page 93.

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

For the full strategy text, please see page 94.

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

For the full strategy text, please see page 95.

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

For the full strategy text, please see page 96.

IMPACTS FROM FISHING ACTIVITIES STRATEGIES

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

For the full strategy text, please see page 108.

VESSEL SPILLS STRATEGIES

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

For the full strategy text, please see page 132

STRATEGY VS-8: *Continue to improve integration of GFNMS Beach Watch and Ecosystem Dynamic Study (EDS) data into Area Contingency Plan.*

For the full strategy text, please see page 133.

GFNMS CONSERVATION SCIENCE

Timeline

Conservation Science Strategy	Year 1	Year 2	Year 3	Year 4	Year 5
STRATEGY CS-1: Maintain Beach Watch program to monitor marine life and human activities on sanctuary beaches and provide baseline information to assist sanctuary management decisions.	—————▶				
STRATEGY CS-2: Conduct research to develop permit conditions for white shark viewing and to assess effectiveness of new regulations.		—————◆			
STRATEGY CS-3: Host a biennial research workshop to facilitate information exchange between researchers active in the GFNMS.	—————◆		—————◆		—————◆
STRATEGY WQ-8: Develop an annotated bibliography of water quality research and monitoring programs in and adjacent to the sanctuary.		—————◆			
STRATEGY WD-1: Create easily accessible centralized Web-based spatial database to house information pertaining to wildlife disturbance.	▶			
STRATEGY WD-3: Coordinate with other agencies, institutions and programs to better understand and address noise, light and visual impacts on wildlife from vessels and low flying aircraft.	▶			
STRATEGY IS-1: Develop a native and introduced species inventory and database specifically for GFNMS and areas adjacent to the sanctuary.▶				
STRATEGY IS-2: Develop a program, in coordination with existing monitoring programs, to detect introduced species in estuarine environments of the sanctuary.		▶		
STRATEGY IS-3: Develop a monitoring program to detect and monitor introduced species in the rocky intertidal areas of the sanctuary.	▶			
STRATEGY IS-4: Develop a monitoring program to detect and monitor introduced species in the pelagic environment of the sanctuary.	—————▶				
STRATEGY FA-1: Develop a resource characterization of the sanctuary to better understand types and distributions of habitats, species and processes.	—————▶				
STRATEGY VS-5: Track distribution and numbers of species of concern and habitats in relation to probable spill trajectories.	—————▶				
STRATEGY VS-8: Continue to improve integration of GFNMS Beach Watch and Ecosystem Dynamic Study (EDS) data into Area Contingency Plan.▶				

Legend:

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

GFNMS CONSERVATION SCIENCE

Budget

Strategy	Estimated Annual Cost (1000's)*					Total Est. 5-Year Cost (1000's)
	YR 1	YR 2	YR 3	YR 4	YR 5	
STRATEGY CS-1: Maintain Beach Watch program	\$168	\$132	\$139	\$142	\$145	\$726
STRATEGY CS-2: Conduct research to develop permit conditions for white shark viewing and to assess effectiveness of new regulations	\$0	\$24	\$0	\$0	\$0	\$24
STRATEGY CS-3: Host a biennial research workshop to facilitate information exchange between researchers active in GFNMS	\$36	\$0	\$41	\$0	\$41	\$118
Total Estimated Annual Cost	\$204	\$156	\$180	\$142	\$186	\$868

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

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

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

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

GFNMS CONSERVATION SCIENCE

Performance Measures

Strategy Title(s)	Performance Goal	Desired Outcome (Objective)	Outcome Measure	How Measured	Who Measures	Output Measure
STRATEGY CS-1: Maintain Beach Watch program to monitor marine life and human activities on sanctuary beaches.	Develop monitoring programs to establish baselines, understand long-term status and trends, detect emerging issues, and guide management decisions.	Design research and monitoring projects that are responsive to management concerns and contribute to improved management of the sanctuary.	Increase understanding of human-use activities and their impacts on sanctuary resources.	1) Complete baseline data set about the resources of the sanctuary. 2) Expand long-term data set. 3) Integrate data into SHIELDS online ArcView database to be used during emergency response.	Resource Protection Coordinator and Research Coordinator	1) Beach Watch Biennial Report 2) Collaborative research papers 3) NRDA data 4) Web-based database
STRATEGY CS-2: Conduct research to develop permit conditions for white shark viewing and to assess effectiveness of new regulations.	Develop monitoring programs to understand long-term status and trends, detect emerging issues, and guide management decisions.	Design research and monitoring projects that are responsive to management concerns and contribute to improved management of the sanctuary.	To determine appropriate permit conditions and effectiveness of new regulations in reducing disturbance to white shark.	1) Complete assessment of white shark behavior in relation to numbers of vessels, at approach distances, during various predator-prey interactions (short term). 2) Sufficient data to make recommendations on number of vessels, vessel size(s), and approach distances during various shark predator-prey interactions (long term).	Research Coordinator and Resource Protection Coordinator	

Conservation Science Action Plan
GFNMS Draft Management Plan

Strategy Title(s)	Performance Goal	Desired Outcome (Objective)	Outcome Measure	How Measured	Who Measures	Output Measure
STRATEGY CS-3: Host a biennial research workshop to facilitate information exchange between researchers active in GFNMS.	1) Increase our knowledge and understanding of the estuarine, nearshore and offshore ecosystems in GFNMS. 2) Develop monitoring programs to understand long-term status and trends, detect emerging issues, and guide management decisions. 3) Develop research programs to identify and address specific resource management issues and assess effectiveness of management solutions.	Encourage information exchange and cooperation among all organizations and agencies undertaking management related research in the sanctuaries to promote more timely and informed management.	1) To track data collected on sanctuary resources and qualities as a source of information for managing sanctuary resources. 2) Identify data gaps as they pertain to management needs.	Track increases in number and quality of monitoring and research projects in and around the sanctuary, and their relevance to sanctuary resources management issues.	Sanctuary Superintendent, Research Coordinator, Resource Protection Coordinator	1) Workshop proceedings 2) Website 3) SIMoN listing



PROGRAM AREA

RESOURCE PROTECTION ACTION PLAN

PROGRAM STATEMENT

The goals and objectives set forth by the National Marine Sanctuaries Act (NMSA) direct each of the sanctuaries to take an ecosystem approach to managing the marine areas of the sanctuaries. Gulf of the Farallones National Marine Sanctuary's (GFNMS) ecosystems include habitat structure, species assemblages, and ecological processes, as well as the many interactions with humans and their activities. GFNMS is developing a resource protection program to expressly maintain an ecosystem perspective while providing oversight in addressing the multitude of resource protection issues the sanctuary is currently facing, as well as anticipating and planning for new and emerging issues on the horizon.

PROGRAM DESCRIPTION

As directed by the NMSA, GFNMS' role is protection of the area's natural resource and ecosystem values by protecting the biodiversity, productivity and aesthetic qualities of the marine environment of the Gulf of the Farallones through ecosystem-based management. There are many successful ecosystem-based management models for the terrestrial environment, but these models don't translate well in a fluid, three-dimensional marine environment which functions under a different spatial and temporal scale. As the sanctuary builds and implements this new management plan, the staff will continue to work with other agencies, stakeholders and national marine sanctuaries to build a more solid model for marine ecosystem management.

Throughout the public scoping process and the entire management plan review, the public and sanctuary advisory council expressed a deep and abiding concern for better, overall resource protection through the use of conservation-based management tools. The suggestions were wide and varied, including the use of:

1. Ecosystem management;
2. The precautionary approach;
3. Adaptive management; and
4. Managing for sustainability.

The sanctuary staff examined both the theory and practice of applying different, conservation-based management tools to the building of the framework for this management plan. These

management tools all add greater value to resource protection. Thus, GFNMS has incorporated these principles to strengthen the sanctuary's management plan.

RESOURCE PROTECTION GOAL

Maintain and, where necessary, restore the natural biological and ecological processes in GFNMS by evaluating and addressing adverse impacts from human activities on sanctuary resources and qualities.

RESOURCE PROTECTION OBJECTIVES

1. Build a comprehensive and coordinated resource protection plan to ensure protection for the resources and qualities of GFNMS.
2. Continue to build on partnerships, collaborative efforts, and coordination with other agencies, institutions, and organizations, in taking a comprehensive and effective ecosystem protection approach.

RESOURCE PROTECTION ACTION PLAN

NEW AND EMERGING ISSUES

Although a wide range of issues have been included in the draft management plan action plans, many other issues are not addressed. These include: (1) issues which are currently considered to have relatively small impacts, but which may grow to have large impacts in the future; (2) activities which may be occurring in similar environments, but not actually in the sanctuary; and/or (3) activities that are based on new technology, and their potential impacts are not well understood. Emerging issues may include activities that are currently unforeseen, but may emerge in the future due to technological advances, changes in operations, changes in market demand, and increased pressures on the coast. The following strategies focus on the development of a framework to identify, prioritize, and address future resource protection issues.

STRATEGY RP-1: *Establish a framework for identifying, tracking, and addressing emerging issues on a timely basis.*

Activity 1.1 Develop an electronic Web-based cataloging system to capture information on new and emerging issues (including sources and references). This system should be easily accessible by sanctuary staff to add and access information.

- A. Information for this system should be gathered from (and be specific to relevant new and emerging issues in the marine environment):
 1. Interactions with other resource management agencies
 2. Meetings with GFNMS, Cordell Bank National Marine Sanctuary (CBNMS), and Monterey Bay National Marine Sanctuary (MBNMS) Advisory Councils

3. Scientific and conservation workshops, conferences, and symposia
 4. National Marine Sanctuary Program (NMSP) Daily News Clips
 5. NMSP situation reports
 6. News articles, news services
 7. NMSP Leadership Team calls and meetings
 8. NMSP National Coordinators meetings
- B. A staff person will be assigned to maintain the system and send out reminders to the staff to use the system.
- C. As highly relevant new and emerging issues surface, staff maintaining the system will send out electronic messaging to the staff to inform and exchange information.

Activity 1.2 Establish an evaluation system for determining if the issue is relevant to the site and identify steps for addressing issues such as:

- A. General description and current status of activity.
- B. Who are the responsible parties or potential user groups involved in the activity?
- C. Have any precedents been set for this type of activity?
- D. Are any other sanctuaries addressing this issue?
- E. Are any other resource management agencies dealing with this issue? If so, how are they addressing the issue?
- F. What are the potential impacts to sanctuary resources?
- G. Might this activity be in violation of GFNMS' regulations?
- H. Are there activities with similar impacts already occurring in the sanctuary for which GFNMS makes an exception, either from a regulatory or permitting standpoint?
- I. If there are similar activities that the sanctuary is already allowing exception for or permitting, are the impacts from this activity less or greater than for the new or emerging issue?
- J. Would GFNMS' current permitting authority allow this activity to be permitted? Under which kind of permit?
- K. Are there other agencies GFNMS should be working with on this issue?
- L. Has NMSP headquarters been involved in addressing this issue?

- M. Does this issue warrant national policy development?
- N. What future implications might there be for other sites?
- O. What are the next steps for addressing this issue (propose regulatory action, develop working group, permit, education, research, etc.)?

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

Products: Electronic Web-based tracking system

Complementary Strategies: GFNMS Draft management Plan (DMP), Resource Protection, STRATEGY RP-2, STRATEGY RP-3; CBNMS DMP, Administration, AD-7; MBNMS DMP, Emerging Issues, STRATEGY EP-1, STRATEGY EP-2

STRATEGY RP-2: *Develop a coordinated communication system among all national marine sanctuaries and other resource management agencies to stay informed about new and emerging issues, share information, and provide a forum for exchange and policy discussion.*

Activity 2.1 The National Oceanic and Atmospheric Administration (NOAA), National Ocean Service (NOS), and the NMSP are addressing new and emerging issues in some capacity every day. Each of these divisions and offices comment on environmental documents from other agencies, provide comment on policy development from within NOAA, and consult on new and emerging issues either on the NMSP site level or from congressional inquiries. A well-organized and maintained electronic communication system would provide opportunity for the following:

- A. A system that flags new and emerging issues of interest and potential importance.
- B. An information source and record of position or policy from within NOAA.
- C. An information exchange forum (conference call/chat room) to share ideas and experiences.

Activity 2.2 GFNMS will formalize a communication system and leverage opportunities with other resource management agencies to exchange ideas on new and emerging issues. Forums for information exchange include:

- A. California Coastal Zone Managers quarterly meetings.
- B. Annual Coastal Zone Managers meeting in Washington, D.C.
- C. Conferences and professional meetings.

Potential Partners: NMSP, CBNMS, MBNMS, CINMS, OCNMS, state and federal agencies

Products: Conference calls, chat room

Complementary Strategies: GFNMS DMP, Resource Protection, STRATEGY RP-1

STRATEGY RP-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.*

Activity 3.1 Due to the sheer number and range of resource management issues that surfaced during the Joint Management Plan Review (JMPR), only the highest priority issues can be addressed in the management plan. There are still many new and emerging issues that need to be tracked and addressed in some capacity over the next five years, including:

- A. User Conflicts/Zonal Management
Develop a resource protection plan (policy) to minimize user conflicts and provide special areas of protection for sensitive habitats, living resources, and other unique sanctuary features. Determine the value of using tools such as zoning (e.g., marine reserves, research reserves) to take a proactive approach and address specific resource management issues. This plan will be built in consideration of other management strategies, both temporary and permanent.

- B. Impacts from Sound
GFNMS will take an active role in reviewing project proposals that have the potential to introduce harmful levels of sound into the sanctuary environment and will work with project proponents to mitigate impacts and protect sanctuary resources. Impacts on marine resources from noise are of increasing concern with over 6,000 container ships and bulk product carriers passing through the sanctuary on an annual basis; the use of seismic surveys for oil and gas exploration; identification of earthquake faults and activities; and the use of side scan sonar for research. Sound travels approximately five times faster in water than in air, with low frequency sounds traveling the farthest. Low frequency sounds (below 1,000 Hz) are generated by many human activities. Communication by many marine mammals and fish also falls within this range of frequency. Individually and cumulatively, the sound produced by these activities may have significant impacts on the living marine resources of the sanctuary. GFNMS would like to have a better understanding of the long-term and cumulative impacts on marine mammals, fishes and invertebrates.

- C. Marine Bioprospecting
Marine bioprospecting is a new issue for GFNMS that has not been clearly defined, nor are the implications clearly understood. GFNMS needs to have a better understanding of the activities associated with, and potential impacts from, marine bioprospecting. The following questions need to be understood before GFNMS can develop a policy statement on marine bioprospecting in sanctuary waters:
 - 1. Does long term extraction threaten biological diversity on the genetic, taxonomic, or ecosystem level,

2. Can the target species be extracted on a sustainable basis, is it possible to determine a threshold,
3. Who should have access to genetic resources,
4. What is the best way to establish appropriate benefit sharing provisions for a public resource, and
5. Can a clear distinction be made between scientific research and commercial investigative activities.

Potential Partners: NMSP, National Marine Fisheries Service (NMFS), sanctuary advisory council (SAC), CBNMS, MBNMS, CINMS, OCNMS, constituents

Complementary Strategies: GFNMS DMP, Resource Protection, STRATEGY RP-2

REGULATORY DEVELOPMENT

One of the NMSA's purposes is to facilitate compatible use that is consistent with its primary purpose of resource protection. To this end, each of the national marine sanctuaries has a discreet set of site-specific regulations or prohibitions (15 CFR § 922), and general policy under the NMSA (16 USC § 1431 et seq.).

STRATEGY RP-4: *GFNMS will develop a formalized program to consistently and continuously review and evaluate effectiveness of sanctuary regulations.*

Activity 4.1 Evaluate the appropriateness and effectiveness of current sanctuary regulatory language (prohibitions) in addressing the priority resource management issues identified through the management plan review process.

- A. Interpret and develop site-specific regulations and amendments.
- B. Provide guidance and understanding of regulations in the NMSA.
- C. Ensure coordination and consistency with other resource management agencies regulations and permits.
- D. Track, review, and comment on environmental assessments and environmental impact statements (EIS).

Potential Partners: NMSP, General Council Ocean Service (GCOS), SAC, constituents

Complementary Strategies: GFNMS DMP, Resource Protection, STRATEGY RP-1, STRATEGY RP-2, STRATEGY RP-3, STRATEGY RP-5, STRATEGY RP-6

PERMITTING

Generally, permit requests are for research or education purposes. The sanctuary evaluates these requests on a case-by-case basis in detail to determine if the activity is necessary to be conducted in the sanctuary and if the activity has negligible impacts on sanctuary resources or qualities.

STRATEGY RP-5: *Develop a formalized permit program as a mechanism to review requests to conduct prohibited activities within the sanctuary, and where possible permit these activities to be conducted in such a way to have negligible effects.*

Activity 5.1 In order to understand, measure, and control prohibited activities within the sanctuary, and to minimize cumulative impacts from these activities, the permit program will continue to review projects by:

- A. Evaluating permit requests on a case-by-case basis.
- B. Developing permit requirements for applicants on procedures and operations to avoid or reduce impacts to sanctuary resources.
- C. Tracking permitted activities to ensure compliance with permit conditions.
- D. Requiring applicants to provide the sanctuary with the data and findings gained through research conducted with research permits.
- E. Ensure permits are issued in compliance with National Environmental Policy Act (NEPA), NMSA, Marine Mammal Protection Act (MMPA), and other environmental protection legislation.
- F. Review all proposed projects with respect to environmental consequences and the level of impact, individually or cumulatively, and make a determination if the activity is excluded from the requirement to prepare an environmental assessment or environmental impact statement.

Activity 5.2 Develop a national Web-based permit application and tracking program.

- A. Website will include a section for identified permitting agencies which applicants may consult. It is the applicants' responsibility to know the laws and be certain they have all of the required permits. The website will provide a venue to make it easier for the applicants to find the required permits.

Activity 5.3 The resource protection coordinator will coordinate with other regulatory agencies issuing permits to ensure consistency with applicable laws.

- A. Coordinate with other regulatory agencies to ensure that other agency permits are consistent with the sanctuary's regulations. Inconsistencies may be rectified by incorporating or referencing the sanctuary's regulations.

Activity 5.4 Conduct outreach about the sanctuary's permit process to help inform potential applicants and bring them into compliance with the sanctuary's permit process.

- A. Provide sufficient outreach to educational and research institutions wishing to conduct prohibited activities within the sanctuary about the permit application process.
- B. Use the SAC as a link to educate the larger community on the sanctuary's permitting process.

Potential Partners: NMSP, GCOS

Complementary Strategies: GFNMS DMP, Resource Protection, STRATEGY RP-4, STRATEGY RP-6

PROTECTED RESOURCES ENFORCEMENT PLAN

The objective of this program is to achieve resource protection through compliance with sanctuary regulations and other applicable state and federal statutes. The mission of sanctuary enforcement is to ensure compliance with the NMSA (16 USC § 1431 et seq.) and applicable regulations of the sanctuary (15 CFR § 922). The approach to the enforcement program should be two-fold in nature: (1) the use of interpretive enforcement as a tool to inform and encourage voluntary compliance; and (2) the use of legal enforcement of regulations and prohibited activities. Together, these two programs should result in a regular and ongoing enforcement presence in sanctuary waters and compliance with sanctuary regulations.

STRATEGY RP-6: *Strive to increase resource protection through compliance with sanctuary regulations and other applicable state and federal statutes.*

Activity 6.1 Ensure sufficient patrol presence in the sanctuary through the development of partnerships and interagency coordination.

- A. Develop enforcement priorities.
- B. Develop compliance priorities for permitted activities.
- C. Develop patrol schedules.
- D. Develop procedures for documenting violations, boarding procedures and other instructions specific to conduct of day-to-day enforcement.
- E. Develop partnerships with other federal, state and local enforcement agencies in order to provide a strong enforcement presence throughout the sanctuary.
- F. Facilitate communication among enforcement assets to ensure coordination.
- G. Promote training and, as appropriate, cross-deputization of law enforcement agencies.

- H. Involve the United States Coast Guard (USCG) and the Civil Aeronautical Patrol (CAP) in presence and patrol in sanctuary waters.
- I. Train law enforcement personnel in interpretive enforcement.

Activity 6.2 Use interpretive enforcement as a tool to inform and encourage voluntary compliance with sanctuary regulations. Interpretive enforcement may be used to affect behavior and change values as it is generally believed, that once informed, most individuals will choose to comply. Interpretive enforcement efforts will include:

- A. Train law enforcement entities to use interpretive enforcement.
- B. Integrate interpretive enforcement into coast-side signage throughout geographic range of sanctuary.
- C. Work with California Dept. of Motor Vehicles to include informational inserts in boat license renewal packets (to be coordinated with all California national marine sanctuaries).
- D. Give presentations to yacht clubs, the Coast Guard Auxiliary, and other appropriate groups.
- E. Provide follow-up letters to possible violators with “you may be in violation” notices that inform the boater about sanctuary regulations.

Activity 6.3 Develop a volunteer-based interpretive enforcement program that will use education and outreach to affect behavior and values to achieve voluntary compliance with sanctuary regulations.

- A. Identify major user groups for targeted education and outreach efforts about sanctuary regulations.
- B. Conduct community outreach program to encourage compliance with sanctuary regulations and citizen involvement in reporting violations.
- C. Hold semiannual meetings and workshops to inform user groups and promote voluntary compliance and stewardship.
- D. Train volunteers in interpretive enforcement as a component of the Sanctuary Naturalist Corps.

Activity 6.4 Develop enforcement tools to ensure effectiveness of the enforcement program.

- A. Work with General Council Enforcement Litigation (GCEL) and GCOS on developing hierarchy of options for addressing minor violations including: warnings, fix-it tickets, and summary settlements/on the scene citations.

- B. Evaluate the effectiveness of technology for surveillance including satellite imagery, drones, wireless cameras and tracking systems.
- C. Work with GCEL on violation assessment.
- D. Comment on national penalty schedule.
- E. Coordinate with Office of Response and Restoration (ORR) on natural resource damage assessment. Secure and utilize reimbursable costs for response, National Resource Damage Assessment and Restoration (NRDA), and restoration funds.

Potential Partners: USCG, CAP, GCEL, GCOS, NOAA Enforcement, California Department of Fish and Game (CDFG)

Complementary Strategies: GFNMS DMP, Education and Outreach, STRATEGY ED-7; Resource Protection, STRATEGY RP-4, STRATEGY RP-5; Vessel Spills, STRATEGY VS-9

EMERGENCY RESPONSE

Incidents within the sanctuary requiring an emergency response may have the potential to significantly impact sanctuary resources. Incident response may be to a recently occurring catastrophic event (e.g., plane crash or vessel grounding), or the delayed or persistent impacts from incidents that occurred years previously (e.g., dumpsites or historic shipwrecks).

STRATEGY RP-7: *Review and revise the sanctuary's emergency response plan in order to be prepared to respond to an incident.*

Activity 7.1 GFNMS will review and revise its emergency response plan, based on the Incident/Unified Command System (ICS) and the USCG's Area Contingency Plan (ACP), to respond to oil spills, hazardous material spills, grounded vessel or natural disasters. The response plan will also be reviewed, evaluated and updated on an annual basis. GFNMS' emergency response plan:

- A. Lays out emergency response notification (including all relevant agencies, user groups, and media) and preparation procedures.
- B. Identifies specific duties for sanctuary staff.
- C. Instructs all sanctuary staff to be trained on an ongoing basis with regular updates and refresher courses, and ready to respond in the case of an emergency. Staff training to include:
 - 1. Understanding ICS.
 - 2. Familiarization with the San Francisco Area Contingency Plan.
 - 3. Assigned emergency response duties.
 - 4. Taking part in emergency response drills.

5. Developing resource damage assessment skills.

Activity 7.2 Develop tools to ensure a coordinated and timely response to incidents.

- A. Establish a relationship and coordinate with ORR, Hazardous Materials Response Division (HAZMAT), NOAA's Regional Response Coordinator, and the NMSP.
- B. Identify resources at risk, potential high probability threats, available response and information assets, notification contracts, maps, coastal observation systems, and jurisdictional information. This information can be used in area contingency plans, area response plans, and Sanctuaries Hazardous Incident Emergency Logistics Database System (SHIELDS).
- C. Participate SHIELDS, a Web-based interface system that can be used on- and off-line to assist in incident response, facilitating the abilities of sanctuary staff to provide information to a unified command during an incident. Enhance SHIELDS to accept and provide near-real time data collected during response efforts.
- D. Participate in the Resources and Undersea Threats (RUST) database that catalogs submerged resources, threats, and hazards data.
- E. Develop contingency response fund for prompt removal or recovery of abandoned vessels.

Activity 7.3 Assess levels of potential risk from activities in and adjacent to the sanctuary.

- A. Track distribution and numbers of sensitive species and habitats.
- B. Develop resources-at-risk model analysis for the sanctuary.
- C. Participate in regional response team to address risks to sanctuary resources.
- D. Based on risk assessment, develop outreach program targeting user groups.

Potential Partners: ORR, HAZMAT, NMSP

Products: SHIELDS, RUST

Complementary Strategies: GFNMS DMP, Resource Protection, STRATEGY RP-8; Vessel Spills, STRATEGY VS-2, STRATEGY VS-3, STRATEGY VS-4, STRATEGY VS-6, STRATEGY VS-7, STRATEGY VS-8, STRATEGY VS-9; CBNMS DMP, Administration, AD-7; MBNMS DMP, Introduced Species, STRATEGY IS-4, Operations and Administration, STRATEGY OA-4, Beach Closures, STRATEGY BC-9, Big Sur Coastal Ecosystem Plan, STRATEGY BCP-2

DAMAGE ASSESSMENT AND RESTORATION

Section 312 of the NMSA authorizes NOAA to pursue civil actions to recover response costs and damages for incidents that injure, destroy, or cause the loss of sanctuary resources. Funds collected by NOAA under Section 312 are deposited in the Damage Assessment and Restoration Evolving Fund (DARRF). Section 312 requires that 20 percent of recovered damages, up to a maximum balance of \$750,000, be used to finance response actions and damage assessment. The remaining damages are to be spent, in priority order to: (1) restore, replace, or acquire the equivalent of the injured sanctuary resources; (2) manage and improve the affected sanctuary; and (3) manage and improve any other national marine sanctuary.

STRATEGY RP-8: *Formalize plan to respond to incidents that damage sanctuary resources and qualities.*

Activity 8.1 Coordinate with ORR to restore sanctuary resources.

- A. Work with other NOAA offices and agencies to assess natural resource damage and implement ecosystem restoration projects.
- B. Work with ORR on taking legal action as appropriate.
- C. Work with NOS scientists on developing a monitoring program to assess restoration effort effectiveness.

Potential Partners: ORR, United States Department of the Interior (DOI), CDFG-(Office of) Oil Spill Prevention and Response (OSPR), other resource trustee agencies

Complementary Strategies: GFNMS DMP, Resource Protection, STRATEGY RP-7; Vessel Spills, STRATEGY VS-6, STRATEGY VS-9

BOUNDARY MODIFICATIONS

During the designation process for all national marine sanctuaries, a range of boundary options are proposed, and modified, before a final boundary is chosen. Sanctuaries are designed to protect areas of special significance. Areas of special significance may include unique natural resources and ecological qualities; biogeographic representation; threatened and/or endangered species; or important ecosystem structure features. In addition to protecting areas of special significance, boundaries alternatives take into consideration existing authorities; human-use activities; their impacts on the marine resources; and the added value of sanctuary designation in addressing these issues. These strategies provide the sanctuary with a framework to re-examine, evaluate, and, as appropriate, redefine a sanctuary's boundary based on new information. Areas to the north, south and west of the current GFNMS boundary will be considered.

STRATEGY RP-9: *Develop a framework for identifying and analyzing boundary alternatives.*

Activity 9.1 Through an incremental process gather information, analyze data, and develop a recommendation on boundary options.

- A. Review and analyze the Biogeographic Assessment to make an initial determination if there are particular areas that require immediate attention.
- B. Identify additional data sets not provided by the Biogeographic Assessment that may be needed for further analysis. In particular, identify smaller scale features and refined spatial scales that were either not available, or not analyzed on a fine enough scale by the Biogeographic Assessment.
- C. Conduct a literature search (contract) to identify additional data sets (also see research recommendations).
- D. Identify sanctuary research needs (opportunistic and planned) to answer boundary questions. Data needs to be received by the sanctuary in a format that is usable for answering boundary questions.
- E. Assemble a working group with broad-based stakeholder representation and scientific expertise.
- F. Develop a framework for quantitative analysis and evaluation of data by working group.
- G. Working group should strive to come to consensus on building a recommendation(s) on boundary options.
- H. Working group to forward recommendation to sanctuary advisory council for their review and comments before forwarding it to the sanctuary manager.

Activity 9.2 Develop a framework to evaluate different boundary options. The following recommended criteria will be used:

A boundary change (based on this option) would:

- A. Provide additional comprehensive and coordinated conservation and management of this area.
- B. Ensure the maintenance of the area's natural 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.

Potential Partners: SAC, NMSP, Special Projects Office (SPO), OE, Marine Conservation Biology Institute (MCBI), CBNMS, MBNMS, The National Centers for Coastal Ocean Science (NCCOS)

Complementary Strategies: GFNMS DMP, Conservation Science and Impacts from Fishing Activities, STRATEGY FA-1

COLLABORATIVE PLANNING AND MANAGEMENT

Sanctuary program development and planning efforts provide an opportunity for public input in identifying and resolving resource management issues. These partnerships and public involvement are essential ingredients to successful resolutions and implementation of strategies.

STRATEGY RP-10: *Continue to culture partnerships and leverage opportunities for protecting sanctuary resources.*

Activity 10.1 Coordinate development of collaborative processes.

- A. Identify appropriate partners for implementing the management plan.
- B. Coordinate with sanctuary advisory council on multi-stakeholder options for addressing resource management issues.
- C. Provide coordination, oversight and facilitation, as appropriate, to issue-specific committees addressing targeting issues.

Potential Partners: state and federal agencies, institutions, non-governmental organizations (NGOs)

Complementary Strategies: All strategies in draft management plan

RADIOACTIVE WASTE DUMP

The area referred to as the "Farallon Islands Radioactive Waste Dump" (FIRWD) is where approximately 47,800 barrels of low-level radioactive waste were dumped between 1946 and 1970. Although the containers were to be dumped at three designated sites, they are actually

strewn over an area of 540 square miles in depths ranging from 300 to more than 6,000 feet within GFNMS. Research results to date are inconclusive on the impacts on the marine ecosystem from radioactive leakage. Significant public fear and uncertainty about the contamination from leaking barrels continue, particularly since major commercial fishing, sport fishing and other recreational activities take place in the area in and above the dump site.

STRATEGY RP-11: *Evaluate condition of, and actual impacts on sanctuary resources and qualities from the Farallon Islands radioactive waste dump.*

Activity 11.1 Convene a group of agency scientists to evaluate status of radioactive waste dump and make recommendations on roles and responsibilities for addressing some of the issues associated with FIRWD.

- A. Identify appropriate agency partners.
- B. Establish target date for the working group to come to conclusions and make recommendations on the status of the FIRWD.
- C. Inventory current research on the FIRWD and identify data gaps.
- D. Determine under whose mandate the issues/impacts will be addressed.

Activity 11.2 Develop an outreach campaign to inform the public on the status and potential threats of the FIRWD.

- A. Clearly define the message to be communicated to the public about the status of the FIRWD, including actual or potential threats to the living marine resources and humans.
- B. Develop a list of audiences, both targeted and general public, on which to focus outreach efforts.
- C. Develop a communications plan to systematically educate the public and target audiences on a routine basis about the status of FIRWD.
- D. Identify partners, such as other agencies or institutions, to help develop outreach materials and participate in outreach efforts.

Potential Partners: United States Geological Survey (USGS), Environmental Protection Agency (EPA), U.S. Navy, California Department of Transportation (CalTrans), California Department of Health

Products: Communications plan, outreach materials, white paper

TOMALES BAY PROTECTION PLAN

Tomales Bay has long been recognized as a special place deserving a high level of protection by citizens and local, state and federal agencies. The Bay is a significant biological community that supports a diversity of habitats, including eelgrass beds, intertidal sand and mud flats and salt

and freshwater marshes. Thousands of species of birds, invertebrates and plants and numerous threatened and endangered species inhabit the watershed.

Ten local, state and federal agencies are collaborating on a plan for Tomales Bay that addresses vessel management, habitat, and water quality issues. GFNMS is taking a lead in proposing both programmatic and regulatory actions to address priority resource management issues that complement other agencies' actions, and is one of the agencies assisting in the development of a comprehensive plan for Tomales Bay.

STRATEGY RP-12: In cooperation and coordination with the other nine local, state and federal agencies, develop a comprehensive plan to ensure the protection of water quality, natural resources and safety in Tomales Bay.

Activity 12.1 Develop vessel management guidelines to address moored vessels and moorings that may be impacting sensitive habitats.

- A. Control the number of moored vessels and/or moorings in Tomales Bay by January 1, 2006
- B. Identify sensitive areas to be considered as no-mooring zones.
- C. Coordinate between agencies on developing an education program about impacts from moorings and vessel activities in Tomales Bay

Activity 12.2 Develop sewage waste disposal and facility guidelines for public and private boating facilities.

- A. Coordinate with existing public and private boating facility operators to develop sewage waste facilities. Agency coordination will include streamlining of permits and providing public funding for construction of sewage waste facilities.
- B. Require new facilities, or facilities with expansion plans, to provide sewage waste management facilities.
- C. Take regulatory action or develop voluntary guidelines to ensure that vessels that are occupied and moored within the Sanctuary have the capacity to manage on-board sewage waste during the extent of their day.
- D. Coordinate with other agencies on developing a targeted outreach program to educate boaters on proper management of sewage waste.
- E. Work with the San Francisco Bay Regional Water Quality Control Board on developing regional standards for sewage disposal facilities for Tomales Bay.

Activity 12.3 Develop an enforcement plan to address derelict and abandoned vessels and moorings in Tomales Bay.

- A. Develop a plan for removal of derelict and abandoned vessels.
- B. Develop a plan for removal of moorings that are in violation of Sanctuary policies and regulations and/or pose a threat to water quality, natural resources including marine wildlife and natural benthic habitat, and/or safety of Tomales Bay.
- C. Take regulatory action or programmatic action to prevent placement of unapproved moorings.

Activity 12.4 Address impacts to sensitive habitats from construction, modifications and additions to docks and piers in Tomales Bay.

- A. Take regulatory action to protect sensitive nearshore and estuarine habitats by preventing further expansion of docks and piers in Tomales Bay

Potential Partners: California State Lands Commission (SLC), California Coastal Commission (CCC), Point Reyes National Seashore (PRNS), California State Parks (SP), San Francisco Bay Regional Water Quality Control Board (SFRWQCB), California Department of Boating and Waterways (DBW), County of Marin, California Department of Health Services (DHS), and California Department of Fish and Game (DFG).

Complementary Strategies: GFNMS DMP, Resource Protection, STRATEGY RP-4, RP-6, RP-10, Water Quality, WQ-1, WQ-2, WQ-3, WQ-6, WQ-9, Wildlife Disturbance, WD-4, Ecosystem Protection, EP-1, EP-3

ISSUE SPECIFIC RESOURCE PROTECTION STRATEGIES

Note: These strategies are cross-referenced from the issue-based action plans to show the entire suite of resource protection strategies to be implemented by resource protection sanctuary staff.

WATER QUALITY STRATEGIES

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

For the full strategy text, please see page 54.

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

For the full strategy text, please see page 55.

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

For the full strategy text, please see page 56.

STRATEGY WQ-4: *Evaluate Areas of Special Biological Significance and make a determination whether to implement a no vessel discharge prohibition within these areas of concern.*

For the full strategy text, please see page 58.

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

For the full strategy text, please see page 58.

STRATEGY WQ-6: *Develop a standing water quality working group supported by sanctuary staff.*

For the full strategy text, please see page 59.

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

For the full strategy text, please see page 60.

WILDLIFE DISTURBANCE STRATEGIES

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

For the full strategy text, please see page 78.

INTRODUCED SPECIES STRATEGIES

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

For the full strategy text, please see page 96.

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

For the full strategy text, please see page 97.

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

For the full strategy text, please see page 98.

IMPACTS FROM FISHING ACTIVITIES STRATEGIES

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

For the full strategy text, please see page 109.

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

For the full strategy text, please see page 109.

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

For the full strategy text, please see page 110.

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

For the full strategy text, please see page 112.

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

For the full strategy text, please see page 112.

ECOSYSTEM PROTECTION STRATEGIES

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

For the full strategy text, please see page 113.

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

For the full strategy text, please see page 114.

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

For the full strategy text, please see page 114.

VESSEL SPILLS STRATEGIES

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

For the full strategy text, please see page 129.

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

For the full strategy text, please see page 129.

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

For the full strategy text, please see page 130.

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

For the full strategy text, please see page 131.

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

For the full strategy text, please see page 132.

STRATEGY VS-6: Participate on regional response team to address risks to sanctuary resources.

For the full strategy text, please see page 133

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

For the full strategy text, please see page 133.

STRATEGY VS-8: Continue to improve integration of GFNMS Beach Watch and Ecosystem Dynamic Study (EDS) data into Area Contingency Plan.

For the full strategy text, please see page 133.

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

For the full strategy text, please see page 135.

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

For the full strategy text, please see page 135.

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

For the full strategy text, please see page 135.

GFNMS RESOURCE PROTECTION

Timeline

Resource Protection Strategy	Year 1	Year 2	Year 3	Year 4	Year 5
STRATEGY RP-1: Establish a framework for identifying, tracking and addressing emerging issues.		—————		▶
STRATEGY RP-2: Develop coordinated communication system among all national marine sanctuaries and resource management agencies.			—————	▶
STRATEGY RP-3: New and emerging issues need to be continually re-evaluated.	—————	—————	—————	—————	▶
STRATEGY RP-4: Evaluate the appropriateness and effectiveness of current sanctuary regulatory language (prohibitions).	—————		◆		
STRATEGY RP-5: Develop a formalized permit program.	—————	—————	▶
STRATEGY RP-6: Achieve resource protection through compliance with sanctuary regulations and other applicable state and federal statutes.	—————	—————	—————	—————	▶
STRATEGY RP-7: Review and revise the sanctuary’s emergency response plan.	—————	—————	—————	—————	▶
STRATEGY RP-8: Formalize plan to respond to incidents that damage sanctuary resources and qualities.		—————	—————	▶
STRATEGY RP-9: Develop a framework for identifying and analyzing boundary options.				—————	▶
STRATEGY RP-10: Continue to culture partnerships and leverage opportunities for protecting sanctuary resources.	—————	—————	—————	—————	▶
STRATEGY RP-11: Evaluate condition of, and actual impacts from the radioactive waste dump.				—————	◆

Legend:

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

GFNMS RESOURCE PROTECTION

Budget

Strategy	Estimated Annual Cost (1000's)*					Total Est. 5-Year Cost (1000's)
	YR 1	YR 2	YR 3	YR 4	YR 5	
STRATEGY RP-1: Establish a framework for identifying, tracking, and addressing emerging issues on a timely basis	\$10	\$10	\$10	\$10	\$10	\$50
STRATEGY RP-2: Develop a coordinated communication system among all national marine sanctuaries and other resource management agencies	\$12	\$12	\$12	\$12	\$12	\$60
STRATEGY RP-3: New and emerging issues need to be continually tracked and re-evaluated	\$10	\$5	\$5	\$5	\$5	\$30
STRATEGY RP-4: Evaluate the appropriateness effectiveness of current sanctuary regulatory language (prohibitions).	\$5	\$5	\$5	\$5	\$5	\$25
STRATEGY RP-5: Develop a formalized permit program	\$23	\$23	\$23	\$23	\$23	\$115
STRATEGY RP-6: Achieve resource protection through compliance with sanctuary regulations and other applicable state and federal statutes	\$57	\$57	\$57	\$57	\$57	\$285
STRATEGY RP-7: Review and revise the sanctuary's emergency response plan	\$17	\$7	\$7	\$7	\$7	\$45
STRATEGY RP-8: Formalize plan to respond to incidents that damage sanctuary resources and qualities	\$16	\$6	\$6	\$6	\$6	\$40
STRATEGY RP-9: Develop a framework for identifying and analyzing boundary alternatives	\$0	\$0	\$10	\$5	\$5	\$20

Strategy	Estimated Annual Cost (1000's)*					Total Est. 5-Year Cost (1000's)
	YR 1	YR 2	YR 3	YR 4	YR 5	
STRATEGY RP-10: Continue to culture partnerships and leverage opportunities for protecting sanctuary resources	\$37	\$37	\$37	\$37	\$37	\$185
STRATEGY RP-11: Evaluate condition of, and actual impacts from the radioactive waste dump	\$0	\$0	\$0	\$31	\$51	\$82
Total Estimated Annual Cost	\$187	\$162	\$172	\$198	\$218	\$937
The sanctuary's base budget is available each year from appropriated funds.						
There is both availability of and opportunity to receive additional funding from appropriated funds.						
The estimates do not take into account increasing personnel costs each year or inflation.						
The estimates do not take into account unexpected events or emergencies or unforeseen projects.						

Resource Protection Action Plan
GFNMS Draft Management Plan

GFNMS RESOURCE PROTECTION

Performance Measures

Strategy Title(s)	Performance Goal	Desired Outcome (Objective)	Outcome Measure	How Measured	Who Measures	Output Measure
STRATEGY RP-1: Establish framework for identifying, tracking and addressing emerging issues.	Maintain the natural biological and ecological processes in the GFNMS by evaluating and addressing adverse impacts from human activities on sanctuary resources and qualities.	Continue to build on partnerships; collaborative efforts; and coordination with other agencies, institutions and organizations to take a comprehensive and effective ecosystem protection approach.	Increase ability to take a proactive, rather than reactive approach to addressing issues, thus averting significant impacts on sanctuary resources.	1) Develop system to track and flag the most relevant new and emerging issues. 2) Take measures to evaluate, and address as appropriate, new and emerging issues that were identified through the JMPR process. 3) Establish communications system with other agencies and NMSs.	Sanctuary Superintendent, Resource Protection Coordinator	Electronic Web-based tracking system
STRATEGY RP-7: Review and revise the sanctuary's emergency response plan, and be prepared to respond to an incident.	Maintain the natural biological and ecological processes in the GFNMS by evaluating and addressing adverse impacts from human activities on sanctuary resources and qualities.	Continue to build on partnerships; collaborative efforts; and coordination with other agencies, institutions and organizations to take a comprehensive and effective ecosystem protection approach.	Increase the sanctuary's ability to respond in a coordinated and timely manner to catastrophic events, and respond to delayed or persistent impacts to sanctuary resources from previous events.	Conduct regular emergency response drills to evaluate: 1) Emergency response notification system 2) Staff preparedness 3) Effectiveness of SHIELDS and RUST system tools 4) Effectiveness of Area Contingency Plan	Sanctuary Superintendent, Resource Protection Coordinator, staff	1) Emergency response plan 2) SHIELDS 3) RUST
STRATEGY RP-8: Formalize framework for responding to damage to sanctuary resources and qualities from incidents.	Maintain the natural biological and ecological processes in the GFNMS by evaluating and addressing adverse impacts from human activities on sanctuary resources and qualities.	Build a comprehensive and coordinated Resource Protection plan to ensure protection for the resources and qualities of GFNMS.	Increase ability to assess natural resource damage and restore affected habitats and/or living resources.	Implement ecosystem restoration projects and monitor to assess restoration effort effectiveness.	Resource Protection Coordinator, Research Coordinator	



PROGRAM AREA
**ADMINISTRATION
ACTION PLAN**

PROGRAM STATEMENT

In order for Gulf of the Farallones National Marine Sanctuary (GFNMS) to build a management plan that is effective in addressing the priority site-specific and cross-cutting resource management issues, as identified through the management plan review process, GFNMS will need to strengthen its infrastructure by adding staff and financial resources to its base budget. In addition to basic infrastructure needs, some administrative areas that will be addressed include: building partnerships; improving interagency coordination; and addressing regulatory and enforcement issues.

PROGRAM DESCRIPTION

Since 1990, GFNMS has grown from a staff of three with a budget of under \$300,000, to a current staff of twelve and budget of \$1.4 million. Until 1998, GFNMS' office managed the GFNMS, Cordell Bank National Marine Sanctuary (CBNMS), and the northern portion of Monterey Bay National Marine Sanctuary (MBNMS).

The National Marine Sanctuary Program (NMSP) provides oversight and coordination among the thirteen national marine sanctuaries by developing a framework for resource management, and directing national program and policy development. The sanctuary superintendent oversees site-specific management functions including implementation of the management plan. The management plan makes use of two complementary and strategic tools for ecosystem management: (1) programs, or action plans, carried out through Conservation Science, Education, and Marine Resource Protection programs, and (2) regulations, for controlling or restricting human behavior that is not compatible with resource protection. The sanctuary superintendent 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 superintendent reports directly to NMSP. In this capacity, the sanctuary superintendent represents the NMSP and is the primary spokesperson for GFNMS.

The NMSP and GFNMS are committed to coordinating with other federal, state, and local agencies in a continuous ecosystem management process. This process is designed to ensure the long-term protection of the unique 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 NMSP. The NMSP takes responsibility for ensuring that the management plan prepared for each sanctuary is coordinated and consistent with the National Marine Sanctuaries Act (NMSA). On an annual basis, the NMSP reviews and adjusts funding priorities and requirements to reflect resource management needs at each of the thirteen national marine sanctuaries. The NMSP and the site superintendent coordinate efforts to protect and manage sanctuary resources with other federal, state, regional and local agencies.

Sanctuary Superintendent

The GFNMS superintendent recommends to the NMSP priorities for annual allocation of funds for site-specific resource protection needs. The superintendent reports to the NMSP on surveillance and enforcement activities, violations and emergencies, and program activities. The superintendent coordinates with the NMSP on evaluating, processing and issuing of permits; monitors and evaluates Conservation Science, Education, and 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 superintendent evaluates overall progress toward the resource protection objectives of the NMSP 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 NMSP guidelines and procedures. The sanctuary advisory council, with its expertise and broad based representation, offers advice to the sanctuary superintendent on resource management issues and decisions. Gulf of the Farallones National Marine Sanctuary Advisory Council representation includes eight agency and stakeholder representatives and six alternates. The council is representative of a broad based constituency to ensure that the superintendent has a broad information base upon which to make management decisions.

IMPLEMENTATION OF THE MANAGEMENT PLAN

Each of GFNMS' program areas (Education and Outreach, Conservation Science, and Resource Protection) has outlined action plans for implementing management plan strategies. These

action plans are designed to directly address resource management issues and guide management of GFNMS over the next five years.

Action plans are purposely designed with only preliminary implementation guidelines as their parameters may change in the future. The action plans presented in the management plan address current resource management issues identified as priorities by the sanctuary during the management plan review process. The implementation of these action plans is highly dependent on available staffing and financial resource allocation.

Implementation of the new management plan will require: coordination within and between action plans; sharing of staff and financial resources between program areas; and cooperation and coordination among many federal, state and local government agencies, as well as private organizations and individuals.

GFNMS' administration provides an organized structure and support system for implementing management strategies while providing the flexibility and guidance necessary to address changing, new, and emerging resource management issues.

Implementation Costs

Operating funds for sanctuary management come from federal appropriations to the NMSP. These funds cover expenses such as personnel salaries, vessel maintenance, property rental, equipment, and supplies.

In addition to calculating operating costs, GFNMS will perform an estimated cost analysis for carrying out each of the program areas. This analysis is necessary in order to secure appropriate and adequate funding for implementation of the management plan over the next five years.

Unpredictable and variable funding for staff and program development over the next five years may affect specific aspects of the sanctuary management plan. The scale and scope of certain programs may be modified due to any unforeseeable changes in the level of funding. However, the goals and objectives of the plan will remain unchanged.

OTHER MANAGEMENT TOOLS

With limited staff and financial resources, partnerships are an integral part of successful ecosystem management of GFNMS. The Gulf of the Farallones sanctuary superintendent may draw from a selection of standard management tools to formalize relationships with other federal, state and local agencies or the private sector. The partnership mechanisms listed below require approval by General Counsel Ocean Services (GCOS), with oversight by the sanctuary superintendent.

Memorandum of Understanding (MOU) / Memorandum of Agreement (MOA)

MOUs and MOAs establish a formal relationship between two or more entities for general purposes, or for a specific purpose or project, that is expected to continue for an extended period

of time. This mechanism cannot be used to transfer funds, but generally addresses commitment of resources.

Letter of Agreement/Letter of Understanding

Letters of Agreement and/or Understanding are informal mechanisms used to establish a relationship between two or more entities, for a specific project or purpose, for a short period of time. This mechanism cannot be used to transfer funds.

Interagency Agreement

An interagency agreement is used when one agency has expertise, equipment, and/or personnel to perform work more efficiently than another, and it is in the government's interest to do so. Generally, funds are transferred to the agency carrying out the work.

Cooperative Agreement

Cooperative agreements provide funding to a non-federal entity for a project/product that benefits the public. Cooperative agreements are the primary mechanism used for financial assistance. The National Oceanic and Atmospheric Administration (NOAA) must serve as the program officer on the cooperative agreement with financial oversight maintained by the Grants Management Division.

Grants

Grants provide funding to a non-federal entity for a project/product that benefits the public and in which NOAA does not need/want to have substantial involvement. A grant is considered one of the major kinds of financial assistance and must be awarded competitively or include a sole source justification. NOAA must serve as the program officer with financial oversight maintained by the Grants Management Division.

Contract

A contract is a mechanism used by the federal government to procure goods and services. A contract must be awarded competitively or include a sole source justification. The program office has administrative oversight. During the term of the contract, financial oversight is maintained by the Finance Services Division.

JURISDICTIONAL SETTING

FEDERAL AGENCIES

United States Coast Guard (USCG)

The USCG holds broad responsibility for enforcing all federal laws throughout the sanctuary and assists NOAA in the enforcement of sanctuary regulations. USCG provides on-scene coordination with regional response center facilities under the National Contingency Plan for removal of oil and hazardous substances in the event of a spill that threatens sanctuary resource.

National Marine Fisheries Service (NMFS)

The NMFS has responsibility along with the California Department of Fish and Game (CDFG), under the Magnuson-Stevens Fishery Conservation Act (MSFCMA), 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 United States Fish and Wildlife Service (USFWS) for the implementation of the Marine Mammal Protection Act (MMPA) and the Endangered Species Act (ESA) to prevent taking of any endangered, threatened or otherwise depleted species.

Environmental Protection Agency (EPA)

The EPA has regulatory responsibilities with regard to sewage outfalls (under the U. S. Clean Water Act [CWA]) via National Pollutant Discharge Elimination System (NPDES) Permits, and ocean dumping (under Title I of the Marine Protection, Research, and Sanctuaries Act) to protect water quality.

Farallon National Wildlife Refuge (FWS)

The USFWS has responsibility for managing the Farallon National Wildlife Refuge. The refuge includes North, Middle, and Southeast Farallon Islands; Maintop Island; and Noonday Rock. The refuge is operated primarily as a migratory bird refuge to protect murre, auklets, guillemots, puffins, and other birds, and secondarily, to protect seal, sea lion, and other marine mammal assemblages.

Golden Gate National Recreation Area (GGNRA)

The National Park Service (NPS) along with the California Department of Parks and Recreation (CDPR) are responsible for the management of the GGNRA. The GGNRA 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 (PRNS)

The NPS is responsible for the management of the PRNS. PRNS includes the entire Point Reyes peninsula, with the exception of Inverness, Bolinas and Tomales Bay State Park. In addition, certain tide and submerged lands have been legislatively conveyed by the state to PRNS.

STATE AGENCIES

California Coastal Commission

The California Coastal Commission (CCC) was established under the California Coastal Act, which gives authority to the commission to establish policy for activities in state waters. In addition, seaward of state jurisdiction, federal development and activities directly affecting the coastal zone must be conducted in a manner consistent with these policies to the maximum extent practicable.

California State Lands Commission (SLC)

The California State Lands Commission (SLC) administers land including the beds of all waterways of the state below ordinary high water mark as well as tidelands (located between the mean high and low tide lines) and submerged lands (located below the mean low tide line and extending 3 nautical miles seaward). These sovereign state lands are held by the state “in trust” for the benefit of the public.

California Department of Fish and Game (CDFG)

The CDFG regulates commercial fishing, including the taking of tidal invertebrates for commercial purposes, under a licensing system. CDFG also regulates sport fishing through license and bag limit systems. A sport fishing license is required for the taking and possession of fish for any non-commercial purpose. CDFG also leases state water bottoms for the purpose of mariculture.

ADMINISTRATION GOAL

1. Build a comprehensive and coordinated administrative plan to provide support for the site in achieving the goals of the management plan, and increase protection for the resources and qualities of GFNMS.

ADMINISTRATION OBJECTIVES

1. Develop an administrative framework to continuously evaluate, maintain, and expand, as 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.

ADMINISTRATION ACTION PLAN

OPERATIONS

The GFNMS office is located at Crissy Field in San Francisco, California. In addition to the main facilities, the sanctuary currently has within its possession various platforms to support an array of research and education program functions. In the future, other satellite offices and visitor centers will be located throughout the region so as to better serve the San Francisco Bay Area's 8 million population.

STRATEGY AD-1: *New sanctuary facilities will be developed through various partnerships with both the public and private sector.*

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

Activity 1.2 Continue to maintain the Crissy Field and Pacifica visitors centers.

Activity 1.3 Increase the sanctuary staff's ability to access the marine waters of the sanctuary by expanding vessel capabilities and contracting more vessel time to support research and monitoring efforts. Currently, the sanctuary's research vessel *Phoecena* serves as a day-use platform supporting research efforts of the sanctuary and its partners.

Activity 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 CBNMS. Outreach and interpretive exhibit venues being considered include:

- A. Bear Valley Visitors Center at Point Reyes National Seashore (PRNS) headquarters has offered space to GFNMS and CBNMS for its exhibit needs. The visitors center has 450,000 visitors per year from school children to local and recreational users.
- B. The PRNS lighthouse visitor center has space for a display about the national marine sanctuaries. GFNMS will partner with CBNMS to design an exhibit highlighting the natural history of the two sanctuaries.
- C. Bodega Marine Laboratory (BML) is the marine research arm of UC Davis (UCD), and the center of marine research on the north coast. GFNMS, in partnership with CBNMS, is proposing to update and expand its interpretive panels at the lab.
- D. Fort Ross State Park celebrates the Russian presence in northern California in the 19th century during the heyday of the Russian-American Company. It also tells the story of local Native American tribes who fished and hunted in the area. GFNMS and CBNMS are proposing to develop wayside signage themed on wildlife watching, including tide pool etiquette and marine mammal viewing.
- E. Bodega Head State Park is the best vantage for getting a perspective on GFNMS and CBNMS. This is a popular whale 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.
- F. Maintain Duxbury Reef's three-paneled sealed kiosk interpreting the intertidal habitats, intertidal etiquette and a description of the GFNMS.

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- G. The sanctuary will partner with USFWS to upgrade the Southeast Farallon Island facility and add a field laboratory to support monitoring and research efforts on the Farallon Islands.
- H. 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.
- I. GFNMS will develop an exhibit in the Northern California Coast exhibit wing at the California Academy of Sciences (CAS). GFNMS has a rare opportunity to become the focal point of the “new” academy and install a permanent exhibit.
- J. 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 NMSP. The Ocean Exploration Center will also have a theater for films, lectures, telepresence and seminars. The center will also have classrooms and office space.
- K. GFNMS has received funding for a maritime exhibit at the San Francisco Bay National Historic Park. This exhibit will include an interactive kiosk for local weather and an indoor interactive screen linking to NOAA websites highlighting programs in San Francisco Bay and beyond.
- L. GFNMS and MBNMS will install interpretive displays in the Pigeon Point Lighthouse. These displays will highlight the maritime heritage of the area, including shipwrecks and lighthouse keepers. There will also be a panel on watchable wildlife.
- M. GFNMS will work with CBNMS to develop an exhibit and information kiosk for the Oakland Museum. The exhibit will feature CBNMS but will include information about GFNMS.
- N. GFNMS will develop interpretive signs at forty-seven possible locations throughout central and northern California. Much of the signage will be developed in coordination with Cordell Bank and/or Monterey Bay national marine sanctuaries.

Activity 1.5 Improve, upgrade, maintain, and evolve the information technology infrastructure of the main office and satellite facilities. Continue to innovate technology through dedicated base funds, stable support staff, and strategic partnerships with Silicon Valley and other Bay area information technology leaders. The San Francisco Bay area is recognized as one of the most technologically advanced regions in the world. The GFNMS should tap into these local resources and creative thinking to evolve more efficient, creative, and engaging methods of protecting our marine resources.

STAFFING

Under the direction of the sanctuary superintendent, the sanctuary staff is directly responsible for implementation of the management plan. Although each staff member is assigned to one of the four program areas or administration, collectively the staff is responsible for coordinating their efforts in addressing the priority resource management issues identified in the management plan.

STRATEGY AD-2: *The primary focus of GFNMS is marine resource protection. Basic staffing requirements must provide support for administration and the program areas of conservation science, education/outreach, and resource management.*

Activity 2.1 Sanctuary staff skills should collectively represent expertise in policy, marine resource management, education, outreach, volunteer development, research, monitoring, geographic information systems (GIS), communications technology, and administration. The actual number and expertise of staff will depend on budget allocations and the operating priorities of GFNMS. In order to meet the objectives of this management plan, minimum staffing requirements have been laid out (see staffing chart). Administration will support the following:

- A. Building leadership in the field.
- B. Increasing professional exposure of the staff.

Activity 2.2 Each staff member must exhibit general knowledge about all GFNMS program areas and the ability to effectively communicate with constituents, other professionals, and the community at large. In an effort to attract and maintain a consistent and high caliber staff base, the GFNMS manager will allocate 1.5 percent of the base budget, to encourage staff participation in professional development such as:

- A. Continuous training
- B. Advancement opportunities
- C. Professional development and attendance at professional meetings and workshops
- D. Staff exchanges with other sanctuaries

Activity 2.3 Collectively, the staff will function as a team supporting each program area, working towards the common goals and objectives of the management plan and increasing protection of sanctuary resources and qualities. Through administration, the following support will be provided:

- A. Team building through on-site activities and off-site retreats.
- B. Define relationship and nature of interactions between staff and management.
- C. Clarify job 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.

Activity 2.4 Through the administrative framework, the sanctuary will work to create a positive working environment that encourages trust and clear accountability.

- A. Hold an all-hands sanctuary meeting with headquarters and site staff to learn other's 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 among all staff members.
- D. Hire consultant to assist the site in further developing a positive work environment that encourages trust and team building.
- E. Hold regular, well planned staff meetings with activities to build trust.

Activity 2.5 Work towards developing a strong and favorable public identity.

- A. Develop site communications and media plan.
- B. Offer formal media training for site staff.
- C. Submit articles on a quarterly basis for NOAA publications (NOAA Report, Sanctuary Watch).
- D. Develop PowerPoint presentation for GFNMS and specific programs.
- E. Revamp and refine image library.
- F. Develop series of boilerplate press releases.
- G. Encourage headquarters to highlight GFNMS in press releases and publications.

PARTNERSHIPS

With limited staff and financial resources, GFNMS relies on partnerships, outside funding sources and volunteers to assist in the implementation of the management plan. An integrated ecosystem approach to resource management requires direct and broad-based participation in resource management by all parties who have a stake in the long-term health of the region.

STRATEGY AD-3: *With limited staff and financial resources, GFNMS will develop partnerships and identify outside funding sources and in-kind services to assist in the implementation of the management plan.*

Activity 3.1 Continue to maintain and build on existing partnerships.

- A. Continue the Memorandum of Understanding with the Farallones Marine Sanctuary Association (FMSA) to carry out education and outreach programs and maintain visitor centers for the sanctuary.
- B. Continue the Memorandum of Agreement with GGNRA for office space and services.
- C. Revise the Memorandum of Agreement with PRNS for enforcement of sanctuary regulations.
- D. Develop a Memorandum of Understanding with PRNS to renovate the facility and dock at Sacramento Landing in Tomales Bay.

Activity 3.2 Expand informal working relationship with NMFS and United States Geological Survey (USGS). Partnership activities include coordination on research projects, data analysis and cruise operations.

STRATEGY AD-4: *As the sanctuary advisory council matures and develops a strong voice within the community, its role in resource management should be more clearly defined. With experience, the sanctuary advisory council will develop, and can draw on, a historical framework for ongoing community-based decision making as they assume a leading role in providing advice to the sanctuary superintendent.*

Activity 4.1 In consultation with the sanctuary advisory council, strengthen the structure of the sanctuary advisory council by: evaluating and amending as necessary the sanctuary advisory council charter; evaluating and developing organizational strategies to enhance the sanctuary advisory council's level of participation and effectiveness; evaluating and adjusting as necessary the representation of sanctuary advisory council membership; and providing support to help the advisory council develop a respected voice in the community.

Activity 4.2 Identify the role of the sanctuary advisory council in addressing resource management issues by developing a process for assisting in the building of GFNMS policies and procedures.

Activity 4.3 Provide support, resources, and guidance to help the sanctuary advisory council engage and educate the public about current, new, and emerging resource management issues in the sanctuary.

Activity 4.4 Sanctuary advisory council members will be asked to serve on various advisory council working groups. Working groups will be convened by the sanctuary advisory council to focus on specific issues and to allow for participation by additional stakeholders and community experts.

Activity 4.5 Review the working group recommendations to add standing working groups and seats to the sanctuary advisory council.

INTERAGENCY COORDINATION

The NMSP and GFNMS are committed to coordinating with other federal, state and local agencies in a continuous ecosystem management process. This process is designed to ensure the long-term protection of the unique resources of this region, while considering the demands of multi-use interests. This requires the cooperation of many institutions that historically have not focused on the same goals. Because of the complexity of managing the activities and resources in the sanctuary, no single agency or institution can effectively meet sanctuary goals. Overlapping jurisdictions, different agency mandates, and limited resources necessitate the development of a management plan that brings together multiple institutions for the common purpose of ecosystem protection. Achieving the long- and short-term goals for this region requires the development of a close and continuing partnership among all the agencies.

STRATEGY AD-5: *NOAA and GFNMS recognize all other authorities in and around sanctuary waters as important components of effective ecosystem protection. Therefore, GFNMS' regulations complement or supplement, but do not replace, existing authorities. To ensure coordination and cooperation with federal, state, and local jurisdictions within or adjacent to the sanctuary, GFNMS seeks to formalize intra- and interagency efforts.*

Activity 5.1 GFNMS will engage other agencies in reviewing each other's actions, responding to environmental impact statements (EIS), and participating on sanctuary panels and working groups. Building agency relationships allows for: coordinating the development of policies at the federal, state and local level; the sharing of research and education resources; and the opportunity to work together to identify resource management issues.

Activity 5.2 Formalize agreements with federal/state co-trustee managers signaling that the cooperative and integrated management approach established for GFNMS has been adopted by other agencies. To formally implement cooperative management of the sanctuary a number of separate types of agreements may be entered into, including: cooperative agreements, Memoranda of Understanding/Agreement, and consultation.

Activity 5.3 GFNMS seeks to formalize agreements for the following programs: (1) Protected Resources Enforcement Plan (USCG, NMFS) (see below), and (2) Emergency Response Plan (local, state and federal emergency response agencies).

PLANNING AND EVALUATION

Evaluating performance as part of the regular cycle of management is a relatively new concept for the NMSP. Periodic reviews have taken place over the course of the sanctuary program's existence, but a process for integrating a system for performance evaluation has not been implemented up to now. As a result, NMSP headquarters staff began working on models for integrating performance measurement into the management plan review process as well as for evaluating overall performance of the sanctuary program. The idea behind these models was simple, but implementing them has been challenging due to the inherent difficulties of

performance measurement (developing quantifiable outcome-based targets, projecting outward for results, estimating needs, relying on outputs or products for results reporting, etc.). With the measures in this draft management plan, however, GFNMS is initiating the performance measurement process for the sanctuary and, therefore, beginning to establish a baseline of information that can be used by the NMSP to evaluate effectiveness of both the site and the sanctuary program over time.

PROGRAM DESCRIPTION

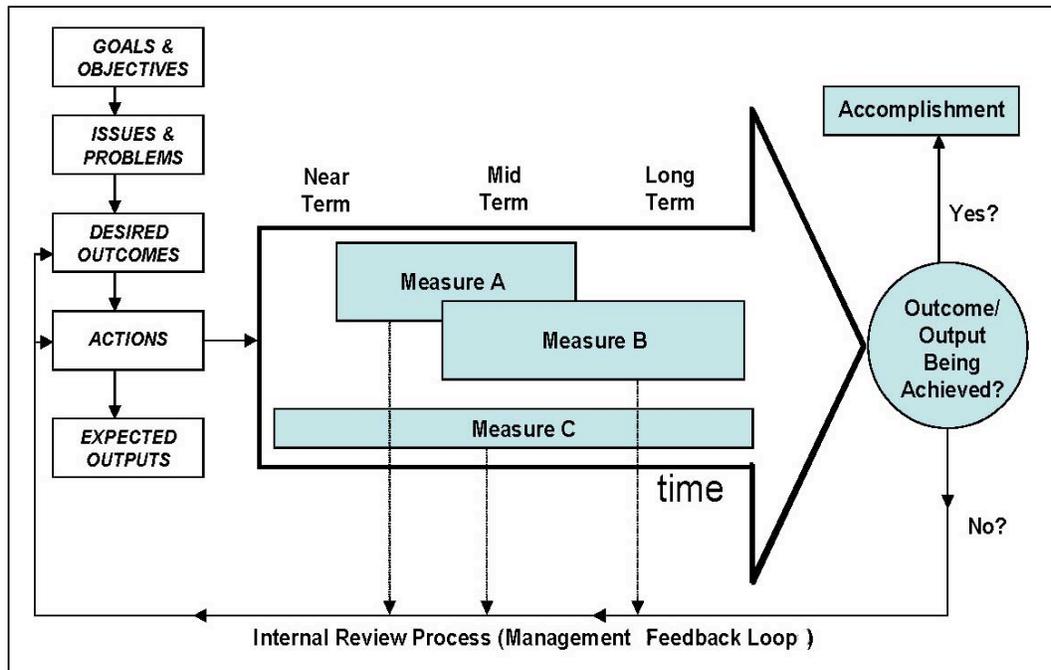
As part of an effort to improve overall management of sanctuaries, ongoing and routine performance evaluation is a priority for the NMSP. Both site-specific and programmatic efforts are underway to better understand the sanctuary program's ability to meet the objectives outlined in each of the action plans. Performance evaluation has many other benefits, including:

- Highlighting successful (or not so successful) efforts of site management;
- Keeping the public, congress, and other interested parties apprised of sanctuary effectiveness;
- Helping managers identify resource gaps so that they may better manage their sites;
- Improving accountability;
- Improving communication among sites, stakeholders and the general public;
- Fostering the development of clear, concise and, whenever possible, measurable outcomes;
- Providing a means for managers to comprehensively evaluate their sites in both the short- and long-term;
- Fostering an internal focus on problem-solving and improved performance;
- Providing additional support for the resource allocation process; and
- Motivating staff with clear policies and a focused direction.

Throughout the management plan review process, GFNMS staff worked towards developing performance measures for the action plans. The principal objective of these measures is to present a set of performance targets that demonstrate progress towards desired outcomes for each action plan. The NMSP Performance Evaluation Logic Model (below) depicts the basic idea behind this process, which will be implemented in all sanctuaries undergoing management plan review.

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NMSP Performance Evaluation Logic Model



Priority resource management issues were identified during the management plan review process relative to GFNMS' goals and objectives. Staff developed desired outcomes (targets based on a desired change in the status quo of the ecosystem, such as the sanctuary's environmental condition or management capacities). Strategies (as identified in each of the action plans) are then grouped under the relevant outcomes. Expected outputs, or products, are also identified. Performance measures are then drafted, which identify the means by which the sanctuary will evaluate its progress towards achievement of the desired outcomes (based on goals and objectives). As represented by the large arrow in the model, measures were developed to provide information on results over time, from the near term (within one year, for example) to the long term (over the span of ten years or more, for example). As these measures are monitored over time, data is collected on progress towards the achievement of outcomes and the production of outputs. Outcomes that are being achieved and outputs that are being produced are reported as accomplishments. The inability to achieve outcomes or produce outputs is also reported, but as areas that are falling short of targets. In these areas, staff will work to identify the obstacles that are preventing management from reaching targets (represented in the model by the arrow that runs along the bottom of the graphic). This internal review is one of the primary benefits of the performance evaluation process as it provides an opportunity for staff to think carefully about why particular strategies in the management plan are not meeting stated targets and how they can be developed to do so.

The GFNMS Ecosystem Protection Implementation Plan matrixes (see Appendix II) are organized around the priority habitats identified in the management plan: estuarine, nearshore and pelagic. Each of the strategies in the management plan that address the priority issues (water quality, wildlife disturbance, introduced species, ecosystem protection, vessel spills) and program areas (education and outreach, conservation science, and resource protection) will be

implemented around improving protection of the estuarine, nearshore and pelagic environments. The Performance Measures matrixes are also organized to track the structure of the action plans in the management plan including: goals, objectives and outcomes.

The information produced by performance measures in sanctuary management plans will be used not only to improve the management of individual sanctuaries, but to inform the sanctuary program's performance evaluation through the NMSP Report Card.

The NMSP Report Card will use action-plan-specific performance information from the site management plans (along with information on headquarters-specific tasks) to evaluate the sanctuary program's performance in a wide variety of functional areas (such as education, research and monitoring, planning and policy, enforcement, and operations). Although this will be an internal process, results will be compiled, synthesized and then reported by the NMSP Director in a public document (such as the State of the Sanctuary Report).

PERFORMANCE EVALUATION GOAL

1. Ensure that GFNMS' management plan strategies are producing effective results in addressing the priority resource management issues identified in the management plan.

PERFORMANCE EVALUATION OBJECTIVES

1. GFNMS will continuously measure and evaluate the successes and challenges of the strategies put forth in the five-year management plan.
2. Based on the outcome of these evaluations, the sanctuary will modify existing programs and make recommendations for the future that best support the sanctuary's primary objective of ecosystem protection.

PERFORMANCE EVALUATION STRATEGY

STRATEGY AD-6: *Develop and make use of performance indicators to measure effectiveness of the management of the sanctuary as a whole, as well as to evaluate specific strategies within the management plan.*

Activity 6.1: GFNMS staff will conduct routine performance evaluations to collect and record data on sanctuary performance over time. Using this data, staff will determine the effectiveness of management plan strategies by (a) evaluating progress towards achievement of each action plan's desired outcomes and (b) assessing the role or added value of those outcomes in the overall accomplishment of site goals and objectives.

Activity 6.2: Results from performance monitoring will be collected, analyzed and used to populate and inform the NMSP Report Card and, when necessary, National Ocean Service (NOS) or NOAA-wide performance requirements. Performance data may also be presented in a site-specific annual report that would explain each measure, how it was evaluated, the site team that conducted the evaluation, and next steps. Based on this analysis, site staff, in cooperation with the advisory council, will identify accomplishments as well work to determine those

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management actions that need to be changed to better meet their stated targets. The targets themselves may also be analyzed to determine their validity (if, for instance, they are too ambitious or unrealistic given current site capacities).

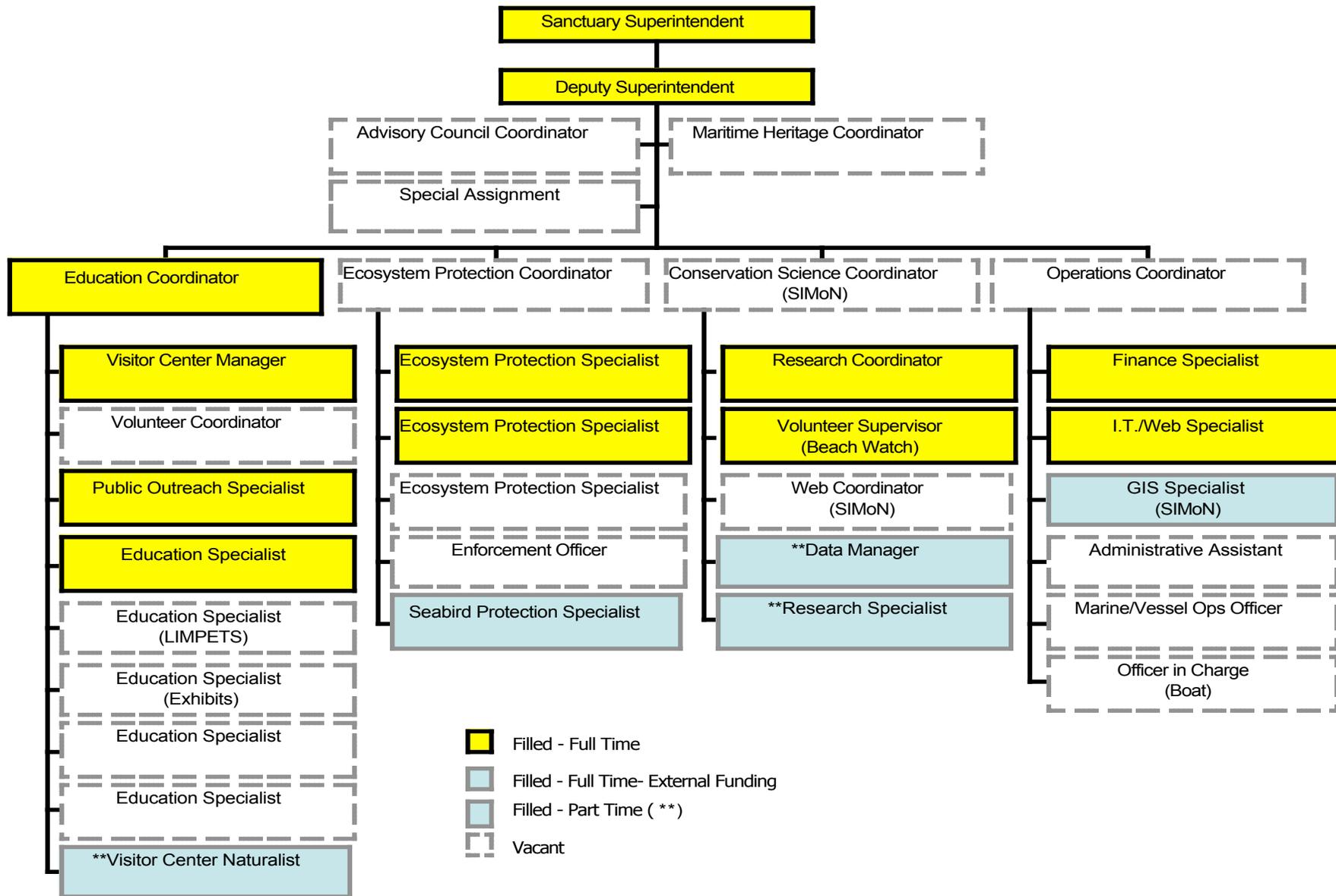
Activity 6.3: An annual assessment on the implementation of the GFNMS Management Plan will be conducted. This assessment will be conducted internally by GFNMS staff who will consider the progress and effectiveness of activities implemented over the previous year. In this activity, successes or weaknesses of specific activities will be determined. Activities deemed less than successful in achieving desired outcomes will be addressed to correct or improve the outcomes/outputs. Successful activities will be recognized with application of positive lessons learned to other programs.

Activity 6.4: As the NMSP continues to increase the rigor of its internal evaluation process, GFNMS will begin to increase the frequency with which partners collaboratively join with GFNMS in assessing the effectiveness of joint-management actions (those actions conducted primarily in partnership with others). Toward this end, regular evaluation of partner dependent strategies within this management plan is proposed.

Potential Partnerships: NMSP, SAC, strategy partners

Complementary Strategies: All strategies

Staffing Plan



GFNMS ADMINISTRATION

Timeline

Administration Timeline	Year 1	Year 2	Year 3	Year 4	Year 5
STRATEGY AD-1: Facilities					▶
STRATEGY AD-2: Staffing					▶
STRATEGY AD-3: With limited staff and financial resources, GFNMS will need to develop partnerships.				▶
STRATEGY AD-4: Sanctuary advisory council					▶
STRATEGY AD-5: Formalize intra- and interagency efforts.					▶
STRATEGY AD-6: Develop and make use of performance indicators to measure performance of the management of the sanctuary.					▶

Legend:

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

GFNMS ADMINISTRATION

Budget

Strategy	Estimated Annual Cost (1000's)*					Total Est. 5-Year Cost (1000's)
	YR 1	YR 2	YR 3	YR 4	YR 5	
STRATEGY AD-1: New sanctuary facilities will be developed	\$101	\$181	\$181	\$181	\$231	\$875
STRATEGY AD-2: Basic staffing requirements must provide support for administration and the program areas	\$100	\$600	\$900	\$1,150	\$1,350	\$4,100
Action 2.3: Collectively, the staff will function as a team supporting each program area, working towards increasing protection of the sanctuary	\$15	\$15	\$15	\$15	\$15	\$75
Action 2.5: Work towards developing a strong and favorable public identity	\$60	\$10	\$10	\$10	\$10	\$100
STRATEGY AD-3: GFNMS will develop partnerships to assist in the implementation of the management plan	\$36	\$36	\$36	\$36	\$36	\$180
STRATEGY AD-4: The sanctuary advisory council will assume a leading role in providing advice to the sanctuary superintendent	\$43	\$46	\$46	\$46	\$46	\$227
STRATEGY AD-5: Formalize intra- and interagency efforts	\$12	\$12	\$12	\$12	\$12	\$60
STRATEGY AD-6: Develop and make use of performance indicators	\$40	\$40	\$40	\$40	\$40	\$200
Total Estimated Annual Cost	\$400	\$940	\$1,240	\$1,490	\$1,740	\$5,817

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

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

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

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