
**MONTEREY BAY
NATIONAL MARINE SANCTUARY**



FINAL MANAGEMENT PLAN

**PREPARED AS PART OF THE
JOINT MANAGEMENT PLAN REVIEW (JMPR)
VOLUME III OF IV**

OCTOBER 2008

**U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SERVICE
OFFICE OF NATIONAL MARINE SANCTUARIES**





This document is a final management plan for the Monterey Bay National Marine Sanctuary. This management plan is the result of a community-based management plan review undertaken by the Monterey Bay National Marine Sanctuary Advisory Council, community stakeholders and volunteers. This plan was developed in coordination with the Cordell Bank and Gulf of the Farallones National Marine Sanctuaries in the Joint Management Plan Review. This document will serve as the guiding management document for the MBNMS for the next five years.

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

Paul Michel, Superintendent
Monterey Bay National Marine Sanctuary
299 Foam Street
Monterey, CA 93940
(831) 647-4201
Paul.Michel@noaa.gov

For readers that would like to learn more about the management plan, MBNMS policies and community-based management processes, we encourage you to visit our web site at www.montereybay.noaa.gov.

Readers who do not have Internet access may call the Sanctuary office at (831) 647-4201 to request relevant documents or further information.

NOAA's National Marine Sanctuary Program seeks to increase public awareness of America's ocean and Great Lakes treasures by conducting scientific research, monitoring, exploration and educational programs. Today, the Program manages 13 national marine sanctuaries and one coral reef ecosystem reserve that together encompass more than 150,000 square miles of America's ocean and Great Lakes natural and cultural resources.

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

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

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Monterey Bay National Marine Sanctuary

Final Management Plan

October 2008

Table of Contents

<i>Executive Summary</i>	1
Section I Introduction	11
<i>Background</i>	13
<i>Monterey Bay National Marine Sanctuary Setting</i>	25
<i>Regulations</i>	43
<i>Implementing the Management Plan</i>	53
Section II Coastal Development	69
<i>Coastal Armoring Action Plan</i>	71
<i>Desalination Action Plan</i>	81
<i>Harbors and Dredge Disposal Action Plan</i>	91
<i>Submerged Cables Action Plan</i>	99
Section III Ecosystem Protection	109
<i>Ecosystem Protection Action Plans</i>	111
<i>Big Sur Coastal Ecosystem Action Plan</i>	115
<i>Bottom Trawling Effects on Benthic Habitats Action Plan</i>	123
<i>Davidson Seamount Action Plan</i>	133
<i>Emerging Issues Action Plan</i>	143
<i>Introduced Species Action Plan</i>	149
<i>Sanctuary Integrated Monitoring Network (SIMoN) Action Plan</i>	157
<i>Marine Protected Areas Action Plan</i>	167
Section IV Operations and Administration	181
<i>Operations and Administration Action Plan</i>	183
<i>Performance Evaluation Action Plan</i>	211
Section V Partnerships and Opportunities	219
<i>Fishing Related Education and Research Action Plan</i>	221
<i>Interpretive Facilities Action Plan</i>	231
<i>Ocean Literacy and Constituent Building Action Plan</i>	243
Section VI Water Quality	257

<i>Beach Closures and Microbial Contamination Action Plan</i>	259
<i>Cruise Ship Discharges Action Plan</i>	277
<i>Water Quality Protection Program Implementation Action Plan</i>	281
Action Plan I: Implementing Solutions to Urban Runoff	284
Action Plan II: Regional Monitoring, Data Access, and Interagency Coordination	293
Action Plan III: Marinas and Boating	298
Action Plan IV: Agriculture and Rural Lands	303
Action Plan V: Protecting Water Quality in Wetlands and Riparian Corridors	309
Section VII Wildlife Disturbance	317
<i>Marine Mammal, Seabird, and Turtle Disturbance Action Plan</i>	319
<i>Motorized Personal Watercraft Action Plan</i>	333
<i>Tidepool Protection Action Plan</i>	343
Section VIII Cross-Cutting Action Plans	353
<i>Cross-Cutting Action Plans</i>	355
<i>Administration and Operations Action Plan</i>	357
<i>Community Outreach Action Plan</i>	369
<i>Ecosystem Monitoring Action Plan</i>	377
<i>Maritime Heritage Action Plan</i>	391
<i>Northern Management Area Transition Action Plan</i>	405
Section IX Appendices	427
<i>Appendix A – Ecosystem Management Strategies</i>	
<i>Appendix B - Education and Outreach Related Activities</i>	
<i>Appendix C – Research and Monitoring Related Activities</i>	
<i>Appendix D – Enforcement Related Activities</i>	
<i>Appendix E – List of Acronyms</i>	

Executive Summary

Background

The Monterey Bay National Marine Sanctuary (MBNMS) is the largest of thirteen marine sanctuaries administered by the United States Department of Commerce National Oceanic and Atmospheric Administration (NOAA). The MBNMS extends from Marin County to Cambria, encompassing nearly 300 miles of shoreline and 5,322 square miles of ocean extending an average distance of twenty-five miles from shore. At its deepest point the MBNMS reaches down 10,663 feet (more than two miles). By surface area, the MBNMS represents about thirty percent of the area protected by the National Marine Sanctuary System; however, by volume, because of its depth, it protects two-thirds of all the marine and coastal waters in the national system. It is home to numerous mammals, seabirds, fishes, invertebrates, and algae in a remarkably productive coastal environment. Within its boundary is a rich array of habitats, from rugged rocky shores and lush kelp forests to one of the largest underwater canyons in North

America. These habitats abound with life, from tiny microscopic plants to enormous blue whales. There is a human dimension to the MBNMS with several urban centers and approximately 3 million people living within 50 miles of its shoreline, many who rely on MBNMS resources for pleasure or work. With its great diversity of habitats and life, and due to the human communities along its shoreline, the MBNMS is a national focus for recreation, research, and education.

Joint Management Plan Review

This management plan for the MBNMS was developed as part of a process known as the Joint Management Plan Review (JMPPR). The National Marine Sanctuary Program (NMSP) reviewed the management plans of the MBNMS together with the Cordell Bank and Gulf of the Farallones

Figure EX. 1 Central California National Marine Sanctuaries and Coastal Counties



National Marine Sanctuaries in the JMPR for several reasons. These sanctuaries are located adjacent to one another, managed by the same program, and share many of the same resources and issues. In addition, all three sites share many overlapping interest and user groups. Using a community-based process providing numerous opportunities for public input, the NMSP examined the current issues and threats to the resources and whether the management plan put in place at that time is adequately protecting MBNMS resources.

The Management Plan

This management plan is a revision of the original management plan, adopted with Sanctuary designation in 1992, and is focused on how best to understand and protect the Sanctuary's resources. This management plan includes twenty-three action plans guiding the Sanctuary for the next five years. The majority of the action plans are grouped into four main marine management themes: coastal development, ecosystem protection, water quality, and wildlife disturbance. Two additional sections, partnerships and opportunities as well as operations and administration, comprise action plans and strategies addressing how the Sanctuary will function and operate. Finally, five cross-cutting plans will be implemented in conjunction with the other two sanctuaries. Successful implementation of each of the action plans relies on partnerships with federal, state, and local agencies in addition to local stakeholders. Much of the work to be accomplished crosses many jurisdictions and exceeds the resources of any one agency. Following is a summary of the action plans, which make up the priority initiatives of the MBNMS in this new management plan.

Coastal Development Action Plans

Coastal Armoring: The armoring of the coastline for protection of private and public structures continues to expand throughout the Sanctuary. This action plan proposes to address coastal armoring issues through development of a program to coordinate with the California Coastal Commission and other agencies to identify planning regions and guidelines and where possible, alternatives to armoring.

Desalination: Increased demand for water in various communities adjacent to the Sanctuary, together with advancements in technology, has made desalination an attractive source of fresh water. The Sanctuary proposes development of a regional program and policy regarding desalination facility locations. The action plan also includes development of facility siting guidelines and a modeling and monitoring program for desalination discharges.

Harbors and Dredge Disposal: The Sanctuary will continue to review the disposal of dredged material in approved locations at sea or along the shoreline. This action plan proposes several agency coordination improvements, and the development of review guidelines. It would also implement a sediment monitoring and reduction program, address fine grain material disposal at sea, and evaluate alternative disposal methods for the four harbors in the Sanctuary.

Submerged Cables: The installation, operation, and removal of submerged cables may disturb sensitive habitats and negatively impact areas of the seafloor. Implementation would provide administrative guidelines for applications and define sensitive Sanctuary habitats that should be avoided. This would include a program to provide siting guidelines in a Geographic Information System (GIS) to identify environmental constraints.

Ecosystem Protection Action Plans

Big Sur Coastal Ecosystem Plan: The Sanctuary is proposing development of a program to coordinate and integrate management plans from seven coastal agencies with jurisdiction in the Big Sur area. Full implementation would integrate management plans into one comprehensive regional plan and identify potential methods and locations of disposal associated with landslides and maintenance of Highway 1 in Big Sur.

Bottom Trawling Effects on Benthic Habitats: The effects of bottom trawling on benthic habitats in areas of the Sanctuary are not completely known. Implementation of this action plan would include development of a program to examine where trawling occurs and its impacts to sanctuary resources, and if necessary, to present potential protective measures to the National Marine Fisheries Service, the Pacific Fishery Management Council, and the California Department of Fish and Game.

Davidson Seamount: The Davidson Seamount is a pristine undersea volcano that is proposed for inclusion in the Sanctuary as part of the JMPP. Inclusion of the Davidson Seamount would provide additional protection of the seamount, additional regulations, and a new management zone. Implementation of the action plan would initiate monitoring, research, and education activities focused on the Davidson Seamount increasing the public's knowledge of seamounts, and the variety of deep sea flora and fauna inhabiting the area.

Emerging Issues: This action plan provides a framework for staff to evaluate and adequately address emerging resource issues in a timely and responsible manner. The strategies outline a process to provide adequate staffing and operations.

Introduced Species: The introduction of non-native species can destroy natural biological communities and potentially harm commercial activities. The Sanctuary will develop a program to prevent introduction, collect baseline information, and develop a research and monitoring program. The action plan also includes development of a detection and response program for potential introductions or releases of non-native species.

Sanctuary Integrated Monitoring Network (SIMoN): Comprehensive, long-term monitoring is a fundamental element of resource management and conservation. The MBNMS, in collaboration with the regional science and management community, designed SIMoN to identify and track natural and human induced changes to the MBNMS. This action plan outlines how SIMoN integrates and interprets results of individual efforts in a large ecosystem-wide context and continuously updates and disseminates data summaries to facilitate communication between researchers, managers, educators, and the public. Timely and pertinent information is provided to all parties through tools such as a SIMoN web site, an annual symposium, and a series of technical and public reports.

Marine Protected Areas (MPAs): The action plan outlines how the Sanctuary will examine the utility of additional marine protected areas (MPAs) in maintaining the integrity of biological communities. It also outlines a program for identifying various types of ocean uses, integrated management, MPA design criteria, socioeconomic impact analysis, MPA enforcement, outreach, and monitoring. This plan also provides a framework to identify how the Sanctuary will

coordinate with the National Marine Fisheries Service, Pacific Fishery Management Council, and California Department of Fish and Game.

Operations and Administration Action Plans

Operations and Administration: This action plan provides the administrative guidelines for programs such as operational planning, staffing and infrastructure needs, volunteer programs, administrative initiatives, interagency coordination, and reviewing requests to conduct prohibited activities that may injure Sanctuary resources. Other activities consist of streamlining the permit review process, including improved outreach and interagency coordination; improved permit compliance; and monitoring and enforcement of permit conditions. Part of this action plan also addresses operation of the Sanctuary Advisory Council and the standing working groups (Conservation Working Group, Sanctuary Education Panel, Business and Tourism Activity Panel, and Research Activities Panel).

Performance Evaluation: MBNMS will effectively and efficiently incorporate performance measurement into the regular cycle of management. This action plan details how strategy and related activities are to be measured for effectiveness during implementation by staff. This action plan also details the process by which the Sanctuary will measure its management performance over time and report its progress in meeting goals and objectives.

Partnerships and Opportunities Action Plans

Fishing-Related Education and Research: The Sanctuary will work with the fishing community to develop education programs; enhance stakeholder communication; promote understanding of sustainable fisheries; increase involvement in education and research; promote fishery, socioeconomic, cultural, and historical data collection and distribution; and help educate the public on the role of healthy ecosystems and fish populations.

Interpretive Facilities: This action plan describes the need for and location of interpretive facilities including visitor centers, kiosks, virtual experiences, and signage at various locations along the coastline. Implementation would include development of a Sanctuary visitor center in Santa Cruz and provide for a key education and outreach tool component for all of the priority action plans.

Ocean Literacy and Constituent Building: This action plan addresses the need to cultivate an informed, involved constituency who cares about restoring, protecting and conserving our precious ocean resources. The Sanctuary will implement an integrated, multicultural outreach program to pull together specific outreach and education activities outlined in other sections of this management plan and coordinate their execution, further developing the Sanctuary's relationships with its constituencies.

Water Quality Action Plans

Beach Closures and Microbial Contamination: In the last ten years, beach closures and warnings due to microbial contamination have become more common. This action plan provides a program to identify sources of contamination; research pathogen sources; increase monitoring, education, and enforcement; expand notification and emergency response; and develop a

database and a source control program to reduce beach closures and postings due to microbial contamination.

Cruise Ship Discharges: Cruise ships can carry upwards of 3,000 people, and the discharge of waste may harm the water quality and resources. The Sanctuary proposes to prohibit discharges from cruise ships and conduct outreach and coordination with the cruise ship industry, providing it with information about the MBNMS. The MBNMS would also monitor and enforce potential cruise ship discharges.

Water Quality Protection Program Implementation: Pollutants running off the land often lower the quality of the water as both a habitat and resource for recreational and commercial use. The Sanctuary has four existing action plans that are in place to prevent pollution and facilitate water quality improvements as part of the Water Quality Protection Program: Urban Runoff, Regional Monitoring, Marinas and Boating, and Agriculture and Rural Lands. This action plan integrates the four existing plans into the Sanctuary management plan and provides for full implementation to address pollutants and their sources.

Wildlife Disturbance Action Plans

Marine Mammal, Seabird, and Turtle Disturbance: Various activities occurring on the water, in the air, or on land have the potential to harm the sensitive wildlife inhabiting the Sanctuary. Through increased monitoring, education, outreach, and enforcement, the Sanctuary will address disturbance to marine mammals, birds, and turtles from vessels, aircraft, shore-based activities, marine debris, commercial harvest, and acoustic disturbance.

Motorized Personal Watercraft (MPWC): MPWC use has increased in the Sanctuary with the development of larger and more powerful vehicles for use in the marine environment. The MBNMS is proposing an updated definition of MPWC in order to address the original intent of the existing MBNMS regulation, which was to restrict them to four certain zones outside of the surf area. This action plan includes education and enforcement procedures and exploration of the need for certain exceptions.

Tidepool Protection: The MBNMS will evaluate and prioritize high-visitation tidepool areas and address possible impacts associated with potentially excessive use. The action plan includes education and enforcement programs, and implementation would include the development of guidelines for tidepool access and enjoyment.

Cross-Cutting (Multi-Sanctuary) Action Plans

The management plans also include several cross-cutting plans, which would be implemented through coordination among each of the three sanctuaries. The following action plans will be included as appendices to the management plans:

Administrative and Operations: This action plan will outline coordination and cooperation across all three sites and identify methods to work and function as an integrated team.

Community Outreach: This action plan will build awareness about the existence and purpose of the three sanctuaries and why they are relevant to their communities. Implementation will

identify how sanctuaries work with constituents and how groups can become engaged in helping the sanctuaries accomplish their goals.

Ecosystem Monitoring: This action plan provides a framework to coordinate the various monitoring activities and to conduct a monitoring needs assessment. The MBNMS will also coordinate with the other sites in expanding the SIMoN to integrate the numerous ecosystem monitoring operations throughout the Sanctuary.

Maritime Heritage: Implementation of this action plan will establish a maritime heritage program at each of the three sites, outline how the West Coast marine heritage program will conduct a submerged-site inventory and assessment, identify and address submerged hazards, and provide for extensive education and outreach.

Northern Management Area (NMA): This action plan outlines how this area will be managed given the recent transfer of management and administrative functions from the MBNMS to the Gulf of the Farallones National Marine Sanctuary (GFNMS) in the Northern Management Area (NMA), an area of the MBNMS extending from the Santa Cruz-San Mateo county line north to the adjacent GFNMS boundary.

Budget Development

MBNMS management staff developed the budgets in each action plan by evaluating the resources necessary to completely implement each action plan. MBNMS staff estimated the number of hours of personnel staff required to address each activity, the number of field operation (boat, air, dive) days required, as well as materials, supplies, and travel time. Some activities were assumed to be contracted out to other parties and in these cases, the total cost of the contract was included in the budget estimate. Some assumptions were also necessary to arrive at a cost for each strategy. Staffing was estimated at \$80,000 / yr for a full time employee. Each day at sea or in the air was estimated to cost \$2,000 and diving days were estimated to cost \$400 per day in addition to the personnel time. Outreach materials, supplies, travel, and outside contracts were estimated at their dollar value. A summary of the cost for each action plan is included in Table EX-1.

The budgets were also developed with the assumption that all work would begin in the first year. Naturally, given resource limitations as well as the necessary program and partner development to fully implement all of the action plans, it is unlikely the MBNMS will operate at the necessary capacity for some time. After an assessment of the likely resource needs for full implementation, the MBNMS and Sanctuary Advisory Council could then prioritize the implementation of the action plans.

Table EX-1: Estimated Annual Costs for Action Plans

Action Plan	Estimated Annual Cost (in thousands)*				
	YR 1	YR 2	YR 3	YR 4	YR 5
Coastal Development Action Plans					
Coastal Armoring	\$227	\$173.5	\$194.5	\$120.5	\$119.9
Desalination	\$99.5	\$404.9	\$74.3	\$198.4	\$17

Monterey Bay National Marine Sanctuary –Final Management Plan
Executive Summary

Action Plan	Estimated Annual Cost (in thousands)*				
	YR 1	YR 2	YR 3	YR 4	YR 5
Harbors and Dredge Disposal	\$71.8	\$156.9	\$53.1	\$49.1	\$45.1
Submerged Cables	\$83	\$128	\$112	\$8	\$8
Ecosystem Protection Action Plans					
Big Sur Coastal Ecosystem	\$391	\$307	\$291	\$283	\$259
Bottom Trawling Effects on Benthic Habitats	\$317	\$484	\$513	\$165	\$65
Davidson Seamount	\$375	\$138	\$104	\$98	\$108
Emerging Issues	\$45	\$27	\$22	\$27	\$27
Introduced Species	\$133.5	\$332	\$303	\$345	\$336
Sanctuary Integrated Monitoring Network (SIMoN)	\$320	\$300	\$280	\$280	\$280
Marine Protected Areas	\$407	\$683	\$270	\$890	\$0
Operations and Administration Action Plans					
Operations and Administration	\$1,526.5	\$1,624.5	\$1,757.5	\$1,793.5	\$1,798.5
Performance Evaluation	\$4	\$4	\$4	\$4	\$4
Partnerships and Opportunities Action Plans					
Fishing Related Education and Research	\$223	\$249.5	\$433.5	\$250.5	\$192.5
Interpretive Facilities	\$288	\$4,225	\$2,929	\$1,933	\$2,083
Ocean Literacy and Constituent Building	\$670.6	\$888.1	\$1,150.8	\$2,937.3	\$1,132.8
Water Quality Issues					
Beach Closures and Microbial Contamination	\$1,256	\$668.5	\$1,020	\$660	\$684
Cruise Ship Discharges	\$183.5	\$103	\$64.5	\$51.5	\$51.5
Water Quality Protection Program Implementation	\$1,769	\$1,551	\$1,577	\$1,509	\$1,532
Wildlife Disturbance Action Plans					

Action Plan	Estimated Annual Cost (in thousands)*				
	YR 1	YR 2	YR 3	YR 4	YR 5
Marine Mammals, Seabirds, and Turtles	\$1,438.5	\$738.5	\$609.5	\$581.5	\$617.5
Motorized Personal Watercraft	\$330	\$215	\$159.5	\$159.5	\$152
Tidepool Protection	\$533	\$391	\$416	\$395	\$486.5
Cross Cutting Action Plans					
Administration and Operations	\$288	\$276	\$264	\$264	\$264
Community Outreach	\$144	\$180	\$180	\$180	\$216
Ecosystem and Monitoring	\$381	\$525	\$567	\$531	\$471
Maritime Heritage	\$237	\$237	\$246	\$270	\$270
Northern Management Area Transition	\$50	\$50	\$50	\$50	\$50
Total Estimated Annual Cost	\$11,791.9	\$15,060.4	\$13,645.2	\$14,033.8	\$11,270.3

* Cost estimates are for both “programmatic” and “base” (salaries and overhead) expenses.

Prioritized Action Plan Implementation

The action plans and strategies in this management plan comprise a body of work, which if fully implemented, requires resources well beyond what is currently available to the MBNMS and NMSP. MBNMS staff worked with the Sanctuary Advisory Council and NMSP leadership to identify which action plans should be implemented in which order or with the most initial emphasis. Implementation of some action plans may also be dependent on a variety of funding scenarios such as grant applications, funding priorities of outside parties, or reliance on partner participation. The implementation of various action plans in the management plan may therefore occur at different stages based on urgency, benefit to Sanctuary resources, and resource availability. Table EX-2 outlines the potential funding scenarios, identifies the level of partner participation and indicates the sources of funding (internal vs. external).

Legend			
Column A	Column B, C, D	Column E	Column F
<p>Strategy Status:</p> <p>● – Existing w/o significant modification</p> <p>◐ – Existing w/ significant modification</p> <p>○ – New or future (not yet implemented)</p>	<p>Implementation* (w/ NMSP Funding):</p> <p>H – High</p> <p>M – Medium</p> <p>L – Low</p> <p>* 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.</p>	<p>Necessary Partnership Coordination:</p> <p>● – Not possible w/o partners</p> <p>◐ – Significant reliance on partners</p> <p>○ – Little reliance on partners</p>	<p>Primary Funding Sources:</p> <p>● – External (e.g. Grants)</p> <p>◐ – Internal and External</p> <p>○ – Internal</p>

Table EX 2.0 Summary of Action Plan Implementation Scenarios

	A	B	C	D	E	F
Action Plans	Strategy Status:	Implementation Level Funding: Scenario 1	10% per year Increase: Scenario 2	20% per year Increase: Scenario 3	Partnership Coordination	Internal / External Funding Sources
Coastal Development Action Plans						
Coastal Armoring	◐	L	L	M	●	○
Desalination	◐	M	M	H	●	○
Harbors and Dredge Disposal	◐	L	L	M	●	○
Submerged Cables	◐	L	L	L	○	○
Ecosystem Protection Action Plans						
Big Sur Coastal Ecosystem	○	L	L	M	●	◐
Bottom Trawling Effects on Benthic Habitats	◐	M	M	M	●	◐
Davidson Seamount	◐	L	L	M	◐	◐
Emerging Issues	○	L	L	L	○	○
Introduced Species	◐	L	L	M	◐	○
Sanctuary Integrated Monitoring Network (SIMoN)	◐	H	H	H	◐	◐
Marine Protected Areas	○	M	H	H	●	○
Operations and Administration Action Plans						
Operations and Administration	◐	M	M	H	○	○
Performance Evaluation	○	H	H	H	○	○
Partnerships and Opportunities Action Plans						
Fishing Related Education and Research	◐	M	M	M	◐	●
Interpretive Facilities	◐	H	H	H	●	●
Ocean Literacy and Constituent Building	●	M	M	M	●	◐
Water Quality Action Plans						
Beach Closures and Microbial Contamination	○	H	H	H	●	◐
Cruise Ship Discharges	◐	M	M	M	◐	○
Water Quality Protection Program Implementation	●	H	H	H	●	◐
Wildlife Disturbance Action Plans						
Marine Mammal, Seabird, and Turtle Disturbance	○	L	L	M	◐	○
Motorized Personal Watercraft	◐	M	M	M	◐	○
Tidepool Protection	○	L	L	M	◐	○
Cross-Cutting Action Plans						
Administration and Operations	◐	M	M	H	○	○
Community Outreach	○	L	L	M	◐	○
Ecosystem Monitoring	◐	M	M	H	◐	◐
Maritime Heritage	○	L	L	M	●	◐
Northern Management Area Plan	◐	M	M	H	◐	◐



Section I

Introduction

- **Background**
 - **Monterey Bay National Marine Sanctuary Setting**
 - **Regulations**
 - **Implementing the Management Plan**
-

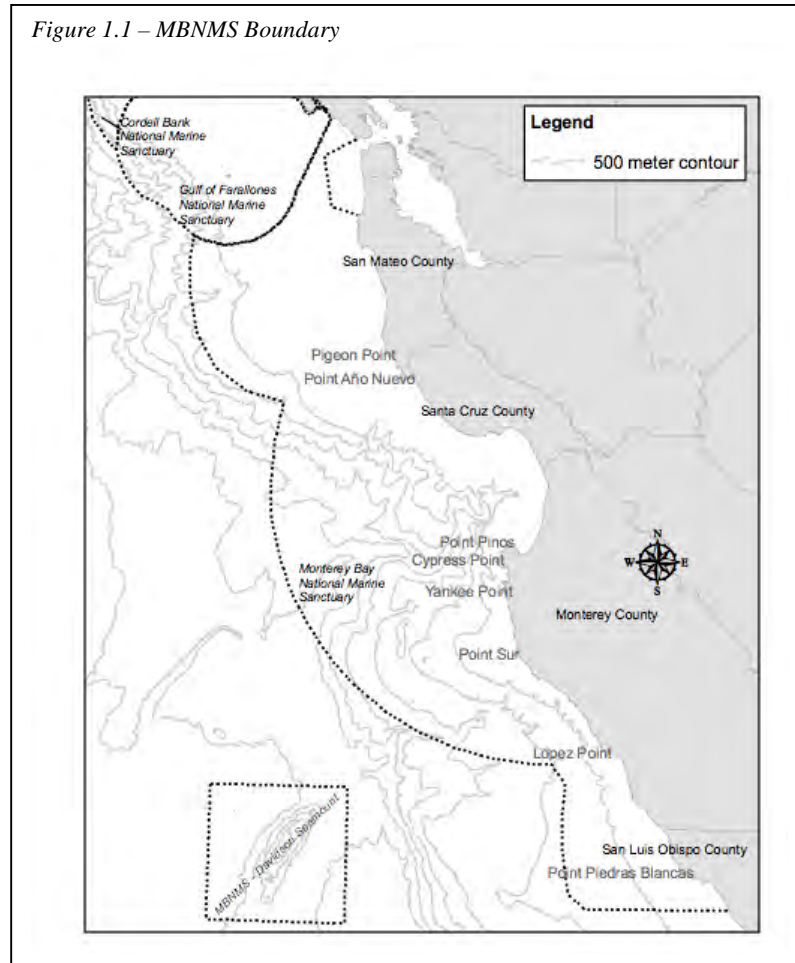
Background

The Monterey Bay National Marine Sanctuary (MBNMS), designated in 1992, is a federally protected marine area offshore of California's central coast. Stretching from Marin County to Cambria, the MBNMS encompasses a shoreline length of 276 miles and 5,322 square miles of ocean, extending an average distance of twenty-five miles from shore. At its deepest point, the MBNMS reaches down 10,663 feet (more than two miles). The MBNMS encompasses a range of habitats from sandy beaches to rocky intertidal areas to open ocean, as well as the nation's largest kelp forest and submarine canyon. Its highly productive biological communities host one of the

highest levels of marine biodiversity in the world, including twenty-six threatened and endangered species. The MBNMS is adjacent to one of the largest urban concentrations in North America with several population centers of approximately 8 million people living within fifty miles of its shoreline, many who rely on MBNMS resources for pleasure or work.

This management plan is a revision of the original management plan adopted with MBNMS designation in 1992 and is focused on how to best understand and protect the resources of the MBNMS. By centering around issues, this management plan is structured differently from the original 1992 management plan, and provides guidance to the public and the National Marine Sanctuary Program as to how the MBNMS will address the priority resource management issues, challenges, and opportunities of the future. This plan was developed with extensive public input from twenty public scoping meetings, over 12,000 written comments, twenty Sanctuary Advisory Council meetings, and sixty-eight meetings of volunteer working groups, offering input and recommendations regarding which issues the MBNMS must address and how to address them. The invaluable time provided by members of the public and government agencies to offer advice and guidance to the MBNMS in public meetings alone totals well over 8,000 hours in the development of this plan.

Figure 1.1 – MBNMS Boundary



There are many marine resource management issues confronting the MBNMS. The action plans that make up this management plan provide strategies to understand the issues, understand the coastal and marine environments which comprise the marine sanctuary, and address those issues through education and outreach, research and monitoring, collaborative planning and management efforts, and regulation and enforcement where necessary. All actions are addressed in partnership with the local, state and other federal agencies, as well as the many stakeholders that have an interest in the MBNMS.

This management plan is comprised of twenty-three action plans guiding the MBNMS for at least the next five years, beginning in 2008. The action plans are grouped into four main marine management themes: Coastal Development, Ecosystem Protection, Water Quality and Wildlife Disturbance. Each section contains several action plans that address issues that were determined to be a priority for the MBNMS to address through the public scoping process and prioritization by the Sanctuary Advisory Council (SAC). Two additional management themes, Partnerships and Opportunities, as well as Operations and Administration, are comprised of action plans and strategies addressing how the MBNMS will function and operate, and work with our partners in providing the services necessary to implement the mandates outlined in the National Marine Sanctuaries Act as well as address the priority marine management issues.

Each action plan details the management action and provides an estimated cost to fully implement the action plan. The action plans also contain mechanisms to evaluate the performance of the MBNMS in addressing the goals and a description of the products and services necessary to accomplish those goals.

This section provides background on the National Marine Sanctuary Program (NMSP), the MBNMS, and the management plan review process. It describes the organic act establishing the NMSP and the administrative hierarchy within which the program resides. Next, it details the history, mission, goals, and accomplishments of the MBNMS. Finally, this section introduces the fundamental steps of the management plan review process concluding with development of the new management plan.

Overview of the National Marine Sanctuary Program

The NMSP resides within the Department of Commerce, managed by the National Ocean Service (NOS) in the National Oceanic and Atmospheric Administration (NOAA). The NMSP oversees a system of thirteen national marine sanctuaries and one marine national monument encompassing marine and freshwater resources from Washington State to the Florida Keys, from Massachusetts to American Samoa, and from Lake Huron to the Northwestern Hawaiian Islands.

The national marine sanctuaries system contains many unique and special marine features, including kelp forests, nearshore coral reefs, areas for whale feeding, reproduction and migration, deep-sea canyons and underwater archaeological sites. The sites range in size from one-quarter square mile in Fagatele Bay, American Samoa to more than 135,000 square miles in the Northwestern Hawaiian Islands, the largest marine protected area in the world. Together, these sanctuaries protect nearly 18,000 square miles of coastal, open ocean and Great Lake waters and habitats.

The NMSP provides oversight and coordination among the thirteen sanctuaries by setting priorities for addressing resource management issues and directing program and policy development. The NMSP also has responsibility for ensuring that the management plan prepared for each sanctuary is consistent with the National Marine Sanctuaries Act, addresses current threats and management strategies, and provides a general budget to estimate expenditures for program development, operating costs, and staffing.

On an annual basis, the NMSP reviews and adjusts funding priorities and requirements to reflect resource management needs at each of the thirteen sanctuaries. The NMSP also monitors the effectiveness of the management plan, makes recommendations to promulgate regulatory changes where necessary and monitors intra- and inter-agency agreements.

The National Marine Sanctuaries Act

The National Marine Sanctuaries Act, as amended, (NMSA) (16 U.S.C. §1431 et seq.) is the law that governs the NMSP. The NMSA authorizes the Secretary of Commerce to designate as national marine sanctuaries areas of the marine environment or Great Lakes with special national significance due to their conservation, recreational, ecological, historical, scientific, cultural, archeological, educational, or aesthetic qualities. Additionally, the NMSA established the NMSP as the federal program charged with managing national marine sanctuaries. The primary objective of the NMSA is to protect marine resources. The NMSA also directs the NMSP to facilitate all public and private uses of those resources compatible with the primary objective of resource protection.

The purposes and policies of the NMSA are:

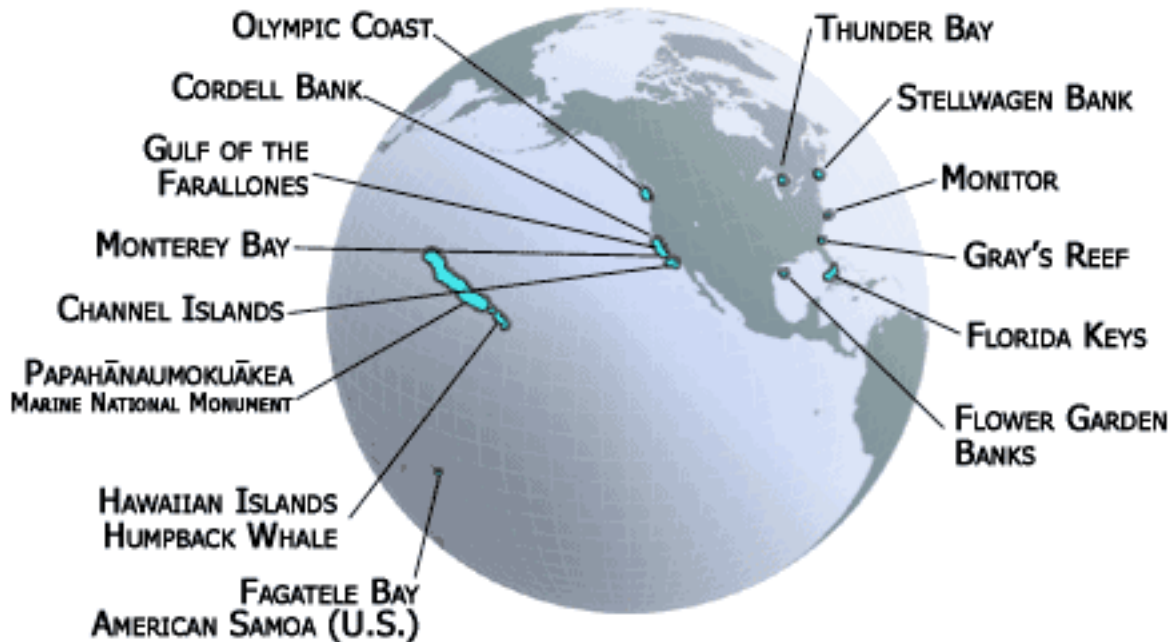
1. To identify and designate as national marine sanctuaries areas of the marine environment which are of special national significance and to manage these areas as the National Marine Sanctuaries Program;
2. To provide authority for comprehensive and coordinated conservation and management of these marine areas, and activities affecting them, in a manner that complements existing regulatory authorities;
3. To maintain the natural biological communities in the national marine sanctuaries, and to protect, and, where appropriate, restore and enhance natural habitats, populations, and ecological processes;
4. To enhance public awareness, understanding, appreciation, and wise and sustainable use of the marine environment, and the natural, historical, cultural, and archeological resources of the National Marine Sanctuaries Program;
5. To support, promote, and coordinate scientific research on, and long-term monitoring of, the resources of these marine areas;
6. To facilitate to the extent compatible with the primary objective of resource protection, all public and private uses of the resources of these marine areas not prohibited pursuant to other authorities;
7. To develop and implement coordinated plans for the protection and management of these areas with appropriate federal agencies, state and local governments, Native American tribes and

organizations, international organizations, and other public and private interests concerned with the continuing health and resilience of these marine areas;

8. To create models of, and incentives for, ways to conserve and manage these areas, including the application of innovative management techniques; and
9. To cooperate with global programs encouraging conservation of marine resources.

A complete version of the NMSA is available from the NMSP website at www.sanctuaries.nos.noaa.gov.

Figure 1.2 – National Marine Sanctuary System



Ecosystem-Based Management in the NMSP

The NMSA states that a purpose and policy of the NMSA is to “maintain for future generations the habitat, and ecological services, of the natural assemblage of living resources that inhabit [Sanctuaries]” (16 U.S.C. 1431 et seq., §301(a)(4),(C)) and “while the need to control the effects of particular activities has led to enactment of resource-specific legislation, these laws cannot in all cases provide a coordinated and comprehensive approach to the conservation and management of the marine environment” (16 U.S.C. 1431 et seq., §301(a)(3)). As such, the thirteen national marine sanctuaries and one marine monument subscribe to a broad and comprehensive management approach that is in keeping with the NMSA’s primary objective of resource protection. This approach differs from the various national and local agencies and laws directed at managing single or limited numbers of species or specific human activities within the ocean. Ecosystem-based management serves as a framework for addressing long-term protection of a wide range of living and non-living marine resources, while allowing multiple uses of the Sanctuary that are compatible with resource protection. These ecosystems managed by the NMSP span diverse geographic, administrative, political and economic boundaries, and the need for strong partnerships among resource agencies, non-governmental interests, members of the public and scientific community, user groups and conservationists is essential.

Monterey Bay National Marine Sanctuary

Designation

The MBNMS was established for the purpose of resource protection, research, education and public use. Its natural resources include our nation's largest contiguous kelp forests, one of North America's largest underwater canyons and the closest-to-shore, deep ocean environment off the continental United States. It is home to some of the most diverse and productive marine ecosystems in the world, including a vast diversity of marine life, with 33 species of marine mammals (it's one of the best places in the world to view elephant seals, sea otters, and a huge variety of whales and dolphins), 94 species of seabirds, 345 species of fish, four species of sea turtles, 31 phyla of invertebrates, and more than 450 species of marine algae. It is the "Serengeti of the Sea." It is also home to 26 species that receive special protection under the Endangered Species Act. Federally-listed threatened or endangered species include six species of large whales, the Southern sea otter, Steller sea lion, Guadalupe fur seal, California brown pelican, California clapper rail, western snowy plover, marbled murrelet, four species of sea turtles, six species of salmon or steelhead, and the tidewater goby. The MBNMS is also a meeting place for the geographic ranges of many species. It lies at the southern end of the range for some species, like the Steller sea lion, occurring from central California north to Alaska and Japan; and it lies at the northern end of the range for others, like giant kelp, occurring from San Francisco to Baja California, Mexico.

The MBNMS includes one of four major coastal upwelling regions worldwide. Coastal upwelling occurs along the western edges of continents, where winds from the northwest drive oceanic surface waters away from shore due to the Coriolis effect. These shallow, relatively warm waters are replaced by deep, colder and nutrient rich waters driving high primary productivity, allowing phytoplankton to bloom, which in turn support zooplankton, providing a key prey resource for higher-order predators such as fishes, birds, and whales. Globally, these upwelling regions rival the productivity of tropical rain forests, and account for nearly 95 percent of the annual global production of marine biomass, in spite of only representing 0.1 percent of the ocean's total surface area.

There are a variety of potential resource threats and opportunities within the MBNMS due to the sensitivity of habitats and species in the region, the long stretch of adjacent populated coastline with several urban centers along the MBNMS's shoreline, and the multiple uses of the marine environment. MBNMS research and monitoring programs evaluate the status and health of marine species, habitats and ecosystems, provide critical information to resource managers, and coordinate activities with the array of world-class research institutions in the region. Resource protection activities use a variety of means to reduce or prevent detrimental human impacts, including collaborative planning and management efforts, regulations and permits, emergency response activities, and enforcement. Education and outreach is used as a critical element in enhancing understanding and stewardship of this national treasure, utilizing tools ranging from public events and interactive teacher workshops to extensive written materials.

Cultural resources abound as well and are protected by MBNMS regulations. Archeologists estimate approximately 445 reported vessel (shipwrecks or aircraft) losses within the waters of the MBNMS, and 718 historic sites line its shores.

History

As directed congressionally by the Oceans Act of 1992, the MBNMS was officially established in 1992 by authority of the Secretary of Commerce under the NMSA. This designation was achieved 15 years after it was first nominated by the State of California for consideration as a national marine sanctuary. During this period, many site analyses and meetings were conducted to determine whether this region met the designation criteria required by the NMSA, that is,

- A "the area is of special national significance due to its resource or human-use values,
- A. existing state and federal authorities are inadequate to ensure coordinated and comprehensive conservation and management of the area, including resource protection, scientific research, and public education,
 - B. designation of the area will ensure comprehensive conservation and management, including resource protection, scientific research, and public education,
 - C. the area is of a size and nature that will permit comprehensive and coordinated conservation and management."

Under the 1988 reauthorization of the NMSA, NOAA was directed to designate Monterey Bay as a national marine sanctuary. On August 3, 1990, NOAA released the DEIS/MP for the proposed MBNMS and published proposed regulations. NOAA held public hearings and published the Final Management Plan and Environmental Impact Statement in June of 1992. The MBNMS final regulations were published in the Federal Register on September 18, 1992.

Goals and Accomplishments

The MBNMS Program's goals are to:

1. Enhance resource protection through comprehensive and coordinated conservation and management tailored to the specific resources that complements existing regulatory authorities
2. Support, promote and coordinate scientific research on, and monitoring of, the site-specific marine resources to improve management decision-making
3. Enhance public awareness, understanding, and wise use of the marine environment through public interpretive and recreational programs
4. Facilitate, to the extent compatible with the primary objective of resource protection, multiple uses of these marine areas not prohibited pursuant to other authorities

Four program areas generally divide the administration of the MBNMS: research and monitoring, resource protection, education and outreach, and program operations. Following is a description of these areas and accomplishments since MBNMS designation.

Research and Monitoring

The research and monitoring program's focus is on science for resource management: determining information gaps; developing collaborative studies to improve understanding of issues; and interpreting research for decision makers. Much of the credit for the research in the MBNMS belongs to the world-renowned and extremely collaborative research community in

central California. For example, approximately twenty research institutions are represented on the MBNMS Research Activity Panel, which wrote the first-ever MBNMS Research Plan. Many members also contributed text and bibliography files to a web-based Site Characterization that summarizes existing information on the MBNMS's natural resources. In turn, the MBNMS identified the need for research to address specific resource management issues and provided a method for applying scientific results to public policy. This resulted in several multi-million dollar efforts to map MBNMS habitats, monitor nearshore ecosystems, and model ocean circulation.

Through MBNMS funding, writing issue reviews, building collaborations, providing research platforms, and obtaining grants, the research and monitoring program achieved notable success in:

Monitoring beach-cast seabirds and marine mammals, seabirds, marine mammals, and krill in Monterey Bay; gray whale migrations; kelp canopies; rocky shores; and water quality in Elkhorn Slough

Characterizing pinniped rookeries; seafloor habitats in the nearshore, offshore, and in formerly restricted military zones; and even management issues such as marine zoning regulation and kelp harvesting

Providing extensive information in technical reports available on the web; at symposia coordinated with the MBNMS Education Program and local governments; and through numerous technical advisory committees

Studying tidal erosion in Elkhorn Slough; distribution of introduced species; sea lion deaths caused by harmful algal blooms; fishery impacts from trawling and gill net by-catch; coastal erosion; impacts of ship groundings and oil spills; and human use effects in kelp forest and rocky shore systems

As public and resource management needs are clarified through MBNMS advisory groups and in coordination with the MBNMS resource protection program, it becomes evident more research and monitoring is needed than has been completed. Habitat mapping has improved since 1992, yet most of the habitats and distribution and abundance of key species have not been mapped or measured. Moreover, little data exists on how human activities are changing the MBNMS ecosystem through time. The MBNMS initiated its ecosystem monitoring program, the Sanctuary Integrated Monitoring Network (SIMoN), in 1999 with grant funding awarded in 2001. After hiring staff and developing the infrastructure, the website for SIMoN was launched in 2003 which provides the public, decision makers and the research community with monitoring data and an integrated view of data collecting efforts.

Resource Protection

A key objective of the management plan is to ensure that human activities in the MBNMS do not adversely affect natural resources, including habitats. This is accomplished through a variety of approaches, including collaborative planning efforts to prevent and reduce human impacts, regulations, permits, and enforcement efforts. Management efforts also involve helping to educate the public and MBNMS users about how they can minimize or eliminate harmful behavior. The resource protection program also administers the Conservation Working Group

(CWG), which was originally formed to focus the knowledge and talent of local, regional, and national conservation groups on the designation process for the Monterey Bay National Marine Sanctuary. The CWG now works to serve as a forum for conservation issues, identify resource protection needs, and provide advice, views, and factual information on resource protection, Sanctuary management, and other issues in response to requests from staff, the SAC and associated working groups, and other appropriate parties.

The MBNMS's long coastline, including four harbors and several urban areas, creates multiple, complex threats to a healthy coastal ecosystem. A key goal is to actively prevent damage to the resources, thereby avoiding crisis situations apparent elsewhere in the country. The resource protection program accomplished many important objectives such as:

- A Water Quality Protection Program developed and partially implemented three plans to improve or protect water quality (related to urban runoff, harbors and marinas, and agriculture and rural lands) as well as plans to strengthen coordinated regional water quality monitoring by government agencies and citizen groups

- Strategies, now approved at the international level, to move large commercial ships farther offshore and use north-south transit lanes to reduce threats of spills from vessel traffic such as container ships, bulk product carriers, and tankers

- Participation in research and a long-range management plan for Highway 1 reducing impacts from landslide repair and disposal activities

- Establishment of an Interpretive Enforcement Program, including a NOAA Office of Law Enforcement officer assigned to focus exclusively on MBNMS enforcement issues

- Development of a cooperative enforcement agreement with state agencies

- A hazardous material/emergency response program for events such as spills and vessel groundings

- Collaborative educational products and outreach on resource protection issues such as water quality, motorized personal watercraft (MPWCs), boating, and vessel traffic

- Development of a permit program to review planned activities that may harm MBNMS resources and to issue permits or other authorizations with conditions to minimize impacts

- Coordinated review of projects, plans and permits of other agencies to minimize impacts

Education and Outreach

The MBNMS's education and outreach efforts help connect people to the marine environment. The education program's goal is to promote public understanding of our national marine Sanctuaries and empower citizens with the knowledge necessary to make informed decisions leading to the responsible stewardship of aquatic ecosystems. Partnerships and collaboration have played a key role in the development and implementation of the MBNMS's educational efforts. The MBNMS Education Panel, comprised of marine educators representing twenty organizations and schools, is a prime example of how the MBNMS works with the regional community to shape the MBNMS's educational focus. The Education and Outreach Program has accomplished or has underway several important objectives of the management plan.

Increasing public awareness of our sanctuaries through a variety of techniques, including:

Public lectures and forums and the annual MBNMS Currents Symposium

Anniversary celebrations and a variety of public events

Interpretive signs and displays at state parks, beaches, and interpretive facilities

Educational products and materials including books, brochures, posters, maps, newsletters, annual reports, videos, and an extensive web site

Operation of MBNMS’s Team Ocean Conservation Education Action Network (OCEAN) and support of volunteer programs, including Bay Net, Save Our Shores, and Friends of the Elephant Seal

Providing education to address specific issues that may threaten MBNMS resources by:

Developing a variety of water quality programs and products to address urban runoff

Providing public outreach to promote stewardship of endangered species, fragile habitats like tidepools, and protected species such as marine mammals

Developing and distributing educational materials on shipping lanes to mariners

Providing educational opportunities for teachers and students by:

Developing school curricula

Organizing teacher workshops

Providing shipboard and submersible “teacher-in-the-sea” opportunities

Coordinating teacher-led intertidal monitoring programs for high school students

Supporting the development of Camp SEA (Science, Education, and Adventure) Lab, a residential marine science program

Program Operations

Critical to the MBNMS’s successful operation is an effective program to support the research, resource protection, education, and outreach efforts.

Important parts of the program operations function already in place include:

Budget & Annual Operating Plan development & tracking

A 67ft research vessel and a 30ft patrol boat for enforcement, research, monitoring, and buoy maintenance

Computer systems and associated networks

Geographic information systems (GIS)

A diving program for enforcement, research and monitoring

Support and operation of the Sanctuary Advisory Council

Media and public relations

Management Plan performance measures

Non-profit foundation to support MBNMS activities and projects

One main office and two smaller field offices

Public Participation and the Sanctuary Advisory Council

The citizens of central California are very politically and socially engaged on issues affecting their communities and the surrounding environment, including the ocean. The MBNMS owes its existence largely to the dedication and determination of thousands of local citizens and elected officials who strongly advocated for its designation. To this day, public participation permeates nearly every aspect of Sanctuary management and operation, from participating in the MBNMS Advisory Council and its working groups, to volunteering for one of many organizations helping the MBNMS achieve its education and research missions, to participating in community festivals and symposia.

Establishing the Sanctuary Advisory Council (SAC) for the purpose of advising the superintendent on policy issues affecting the MBNMS was identified in the MBNMS's 1992 Management Plan and one of the MBNMS' first accomplishments. As local involvement in the MBNMS was a vision by the community in 1992, the Management Plan directed the MBNMS to consult with all interested groups and agencies to ensure that the SAC was representative of a broad-based constituency. The SAC is comprised of eighteen voting members with alternates, and six non-voting members representing various stakeholders. Since its establishment in March 1994, the group has played a vital role in many decisions affecting the central California coast. The SAC also has four standing working groups:

Conservation Working Group: coordinates the efforts of existing organizations and helps promote and achieve comprehensive and long-lasting stewardship of the MBNMS through continued oversight and advocacy.

Research Activity Panel: promotes a comprehensive understanding of existing research activities and institutions, reviews research proposals, advises on research priorities, provides scientific advice and objective information, and assists in the implementation of programs to increase our scientific understanding of the MBNMS.

Sanctuary Education Panel: promotes a comprehensive understanding of existing education activities and organizations, reviews program proposals, advises on educational priorities, and assists in implementation of programs to increase understanding and stewardship of the MBNMS.

Business and Tourism Activity Panel: strengthens economic partnerships with the MBNMS and provides a forum for local businesses to discuss MBNMS-related issues.

Monterey Bay National Marine Sanctuary Setting

Human Environment

Regional Context

Five counties border the Monterey Bay National Marine Sanctuary (MBNMS): Marin, San Mateo, Santa Cruz, Monterey and San Luis Obispo. Two additional inland counties, Santa Clara and San Benito, have watersheds which drain directly into the MBNMS. Each is diverse in terms of population and economic base. The northern region borders Marin County and the San Francisco Peninsula. This includes San Mateo County and Santa Clara County, an inland county home to the San Jose metropolitan area commonly known as Silicon Valley due to the large concentration of high technology businesses. Growth along the coast has been somewhat constrained by limited water availability, few access roadways, and strong environmental advocacy. However, due to the rapid growth of the technology sector, the Silicon Valley area exerts significant development



pressure to the south and westward toward the coast. In the southern region, Monterey County faces significant growth challenges. Agriculture is the leading industry, followed by tourism. San Luis Obispo County's economy focuses on agriculture, tourism, and education. These counties face significant economic and developmental challenges in addressing population growth. Limited infrastructure to accommodate the coastal population growth, a lack of labor for growing companies, a growing gap between the wealthy and other residents, and environmental pressures comprise the main constraints to urban expansion.

Socio-Economic Environment

There is a rich history of human use of central California's marine resources, beginning with the Native Americans and continuing to the present. Today the MBNMS's spectacular scenery, moderate climate, abundance of marine life, and relatively clean ocean waters all draw large numbers of divers, kayakers, boaters, fishermen, surfers, tidepoolers, and bird and mammal watchers. Coastal tourism, agriculture, and commercial fisheries are all pillars of the regional economy with direct links to the MBNMS.

Travel and tourism is one of the most significant industries, with total travel-spending revenue in 2003 of \$5.9 billion for the five counties adjacent to the MBNMS. San Mateo leads in total spending at \$2.0 billion, followed by Monterey at \$1.8 billion, and San Luis Obispo at \$930 million. (Source: Dean Runyan and Associates) Two of the main reasons given for travel to the coastal region are its natural and scenic beauty and recreational opportunities. Agriculture is also an important industry in the MBNMS region and the area is a national leader in the production of artichokes, strawberries, and salad greens. In 1999, it was valued at \$3.65 billion for the region including the inland counties of Santa Clara and San Benito. Monterey County, valued at \$2.44 billion, is by far the most significant producer in the region and ranks third highest statewide. Other MBNMS-related industries include aquaculture, kelp harvesting, and commercial shipping. The adjacent San Francisco Harbor is the largest harbor on the U.S. Pacific Coast with millions of tons of cargo passing through the Golden Gate annually.

The fishing industry constitutes a relatively small portion of the overall economy, both regionally and statewide. However, it reflects an important component to the historical, economic, and cultural fabric of the region. Most fish caught within the MBNMS are landed at one of five main ports: Princeton /Half Moon Bay, Santa Cruz, Moss Landing, Monterey Bay, or Morro Bay/Avila/Port San Luis. More than 600 commercial vessels fish within the MBNMS annually, and more than 80 percent of the commercial landings by weight are comprised of squid, rockfishes, Dover sole, anchovy, mackerel, sardines, sablefish, albacore, and salmon. In 2003, ex-vessel revenues for all species within the MBNMS totaled almost \$16.6 million dollars paid to commercial fishers in California. Additional revenue is also generated from the businesses associated with fishing operations, including marinas, maintenance operations, and equipment.

The rich biodiversity and close proximity of the deep sea also provide unparalleled research opportunities for approximately twenty-five marine science facilities that, in 2004, employed almost 2,000 people in staff and researchers with a combined budget of over \$200,000,000. This includes government agencies, public and private university research institutions, and private facilities such as the Monterey Bay Aquarium and the Monterey Bay Aquarium Research Institute.

Human History and Resource Use

Humans settled in the vicinity of MBNMS at least 10,000 years ago. At the time of Spanish arrival in the early 1700's, about forty Native American tribes populated coastal areas from San Francisco Bay to Point Sur, consuming acorns, terrestrial plants and animals, intertidal invertebrates, fish, and marine mammals. The Spanish called the Indians "Costanoans," meaning "coast dwellers." Today they are known as the Ohlone, meaning "people of the west." Shell midden piles left by the Costanoans have been found at most substantial drainages and shorelines

between Morro Bay and Monterey Bay, comprised primarily of remains of abalone, California mussels, clams, snails, chitons, limpets, and other invertebrate groups. The quantity of shells suggests that Costanoan Indians were "a principal control of animal population sizes" in the intertidal zone in some areas. Costanoans also used fire to manage terrestrial vegetation for purposes such as enhancing growth and preparing plants for harvest.

Spanish settlements arose in the late 1700's, and they began to exploit both natural resources and the Ohlone. They established a pastoral lifestyle and an extensive network of missions that relied heavily on livestock. Sweeping changes in the resulting landscape included greatly enlarged pasturelands throughout fertile drainages of the MBNMS and incidental importation of many exotic grasses and other plants. The Spanish also hired imported Russian or local Indian hunters to hunt sea otters. These valuable pelts were exported to Asia, Europe, and the Americas. Sea otters became scarce around Monterey Bay by the late 1800's. The Spanish harvested abalone for trade with northwest coast Indians. Indian populations plummeted after establishment of the Missions due to introduced diseases, cultural dissolution, and exploitation by the Spanish and later the Mexicans. Many European traders and explorers of the late 1700's wrote of the remarkable abundance and richness of wildlife in the Monterey Bay area. French explorer Jean Francoise de La Perouse, the first foreign visitor to the Spanish outposts, wrote his ships were "surrounded by pelicans and spouting whales. There is not a country in this world which more abounds in fish and game of every description."

New England whalers often hunted along the central coast in the late 1700's and early 1800's, feeding a voracious east coast market for oil, baleen and meat. Portuguese whalers from the Azores, originally brought to Monterey Bay as crew on the deep-water ships, settled in Monterey Bay by the 1850's. The Portuguese worked in shore-whaling operations begun by Yankee whaler John Davenport, which targeted humpbacks and gray whales, though other species were also captured. As the price of whale oil decreased due to the production of kerosene in the 1880's, shore whaling died out. A brief resurgence in whaling occurred along the California coast in the 1900's, including a short-lived Norwegian-style and -owned modern whaling operation between 1919-1926 in Moss Landing.

In the 1850's, ethnic Chinese settled in Monterey to harvest kelp and to fish for abalone, squid and shark. These products were dried and shipped to San Francisco and China. This industry helped feed California's burgeoning Gold Rush population. By 1900, abalone were so scarce the commercial harvest was banned, and the Chinese turned to other fisheries, especially as market demand from San Francisco increased. The construction of the San Francisco/Monterey railway in the 1860's allowed for rapid transport of fresh fish. Genovese Italian immigrants established fishing settlements around Monterey Bay in the 1870's, providing a variety of fresh fish to the San Francisco markets via railroad. Sicilian fishermen followed in 1906, and soon focused on the sardine fishery. The sardine fishery peaked from 1910-1930, collapsed in the 1930's, and has not yet recovered to its former size. Several other ethnic groups harvested MBNMS natural resources during this century, including Japanese hard-hat abalone divers (1900-1941), Vietnamese gillnet fishermen (1979-present), and offshore foreign (Russian, Polish and others) fishing fleets. All adapted to become part of the multicultural population that continues to utilize the resources of this biologically rich region. (Adapted from MBNMS Site Characterization, 1996.)

Physical Environment and Natural Habitats

Regional Geography

The MBNMS contains one of the world's most geologically diverse and complex seafloors and continental margins. The MBNMS is located on a plate boundary that separates the North American Plate from the Pacific Plate, and is marked by the San Andreas Fault system. This is an active tectonic region with common occurrences of earthquakes, submarine landslides, turbidity currents, flood discharges and coastal erosion. It is also a region of extensive natural and economic resources.

Coastal topography varies greatly, encompassing steep bluffs with flat-topped terraces and pocket beaches to the north; large sandy beaches bordered by cliff and large dune fields mid-MBNMS; and predominately steep, rocky cliffs to the south. Low- to high-relief mountain ranges and broad, flat-floored valleys are prevalent farther inland.

The Santa Cruz and Gabilan mountain ranges dominate the topography in the northern and central half of the region. Two major rivers (San Lorenzo and Pajaro Rivers) and a major creek (Scott Creek) enter Monterey Bay from these highlands through well defined valleys. Elkhorn Slough, an old river estuary occupied today only by tidal salt marshes, extends inland from Moss Landing for more than six miles. The broad, extensive Salinas Valley, the Gabilan Range, and the northern Santa Lucia Range are the dominant topographic features in the southern half of the region; the Salinas River is the major drainage system. South of Monterey, the west flank of the Santa Lucia Range drops abruptly into the ocean. Here, the valleys of the Carmel and Little Sur Rivers are dominant topographic features. From Point Sur to Morro Bay, many streams and creeks drain the southern Santa Lucias and cut the steep western face of the mountain range.

The watersheds of much of northern and central California, including the Central Valley, drain into the San Francisco Bay and Sacramento-San Joaquin Delta, which contain most of the state's remaining coastal wetlands. More than a third of the state's land mass drains from the Central Valley, Sierra Nevadas, and Cascade range into the bay, which is the largest estuary on the west coast of North America.

Geology

The MBNMS is within the active North American-Pacific plate boundary along the western margin of the San Andreas Fault system. The San Gregorio-Palo Colorado and Monterey Bay fault zones are the main southeast-northwest trending fault zones in the MBNMS. The San Gregorio-Palo Colorado fault zone is mapped as largely an offshore fault crossing nearly the entire MBNMS from offshore Partington Point in the Big Sur coast to north of Montara Point near Half Moon Bay, California. This fault zone is considered active with a 10 percent probability of an earthquake of magnitude 6.7 or greater by 2032. The formation and linear shape of the Carmel Submarine Canyon is attributed to this fault zone. The Monterey Bay fault zone lies primarily offshore between the cities of Monterey and Santa Cruz and is approximately six to nine miles wide. It consists of a number of relatively short fault segments potentially affecting local submarine physiography.

Continental shelf (less than 400 feet water depth) sediments of the northern portion of the MBNMS vary from sand-dominated near shore and at the shelf edge to mud and silt-dominated in mid-shelf areas. The thickest accumulations of modern sediments are in mid-shelf regions. These sediment accumulation patterns determine biological habitats. In dynamic areas with high sediment deposition, organisms that are adapted to shifting substrate are found. Organisms that depend on shelter and steady algal growth are found on rocky substrate that does not experience major changes regularly. Bluff erosion, dune erosion, and sediment input from rivers and streams are the most significant sediment sources to the continental shelf in the MBNMS. The greatest concentrations of coarse-sand deposits have been found on the southern Monterey Bay shelf and on the shelf off the Big Sur coast. Submarine canyons, common to the MBNMS, are thought to contribute sediment to the deep sea. Erosion is greatest in winter months, especially during El Niño years. Beaches tend to rebuild whereas sand dunes and cliffs continuously retreat. The organisms that inhabit beaches are adapted for life in a continually changing environment, while sand dune communities transform as the dunes and cliffs retreat from the water's edge. The highest erosion rates are found on dunes in southern Monterey Bay.

Oceanography

Oceanographic processes in the MBNMS are influenced largely by the California Current. The California Current is an eastern boundary current that has been generally characterized as a broad, shallow, slow southward moving current, exhibiting high spatial and temporal variability. The California Current is the eastward portion of the clockwise North Pacific Gyre and transports cool water with low salinity towards the equator. Associated with the coastal surface flow is an undercurrent moving in the direction of the North Pole, the California Undercurrent, also referred to as the Davidson Current.

The California Current has many semi-stationary jets and eddies. Satellite imagery has shown cold filaments approximately thirty miles wide, extending approximately 150 miles offshore. The importance of these features, which represent the highly variable oceanographic weather of the California Current, lies in their offshore transport of cool, nutrient-rich water from depths to the surface, referred to as upwelling. The surface and intermediate depth water masses in the MBNMS are a mixture of Pacific Subarctic water having low salinity and cool temperatures and the warmer, saltier Pacific Equatorial water. The proportion of the types of water changes as does the strength of the northward flowing Davidson Current. Nearshore surface temperatures vary from 46°F during winter and early spring to 62°F during fall. Nearshore surface salinities vary from 34.0 psu (practical salinity units) when upwelling is strong to 33.2 psu otherwise. Streams and rivers can have large local effects on salinity.

There are three oceanic seasons in the Monterey Bay area during which upwelling, wind relaxation, and winter storm conditions prevail: the "upwelling period" from early spring to late summer when cool surface waters are found in the MBNMS; the "oceanic period" from late summer to early fall; and the "Davidson Current period" from late fall to late winter. Those descriptions may be useful to describe the changing hydrographic conditions along the MBNMS, but in reality these periods overlap extensively and do not recur with clockwork punctuality. The timing reflects changes in local winds and external effects such as El Niño and other long-term weather shifts. Within the coastal regime, sea surface flow undergoes a seasonal reversal. During the late fall and winter the direction is primarily poleward while equatorward flow

dominates during the spring and summer. The equatorward flow is coupled with the intensification of northwesterly winds that generally parallel the central California coastline. The sudden strengthening of the northwesterly winds, usually in March-May, may result in the "spring transition" in which upwelling commences and local sea surface temperatures fall by as much as 5°F within a few days. During late fall, the North Pacific High weakens and migrates southward and the thermal low disappears. The surface flow reverses to poleward.

When winds are strong from the northwest, water from the surface to about 165 feet has an offshore component. The sea surface is lowest along the coast and tilts upward by about eight inches across the width of the California Current (620 miles). Surface waters that moved seaward, are replaced by deeper upwelled waters that flow shoreward and upward. Although the seasonal changes in the MBNMS are important, longer-term inter-annual variations, principally "El Niño" events, also affect local physical and biological systems. El Niño is a warming of nearshore waters of the Eastern Pacific, caused by relaxation of the trade winds in the equatorial Pacific. Cessation or weakening of the trade winds allows the sea surface, which usually tilts upward by about one mile from east to west, to relax. This is accomplished as an eastward propagating pulse or Kelvin wave that takes several months to transit the equatorial Pacific. The wave propagates poleward along the coast of Central and North America and eventually is observed locally as warmer surface waters and higher than normal sea level. Local temperature anomalies up to 5°F and sea level anomalies of up to eight inches occur more or less periodically at intervals of three to five years.

Tides, the periodic rise and fall of the seas, are caused by the earth rotation, and the gravitational pull of the moon, the sun, and other celestial bodies. The MBNMS tides follow a mixed semidiurnal tidal pattern with two high-water and low-water phases per day. The tides are mixed because consecutive highs and lows have different tidal height. The internal tide in the Monterey Submarine Canyon is one of the remarkable oceanographic effects caused by the presence of the canyon cutting across the middle of Monterey Bay. Large internal underwater waves measuring up to 393 feet were recorded within three miles of the Monterey Canyon head. Energy lost upon breaking at the head of the Canyon leads to tidal rectification and promotes a net up-canyon flow, whose effects are similar to wind-driven upwelling. Internal waves may contribute up to 30 percent of the nutrients assimilated by phytoplankton during periods when upwelling is absent, and perhaps 10 percent of the required nutrients during periods of upwelling. The Canyon acts as a deep water conduit bringing offshore waters and organisms directly into the Bay and at the same time acts as a sediment drain.

Habitats

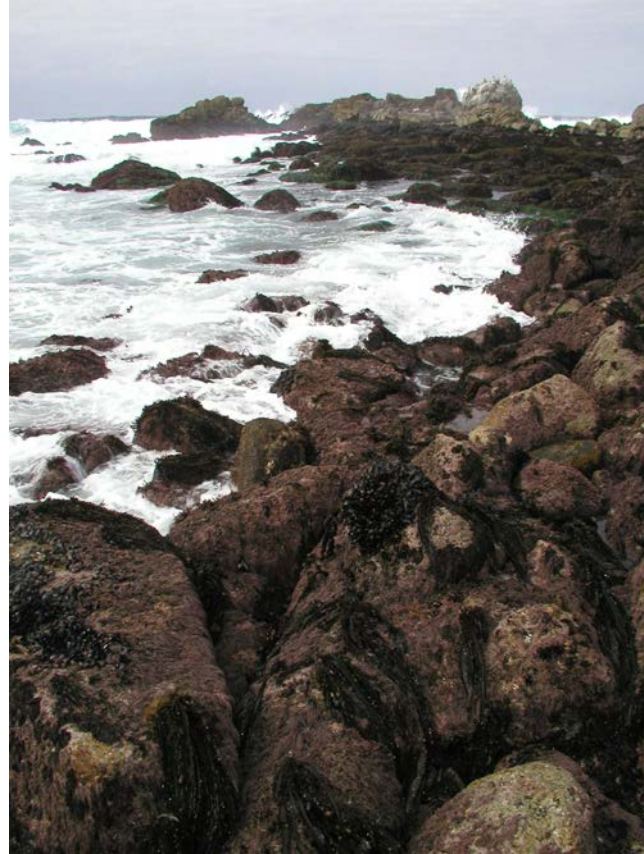
Rocky Shores

Rocky shores are one of the MBNMS's most accessible habitats, and, at low tide, a wide diversity of beautiful and intriguing organisms are exposed. Hermit crabs scurrying across tide pools have captivated the imagination of countless young children. The distribution of organisms in zones provide the perfect laboratory for young biologists. The accessibility of organisms attracted early marine ecologists to developed experimental field biology influencing the study of ecology well beyond the marine realm. Approximately 56 percent of the MBNMS coast is rocky shore habitat. Particularly in central California, rocky shores are one of the most diverse, most studied, and best understood biological regions of the world.

In general, the MBNMS has four zones of rocky intertidal organisms associated with different tidal heights. The splash zone is usually exposed to air and has relatively few species. The periwinkle, *Littorina keenae*, is used in some cases as an indicator of this zone, and microscopic algae are common in winter months when large waves produce consistent spray on the upper portions of the rocky shore. The high intertidal zone is exposed to air for long periods twice per day. The barnacle, *Balanus glandula*, and red algae, *Endocladia muricata* and *Mastocarpus papillatus*, are used as indicators of this zone. However, these species are also found in other areas of the rocky shore. The mid-intertidal zone is exposed to air briefly once or twice per day and has many familiar organisms. At wave-exposed sites, the mussel, *Mytilus californianus*, can dominate this zone. The low intertidal zone is exposed only during the lowest tides, and the presence of the seagrass *Phyllospadix* is a good indicator of the mean lower low water tide level (0.0 feet). This zone is also where sponges and tunicates are most common.

Zones will form at different distances from the sea when there is no tidal height difference. Zones will form within zones, and zones will expand with increasing wave exposure. So, while dramatic and extensively referred to, zonation patterns are highly variable. The mechanisms that determine zonation patterns are often broken down into the categories of physical and biological

Figure S-2: Rocky Intertidal Zone



factors, and it is a combination of these that determines each site's biological characteristics. Within zones, patchily distributed organisms are common. Indeed, rocky shores are sometimes referred to as mosaics of patches undergoing succession after a variety of possible disturbance events and times. Disturbances that open up space for colonization are caused by waves, predation on mussels, wave-tossed rocks and logs, substratum weathering and exfoliation, and human collection and trampling. Disturbances are common enough that some species persist as fugitives, dispersing from one patch to another, as the dominant competitors crowd them out.

Kelp Forests

Kelp provides a unique and diverse habitat utilized by numerous species, including marine mammals, fishes, other algae, and vast numbers of invertebrates. Hugging the rocky coastline just beyond breaking waves, several species of kelp cling to hard substrates with their tenacious holdfasts and lend added vertical structure to the rocky reef habitat. Although some individual kelps can persist for up to three years, the overall structure of the kelp forest is very dynamic. Kelp canopy cover varies seasonally. It is thickest in late summer and thins or disappears in winter when large swells and old age combine to remove weakened adults. During the following spring, the next generation takes advantage of the thin canopy cover

and increase in available light to grow rapidly. When coupled with upwelling, which brings cold, nutrient-rich waters to the surface, these conditions allow some species of kelp to grow up to twelve inches per day. The measured productivity (per square foot of sea floor) of a kelp forest is among the highest of any natural community in the world



Like terrestrial forests, kelp forests consist of layers. In central California, the two primary canopy-forming species in kelp forests are giant kelp, *Macrocystis pyrifera*, and bull kelp, *Nereocystis luetkeana*. Both of these seaweeds are brown algae (Phaeophyta). While both can be found within the same kelp forest, giant kelp is more typical of the Monterey Bay area and bull kelp is more common north of Santa Cruz and along the Big Sur coastline. The understory is the layer three to six feet above the bottom and is dominated by stalked brown algae such as *Pterygophora californica* and *Laminaria setchellii*. The lowest layer, turf algae, consists of several red algae, including corallines. These layers support a rich assemblage of fishes and invertebrates.

Some vertebrates, such as sea otters and many fishes, reside within kelp forests. Other vertebrates, such as seabirds, harbor seals, sea lions, and even gray whales will visit kelp forests while foraging for food. Giant kelp and other algae support large populations of benthic

invertebrates, which in turn attract higher-order predators. Scuba divers are also attracted to kelp forests and their rich invertebrate fauna, making dive sites in Monterey Bay and along the Big Sur coast among the most scenic in the world. And while kelp forests are used by dozens of seabirds and marine mammals, and hundreds of fishes and algae, it is the hundreds of invertebrate species that make this system so rich and diverse.

Kelp forests and their associated flora and fauna are also important resources to humans. The complex canopies serve as nurseries for juvenile rockfishes, providing refuge during vulnerable stages of the life cycle. As these rockfish grow, some leave the kelp forest for deeper waters and support commercial and recreational fisheries. Kelp forests and their associated marine life are also an important part of the aesthetic experience that attracts visitors to Monterey Bay from all over the world. In addition, kelp is itself a resource, harvested as food for abalone farms and as a source of algin, an emulsifying and binding agent used in ice cream, toothpaste, and cosmetics.

Sandy Bottoms

Most of the ocean floor in the MBNMS is covered with sand or mud. Waves and currents create sand waves and ripples, and organize sediment particles in different group sizes. The lack of hard substrate and the shifting sand prevents algae from settling, and therefore these vast sandy plains stretching in all directions appear to be lifeless deserts. However, many organisms live in the sand. There are two broad zones, including a shallow region dominated by crustaceans and a deeper area dominated by more sedentary polychaete worms. The crustacean zone continues up into the surf zone and intertidal beach zone, areas where sediment is constantly moving around. The main crustacean groups include those that burrow into the sand and those that are active on the surface of the sandy floor. All burrow into the seafloor and flourish in wave disturbed sandy bottoms. Here only few animals live in relatively permanent burrows or tubes. Most live close to the seafloor surface and do not burrow deeply. Benthic fishes are also less abundant in the crustacean zone than farther offshore.

Estuaries

An estuary is a coastal body of water that connects a watershed to the open ocean. The resulting mix of land, fresh and salt water creates a mosaic of habitats and communities, changing from terrestrial to marine over small distances. By their very nature, estuaries are highly variable, affected by both marine and terrestrial processes. Environmental variables influencing the communities found within an estuary include tides, salinity, temperature, currents, sediment type, and dissolved oxygen. Unlike purely marine or freshwater habitats, which have relatively stable salinities and temperature ranges, an estuary is subject to dramatic changes in both temperature and salinity. The dramatic changes in temperature and salinity can stress the flora and fauna that make the estuary their home. As the tide flows in, fresh and salt water mix to form a gradient, which can move up and down the estuary over the course of a day. Some animals burrow into the soft sediments to seek refuge from these fluxes. Other animals thrive, having broad physiological tolerances that evolved in response to these stressors. Some environmental variables change spatially as well as over time, and influence the distribution of animals.

At the head of an estuary, where fresh water enters the system, salinity is very low, tidal influence is minimal, and the currents are dominated by watershed input and flow down stream. In the upper reaches of an estuary there is more of a marine influence, which leads to higher

salinities and deposition of fine marine sediments. Topography of the area, as well as the extent and pattern of channels, determine the degree of the marine influence. In the middle reaches, sand may be present and mixed in with the fine mud, and water is generally brackish (salinity 18-25 parts per thousand). At the lower reaches, the marine influence dominates the system, with more sand, high flow patterns dominated by the tides, and salinities near marine levels. At the mouth of an estuary, there is usually little mud on the bottom, but fine sediments suspended in the water column can make turbid plumes that are clearly visible from the surface and extend out into the open ocean.

Beyond the communities of invertebrates and fishes that spend most or all of their time underwater, terrestrial communities add to the tremendous diversity of an estuary. Estuary habitats and communities include mudflats, eelgrass beds, salt marshes, beaches, coastal dunes, coastal maritime chaparral, and oak woodlands. Many birds use estuaries as important rest or feeding stops while migrating along the Pacific flyway. Partially within the MBNMS, Elkhorn Slough serves an important role in sustaining both resident and migratory birds, which utilize the resources generated by this highly productive ecosystem. Elkhorn Slough, designated in 2000 as a Globally Important Bird Area by the American Bird Conservancy, is a must-see site for avid bird watchers and visitors to Monterey Bay. In addition, the Elkhorn Slough National Estuarine Research Reserve is one of twenty-six National Estuarine Research Reserves established nationwide as field laboratories for scientific research and estuarine education. The Reserve is administered by the National Oceanic and Atmospheric Administration and managed by the California Department of Fish and Game and is the only National Estuarine Research Reserve contiguous with a National Marine Sanctuary.

Submarine Canyons

Submarine canyons are prominent geomorphic features within the MBNMS. The Monterey Canyon is the largest of these submarine features and is similar in size to the Grand Canyon in Arizona. Submarine canyons share physical characteristics with onshore river valleys. Submarine canyons are erosional features carving into the seafloor and exposing older, underlying strata in canyon walls. Submarine canyons can have sinuous channel axes and may also have a number of branching channels. The positions of some channels coincide with geologic faults, like Carmel Canyon.

The deepest and largest submarine canyon on the coast of North America is the Monterey Canyon in the center of Monterey Bay. It is 292 miles long, approximately 7 miles wide at its widest point, and has a maximum rim to floor relief of 5577 feet. Numerous smaller canyons also exist in the MBNMS and incise the continental shelf and slope. Canyons terminating at the shoreline are thought to be active and are the major sediment transport conduits to the deep sea. The heads of Monterey Canyon, Carmel Canyon, and Partington Canyon reach the modern-day shoreline whereas most of the other canyons within the MBNMS terminate near the continental shelf edge. Much of the sediment carried by longshore currents ends up in the axes of active submarine canyons. Approximately 14,125,000 cubic feet of sand as well as large volumes of finer grained material descend into Monterey Canyon each year. The organic material associated with these sediments provides nutrients to deep-sea organisms. Submarine landslides from canyon walls are also deposited in the canyons. Sand, gravel, mud, and skeletal remains of marine mammals have been observed in the axis of Monterey Canyon.

Submarine canyon sediment transport events are thought to be episodic. Potential triggering events include storms, earthquakes, moderate sea and surf conditions, tidal fluctuation, and flooding rivers. The frequency of these events is not well known. Repeat bathymetric mapping using high-resolution tools and installation of instruments in the canyons enable scientists to determine locations where deposition and erosion take place and to quantify the frequency and intensity of sediment transport events. Submarine canyons in MBNMS are also ecologically important to many species of fish. Canyons provide habitat for larger sized rockfish that seem to prefer structures of high relief such as boulders, vertical walls, and ridges. The cover and protection offered by submarine canyons allow pockets of rockfish populations to flourish, in contrast to more exposed areas where the populations are more easily fished. Monitoring programs in the sanctuary study the habitat use of rockfish in submarine canyons. These programs typically used manned and remotely operated submersibles to map the substrate type and quantify the amount of rock habitat available to fish.

Deep Sea

The deep sea is a dark and cold environment which includes a variety of habitats from the midwater to the abyss that are populated by a wide array of animals, specially adapted to live under the tremendous water pressure and low level of oxygen of this harsh environment. The mesopelagic zone starts at 656 feet below the surface and extends to about 3300 feet. Available light, nutrients and dissolved oxygen diminishes and water pressure increases. Mesopelagic fish and some macroinvertebrates have large and elaborate eyes that allow them to see under low-light conditions. The bathypelagic zone starts below 3300 feet and extends to the seafloor. This cold realm of total darkness and immense pressure is poor in nutrients and dissolved oxygen. Unlike mesopelagic fishes, bathypelagic fishes typically have small eyes or no eyes at all. To adapt to life in an environment with no other light than bioluminescence, they developed other senses to find mates and food, and to escape predators.

Bioluminescence is the production of visible light by living organisms. Most of the species living in the deep sea are bioluminescent. They possess organs called photophores, which produce light from chemical reactions. This elaborate adaptation may provide many advantages in the deep sea. Deep-sea inhabitants may use bioluminescence for attracting and capturing prey, for escaping from predators by scaring them or creating a diversion, or for communication.

Figure S-3: Mystery Mollusk at Davidson Seamount



Plant life, including phytoplankton, needs light to thrive and is absent in the deep sea. After sunset, many small mesopelagic fishes and zooplanktons, including krill, feed on phytoplankton

by migrating from the deep sea to the surface layer. At dawn, they return to the deep sea. This daily vertical migration to the surface may provide protection from surface water predators relying on sight to hunt. The range and intensity of the vertical migration varies seasonally and among species.

The distribution of benthic communities appears to be patchy, and the specific species assemblages differ at various sites between years and among seasons. Benthic invertebrate communities below 6500 feet in depth are not as well known as the sedimentary invertebrate communities of the continental shelf. The most abundant large invertebrates are sea cucumbers. It appears the dominant invertebrates in terms of abundance are infaunal and are all deposit feeders. Specialized benthic invertebrates feed on marine snow, which is the minute debris left over from animals, plants, and non-living matter that sinks from the surface layer to the deep sea. Other abundant invertebrate groups include anemones, brittle stars, sea pens, and sea stars.

In the late 1980s, scientists discovered cold seeps deep in the axial valley of the Monterey Canyon 10,500 feet below the ocean surface. Cold seeps are sites where sulfide or methane-rich fluids are released from the sea floor. Specialized chemosynthetic communities are often associated with cold seeps. Chemosynthetic communities, unlike the other deep sea communities that depend on food sinking from the above water column, rely on chemical energy from the fluid released from the sea floor. On earth, most of the food web starts with plants depending on sunlight as a primary energy source. In cold seeps, bacterial mats, at the base of the food web, use the chemical energy in a similar way plants use the energy from the sunlight. The concentrations of sulfide, methane, and other chemical constituents, the mechanism regulating fluid flow and the biological communities differ among the cold seeps within the MBNMS.

Cold seep communities are composed of species found only in cold seep areas and include vesicomyd clams and vestimentiferan worms basing all or most of their nutrition on chemosynthetic production by bacteria. They include species of anemones, brachyuran and anomuran crabs, gastropods, and soft corals utilizing seep-derived production but are also found in different habitats in the MBNMS. The ecology of cold seep communities is poorly understood. Seep communities, similar to seamounts (underwater mountains), can be viewed as isolated oases in a relatively energy-poor deep seafloor landscape. A variety of species of cosmopolitan benthic fauna appear to benefit from foraging at cold seeps. The extent to which chemosynthetic production at these underwater oases fuels secondary productivity by the local non-seep biological assemblage is unknown. Little or no information is available concerning ecological processes that influence demographic rates of biological populations at cold seeps. Predation, competition, and disturbance likely play a major role, but few hypotheses regarding these population processes have been addressed.

Open Ocean

Although oceans cover 70 percent of the Earth's surface, only 5 percent consists of what one might consider typical marine ecosystems, like coral reefs or kelp forests for example. The remaining 65 percent make up the open ocean ecosystem, which typically lies well offshore where the water depth is greater than 330 feet. The Pacific Ocean, one of four major ocean basins, accounts for nearly half of the total ocean surface area and is twice as large as the

Atlantic Ocean. The waters of MBNMS are part of the eastern Pacific Ocean. The eastern Pacific waters are cooler and more nutrient rich than the western Pacific waters found along the coast of Asia.

Open ocean waters are 13,100 feet deep on average, and in the Pacific basin reach a maximum depth of 36,000 feet. However, in the upper 330 feet of the photic zone, sunlight drives photosynthesis that is highly productive and teems with life. In the eastern Pacific, recirculation of nutrients from deeper waters drives phytoplankton to bloom, which in turn feed zooplankton and their predators.

Oceanic surface currents generated by sustained winds transport water, nutrients, and sometimes organisms across large distances. As these currents collide with continents, they are diverted along the edge of the landmass. In the North Pacific Ocean, the north-south continental boundary currents are also acted upon by the Earth's rotation and produce a clockwise pattern of flow called a gyre. The major north-south flow along the eastern Pacific (western U.S.) is called the California Current, even though it begins in Alaska and extends down to Baja California. The California Current, which is usually located several miles offshore, strongly influences the pelagic ecosystem. Several agencies and research groups are studying the physical, chemical, and biological properties of this system, and how atmospheric conditions influence oceanic conditions, which in turn affect productivity.

Seamounts

Seamounts have been defined as steep geologic features rising from the seafloor with a minimal elevation of 3300 feet and with a limited extent across the summit. This definition is not strictly adhered to, and steep undersea mountains are often referred to as seamounts regardless of size. Seamounts have a variety of shapes, but are most often conical with a circular, elliptical, or more elongate base. They usually have volcanic origins. It has been estimated that more than 30,000 seamounts over 1,000 meters tall are found in the Pacific Ocean, approximately 800 are in the Atlantic Ocean, and an unknown number exist in the Indian Ocean. Seamounts create complex current patterns influencing sea life above them. Commercially valuable fish species often concentrate around relatively shallow seamounts. Current-topography interactions on seamounts include semi-stationary eddies (Taylor columns), internal wave reflection, tidally induced currents and eddies, trapped waves, and eddies shed downstream. Currents over seamounts have been measured up to nineteen inches per second, or 0.9 knots. Evidence for concentrations of fish and zooplankton over seamounts due to enhanced primary productivity is sparse. Some even suggest that productivity over seamounts is more influenced by the physical prevention of zooplankton diurnal migrations to deep water, making the zooplankton more vulnerable to predation. The proximity of the seamount summit to the seasurface is likely an important variable that could influence water column productivity, but this has not yet been definitively addressed. Though relatively close to shore and one of the largest seamounts on the west coast, Davidson Seamount is apparently relatively pristine. Davidson Seamount has large assemblages of corals and sponges adjacent to each other and never seen at other seamounts. Many of these species are rare or new to science.

Living Marine Resources

Marine Mammals

The Sanctuary has one of the most diverse and abundant assemblages of marine mammals in the world, including six species of pinnipeds (seals and sea lions), twenty-six species of cetaceans (whales, dolphins, and porpoises), and one species of fissiped (sea otter). California sea lions are the most common pinnipeds in the Sanctuary, and their numbers continue to increase. During the El Niño event in 1997-1998, more sea lions were observed at Año Nuevo Island than ever before, and the number of pups born also increased. Probably the fastest growing population of marine mammals in the Sanctuary is the northern elephant seal, with haul-out sites at Año Nuevo, Point Piedras Blancas, and isolated Big Sur beaches. The most dramatic increase in their population has occurred at beaches near Point Piedras Blancas, from 400 adults in 1991 to over 5,000 in 1999.

A common cetacean and visitor in the Sanctuary, the gray whale has increased in number over the years (approximately 2.5 percent per year), resulting in the 1994 delisting of the California stock (or Eastern North Pacific stock) from the federal list of endangered and threatened species. In 1999, however, there was a dramatic increase in the number of stranded gray whales on beaches along their migration route from Mexico to Alaska. Aerial surveys indicated there were fewer pregnant females that migrated south, and fewer calves migrated north. Researchers do not know whether these changes are the result of a short-term shift in their environment or whether they signal a long-term change in the population. It is suspected that the gray whale population has neared or reached its carrying capacity. Scientists studying the gray whale's primary prey (benthic amphipods) reported a decrease in these small crustacean populations in the northern Bering Sea from what they were a decade ago.

Recent counts of the California sea otter have made population trends difficult to interpret. In the late 1990's, sea otter numbers consistently declined, but in the spring of 2000 there was an apparent 10.9 percent increase from the spring 1999 counts. Surveys from fall 2000 reported a 4.7 percent decrease in adults from the previous fall, but pup production was up 22 percent. On a longer time scale, however, the sea otter population has increased by approximately 10 percent since Sanctuary designation in 1992.

Although we know a great deal about many of the pinnipeds and the California sea otter, we know very little about most cetaceans. One of the most important ecological questions that needs more study is the relationship between the prey resources and the marine mammal populations. Monterey Bay itself has become an active feeding area for many large cetaceans, most of which are protected. Quite rare species such as sperm whales and North Pacific Right Whales have been seen on canyon edges well within the bay. Research on the whales as well as tourist whale watching has increased since 1992 in the bay. However, we know relatively little about marine mammal ecology at the northern and southern borders of the Sanctuary, although the MBNMS anticipates expansion of research outward from the ports and research institutes bordering Monterey Bay.

Seabirds & Shorebirds

Sanctuary waters are among the most heavily utilized by seabirds worldwide. Ninety-four species of seabirds are known to occur regularly within and near the Sanctuary. Approximately ninety species of tidal and wetland birds regularly occur on the shores, marshes and estuaries bordering on Sanctuary waters. Their success depends, in part, on fluctuating marine conditions, specifically El Niño.

Recently, researchers in central California had a unique chance to prepare specific studies of the response of seabirds to an El Niño event at the Southeast Farallon (SEFI) and Año Nuevo (ANI) Islands. This was due to the advance forecast of the dispersion of the 1997-1998 El Niño to the temperate northern Pacific. SEFI is located approximately fifty-six miles north of ANI (home of the Rhinoceros Auklet) and supports core populations of Brandt's and Pelagic Cormorants, Common Murres, Cassin's Auklets, and Pigeon Guillemots in central California. During the non-breeding season, individuals disperse to the north and south. While seabird breeding at these sites in 1997 was relatively unaffected by El Niño, things were different in 1998. Egg laying dates were delayed for Common Murres and Cassin's Auklets. Breeding populations were much reduced for all five seabird species from SEFI. Moreover, for those that attempted reproduction, success was poor. El Niño's influence on Rhinoceros Auklets on ANI was apparent as well. Changes in normal prey availability and diet may help explain reduced productivity in this species. As highly visible upper trophic level predators, birds can be used as accurate and immediate gauges to the timing and intensity of both relatively short- and long-term oceanographic anomalies.

Fishes

The status of commercial and recreational fisheries, including the status or health of fish populations, is influenced by numerous social, economic, environmental, and biological variables and is characterized by constant change. The MBNMS does not manage fisheries, however, it does play a role in protecting fishery habitat and conducting research on fish and fish populations as well as providing advice and recommendations to federal and state fishery managers. In 2002, researchers examined the status of fish populations in the Sanctuary from 1981-2000. (Starr et al., 2002) About 200 species are typically caught in commercial and recreational fisheries in the Sanctuary, and most are landed at one of five main ports: Princeton/Half Moon Bay, Santa Cruz, Moss Landing, Monterey Bay, and Morro Bay/Avila/Port San Luis. More than 80 percent by weight of the commercial fish landings at these five harbors are comprised of squid, rockfishes, Dover sole, anchovy, mackerel, sardines, sablefish, albacore, and salmon. In the last twenty years, catches of some pelagic species have increased (mainly sardine and squid), but landings of many other species have decreased. Regulatory restrictions have led to shorter seasons and lower quotas. (Ibid). The population status of a many species harvested in the MBNMS is unknown.

Invertebrates

Invertebrate species in the MBNMS include squid, sponges, anemones, jellies, worms, corals, tunicates, snails, octopus, clams, and arthropods such as barnacles, crabs, and spot prawns. Thousands of various species of invertebrates populate the MBNMS. Most invertebrate species are not harvested commercially, with the exception of squid, spot prawn, and Dungeness crab,

rock crab, and octopus. Various types of invertebrates are found in all habitats from the sandy beach to intertidal, mid-water, and deep sea.

Algae

Algae forms one of the primary components in the marine food web by converting solar energy using chlorophyll. The marine algae found in the MBNMS is some of the most diverse in the world, from microscopic phytoplankton to seaweed and surfgrasses to giant kelp, which can be found over sixty feet into the photoactive zone and can grow up to ten inches a day.

Species of Special Concern (or Endangered and Threatened Species)

More than 55 percent of all species federally listed as threatened or endangered reside in California. Twenty-four of these reside within the Sanctuary. Of these twenty-four species, nine species and/or anadromous fish populations inhabiting the Sanctuary have been placed on the federal list of endangered and threatened wildlife since Sanctuary designation in 1992. These new listed species include the Western Snowy Plover (threatened), the Marbled Murrelet (threatened), winter and spring runs of Chinook Salmon (Endangered), fall/late fall run of Chinook Salmon (candidate), central California Coho Salmon (threatened), and central and south/central California Steelhead (threatened). Two species bring a hopeful sign for the future: the gray whale (Eastern North Pacific or California stock) was delisted in June 1994; and the American Peregrine Falcon was removed as a threatened species in August 1999. Other threatened or endangered species showing an increasing population trend include the blue whale, humpback whale, sperm whale, southern sea otter, California condor (slowly), and tidewater goby.

Table 1. ESA-listed endangered and threatened species under the jurisdiction of NMFS that may occur off the coasts of California

Marine Mammals	Status	
Cetaceans		
Blue whale (<i>Balaenoptera musculus</i>)	Endangered	
Fin whale (<i>Balaenoptera physalus</i>)	Endangered	
Humpback whale (<i>Megaptera novaeangliae</i>)	Endangered	
Killer whale - southern resident DPS (<i>Orcinus orca</i>)	Endangered	
Northern Right Whale (<i>Eubalaena glacialis</i>)	Endangered	
Sei whale (<i>Balaenoptera borealis</i>)	Endangered	
Sperm whale (<i>Physeter macrocephalus</i>)	Endangered	
Pinnipeds		
Guadalupe fur seal (<i>Arctocephalus townsendi</i>)	Threatened	
Steller sea lion - eastern distinct population segment (DPS) (<i>Eumetopias jubatus</i>)**	Threatened	
Sea turtles		
Green turtle (<i>Chelonia mydas</i>)	Endangered/threatened*	
Leatherback turtle (<i>Dermochelys coriacea</i>)	Endangered	
Loggerhead turtle (<i>Caretta caretta</i>)	Threatened	
Olive ridley turtle (<i>Lepidochelys olivacea</i>)	Endangered/threatened*	
Marine fish		
Green Sturgeon, southern DPS (<i>Acipenser medirostris</i>)	Threatened	
Marine invertebrates		
White abalone (<i>Haliotis sorenseni</i>)	Endangered	
Salmonids		
Chinook (<i>Oncorhynchus tshawytscha</i>)	Sacramento River winter, evolutionarily significant unit (ESU)	Endangered
	Central Valley Spring ESU	Threatened
	California Coastal ESU	Threatened
Coho (<i>O. kistuch</i>)	Central California Coastal ESU	Endangered
	S. Oregon/N. CA Coastal ESU	Threatened
Steelhead (<i>O. mykiss</i>)	Southern California DPS	Endangered
	South-Central California DPS	Threatened
	Central California Coast DPS	Threatened
	California Central Valley DPS	Threatened
	Northern California DPS	Threatened

*In the Pacific Ocean, breeding colony populations on the Pacific coast of Mexico of both green turtles and olive ridley turtles are listed as endangered; all others are listed as threatened.

**Critical habitat for Steller sea lions includes the rookeries at Año Nuevo Island within the MBNMS and Southeast Farallon Island within the GFMNS (see 50 CFR 226.202(b) and Table 1 to part 226). No other ESA listed species under NMFS’s jurisdiction have proposed or designated critical habitat within the MBNMS, CBNMS, or GFNMS waters.

Regulations and Prohibitions

All activities (e.g. fishing, boating, diving, research, and education) may be conducted in the MBNMS unless prohibited or otherwise regulated by the Monterey Bay National Marine Sanctuary (MBNMS). Also, all activities are subject to all prohibitions, regulations, restrictions, and conditions validly imposed by any government authority of competent jurisdiction and are also subject to liability for destruction, loss, or injury to Sanctuary resources under Section 312 of the NMSA, as amended.

Scope of Regulations

Each national marine sanctuary is designated with a broad “scope of regulations” within which regulations may be promulgated as necessary to ensure the protection and management of the conservation, ecological, recreational, research, educational, historical and aesthetic resources and qualities of the sanctuary. The designation document of the MBNMS includes the following activities within the “scope of regulations,” including prohibition, to the extent necessary and reasonable. The prohibitions of the MBNMS follow this section. For complete text of the revised Designation Document please see Appendix E.

Activities subject to regulation regarding the MBNMS include:

- a. Exploring for, developing, or producing oil, gas, or minerals (e.g., clay, stone, sand, metalliferous ores, gravel, non-metalliferous ores, or any other solid material or other matter of commercial value) within the Sanctuary;
- b. Discharging or depositing, from within or into the Sanctuary, any material or other matter, except specific types of vessel discharges and dredged material deposited at disposal sites authorized prior to the effective date of Sanctuary designation, provided that the activity is pursuant to, and complies with the terms and conditions of, a valid Federal permit or approval existing on the effective date of Sanctuary designation;
- c. Discharging or depositing, from beyond the boundary of the Sanctuary, any material or other matter, except dredged material deposited at the authorized disposal sites described in Appendix D to the site regulations, provided that the activity is pursuant to, and complies with the terms and conditions of, a valid Federal permit or approval;
- d. Taking, removing, moving, catching, collecting, harvesting, feeding, injuring, destroying, or causing the loss of, or attempting to take, remove, move, catch, collect, harvest, feed, injure, destroy, or cause the loss of, a marine mammal, sea turtle, seabird, historical resource, or other Sanctuary resource;
- e. Drilling into, dredging, or otherwise altering the submerged lands of the Sanctuary; or constructing, placing, or abandoning any structure, material, or other matter on or in the submerged lands of the Sanctuary;
- f. Possessing within the Sanctuary a Sanctuary resource or any other resource, regardless of where taken, removed, moved, caught, collected, or harvested, that, if it had been found within the Sanctuary, would be a Sanctuary resource;
- g. Possessing any Sanctuary historical resource;
- h. Flying a motorized aircraft above the Sanctuary;
- i. Operating a vessel (i.e., water craft of any description) within the Sanctuary;
- j. Aquaculture or kelp harvesting within the Sanctuary;

- k. Interfering with, obstructing, delaying, or preventing an investigation, search, seizure, or disposition of seized property in connection with enforcement of the Act or any regulation or permit issued under the Act;
- l. Introducing or otherwise releasing from within or into the Sanctuary an introduced species.

In the event of an emergency and where necessary to prevent or minimize the destruction of, loss of, or injury to a Sanctuary resource or quality, or minimize the imminent risk of such destruction, loss or injury, any and all activities, including those not listed above, may be subject to immediate regulation.

Prohibitions

Following is a summary of MBNMS prohibited and restricted activities. The exact language of these regulations can be found in Appendix F.

Oil, Gas and Mineral Development: The first activity prohibited is exploring for, developing or producing oil, gas or minerals within the Sanctuary except for jade in certain areas and subject to restriction.

Discharge and Disposal: The second activity prohibited is depositing or discharging from within or into the Sanctuary, other than from a cruise ship, any material or other matter except: (1) fish, fish parts, chumming materials or bait used in or resulting from lawful fishing operations in the Sanctuary; (2) for a vessel less than 300 gross registered tons (GRT) or a vessel greater than 300 GRT without sufficient holding tank capacity to hold sewage while within the Sanctuary, clean (meaning not containing detectable levels of harmful matter as defined) effluent generated incidental to vessel use by an operable Type I or Type II marine sanitation devices; (3) clean vessel deck wash down, vessel engine cooling water, vessel generator cooling water, anchor wash, or bilge water; (4) for a vessel less than 300 gross registered tons (GRT) or a vessel greater than 300 GRT without sufficient holding capacity to hold graywater while within the Sanctuary, clean graywater as defined by section 312 of the FWPCA; (5) vessel engine or generator exhaust; and (6) dredged material deposited at disposal sites authorized by the U.S. EPA (in consultation with U.S. Army Corps of Engineers) prior to the effective date of Sanctuary designation, provided that the activity is pursuant to, and complies with the terms and conditions of, a valid federal permit or approval existing on the effective date of Sanctuary designation.

This prohibition also prohibits all discharges from cruise ships (defined as having more than 250 passenger births for hire) except clean vessel engine cooling water, generator cooling water or anchor wash.

This prohibition also prohibits depositing or discharging, from beyond the boundary of the Sanctuary, material or other matter that subsequently enter the Sanctuary and injure a Sanctuary resource or quality, except for the discharges identified above.

Protection of Historical Resources: The third activity prohibited is possessing, moving, removing or injuring or attempting to move, remove or injure a Sanctuary historical resource.

Historical resources in the marine environment are fragile, finite and non-renewable. This prohibition is designed to protect these resources so that they may be researched and information about their contents and type made available for the benefit of the public. This prohibition does not apply to moving, removing or injury resulting incidentally from kelp harvesting, aquaculture or lawful fishing operations.

Alteration of the Submerged Lands within the Sanctuary: The fourth activity prohibited is drilling into, dredging or otherwise altering the submerged lands of the Sanctuary; or constructing, placing or abandoning any structure, material or other matter on the submerged lands of the Sanctuary, except as incidental and necessary to: (1) conduct lawful fishing operations (2) anchor a vessel; (3) conduct aquaculture or kelp harvesting; (4) install an authorized navigation aid; (5) conduct harbor maintenance in the areas necessarily associated with a Federal project in existence on January 1, 1993, including dredging of entrance channels and repair, replacement or rehabilitation of breakwaters and jetties; (6) construct, repair, replacement or rehabilitation of breakwaters and jetties; (7) construct, repair, replace, or rehabilitate a dock or pier; or (8) collect jade pursuant to paragraph (a)(1) of this section, provided that there is no constructing, placing, or abandoning any structure, material, or other matter on the submerged lands of the Sanctuary. Federal Projects are any water resources development projects conducted by COE or operating under a permit or other authorization issued by COE and authorized by federal law. The only exception to this regulation that applies in the Davidson Seamount Management Zone is that for lawful fishing. However, while this regulation does not prohibit fishing at the Davidson Seamount, NOAA fisheries regulations (50 CFR Part 660) prohibit fishing below 3000 at this location. The intent of the prohibition against altering the submerged lands within the Sanctuary is to protect the resources and qualities of the Sanctuary from the harmful effects of activities such as archaeological excavations, drilling into the seabed, strip mining, laying of pipelines and outfalls, and offshore commercial development, which may disrupt and/or destroy sensitive marine resources.

Protection of Marine Mammals, Sea Turtles, and Seabirds: The fifth activity prohibited is taking marine mammals, sea turtles or seabirds within or above the Sanctuary, except as authorized by the Marine Mammal Protection Act, as amended, (MMPA), 16 U.S.C. 1361 et seq., the Endangered Species Act, as amended, (ESA), 16 U.S.C. 1531 et seq., and the Migratory Bird Treaty Act, as amended, (MBTA), 16 U.S.C. 703 et seq. The term "taking" includes all forms of harassment. The MMPA, ESA and MBTA prohibit the taking of species protected under those acts. The prohibition overlaps with the MMPA, ESA and MBTA but also extends protection for Sanctuary resources on an environmentally holistic basis and provides a greater deterrent with civil penalties of up to \$130,000 per taking. The prohibition covers all marine mammals, sea turtles and seabirds within or above the Sanctuary.

Overflight of Motorized Aircraft: The sixth activity prohibited is flying motorized aircraft at less than 1,000 feet above the Sanctuary within four specified zones. This area-specific prohibition on overflights below 1,000 feet is designed to limit potential noise impacts, particularly those that might startle hauled-out seals and sea lions, sea otters or birds nesting along the shoreline margins of the Sanctuary. For more information, see the Marine Mammal, Seabird and Turtle Disturbance Action Plan in Section VII.

Motorized Personal Watercraft: The seventh activity prohibited is the operation of motorized personal watercraft within the Sanctuary except in five specified zones and access routes to and from these zones. This regulation is intended to provide enhanced resource protection by prohibiting operation of motorized personal water craft in areas of high marine mammal and seabird concentrations, kelp forest areas, river mouths, estuaries, lagoons and other similar areas where sensitive marine resources are concentrated and most vulnerable to disturbance and other injury from personal water craft. The regulation is also intended to allow the continuation of this form of recreation while minimizing conflicts with other recreational users, as well as reducing aesthetic disturbance. For more information, see the Motorized Personal Watercraft Action Plan in Section VII.

Possessing a marine mammal, seabird, or turtle: The eighth prohibition serves to facilitate enforcement actions for violations of Sanctuary regulations. It prohibits the possession within the Sanctuary of any marine mammal, sea turtle or seabird, regardless of where the resource was taken, except in compliance with the ESA, MMPA and MBTA.

Deserting a vessel aground, at anchor, or adrift in the Sanctuary: The ninth prohibited activity is deserting a vessel aground, at anchor, or adrift in the Sanctuary. This regulation is intended to reduce the number of derelict vessels coming aground on the beaches or going adrift within the Sanctuary prior to causing harm to the natural resources.

Leaving harmful matter aboard either a grounded or deserted vessel: The tenth prohibited activity is leaving harmful matter aboard either a grounded or deserted vessel. This prohibition requires removal of harmful substances (as defined) from these vessels to preempt any harm to the environment from their discharge.

Protection of the Davidson Seamount: The eleventh prohibited activity is in the Davidson Seamount Management Zone. The regulation prohibits:

(i) Moving, removing, taking, collecting, catching, harvesting, disturbing, breaking, cutting, or otherwise injuring, or attempting to move, remove, take, collect, catch, harvest, disturb, break, cut, or otherwise injure, any Sanctuary resource located more than 3,000 feet below the sea surface within the Davidson Seamount Management Zone (DSMZ). This prohibition does not apply to fishing below 3000 feet within the DSMZ, which is prohibited pursuant to 50 CFR part 660 (Fisheries off West Coast States and in the Western Pacific).

(ii) Possessing any Sanctuary resource the source of which is more than 3,000 feet below the sea surface within the Davidson Seamount Management Zone. This prohibition does not apply to possession of fish resulting from fishing below 3000 feet within the DSMZ, which is prohibited pursuant to 50 CFR part 660 (Fisheries off West Coast States and in the Western Pacific).

Introduced Species: The twelfth prohibited activity is the release or introduction of non-native species, except striped bass released during catch and release fishing activity, into the MBNMS. This regulation is intended to restrict activities displacing native species and causing biological or economic harm to the MBNMS or its users. For more information, see the Introduced Species Action Plan.

Attraction of White Sharks: The thirteenth activity prohibited is the attraction of white sharks by any means within the MBNMS. This regulation is intended to prohibit activities that might harm white sharks or change their behavior in a manner that may cause conflicts with other uses of the MBNMS (e.g. surfing, kayaking, swimming).

Interfering with Enforcement: The fourteenth prohibition prohibits interfering with, obstructing, delaying or preventing investigations, searches, seizures or disposition of seized property in connection with enforcement of the NMSA or any regulation or permit issued under the NMSA.

Marine Zones

Certain human activity within the MBNMS can have negative impacts on its sensitive physical and biological resources. As a result, agencies have attempted to protect resources by designating areas (e.g., Marine Protected Areas, Dredged Material Disposal sites) in which human activities are controlled through regulatory zoning and spatial restrictions. The MBNMS contains 73 of these marine zones, 60 of which encompass coastline areas and are managed by NOAA, Department of Defense, California Department of Fish and Game, California Department of Parks and Recreation, State and Regional Water Control Boards, and National Park Service. The remaining 13 areas encompass offshore marine habitats and are managed by NOAA, Army Corps of Engineers, U.S. Coast Guard, Department of Defense, and U.S. Environmental Protection Agency. In addition to restricting uses in certain areas, zoning is also used to allow uses or activities otherwise prohibited in the MBNMS.

The following identify and describe the primary regulatory zones of the MBNMS:

Jade Collection Zones: Areas in which traditional small-scale collection of loose jade is allowed in the MBNMS. Zone regulations allow small-scale collection to support the local artisans while protecting the mineral resources of the Sanctuary.

Dredged Material Disposal Zones: Areas designated as disposal sites for dredged material (sediment removed from the sea floor, by means of suction or scooping). For more information on dredged material disposal see Section II - Coastal Development: Harbors and Dredge Disposal Action Plan.

Restricted Overflight Zones: Intertidal and subtidal areas over which motorized aircraft are restricted from flying below 1000 feet (305 meters). These zones often encompass areas with high densities of marine mammals or seabirds. For more information see Section VII - Wildlife Disturbance: Marine Mammal, Seabird, and Turtle Disturbance Action Plan.

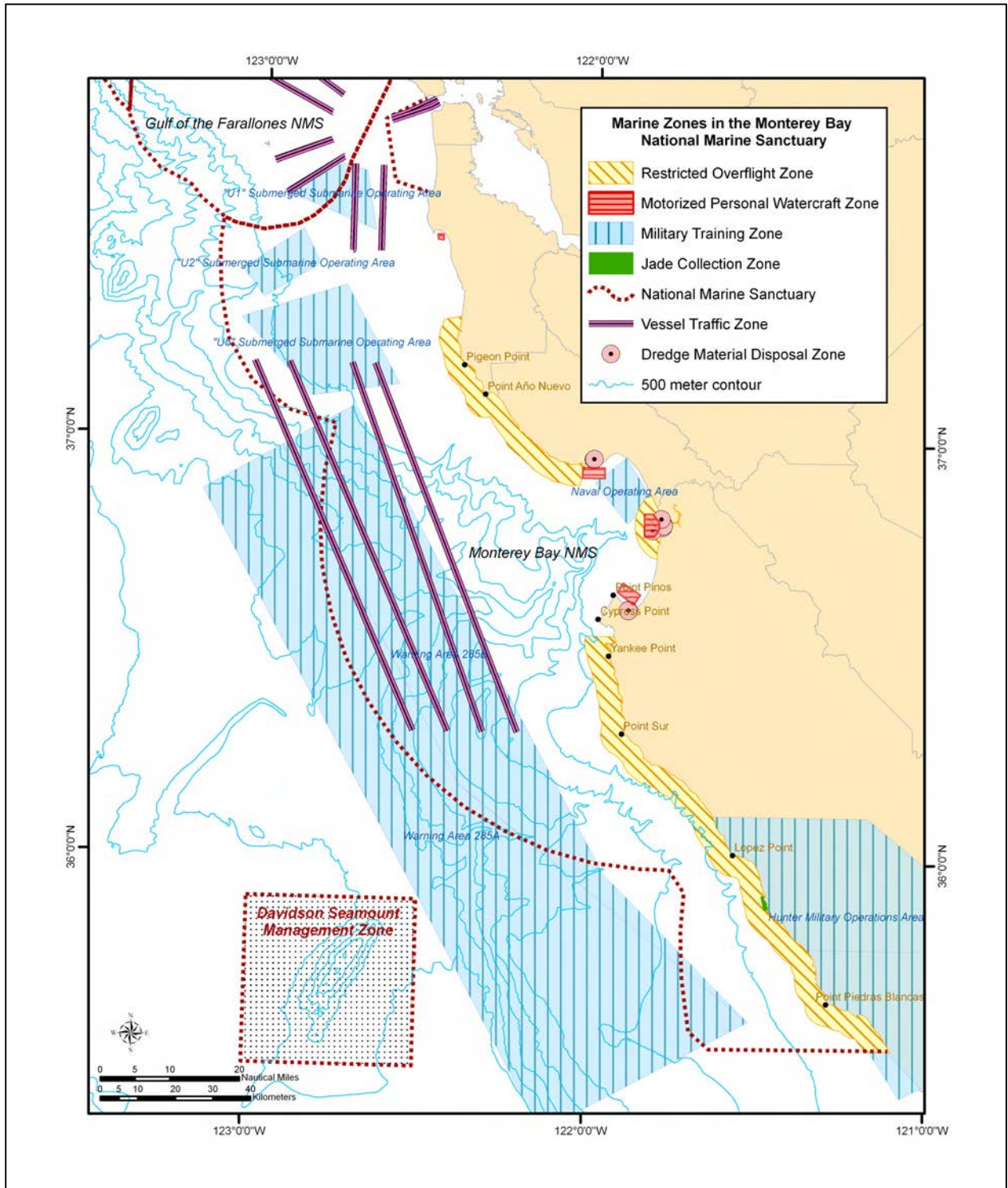
Motorized Personal Watercraft Zones (MPWC): Areas designated for the use of motorized personal watercraft (MPWC). MPWC zones allow this form of recreation while protecting nearshore marine life from disturbance or other injury and minimizing conflicts with other users, such as surfers and kayakers. For more information see Section VII Wildlife Disturbance: Motorized Personal Watercraft Action Plan.

Military Training Zones: Military training zones are mapped to provide awareness to the public areas of the Sanctuary in which military training operations are conducted by the Department of Defense and marine activities may be restricted during MBNMS training or operations. Information about military zones, including the location of the zone and advisories to civilian users, are included on nautical and aeronautical charts. Military zones allow military training while avoiding interference from and harm to civilian vessels and aircraft. Military activities that were specifically identified in the original 1992 MBNMS FEIS and Management Plan are exempt from Sanctuary regulations. New activities may be exempted by the Director of the National Marine Sanctuary Program after consultation between the Director and the Department of Defense.

Vessel Traffic Zones: Vessel traffic zones apply primarily to the following vessel types: tankers, ships containing hazardous materials, barges, and large commercial vessels. These zones are managed by the U.S. Coast Guard, U.S. Department of Transportation, NOAA, U.S. Department of Commerce, International Maritime Organization, and the United Nations. Adherence is voluntary but recommended and accomplished by agreements between large vessel operators and agencies. To fulfill a Congressional mandate, in 1997, the United States Coast Guard (USCG) and NOAA established a workgroup of key stakeholders in the issue of maritime traffic through the MBNMS (including representatives from federal, state and local governments, environmental groups and industry) to review existing practices and risks, and recommend a package of strategies which would maximize protection of Sanctuary resources while allowing for the continuation of safe, efficient and environmentally sound transportation. The group's recommendations included alteration of the Traffic Separation Scheme off San Francisco to move vessels away from the sensitive San Mateo County shoreline. Most importantly, container ships, bulk freighters, and vessels carrying hazardous materials were moved approximately 10 miles further offshore to reduce the risk of groundings, and organized into north-south lanes to reduce the risk of collision. These recommendations were approved by the International Maritime Organization and implemented in 2000.

Davidson Seamount Management Zone: The Davidson Seamount Management Zone (DSMZ) is a special zone in which the only exception to the prohibition on disturbance of the submerged lands of the Sanctuary is for lawful fishing below 3000 feet of seawater. However, in the DSMZ, NOAA fisheries regulations prohibit fishing below 3000 feet, and the sanctuary regulations prohibit take by any other means. The DSMZ was designated to protect the fragile and pristine seamount environment that includes rare corals and sponge communities that are not found in other MBNMS habitats. For more information, see Section III Ecosystem Protection – Davidson Seamount.

Figure IR-1: MBNMS Marine Zones



Exceptions to Prohibitions and Permitting

When an activity is prohibited in the Sanctuary, it may still be conducted under certain circumstances. Some activities may be permitted by the MBNMS or they may be excepted from regulation. Many of the prohibitions contain exceptions for activities conducted in the MBNMS that would otherwise conflict with the regulations. For example, it is prohibited to drill into, dredge or otherwise alter the submerged lands of the MBNMS. However this would prevent certain activities such as anchoring a vessel or installing navigational aids. The regulations therefore provide exceptions for certain activities conflicting with a broad prohibition. For a complete list of the exceptions to the prohibitions, see Appendix F for the exact language of the MBNMS regulations.

Permits

Some prohibited activities may be allowed by regulatory exceptions (briefly described above) or by a “sanctuary permit,” “special use permit,” or “authorization” issued by the MBNMS. Regardless of potential impacts, in no case may the MBNMS issue a sanctuary permit, special use permit, or authorization for: (1) the exploration for, development of or production of oil, gas or minerals in the Sanctuary; (2) the discharge of primary-treated sewage within the Sanctuary; or (3) the disposal of dredged material within the Sanctuary other than at sites authorized by the EPA prior to the effective date of designation. The MBNMS may issue a Sanctuary permit for an otherwise prohibited activity that will have only short term negligible effects on MBNMS resources and qualities. To be considered for such a permit, an activity must either be research related to MBNMS resources or qualities; further the educational, natural, or historical value of the MBNMS; or further salvage or recovery operations.

MBNMS receives approximately sixty requests per year to conduct prohibited activities. The number of requests has grown each year since MBNMS designation in 1992. Generally, these requests are for research or education purposes, but may be for an activity otherwise prohibited, but authorized by another agency permit, such as overflights or coastal construction. The MBNMS evaluates these requests on a case-by-case basis in detail to determine if the activity would have only negligible short-term adverse effects on MBNMS resources and qualities. If the proposed activity meets that criterion, then a permit may be granted to the applicant. Implementation of the MBNMS permit program is addressed further in the Operations and Administration Action Plan, Strategy OA-8 Permit Program.

Special Use Permits

Some prohibited activities, with adequate mitigation measures, may not adversely impact a Sanctuary resource. Several of these activities are of a nature that does not qualify for other NMS permits because the proposed activity is not for the purpose of resource management, research, education, or salvage. Special Use Permits are designated for instances where a commercial “use” of the MBNMS is proposed, and are used when a typical MBNMS permit would not be applicable. Special Use Permits may be issued for the narrow range of activities prohibited by the National Marine Sanctuary Program (NMSP) regulations and must result in no adverse effect to the Sanctuary resource or qualities. The MBNMS named various activities for which it could consider issuing a Special Use Permit in a Federal Register notice to identify program-wide uses for Special Use Permits. These activities include:

The disposal of cremated human remains by a commercial entity

Commercial and private overflights in restricted zones

The placement on and subsequent recovery from the seafloor of objects associated with public events or uses on non-living substrate

The deposit and immediate recovery of objects related to special effects of motion pictures

The continued presence of commercial submarine cables on or beneath the seafloor

The provisions for issuing Special Use Permits as outlined in the NMSA allow the NMSP to recover the administrative costs of issuing the permit and certain other amounts. The MBNMS determines suitable fees. Fees include:

- The costs incurred, or expected to be incurred, by the MBNMS in issuing the permit
- The costs incurred, or expected to be incurred, by the MBNMS as a direct result of the conduct of the activity for which the permit is issued, including the costs of monitoring the conduct of the activity
- An amount that represents the fair market value of the use of the MBNMS resource

Authorizations

When the MBNMS was designated in 1992, it was recognized that other agencies had regulatory authority that interfaced with MBNMS regulations. Activities prohibited in the MBNMS, but not proposed for resource management, research or education purposes, could be permitted by these agencies. Thus, MBNMS regulations included an ability to “authorize” other agency’s permits to allow otherwise prohibited activities. An authorization must be issued in conjunction with a valid lease, permit, license, approval or other authorization issued by any federal, state, or local authority of competent jurisdiction. MBNMS staff coordinates with the agency issuing the original permit to address concerns of the MBNMS. If the original agency does not impose conditions MBNMS staff believes are essential, then the MBNMS may impose specific conditions or terms in issuing its authorization.

The authorization process is intended to be a streamlining measure alleviating the need to get permits from multiple government agencies. The MBNMS examines requests from an ecosystem-based perspective, whereas other agencies usually have a narrower, more focused mandate. Authorizations allow for a more integrated process among agencies with overlapping jurisdictions. The September 18, 1992 Federal Register document announcing the designation of the MBNMS outlines the process for notification and review of applications for leases, licenses, permits, approvals or other authorizations to conduct a prohibited activity. The MBNMS has several procedural options when issuing authorizations.

Authorizations of projects that may affect water quality are generally conducted under a Memorandum of Agreement (MOA) between NOAA, the State of California, the Environmental Protection Agency, and the Association of Monterey Bay Area Governments (AMBAG) regarding the MBNMS regulations relating to water quality within state waters within the MBNMS. This MOA prohibits any permit from being renewed or otherwise issued allowing the discharge of primary-treated sewage within the MBNMS. With regard to permits, the MOA encompasses:

National Pollutant Discharge Elimination System (NPDES) permits issued by the State of California under section 13377 of the California Water Code

Waste Discharge Requirements issued by the State of California under section 13263 of the California Water Code

The MOA specifies how the MBNMS authorization process will be administered within state waters within the MBNMS in coordination with the state permit program.

Other Exceptions

There are two other exceptions to the prohibitions, but under no circumstances do they apply to oil, or mineral activities, the discharge of primary treated sewage, or the disposal of dredged material at new disposal sites. The MBNMS regulatory prohibitions do not apply if one of the following situations applies:

1. An activity is necessary to respond to an emergency threatening life, property or the environment; authorized by a NMS permit; or authorized by a Special Use Permit issued under Section 310 of the Act.
2. With regard to Department of Defense activities: an activity is an existing military activity, or the activity is a new activity and exempted by the Director of the Office of the National Marine Sanctuaries or designee after consultation between the Director or designee and the Department of Defense. The regulations require that the Department of Defense carry out its activities in a manner that avoids, to the maximum extent practicable, any adverse impact on Sanctuary resources and qualities and that it, in the event of threatened or actual destruction of, loss of, or injury to a Sanctuary resource or quality resulting from an untoward incident, including but not limited to spills and groundings, caused by it, promptly coordinate with the Director or designee for the purpose of taking appropriate actions to respond to and mitigate the harm and, if possible, restore or replace the Sanctuary resource or quality.

Implementing the Management Plan

Joint Management Plan Review

Management plan review, which is required by the NMSA (16 U.S.C. §1434(e)) for all national marine sanctuaries, is conducted to ensure that each site properly conserves and protects its living and cultural resources. Management plans are documents that describe regulations and boundaries, outline staffing and budget needs, present management actions and performance measures, and guide development of future budgets and management activities. The MBNMS had not reviewed its management plan since its designation in 1992. Through the process of reviewing the management plans it was clear that recent scientific discoveries, advancements in managing marine resources, and new resource management issues were not adequately addressed in the 1992 plan.

The management plan review process is based on three fundamental steps: (1) public scoping meetings; (2) the prioritization of issues and development of action plans; and (3) the preparation of draft and final management plans and the relevant National Environmental Policy Act (NEPA) documentation (such as an Environmental Impact Statement or Environmental Assessment). Public meetings and formal public hearings on the draft plan help staff revise the document into a final management plan outlining the MBNMS's priorities for at least the next five years.

The National Marine Sanctuary Program (NMSP) reviewed the management plans of the MBNMS together with the Cordell Bank and Gulf of the Farallones National Marine Sanctuaries as part of a process known as the Joint Management Plan Review (JMPR). These sanctuaries are located adjacent to one another, managed by the same program, and share many of the same resources and issues. In addition, all three sites share many overlapping interest and user groups. Using a community-based process that provides numerous opportunities for public input, the NMSP examined the current issues and threats to the resources and whether the management plan put in place at that time is adequately protecting MBNMS resources.

Identification and Prioritization of Issues

The NMSP selected the issues to be addressed in the JMPR following an extensive public process of scoping and issue prioritization. Twenty scoping meetings were held jointly with Cordell Bank and Gulf of the Farallones National Marine Sanctuaries between November 2001 and January 2002, and over 12,500 comments were received. A Summary Scoping Report (February 25, 2002) was used by the Sanctuary Advisory Councils to help them provide advice on the highest priority issues. The Sanctuary Advisory Councils are advisory bodies representing various stakeholder and user groups who meet bi-monthly to advise Sanctuary management on issues of concern. Through a series of workshops in April 2002, Sanctuary Advisory Council members provided feedback and recommendations on the resource issues to be addressed. The results from the workshops were published, in a "Report on MBNMS Advisory Council Prioritization Workshops" on May 13, 2002. Based on input from the Sanctuary Advisory Councils, a report, "Selection of Priority Issues to be addressed in the Joint Management Plan Review" was presented in July 2002. Following selection of the priority issues, NMSP staff developed a work plan ("Priority Issue Work Plan," December 4, 2002) that

characterized the issues to be addressed, identified potential working group members, outlined the timelines for completion, and described the potential products to be produced as part of the working group or internal team efforts. For many of the priority issues, working groups comprised of staff, Sanctuary Advisory Council members, stakeholders and subject experts were established to further characterize the issue and develop strategies to address them. For the MBNMS, 223 members of the public or representing public agencies met in sixty-eight meetings over a period of five months to develop sixteen action plans. Internal teams comprised of NMSP staff addressed other issues and developed proposed action plans that were forwarded to the Sanctuary Advisory Council for review. These documents are available for viewing on the Jmpr website <http://sanctuaries.noaa.gov/jointplan/>

The NMSP determined that certain issues should be addressed as site-specific issues that are to be addressed by the individual sanctuary. Other issues were determined to cut across two or three sanctuaries and were to be addressed as cross-cutting issues. These cross-cutting issues were issues that will be addressed by all three sanctuaries in a coordinated fashion.

Action Plan Development

This report is comprised of action plans developed by working groups and internal teams that were tasked with identifying recommended strategies and activities that address specific priority issues identified during the scoping and prioritization phases of the Jmpr. Meetings of the working groups were meant to be working meetings focused on collaboratively developing a recommendation to the Sanctuary Advisory Council (SAC) regarding their specific issue. The working groups met approximately once a month between January 2003 and May 2003 and focused on the development of the action plans and recommendations in this report.

The action plans were then brought to the SAC in July and August of 2003 for review. The SAC reviewed, modified and recommended a series of action plans to the MBNMS. Generally, the SAC recommended the strategies and activities as proposed by the working groups and internal teams. The original action plans as well as modifications and recommendations from the MBNMS Advisory Council can be reviewed at <http://sanctuaries.noaa.gov/jointplan/archive/welcome.html>

Action Plan Components

Strategies and Activities: *Generally, the action plans are the means by which the MBNMS identifies and organizes the various management issues and the tools with which to address a given issue. They articulate how programs and projects will be implemented, the various steps in the program or project, and who will be accomplishing the work. The action plans are generally divided into strategies. These strategies describe the necessary programs to address a priority resource management issue identified in the scoping and prioritization processes. Each strategy is made up of “activities” describing the actions necessary for successful implementation.*

Performance Measures: *Each action plan contains one or more identified measures by which the MBNMS will evaluate progress toward the desired outcome. These measures will be evaluated periodically and reported as explained in the Performance Evaluation Action Plan.*

Timelines: *The action plans also contain estimated timelines that reflect both when a strategy can expect to start and end and the level of implementation. While the timelines may indicate how long the strategy should take, this may vary depending on the resources and partners available for implementation.*

Budgets: *The budgets identify the resources necessary for implementation of each strategy and in summary, the action plan on an annual basis. These budgets were developed by estimating aggregate costs associated with staff time, facilities, outreach materials, boat, plane, and diving operations, website needs, and outside contracts for studies or monitoring efforts.*

Multidisciplinary Implementation

The action plans are grouped by common themes and issues: Coastal Development, Ecosystem Protection, Operations and Administration, Partnerships and Opportunities, Water Quality, Wildlife Disturbance, and Cross-Cutting Issues. Each action plan is intended to be a discrete plan that will address the issue or problem. However, all issues require common tools of research, monitoring, education, outreach, enforcement, agency coordination, and partnership development. The MBNMS will seek to maximize the synergy between plans by exploring mutual research and monitoring needs for the various issues and combining outreach needs to common audiences. The priority issues identified in this action plan require research, monitoring, education, outreach, enforcement and operational support to be implemented. The MBNMS will implement the new management plan by addressing the action plans in a multi-program team approach where members of the education, research and resource protection programs will each play a critical role in the success of addressing the goals of the action plans. Each of the action plans also requires support from the program operations team to ensure that the multi-disciplinary approach of the action plans and the MBNMS as a whole are a success.

Performance Evaluation

This success will be evaluated through performance measures identified in each of the action plans and summarized in the Performance Evaluation Action Plan. In addition to members from different teams working toward the implementation of each of the action plans, the MBNMS will work cooperatively with its partners, including federal, state, and local agencies, non-

governmental organizations, as well as the Sanctuary Advisory Council and working groups. Successful implementation of this management plan relies on the MBNMS’s traditional multi-stakeholder and partnership-based approach, which will continue as the MBNMS addresses the many marine management issues outlined in this plan.

Budget Development

MBNMS management staff developed the budgets in each action plan by evaluating the resources necessary to completely implement each action plan. MBNMS staff estimated the number of hours of personnel staff required to address each activity, the number of field operation (boat, air, dive) days required, as well as materials, supplies, and travel time. Some activities were assumed to be contracted out to other parties and in these cases, the total cost of the contract was included in the budget estimate. Some assumptions were also necessary to arrive at a cost for each strategy. Staffing was estimated at \$80,000 per year for a full time employee. Each day at sea or in the air was estimated to cost \$2,000 and diving days were estimated to cost \$400 per day in addition to the personnel time. Outreach materials, supplies, travel, and outside contracts were estimated at their dollar value. A summary of the cost for each action plan is included in Table I-1.

The budgets were also developed assuming work would begin in the first year. Naturally, given resource limitations as well as the necessary program and partner development to fully implement all of the action plans, the MBNMS will not be able to operate at the necessary capacity for some time. After assessment of the likely resource needs for full implementation, the MBNMS and Sanctuary Advisory Council could then prioritize the implementation of the action plans.

Table I-1: Estimated Annual Costs for Action Plans

Action Plan	Estimated Annual Cost (in thousands)*				
	YR 1	YR 2	YR 3	YR 4	YR 5
Coastal Development Action Plans					
Coastal Armoring	\$227	\$173.5	\$194.5	\$120.5	\$119.9
Desalination	\$99.5	\$404.9	\$74.3	\$198.4	\$17
Harbors and Dredge Disposal	\$71.8	\$156.9	\$53.1	\$49.1	\$45.1
Submerged Cables	\$83	\$128	\$112	\$8	\$8
Ecosystem Protection Action Plans					
Big Sur Coastal Ecosystem	\$391	\$307	\$291	\$283	\$259
Bottom Trawling Effects on Benthic Habitats	\$317	\$484	\$513	\$165	\$65
Davidson Seamount	\$375	\$138	\$104	\$98	\$108
Emerging Issues	\$45	\$27	\$22	\$27	\$27

Monterey Bay National Marine Sanctuary – Final Management Plan
 Section I – Introduction: Implementing the Management Plan

Action Plan	Estimated Annual Cost (in thousands)*				
	YR 1	YR 2	YR 3	YR 4	YR 5
Introduced Species	\$133.5	\$332	\$303	\$345	\$336
Sanctuary Integrated Monitoring Network (SIMoN)	\$320	\$300	\$280	\$280	\$280
Marine Protected Areas	\$407	\$683	\$270	\$890	\$0
Operations and Administration Action Plans					
Operations and Administration	\$1,526.5	\$1,624.5	\$1,757.5	\$1,793.5	\$1,798.5
Performance Evaluation	\$4	\$4	\$4	\$4	\$4
Partnerships and Opportunities Action Plans					
Fishing Related Education and Research	\$223	\$249.5	\$433.5	\$250.5	\$192.5
Interpretive Facilities	\$288	\$4,225	\$2,929	\$1,933	\$2,083
Ocean Literacy and Constituent Building	\$670.6	\$888.1	\$1,150.8	\$2,937.3	\$1,132.8
Water Quality Issues					
Beach Closures and Microbial Contamination	\$1,256	\$668.5	\$1,020	\$660	\$684
Cruise Ship Discharges	\$183.5	\$103	\$64.5	\$51.5	\$51.5
Water Quality Protection Program Implementation	\$1,769	\$1,551	\$1,577	\$1,509	\$1,532
Wildlife Disturbance Action Plans					
Marine Mammals, Seabirds, and Turtles	\$1,438.5	\$738.5	\$609.5	\$581.5	\$617.5
Motorized Personal Watercraft	\$330	\$215	\$159.5	\$159.5	\$152
Tidepool Protection	\$533	\$391	\$416	\$395	\$486.5
Cross Cutting Action Plans					
Administration and Operations	\$288	\$276	\$264	\$264	\$264
Community Outreach	\$144	\$180	\$180	\$180	\$216
Ecosystem and Monitoring	\$381	\$525	\$567	\$531	\$471
Maritime Heritage	\$237	\$237	\$246	\$270	\$270

Action Plan	Estimated Annual Cost (in thousands)*				
	YR 1	YR 2	YR 3	YR 4	YR 5
Northern Management Area	\$50	\$50	\$50	\$50	\$50
Total Estimated Annual Cost	\$11,791.9	\$15,060.4	\$13,645.2	\$14,033.8	\$11,270.3

* Cost estimates are for both “programmatic” and “base” (salaries and overhead) expenses.

Action Plan Prioritization

The action plans and strategies in this management plan comprise a body of work that if fully implemented would require resources well beyond what is currently available to the MBNMS and NMSP. MBNMS staff worked with the Sanctuary Advisory Council and NMSP leadership to examine prioritization of the issues in order to identify which action plans should be implemented in which order or with the most initial emphasis. Implementation of some action plans may also be dependent on a variety of funding scenarios such as grant applications, funding priorities of outside parties, or reliance on partner participation. The implementation of various action plans in the management plan may therefore occur at different stages based on urgency, benefit to Sanctuary resources, and resource availability.

Management Plan Implementation and Funding Scenarios

The following table (Table 1.0) provides an outline of the how the various strategies in the management plan will be implemented. The implementation of the strategies depends on various factors including:

- status of strategy implementation
- priority of strategy implementation based on resources available,
- coordination level necessary with partners for implementation, and
- 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 level of implementation indicates the priority of a strategy or action plan and subsequent level of effort based on resources available. As stated previously, full implementation of the management plan exceeds the resources available to the MBNMS therefore requiring some prioritization of the action plan or strategies. As resources become available, a greater level of implementation is possible. This table 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 NGO’s. The table 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 NMSP funds as well as funding from external sources such as grants, the Monterey Bay Sanctuary Foundation, or in-kind work from partner agencies. The table highlights the probably source of the funding; primarily internal or external or a mix of funding sources.

Table 1.0 – Legend			
Column A	Column B, C, D	Column E	Column F
<p>Strategy Status:</p> <ul style="list-style-type: none"> ● – Existing w/o significant modification ◐ – Existing w/ significant modification ○ – New (since ‘05) or future (Not yet implemented.) 	<p>Implementation* (w/ NMSP Funding):</p> <p>H – High M – Medium L – Low</p> <p>* 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.</p>	<p>Necessary Partnership Coordination:</p> <ul style="list-style-type: none"> ● – Not possible w/o partners ◐ – Significant reliance on partners ○ – Little reliance on partners 	<p>Primary Funding Sources:</p> <ul style="list-style-type: none"> ● – External (e.g. Grants) ◐ – Internal and External ○ – Internal

Table I-1.0 Action Plan Strategy Funding Scenarios

Action Plan Strategies		A	B	C	D	E	F
		Strategy Status:	Implementation Level Funding: Scenario 1	10% per year Increase: Scenario 2	20% per year Increase: Scenario 3	Partnership Coordination	Primary Funding Source
Coastal Development							
Coastal Armoring Action Plan							
CA-1	Conduct Issue Characterization and Needs Assessment	◐	M	M	H	◐	○
CA-2	Develop and Implement Regional Approach to Coastal Armoring	○	M	M	M	●	◐
CA-3	Improve Permit Program Improvements	◐	L	M	M	◐	○
CA-4	Implement Programs and Increase Training	○	L	L	L	●	◐
Desalination Action Plan							
DESAL-1	Develop and Implement Regional Desalination Program	○	L	L	M	●	◐
DESAL-2	Develop Facility Siting Guidelines	○	M	H	H	●	○
DESAL-3	Identify Environmental Standards for Desalination Facilities	○	M	M	H	●	○
DESAL-4	Develop Modeling and Monitoring Program	○	L	L	M	●	◐
DESAL-5	Conduct Outreach and Information Exchange	○	L	L	M	◐	◐
Harbors and Dredge Disposal Action Plan							
HDD-1	Improve Agency Coordination	◐	M	M	M	●	○
HDD-2	Review Offshore Dredge Disposal Activities	◐	M	M	M	●	○
HDD-3	Coordinate with Sediment Monitoring and Reduction Programs	◐	L	L	M	●	◐
HDD-4	Disposal of Fine-Grained Material	◐	L	L	M	◐	◐
HDD-5	Alternative Disposal Methods	○	L	L	M	●	◐
Submerged Cables Action Plan							
SC-1	Identify Routing and Zones for Submerged Cable Projects	◐	L	L	M	○	○
SC-2	Develop Submerged Cable Project Permit Guidelines	○	L	L	M	○	○
Ecosystem Protection							
Big Sur Coastal Ecosystem Action Plan							
BSP-1	Provide Integrated Data and Information to the Public	○	L	L	L	●	◐
BSP-2	Interagency Coordination Program	◐	L	L	L	●	◐
Bottom Trawling Effects on Benthic Habitats Action Plan							
BH-1	Develop Partnerships with Fishermen	◐	M	H	H	◐	◐
BH-2	Assess Trawl Activity	◐	M	M	M	◐	◐

Monterey Bay National Marine Sanctuary – Final Management Plan
Section I – Introduction: Implementing the Management Plan

		A	B	C	D	E	F
Action Plan Strategies		Strategy Status:	Implementation Level Funding: Scenario 1	10% per year Increase: Scenario 2	20% per year Increase: Scenario 3	Partnership Coordination	Primary Funding Source
BH-3	Identify Habitats Vulnerable to Trawling	◐	M	M	M	●	○
BH-4	Develop a Management Tracking Program	◐	M	M	M	●	○
BH-5	Develop an Impact Identification and Research Program	○	L	L	M	◐	◐
BH-6	Identify and Implement Potential Ecosystem Protection Measures	○	L	L	L	●	○
BH-7	Develop Education and Outreach Program	○	L	L	M	◐	◐
Davidson Seamount Action Plan							
DS-1	Conduct Site Characterization	◐	L	L	M	◐	◐
DS-2	Conduct Ecological Processes Investigations	○	L	L	L	◐	◐
DS-3	Develop Resource Protection Program	○	L	L	L	◐	○
DS-4	Conduct Seamount Education and Outreach Initiatives	◐	L	L	M	◐	◐
Emerging Issues Action Plan							
EI-1	Identify and Track Emerging Issues	◐	L	L	L	○	○
EI-2	Develop Process to Address Emerging Issues	◐	L	L	L	○	○
EI-3	Develop Emerging Issues Staffing and Operations Structure	○	L	L	L	○	○
Introduced Species Action Plan							
IS-1	Address Known Pathways of Introduction	◐	L	M	M	◐	○
IS-2	Develop Prevention Program for Known Pathways of Introduction	○	L	M	M	◐	◐
IS-3	Develop Baseline Information, Research & Monitoring Program	◐	L	L	L	◐	◐
Sanctuary Integrated Monitoring Network (SIMoN) Action Plan							
SI-1	Implement Monitoring Programs Needed to Support Management Priorities	◐	H	H	H	●	◐
SI-2	New Monitoring Efforts for Basic MBNMS Characterization and Understanding of Changes in Natural Resources	◐	H	H	H	●	◐
SI-3	Integrate Regional Monitoring Efforts	◐	H	H	H	●	◐
SI-4	Integrate, Synthesize, and Analyze New and Existing Data	◐	H	H	H	●	◐
SI-5	Increase Outreach and Information Dissemination	◐	H	H	H	◐	◐
SI-6	Expand SIMoN as a Model for the National Marine Sanctuary System	○	H	H	H	●	◐
Marine Protected Areas Action Plan							
MPA-1	Develop Partnerships	●	M	H	H	●	○

		A	B	C	D	E	F
Action Plan Strategies		Strategy Status:	Implementation Level Funding: Scenario 1	10% per year Increase: Scenario 2	20% per year Increase: Scenario 3	Partnership Coordination	Primary Funding Source
MPA-2	Define Conservation Goals and Objectives and Habitats and Resources to be Protected	◐	M	H	H	●	◐
MPA-3	Develop General Design Criteria	◐	M	H	H	●	◐
MPA-4	Determine Types of Use	○	M	H	H	●	○
MPA-5	Develop Integrated Management System	○	M	H	H	●	○
MPA-6	Conduct Socioeconomic Impact Analysis and Identify Mitigation	◐	M	H	H	●	◐
MPA-7	Develop Enforcement and Compliance Program	○	M	H	H	●	◐
MPA-8	Develop Education and Outreach Program	○	M	H	H	◐	◐
MPA-9	Build Research and Monitoring Program	○	M	H	H	◐	◐
MPA-10	Develop Timing Strategies and Phasing/ Effectiveness Evaluations	○	M	H	H	◐	○
MPA-11	Develop Interagency Coordination and Implementation Mechanisms in Federal and State Waters	○	M	H	H	●	◐
Operations and Administration							
Operations and Administration Action Plan							
OA-1	Assess Staffing Needs	◐	H	H	H	○	○
OA-2	Develop Volunteer Program	◐	M	M	H	◐	◐
OA-3	Coordinate and Support Sanctuary Advisory Council	●	H	H	H	○	○
OA-4	Conduct Facilities Assessment	◐	H	H	H	○	○
OA-5	Conduct Administrative Initiatives	◐	H	H	H	○	○
OA-6	Coordinate and Conduct Boat Operations	◐	M	M	H	○	○
OA-7	Oversee and Conduct Dive Operations	◐	L	L	M	◐	○
OA-8	Oversee and Conduct Aircraft Operations	◐	L	L	M	◐	○
OA-9	Maintain and Enhance Permit Program	●	M	M	M	◐	○
OA-10	Increase Interagency Program Review	◐	M	M	M	◐	○
Performance Evaluation Action Plan							
PE-1	Measure Sanctuary Performance Over Time	○	M	M	M	◐	○
Partnerships and Opportunities							
Fishing Related Education and Research Action Plan							
FER-1	Educate About Fisheries Management	○	M	M	M	◐	◐
FER-2	Enhance Stakeholder and Public Communication	◐	M	M	M	◐	◐
FER-3	Facilitate Sustainable Fisheries Definition and Promotion	○	M	M	M	◐	●

Monterey Bay National Marine Sanctuary – Final Management Plan
 Section I – Introduction: Implementing the Management Plan

		A	B	C	D	E	F
Action Plan Strategies		Strategy Status:	Implementation Level Funding: Scenario 1	10% per year Increase: Scenario 2	20% per year Increase: Scenario 3	Partnership Coordination	Primary Funding Source
FER-4	Involve Fishermen in Education and Outreach Programs	◐	M	M	M	●	◐
FER-5	Fisheries Related Data Collection and Distribution	◐	M	M	H	●	◐
FER-6	Collect and Distribute Socioeconomic, Cultural, and Historical Data	◐	L	M	M	●	◐
FER-7	Conduct Public Outreach on Links Between Healthy Ecosystems and Fish Populations	○	L	M	M	◐	◐
Interpretive Facilities Action Plan							
IF-1	Construct and Operate Visitor Center	◐	H	H	H	●	◐
IF-2	Develop Smaller Regional Interpretive Facilities	◐	M	M	H	●	◐
IF-3	Increase Sanctuary-Wide Interpretive Signage	◐	M	M	H	●	◐
IF-4	Virtual Experiences	◐	M	M	H	●	◐
Ocean Literacy and Constituent Building							
MERITO-1	Implement Regional Planning Approach to Address Multicultural Outreach	●	M	M	M	●	◐
MERITO-2	Community-Based Bilingual Outreach Program	●	M	M	M	●	◐
MERITO-3	Implement Site-Based Bilingual Outreach Program	●	M	M	M	●	◐
MERITO-4	Implement Teacher Training and Internship Program	●	M	M	M	●	◐
MERITO-5	Develop Comprehensive Communications Plan	◐	L	M	M	○	◐
MERITO-6	Integrate Multicultural Elements Into Existing MBNMS Programs and Materials	◐	M	M	M	○	◐
MERITO-7	Intra-Sanctuary Expansion of MERITO	◐	M	M	M	◐	◐
Water Quality							
Beach Closures and Microbial Contamination Action Plan							
BC-1	Research	○	M	M	M	●	●
BC-2	Monitoring	◐	M	M	H	●	◐
BC-3	Notification Program	○	M	M	H	●	◐
BC-4	Geographic Information System (GIS)	○	M	M	H	◐	◐
BC-5	Increase Source Control Program	◐	H	H	H	●	◐
BC-6	Increase Technical Training for Industry Professionals	◐	H	H	H	◐	◐
BC-7	Enhance Public Outreach of Contamination Sources and Solutions	◐	H	H	H	●	◐
BC-8	Increase and Coordinate Enforcement	○	M	M	H	●	◐

		A	B	C	D	E	F
Action Plan Strategies		Strategy Status:	Implementation Level Funding: Scenario 1	10% per year Increase: Scenario 2	20% per year Increase: Scenario 3	Partnership Coordination	Primary Funding Source
BC-9	Improve Emergency Response	○	M	M	H	◐	◐
Cruise Ship Discharges Action Plan							
CS-1	Increase Outreach and Coordination	◐	M	M	M	○	○
CS-2	Develop Enforcement and Monitoring Program	◐	M	M	M	◐	○
Water Quality Protection Program Implementation Action Plan							
WQPP-1	Increase Public Education and Outreach	●	M	H	H	◐	◐
WQPP-2	Increase Technical Training	●	M	H	H	◐	◐
WQPP-3	Collaborate with Regional Urban Runoff Management Efforts	◐	M	M	M	●	◐
WQPP-4	Promote Structural/ Non-structural Controls	◐	M	M	H	●	◐
WQPP-5	Promote Sedimentation/Erosion Controls	○	L	L	M	●	◐
WQPP-6	Increase Storm Drain Inspection	◐	M	H	H	●	●
WQPP-7	Produce and Promote CEQA Additions	◐	L	L	M	●	◐
WQPP-8	Increase Regional Monitoring	●	M	M	M	●	●
WQPP-9	Increase Access to Monitoring Data	●	M	M	M	●	◐
WQPP-10	Increase Interagency Coordination	●	M	M	M	●	◐
WQPP-11	Increase Public Education and Outreach	●	L	L	L	◐	◐
WQPP-12	Develop and Implement Technical Training Team	●	L	L	L	◐	◐
WQPP-13	Promote Bilge Waste Disposal and Waste Oil Recovery	●	L	L	M	●	●
WQPP-14	Promote Topside and Haul-out Vessel Maintenance	○	L	L	M	●	◐
WQPP-15	Increase Underwater Hull Maintenance	○	L	L	M	●	◐
WQPP-16	Establish Agricultural Industry Networks to Address Water Quality	●	H	H	H	●	●
WQPP-17	Strengthen Technical Information and Outreach to Agriculture	●	H	H	H	◐	◐
WQPP-18	Improve Education and Public Relations on Watersheds and Agricultural Conservation measures	●	H	H	H	◐	◐
WQPP-19	Coordinate and Streamline Regulations for Conservation Projects	●	M	M	M	◐	●
WQPP-20	Improve Funding Mechanisms and Incentives for Water Quality Improvements	●	M	M	M	◐	◐
WQPP-21	Improve Water Quality Management on Public Lands and Rural Roads	○	H	H	H	◐	◐
WQPP-22	Develop Wetlands and Riparian Corridor Action Plan	○	L	L	L	●	●
Wildlife Disturbance							

		A	B	C	D	E	F
Action Plan Strategies		Strategy Status:	Implementation Level Funding: Scenario 1	10% per year Increase: Scenario 2	20% per year Increase: Scenario 3	Partnership Coordination	Primary Funding Source
Marine Mammal, Seabird, and Turtle Disturbance Action Plan							
MMST-1	Mitigate Impacts From Marine Vessels	●	M	M	H	◐	◐
MMST-2	Mitigate Impacts From Low Flying Aircraft	◐	L	L	M	◐	○
MMST-3	Mitigate Impacts From Shore-Based Activities	◐	M	M	M	◐	◐
MMST-4	Mitigate Impacts From Marine Debris	○	L	L	L	◐	○
MMST-5	Evaluate Impacts From Commercial Harvest	○	L	L	M	●	○
MMST-6	Assess Impacts From Acoustics	◐	L	L	M	●	◐
MMST-7	Reduce Sea Turtle Disturbance	○	L	L	L	◐	○
MMST-8	Maintain and Enhance Enforcement	◐	M	M	H	◐	○
Motorized Personal Watercraft Action Plan							
MPWC-1	Maintain Motorized Personal Watercraft Zones	◐	M	M	M	○	○
MPWC-2	Consider Zone Restriction Exceptions	◐	L	L	M	◐	○
MPWC-3	Conduct Educational Outreach to MPWC Community	○	M	M	M	◐	○
MPWC-4	Enhance Enforcement Efforts	◐	M	M	M	◐	○
Tidepool Protection Action Plan							
TP-1	Assess the Problem	◐	M	M	M	◐	○
TP-2	Conduct Education and Outreach	◐	L	M	M	◐	◐
TP-3	Strengthen Enforcement	○	L	L	M	◐	◐
TP-4	Improve Tracking and Evaluation of Collection and Take	○	L	L	L	◐	○
TP-5	Consider Limitation on Use in Selected Locations	○	L	L	L	●	○
TP-6	Identify Implementation Opportunities	○	L	L	M	○	○
TP-7	Address Other Human Activities	○	L	L	L	◐	○
Cross-Cutting							
Administration and Operations Action Plan							
XAO-1	Improve Internal Communications Among the Three Sanctuaries	◐	H	H	H	○	○
XAO-2	Improve the Efficiency and Cost-Effectiveness of Program Operations	○	M	H	H	○	○
XAO-3	Improve the Efficiency and Cost-Effectiveness of Program Administration	◐	M	M	H	○	○
XAO-4	Improve the Coordination of Sanctuary Resource Protection Activities and Programs	◐	L	M	H	◐	○
Community Outreach Action Plan							

Monterey Bay National Marine Sanctuary – Final Management Plan
 Section I – Introduction: Implementing the Management Plan

	A	B	C	D	E	F
Action Plan Strategies	Strategy Status:	Implementation Level Funding: Scenario 1	10% per year Increase: Scenario 2	20% per year Increase: Scenario 3	Partnership Coordination	Primary Funding Source
XCO-1 Build Upon and Expand Existing Ocean and Coastal Outreach	○	L	M	H	◐	◐
XCO-2 Enhance and Coordinate Ocean and Coastal Education	◐	L	M	H	◐	◐
XCO-3 Enhance Ocean and Coastal Stewardship	○	L	M	H	●	◐
Ecosystem Monitoring Action Plan						
XEM-1 Coordinate Existing Targeted Monitoring Activities to Promote Greater Efficiency and Effectiveness	◐	M	M	H	●	○
XEM-2 Coordinate and Implement Existing Regional Ecosystem Monitoring Activities	◐	L	L	M	●	●
XEM-3 Identify Shared Monitoring Needs With Respect to Management Concerns and Responsibilities at Each of the Sanctuaries	◐	M	M	H	◐	◐
XEM-4 Establish a Joint Internal Monitoring Coordination Team	○	H	H	H	◐	○
XEM-5 Consider Establishing Additional Site-Specific or a Joint Research Activities Panel to Enhance Research and Monitoring Collaborations	○	L	L	M	◐	○
Maritime Heritage						
XMHR-1 Establish Maritime Heritage Resources Program	◐	M	M	M	◐	○
XMHR-2 Inventory and Assess Submerged Sites	◐	L	L	M	●	◐
XMHR-3 Assess Shipwrecks and Submerged Structures for Hazards	○	L	M	M	●	◐
XMHR-4 Protect and Manage Submerged Archaeological Resources	○	L	L	M	●	◐
XMHR-5 Conduct Public Outreach with Traditional User and Ocean-Dependent Groups and Communities	○	L	L	M	●	◐
XMHR-6 Establish Maritime Heritage Focused Education and Outreach Programs	○	L	L	M	◐	○
Northern Management Area Plan						
NMA Administration and Operations						
XNAO-1 Create a Multi-Functional HMB Regional Office.	◐	L	M	H	◐	○
XNAO-2 Evaluate the Delivery and Success of NMSP Programs and Services in the NMA	○	M	H	H	○	○
NMA Resource Protection						
XNRP-1 GFNMS Will Be Responsible for Permit Activities in the NMA	◐	M	M	M	●	○

	A	B	C	D	E	F
Action Plan Strategies	Strategy Status:	Implementation Level Funding: Scenario 1	10% per year Increase: Scenario 2	20% per year Increase: Scenario 3	Partnership Coordination	Primary Funding Source
XNRP-2 GFNMS Will Be Responsible for Regulatory Activities in the NMA While Maintaining Maximum Consistency and Protection to Sanctuary Resources	◐	M	M	M	●	○
XNRP-3 GFNMS Staff Will Coordinate Existing and Emerging Resource Protection Issues in the NMA	◐	L	L	L	●	◐
XNRP-4 GFNMS Staff Will Coordinate Enforcement Activities in the NMA	◐	M	M	M	●	◐
XNRP-5 GFNMS Staff Will Coordinate NMA Emergency Response Activities in the NMA	◐	M	M	M	●	◐
XNRP-6 MBNMS Water Quality Protection Program Staff Will Continue to Coordinate Water Quality Activities in the NMA	◐	M	M	M	●	◐
NMA Research & Monitoring						
XNRM-1 Share Information	●	H	H	H	○	○
XNRM-2 Coordinate Research and Monitoring Information Dissemination	○	M	M	M	○	○
XNRM-3 Collaborate on Sanctuary Advisory Committees and Working Groups on Research and Monitoring Issues Related to the NMA	●	H	H	H	○	○
XNRM-4 Collaborate on Volunteer Monitoring Efforts Related to the NMA	●	H	H	H	●	◐
XNRM-5 Implement JMPR Site-Specific Research and Monitoring Activities in the NMA	○	L	M	H	◐	●
NMA Education & Outreach						
XNEO-1 Transfer, Establish and Implement School Programs for the NMA	◐	M	H	H	●	◐
XNEO-2 Develop and Implement Community Outreach and Stewardship Programs	◐	M	H	H	●	◐
XNEO-3 Develop and Disseminate Outreach Materials in the NMA	○	L	M	M	◐	○
XNEO-4 Implement JMPR Site-Specific Education and Outreach Activities in the NMA	○	L	M	H	◐	◐



Section II

Coastal Development

- **Coastal Armoring Action Plans**
- **Desalination Action Plans**
- **Harbors and Dredge Disposal Action Plans**
- **Submerged Cables Action Plans**

Coastal Armoring Action Plan

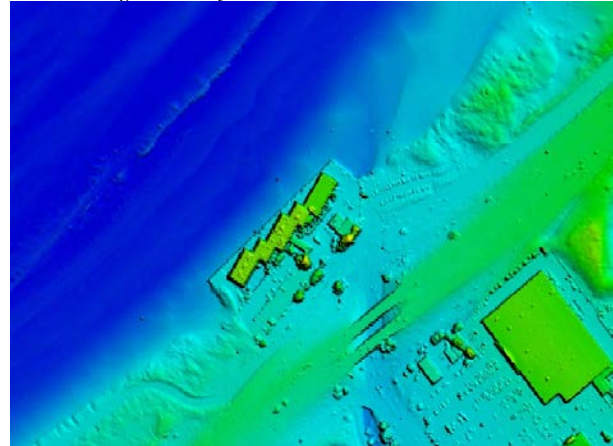
Goal

Reduce expansion of hard coastal armoring in the coastal areas near the MBNMS through proactive regional planning, project tracking, and comprehensive permit analysis and compliance.

Introduction

Shoreline protective structures have been used extensively along California’s coastline to protect infrastructure and other development from wave action, or to retain soil to avoid erosion. Private landowners and local, state, or federal governments have typically installed structures in an attempt to protect development threatened by coastal erosion. Structures have also been installed to protect public infrastructure such as Highway 1, which in some stretches is vulnerable to erosion related to bluff retreat. This practice is commonly known as coastal armoring, and seawalls, bulkheads and revetments are some of the structures that are used. Seawalls are barriers, usually vertical walls, between the land and water that protect from wave erosion. A bulkhead is used as a retainer, providing protection and stabilizing the land that it supports. Revetments are protective structures placed along slopes and are constructed of a sturdy material such as stone.

Figure CA-1: NOAA LIDAR Image of Armored Coastline Surrounding Monterey Beach Hotel



Increases in development and continued, natural erosion of coastal bluffs will cause additional pressure to install structures to protect private and public property from erosion. Development is continuing to occur in vulnerable areas along California’s coast, followed by a desire to protect both private and public property. The situation presents a serious predicament to both resource managers and property owners. However, it is clear that current policies need strengthening, and there is a need to develop collaborative approaches to address the issues of erosion and the demand for coastal armoring, including improved guidance to enable better decision making.

Sanctuary regulations prohibit alteration of the seabed, and all armoring structures placed below the mean high tide line require approval from the MBNMS. The Sanctuary regulates coastal armoring by authorizing California Coastal Commission permits, and placing specific conditions on those permits. Many seawalls have been constructed with no notification to or authorization from the MBNMS. Since 1992, MBNMS review of seawalls primarily focused on minimizing impacts from the construction process rather than long-term impacts from the armoring itself. Since its designation, MBNMS has reviewed and authorized California Coastal Commission permits for seawalls, riprap or other coastal armoring projects at fifteen sites. Only a portion of the total coastal armoring projects underway in the region came to the Sanctuary for review, clearly indicating a need for improved inter-agency coordination.

As with any activity that alters natural processes, there can be significant long-term impacts related to coastal armoring. Environmental impacts of coastal armoring vary significantly depending on the type of structure constructed, the magnitude of the project, and the specific geological, biological, and oceanographic conditions in the vicinity of the structure. Coastal armoring can potentially damage or alter local coastal habitats, deprive beaches of sand, lead to accelerated erosion of adjacent beaches, hinder access, and present problems with public safety. Coastal armoring projects may impede and eventually cut off access to significant stretches of public beaches.

Currents, waves, and wind normally transport sediment throughout the littoral system. Armoring of the coast can interfere with littoral transport, which in a natural state may reach a dynamic equilibrium. When the availability of sediment is reduced due to the existence of a structure, erosion can increase in other nearby locations. Vertical structures in particular can deflect wave energy causing increased erosion and altering natural habitat in front of the structure. Reflected wave energy may make it difficult for organisms to inhabit the area because of high turbidity.

Coastal armoring can negatively impact certain biological resources by causing changes in abundance and distribution of species. Coastal armoring structures can influence the structure of benthic communities, due to potential differences in settlement patterns for natural substrates and armoring structures. Armoring structures can encroach into the intertidal zone or disturb important buffer areas such as marsh habitat between the marine and terrestrial environments, which naturally mitigate erosion, and play an important role in flushing certain contaminants.² Certain structures can also provide habitat for predatory species not normally associated with the beach and intertidal zone such as rats and squirrels, which can feed on intertidal organisms, compete for food with native species, and transmit disease. Additionally, coastal armoring can act as a barrier to wildlife, by blocking access of certain species to the beach.

The construction phase of coastal armoring projects generally causes short-term impacts, lasting only a few days to a few weeks. Problems include increased turbidity caused by suspended solids in the immediate vicinity of the construction site, and the risk of chemicals or other materials entering the ocean from construction activities. Structures constructed in the intertidal zone generally have more impact than those constructed above the high tide line. Many short-term construction impacts can be minimized through appropriate mitigation measures, including scheduling of the construction phase to reduce impacts by considering animal migration patterns and spawning patterns or specific actions such as the use of silt curtains. However, the long-term impacts of coastal armoring projects are more difficult to address or prevent, and they are a key focus of this action plan.

Strategy CA-1: Conduct Issue Characterization and Needs Assessment

Implementation of this strategy will identify existing information and data gaps, and compile and produce the necessary scientific data and evaluation tools. This will also involve an in-depth analysis of a subregion of the MBNMS and then development of a long-term monitoring program based on its success.

Activity 1.1: Produce MBNMS-wide Maps and Database for use as Planning and Permit Review Tools

The MBNMS will coordinate with partners to map existing coastal armoring sites and potential future site requests based on evaluation of coastal erosion rates and development patterns. The MBNMS will also coordinate with partners to develop a regional integrated database and Geographic Information System (GIS) layers showing land use types, parcels, coastal armoring locations, beach and bluff erosion and replenishment rates, bottom types, biological habitats, and geology/geomorphology. This database system should become integrated with Sanctuary Integrated Monitoring Network (SIMoN) to facilitate use by other agencies and the public.

Activity 1.2: Compile and Analyze Ecological and Socioeconomic Data

This activity is a long-term characterization that will begin as a pilot project with an in-depth analysis on a critical subregion. The MBNMS will first coordinate with partners to identify methods and to assess individual and cumulative impacts of coastal armoring on sand supply dynamics, marine biological habitats and ecosystems, and public access. Compilation of this data should include studies to estimate coastal bluff erosion rates, and shoreline change rates and a regional evaluation of sand transport dynamics and beach nourishment.

Activity 1.3: Incorporate Data and link with State Programs

Incorporate data into maps and database from Activity 1.1, and link to State of California’s COASTAL SEDIMENT MANAGEMENT MASTER PLAN.

Activity 1.4: Develop and Implement a Long-term Monitoring Program

Quantify and compare the impacts of different types of coastal armoring structures in various habitat types and conditions. Considerations for monitoring program include intertidal biological community structure, changes in beaches, wave refraction patterns, and impacts on sand budget.

Strategy CA-2: Develop and Implement Regional Approach to Coastal Armoring

MBNMS will collaborate with partners to develop and implement a more proactive and comprehensive regional approach that minimizes the negative impacts of coastal armoring. This approach will consider impacts throughout the life of the structure from construction and maintenance to the long-term cumulative impacts.

Activity 2.1: Apply Hierarchy of Preferred Responses to Erosion

The MBNMS will use the following hierarchy of responses as preferred approaches to addressing coastal erosion that may threaten structures.

A. Use of preventative measures

Identify and evaluate preventative measures aimed at reducing the need for coastal armoring. Considerations may include increased setback requirements, incorporation of a “no hard armoring” policy (possibly in covenants, codes, and restrictions) for new subdivisions or situations when coastal agricultural land is converted to development, re-alignment of coastal roads and highways, and new setback requirements to be established for demolition/rebuild projects in urbanized areas.

B. Alternatives to coastal armoring

Identify and evaluate alternatives to coastal armoring, including but not limited to: (a) alternatives conforming to MBNMS regulations such as relocation of vulnerable structures, re-alignment of coastal infrastructure such as roads, bridges, and highways, and control of surficial erosion; and (b) alternatives not conforming to MBNMS regulations, including some sand supply strategies and artificial reef structures.

C. Preferred types of coastal armoring

In cases where armoring is deemed necessary, identify and evaluate the least environmentally damaging types of coastal armoring, including more natural alternatives for specific conditions and geographic locations, taking into account engineering, environmental, aesthetic and public access concerns.

Activity 2.2: Develop and Implement Guidelines for Identifying Sub-regions

Guidelines will be developed with partners to identify pristine or particularly sensitive areas where coastal armoring should be strongly discouraged or not allowed; urban zones that are already heavily armored and where efforts should focus on restoration and improved armoring techniques; and areas in-between where thorough case-by-case review and additional research is needed.

Activity 2.3: Identify Planning Sub-regions

MBNMS staff will work with partners to identify boundaries for sub-regions and consider measures developed in Activity 2.1 to determine planning approaches for each sub-region. Sub-region and size will be based on complexity and continuity of similar habitats or land uses. This may include continual habitats of rocky shores, sandy beaches, littoral cells, estuarine environments, and land use such as existing armoring, urban areas, rural coastlines, or beaches with heavy visitation. These areas will be identified based on ecological and land use criteria for identifying planning sub-regions for coastal armoring policies and strategies. Identifying sub-regions should be based on: (a) biological sensitivity of habitats; (b) physical considerations, including geological factors such as sediment sources and sinks, beach nourishment needs, shoreline orientation and erosion rates; and (c) development pressures, including the extent of existing armoring, potential for new armoring requests, types of structures to be protected, and level of development and infrastructure.

Activity 2.4: Develop Specific Planning Guidelines for each Sub-region

MBNMS staff will work with partners to develop specific planning guidelines for each sub-region identified in Activity 2.3, based on application of the hierarchical approach as stated in Activity 2.1. All policy development and application of guidelines to sub-regions should involve significant outreach to affected parties and agencies. Sub-regions will be addressed sequentially beginning with an initial pilot region in Southern Monterey Bay.

Activity 2.5: Develop Maintenance and Restoration Program

MBNMS staff will work with partners to develop a program for maintenance and restoration of existing armoring, including “clean-up” of poorly maintained sites, for both authorized and illegal structures. If or when maintenance is requested, MBNMS and partners will re-evaluate the need for protection. All maintenance and restoration programs should incorporate improvements in beach access and public safety. In heavily armored areas where maintenance is

necessary and appropriate, MBNMS and partners will consider the potential for installation of a comprehensive, uniform structure to replace multiple individual structures.

Activity 2.6: Reduce Need for Emergency Permits

The MBNMS will coordinate with partners to reduce the use of and need for emergency coastal development permits through better predictive erosion analyses, potential alteration of current guidelines regarding initiation of work, and more proactive regional planning. Staff will consider areas where it is appropriate to either initiate the work or develop alternative solutions, before the site becomes an emergency.

Activity 2.7: Broaden the Multi-Agency Enforcement Program

MBNMS will work with partners to develop cooperative enforcement mechanisms for inspection of permitted coastal armoring structures, tracking/notification and corrective action regarding illegal structures, assessment of fines, and removal of emergency structures that are not permitted to remain in place permanently.

Activity 2.8: Pursue Pilot Program for Alternatives to Coastal Armoring

Based on the scientific and needs assessment, MBNMS will pursue a pilot program to investigate environmentally sound alternatives to coastal armoring, and develop and implement monitoring protocols for the program. Alternatives will include but not be limited to: preventative measures, planned retreats, beach nourishment, and structural responses such as groins or breakwaters.

MBNMS will convene interagency working groups to identify and help design sub-region specific design alternatives for the coastal erosion responses identified in Activity 2.1. Considerations will include:

- A. Identifying the suite of preventative measures such as restricting activities that contribute to erosion, predevelopment conditioning of projects and the necessary legal measures or relocation of structures such as road realignment or development demolition, or enhanced vegetation of exposed, erosion prone areas.
- B. Identifying hard structures that may preempt erosion or help retain sand on beaches. Types of structures may include groins (narrow wooden or concrete constructions that extend from a shore into the sea to protect a beach from erosion), offshore seawalls, breakwater, or submerged structures such as artificial reefs that dissipate wave energy prior to reaching the shoreline. All hard structures would alter the seabed and therefore trigger review by MBNMS as a prohibited activity.
- C. Identifying appropriate sources of beach quality material and one or more locations for one or more pilot demonstration projects that might receive an MBNMS scientific research permit (and other necessary agency permits) to test and develop appropriate sand supply and beach nourishment program options. MBNMS will develop a coordinating mechanism with the California Coastal Sediment Management Workgroup to promote the exchange of information and ideas. If appropriate sources of sand and potentially beneficial nourishment sites can be identified, the pilot study or studies would develop specific research objectives and study methodologies. Criteria for “success” will also be developed. The criteria could include minimal environmental impacts, recreational access, shoreline protection and habitat benefits, the potential for using maintained

nourishment to avoid or mitigate for shoreline armoring, and other identifiable overall benefits to MBNMS resources.

At the conclusion of this/these demonstration pilot project(s), the agency working group will evaluate the desirability of, and necessary steps for, continuing such a program involving beach nourishment within MBNMS boundaries. If the sand supply project is to continue, this evaluation will also examine whether revision of MBNMS regulations may be warranted, if a beneficial program might continue via MBNMS permit or authorization in concert with other regulatory agencies.

Strategy CA-3: Improve Permit Program

MBNMS will improve the current case-by-case permit system and strengthen coordination with other agencies regarding coastal armoring permit processing.

Activity 3.1: Integrate State and Federal Planning Programs

Where possible, MBNMS will link and integrate aspects of the MBNMS coastal armoring plan with California state erosion policy and Coastal Sediment Management Master Plan.

Activity 3.2: Develop Consistent Permitting Conditions

Following the initiation of regional analysis from Strategy 2, identify permit conditions and authorization criteria of the agencies involved in the regulation of coastal armoring. Staff will subsequently compare typical multi-agency seawall permit conditions, identify and discuss selected discrepancies, and where possible seek to rectify discrepancies.

Activity 3.3: Incorporate MBNMS Standard Conditions into Other Agency Permits

The MBNMS will coordinate with the California Coastal Commission to incorporate current MBNMS standard conditions regarding construction processes into Coastal Commission permits

Activity 3.4: Clarify Level of MBNMS Involvement in Projects and Develop Review Thresholds

MBNMS staff will develop and identify a threshold for full MBNMS review of selected projects based on overall footprint, location, and potential impacts, and ensure early communication on these projects.

Activity 3.5: Share Information with Other Agencies

MBNMS staff will continue to improve early sharing of information on projects and permits among all relevant agencies.

Activity 3.6: Conduct Permit Enforcement Inspections and Actions

The MBNMS will conduct enforcement inspections of permitted coastal armoring activities and follow up to ensure compliance with conditions of permits and authorizations. The MBNMS will conduct general surveillance patrols to detect coastal armoring activities being conducted without required permits.

Strategy CA-4: Implement Programs and Increase Training

MBNMS will provide outreach and training to local, state and federal agencies and the general public about the sanctuary’s sub-regional approach to addressing the issue of coastal erosion.

Activity 4.1: Conduct Needs Assessment

MBNMS staff will conduct a needs assessment to determine best strategies for reaching target groups including: decision makers, agencies, coastal landowners, and coastal developers.

Activity 4.2: Conduct Outreach to Agencies and Property Owners

MBNMS will coordinate with partners to increase outreach to agencies not involved in the planning process, developers, and private property owners about regional approaches to coastal erosion, existing guidelines, and the impacts of coastal armoring.

Activity 4.3: Review and Comment on Local Land Use Decisions

MBNMS staff will track and evaluate local and regional land use decisions where coastal development may impact MBNMS resources. Where appropriate, produce verbal or written comments on specific projects.

Activity 4.4: Review and Comment on Local Coastal Program Updates

MBNMS will coordinate with the California Coastal Commission and local agencies during Local Coastal Program updates to improve existing policies and incorporate coastal armoring guidelines where possible.

Action Plan Partners: California Coastal Commission, United States Geological Survey, California Department of Transportation, California Department of Boating and Waterways, Local Municipalities, Research Institutions, California Department of Fish and Game, Local Jurisdictions, Local Experts, Elkhorn Slough NERR, Property Owners

Table CA.1: Measuring Performance of the Coastal Armoring Action Plan

Desired Outcome(s) For This Action Plan:	
Reduce expansion of hard coastal armoring in the coastal areas near MBNMS through proactive regional planning, project tracking, and comprehensive permit analysis and compliance.	
Performance Measure	Explanation
By 2012, complete three collaborative coastal erosion response plans for the planning sub-regions of the MBNMS.	MBNMS will track performance annually through the development of three detailed plans for three sub-regions that will include: an analysis of coastal erosion and management response including an analysis of local and regional alternatives to manage coastal erosion.

Table CA.2: Estimated Timelines for the Coastal Armoring Action Plan

Coastal Armoring Action Plan	YR 1	YR 2	YR 3	YR 4	YR 5
Strategy CA-1: Conduct Issue Characterization and Needs Assessment	●	—————▶			
Strategy CA-2: Develop and Implement Regional Approach to Coastal Armoring		●	—————●		
Strategy CA-3: Improve Permit Program	●	●			
Strategy CA-4: Implement Programs and Increase Training				●	—————▶
Legend					
Year Beginning/Ending	:	● ——— ●	Major Level of Implementation:	—————	
Ongoing Strategy	:	● ———▶	Minor Level of Implementation:	

Table CA.3: Estimated Costs for the Coastal Armoring Action Plan

Strategy	Estimated Annual Cost (in thousands)*				
	YR 1	YR 2	YR 3	YR 4	YR 5
Strategy CA-1: Conduct Issue Characterization and Needs Assessment	\$198	\$98	\$106	\$64	\$80.4
Strategy CA-2: Develop and Implement Regional Approach to Coastal Armoring	\$17	\$53	\$61	\$33	\$24
Strategy CA-3: Improve Permit Program	\$8	\$8	\$8	\$8	\$4
Strategy CA-4: Implement Programs and Increase Training	\$4	\$14.5	\$19.5	\$15.5	\$11.5
Total Estimated Annual Cost	\$227	\$173.5	\$194.5	\$120.5	\$119.9

* Cost estimates are for both “programmatic” and “base” (salaries and overhead) expenses.

Desalination Action Plan

Goal

Minimize the impacts to sanctuary resources and qualities from desalination activities.

Introduction

Desalination is the process by which salts and other chemicals are removed from salt or brackish water and other impaired water resources. It is also known as desalinization or desalting or commonly referred to as “desal.” As traditional sources of fresh water continue to be depleted and degraded, society is increasingly looking toward desalination as an option for obtaining water for both private and municipal freshwater supply. Various water project proponents are increasingly attracted to desalination due to increasing efficiency in desalting technologies’ ability to produce the water as well as escalating costs of obtaining fresh water from conventional sources.

Three desalination facilities currently operate within the boundaries of the Monterey Bay National Marine Sanctuary (MBNMS); however, there has recently been an increase in interest for both private and public desalination plants. Approximately ten facilities have recently been proposed. Rather than utilizing a coordinated regional planning approach, each plant has been conceived and designed as a separate project. Due to population growth in the area, continuing shortages and degradation of conventional water supplies, and advances in desalination technology, the trend will likely continue.

Desalination plants can impact the marine environment through the introduction of brine effluent and other substances to MBNMS waters. Construction of desalination facilities and associated pipelines often causes alteration of the seabed. Intake of water directly from the ocean typically results in biological impacts as a result of impingement and entrainment. Impingement is when organisms collide with screens at the intake, and entrainment is when species are taken into the plant with the feed water and are killed during plant processes. In addition, desalination facilities bring a potential for community growth. Along most of California’s central coast, fresh water supply is the limiting factor for community growth. With the addition of an unlimited source of freshwater, growth can be allowed to occur. While population growth is not addressed directly by MBNMS regulations, it is of major concern. Significantly increased development of the coastline adjacent to the MBNMS could lead to degradation of water quality and many other challenges to the protection of MBNMS resources.

This action plan is developed as a regional approach to address desalination, aimed at reducing impacts to marine resources in the MBNMS through consideration of regional planning, facility siting issues, on-site mitigation measures, modeling and monitoring, and outreach and information exchange.

Desalination in the Sanctuary

Three of the Sanctuary’s regulations relate directly to desalination. The first involves a prohibition on discharging or depositing any material or other matter within Sanctuary

boundaries. Since the brine effluent, and in some cases other material, are usually disposed of in ocean waters, this activity requires Sanctuary authorization of Regional Water Quality Control Board (RWQCB) permits. The second Sanctuary regulation pertains to discharging material or other matter outside of the boundaries, which subsequently enter Sanctuary waters and injure MBNMS resources or qualities. As with the previous regulation, Sanctuary approval via authorization of the RWQCB permit is required. The third relevant regulation involves a prohibition on activities that alter the seabed. Thus installation of certain desalination facility structures such as an intake/outfall pipeline on or beneath the ocean floor would also require Sanctuary authorization.

Three small desalination plants currently operate in the Sanctuary:

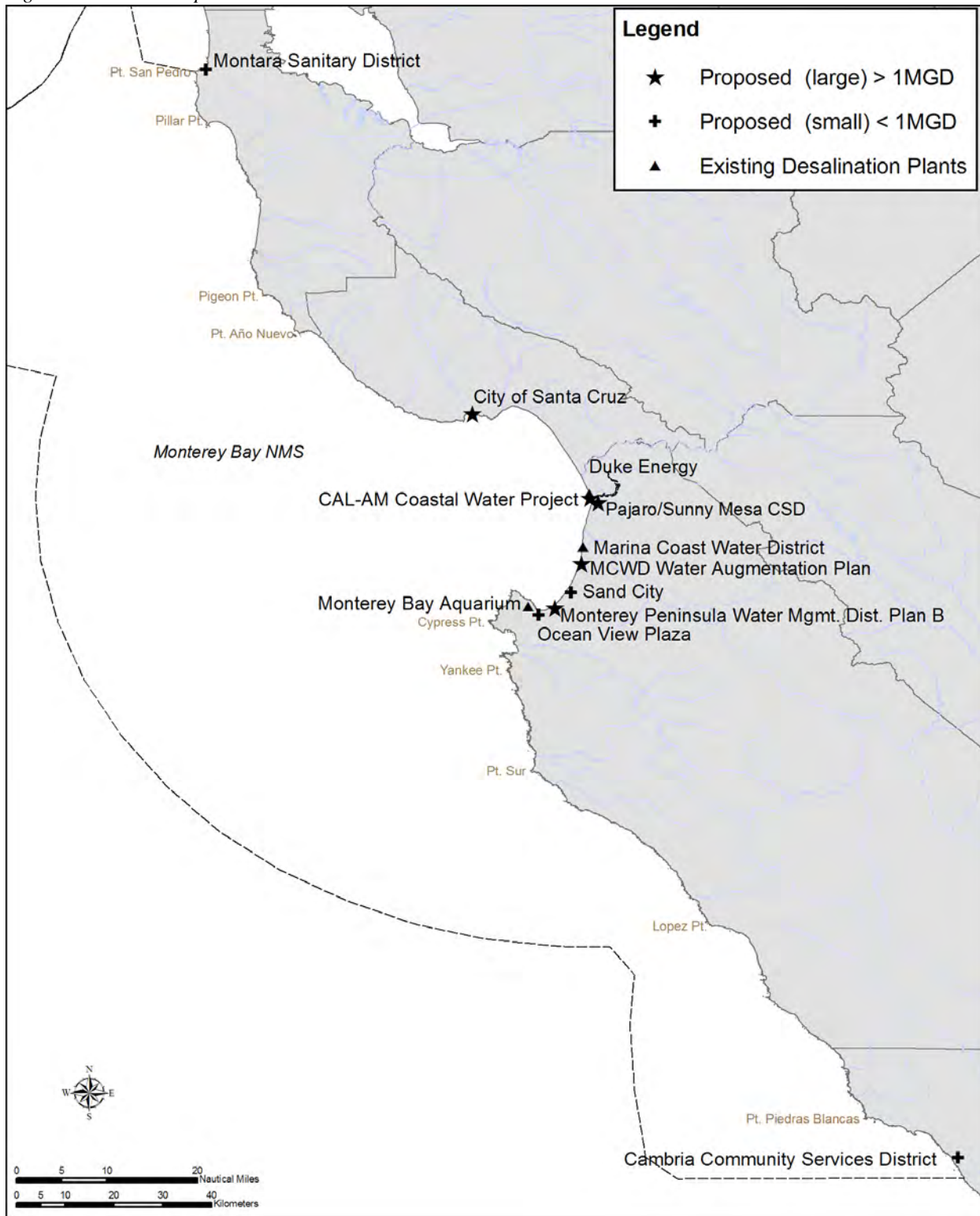
Duke Power Plant in Moss Landing contains a seawater distillation plant that produces a little less than 0.5 million gallons per day (MGD) for use in its boiler tubes for the power production process. This facility uses power plant cooling water as the source for the desalination feed water and brine effluent discharge. Due to the large volume of cooling water being discharged by the plant, the brine effluent is diluted and impacts from the salinity are eliminated.

Marina Coast Water District in the City of Marina operates a small plant with the capacity of 0.45 MGD, which currently supplies about 13 percent of the city's annual municipal water consumption. This plant uses a beach well for intake water and an injection well for discharging brine effluent. This facility, originally built in 1996, will be renovated in the near future with new technologies that will greatly increase its efficiency.

The Monterey Bay Aquarium operates a very small facility that provides about 0.040 MGD for maintenance purposes such as flushing the toilets. The saline brine discharge is blended with, and effectively diluted by, the exhibit water outfall.

Although there are currently only three facilities in operation, there has recently been an increase in proposals for both private and public desalination plants. Approximately ten additional facilities in the Sanctuary region are in some stage of initial consideration or planning (See Figure DESAL-1). These range from small, less than 0.050 MGD private facilities such as the proposed reverse osmosis plant for the Ocean View Plaza to be built on Cannery Row in Monterey, to larger multi-city regional projects like the ones Cal-Am and Pajaro Sunny Mesa Community Services District are currently investigating. There are also several proposals for smaller projects to serve a single city, such as the proposed plants in Cambria or Sand City. Due to population growth in the area, continuing shortages and degradation of conventional water supplies, and advances in desalination technology, the trend will likely continue.

Figure DESAL-1. Proposed or Potential Desalination Facilities



Strategy DESAL-1: Develop and Implement Regional Desalination Program

MBNMS will collaborate with partners to encourage the development and implementation of a regional planning program to address desalination facility development and operation in the MBNMS. A comprehensive regional approach to desalination issues would likely help minimize the impacts to resources by providing increased coordination and planning among desalination proponents and relevant agencies that are now addressing a multitude of independent desalination proposals.

Activity 1.1: Encourage the Development of and Provide Input to a Regional Planning Program

The MBNMS staff will collaborate with partners in the development and implementation of a regional planning approach to desalination that considers siting, volume of water requested, service areas, and potential collaborations. The following system standards and an analysis will be incorporated into the program:

- A. Develop and implement a system for improved coordination among agencies involved in permitting desalination, and among interested parties, in implementing the following strategies and activities in this action plan.
- B. Ensure opportunity for input from local jurisdictions and the interested public.
- C. Investigate potential for and encourage use of full capacity of existing desalination facilities before approval of construction of new plants.
- D. Develop and implement a system to improve tracking of new desalination proposals in order for the MBNMS and other agencies to enter into discussion with desalination plant proponents and interested parties early on in the process.
- E. Evaluate regional opportunities for joint facilities serving multiple jurisdictions, collocation of facilities at existing discharge sites, etc. Evaluate advantages and disadvantages of joint facilities versus several smaller well-sited plants.
- F. In collaboration with the California Coastal Commission, consider the ramifications of public versus private ownership of desalination facilities.
- G. Facilitate assessment and analysis of the potential growth inducing impacts of desalination plants in the region with other interested agencies and parties. Affected local governments, Association of Monterey Bay Area Governments (AMBAG), the Coastal Commission and other appropriate land use entities will be looked to for providing information and analysis on potential growth inducing impacts.

Strategy DESAL-2: Develop Facility Siting Guidelines

Environmental impacts in large part depend on specific physical and biological conditions in the vicinity of the facility, including the intake and outfall. Through proper siting of facilities and intake/outfall structures, impacts can be minimized. The goal of this strategy is to develop and implement a set of desalination facility siting guidelines and recommendations to minimize impacts to MBNMS resources and qualities.

Activity 2.1: Identify Preferred Conditions and Habitats

Building on the work done by California Department of Fish and Game and others, identify preferred conditions and habitats types that are the most resilient to the impacts of brine effluent, as well as sensitive species and habitats where brine effluent disposal should be avoided.

Activity 2.2: Develop Intake/Outfall Siting Guidelines

The MBNMS will coordinate with the appropriate regulatory agencies to develop and implement recommendations and guidelines for siting of intake and outfall structures, which require appropriate outfall siting and design that ensures adequate mixing and dilution of brine effluent. Considerations for siting include avoiding areas with limited water circulation and ensuring discharge to an appropriate depth and distance offshore. Guidelines should encourage use of appropriately sited existing pipelines of acceptable structural integrity to minimize seabed alteration. Other considerations include mixing of brine effluent with power plant cooling water or sewage treatment plant discharges where appropriate and ensuring that temporal variations in operation and maintenance of facilities are addressed to ensure sufficient dilution of brine effluent. In cases where new pipeline construction is required, it is vital to ensure proper routing and construction techniques to minimize environmental impacts e.g., impingement and entrainment, recreational impacts, potential for the effluent to be entrained in the intake, and potential for concentration of contaminants in the feed water.

Activity 2.3: Ensure Comprehensive Consideration of Potential Impacts

The MBNMS will coordinate with the appropriate regulatory agencies, to develop and implement recommendations and guidelines to ensure that planned facilities consider:

- A. Aesthetic, recreational, public access, and safety aspects
- B. The effects of surface waves, circulation, density, and mixing, on the dispersal of brine effluent
- C. Surface wave and sea level effects and geological considerations, including earthquake hazards, liquefaction, sand transport patterns, and beach erosion rates for proposed structures to be located on or near beach
- D. Alternatives analysis for water supply needs and supply options under NEPA and CEQA
- E. Emergency contingencies and incorporation of system-wide fail-safe technologies to address the potential for emergency scenarios (mechanical failures, terrorist attacks, etc.)
- F. Potential cumulative impacts from multiple facilities

Strategy DESAL-3: Identify Environmental Standards for Desalination Facilities

Specific engineering and design aspects of desalination plants are a major determinant of the severity of the impacts to the marine environment. There is an increasing range of technologies available, including many promising new advances in intake design, pretreatment, reverse osmosis, and brine disposal technology. This strategy defines and seeks to implement environmental standards for desalination facilities operating in the MBNMS. The MBNMS will collaborate with partners to define specific standards that proposed facilities would be required to meet through proper design and engineering. Compliance with standards shall be measured using requirements included in Strategy DESAL-4: Modeling and Monitoring Requirements.

Activity 3.1: Define Limits for Constituents of Brine Effluent

MBNMS staff will collaborate with the appropriate regulatory agencies to define and implement limits for salinity levels, toxicity, anti-corrosion additives, and other constituents of brine effluent. Standards shall take into consideration potential cumulative impacts from multiple facility operations.

Activity 3.2: Define Entrainment and Impingement Standards

MBNMS staff will coordinate with partners to define and implement environmental standards for entrainment and impingement including identification of preferred designs, screening, intake well siting, and maximum flow velocities. Standards shall also consider potential cumulative impacts from multiple facility operations.

Strategy DESAL-4: Develop Modeling and Monitoring Program

MBNMS will work with partners to develop a comprehensive modeling and monitoring program to determine predicted properties of brine plume and measure short-term, long-term, and cumulative impacts. The program will include information requirements for parties seeking permits, as well as a multi-tiered modeling and monitoring program. This multi-tiered approach includes identifying different levels of requirements based on characteristics of a proposed facility such as its location, the biological sensitivity of the habitat near its intake and outfall, specific properties of the brine discharge plume, and other characteristics.

Activity 4.1: Establish Regional Modeling Guidelines

MBNMS staff will coordinate with partners to establish and implement regional guidelines for modeling of expected brine effluent plumes by evaluating accuracy of existing plume and circulation models applied to desalination, including field testing, if necessary, and identifying acceptable models.

Activity 4.2: Identify Submittal Information Required for Project Application

MBNMS staff will coordinate with the appropriate regulatory agencies to identify the minimum requirements for the standard information submitted by the applicant for any proposed facilities seeking permits. These should include:

- A. Initial evaluation of recreational, public use, and commercial impacts in vicinity of desalination facility
- B. Initial monitoring to determine currents, tides, water depth and similar parameters of receiving waters
- C. Pre-construction biological analysis, with consideration of seasonal variability, of marine organisms in the affected area and control site to include indices, species richness, and abundance, along with evaluation of entrainment and impingement impacts
- D. Pre-construction estimation of expected brine composition, volumes, and dilution rates of the brine in the zone of initial dilution
- E. Plan for toxicity testing of the whole effluent as an ongoing monitoring requirement
- F. Studies to determine properties of combined discharges (cooling water or sewage), and their effects and toxicity on local species

- G. Post-operational monitoring of salinity in zone of initial dilution and control site, as an indicator for plume spreading and dispersal, to be compared with expected results from plume and circulation modeling; if not in compliance, then identify and implement corrective actions
- H. End of pipe monitoring program to verify results from expected brine composition and dilution
- I. Facility plans, and anticipated operations and management plans, including identification of potential land and water use implications stemming from plans to ensure public safety against possible hostile actions

Activity 4.3: Identify Additional Submittal Requirements for Projects in Sensitive Areas

Staff will coordinate with the appropriate regulatory agencies to identify additional requirements for those proposed facilities that may affect sensitive habitats or may have increased or significant impacts on coastal resources. Based upon sensitivity of habitat in vicinity of the discharge and size of zone of initial dilution, additional requirements may include:

- A. Pre-construction monitoring of affected area as well as a control site to include sampling of water column and sediments
- B. Post operational monitoring of affected area as well as a control site, to include sampling of water column and sediments, to be compared with pre-operational monitoring results
- C. Post operational monitoring of oxygen levels, turbidity, heavy metals or other chemical concentrations with regard to water quality standards
- D. Post operational sampling of sediments for heavy metals to monitor possible accumulation (possible bio-monitoring to sample tissues for heavy metals)
- E. Post operational biological analysis of marine organisms in the affected area and control site, including indices, species richness, and abundance to be compared with the pre-operational results
- F. Monitoring of long-term impacts of discharge (e.g. potential changes in species composition etc.)

Activity 4.4: Coordinate Enforcement and Permit Compliance

The MBNMS will coordinate with state partners to evaluate permitted desalination facilities and follow up to ensure compliance with conditions of permits and authorizations.

Activity 4.5: Determine Cumulative Impacts from Multiple Facilities

MBNMS staff will coordinate with partners and other agencies to develop and implement a regional monitoring program to evaluate cumulative impacts from multiple facilities, including methods to assess impacts of saline brine effluent and cumulative entrainment and impingement.

Strategy DESAL-5: Conduct Outreach and Information Exchange

Extensive outreach on the guidelines and recommendations developed by this working group will be conducted.

Activity 5.1: Continue Participation in Other Desalination Initiatives

MBNMS staff will continue to participate in other desalination initiatives, including state and federal task forces and workgroups, and will actively seek to include the information and relevant recommendations resulting from those efforts into this action plan, as appropriate.

Activity 5.2: Develop Outreach Plan for MBNMS Desalination Guidelines and Regulations

MBNMS staff will develop and implement a program for outreach to agencies, desalination plant proponents, and other interested parties about the guidelines as well as relevant regulations.

Activity 5.3: Develop Outreach Plan for Information about Desalination Issues

MBNMS will coordinate with partners to develop and implement strategies for ongoing outreach to the public and agencies regarding desalination projects, issues, and potential impacts to MBNMS resources.

Activity 5.4: Track and Evaluate Emerging Desalination Technology

MBNMS staff will develop a program to track and evaluate new and emerging desalination technologies, and a system to incorporate these into existing and proposed plants.

Activity 5.5: Conduct Community Growth Impact Outreach

MBNMS staff will work with partners to share information and concerns with agencies and local jurisdictions about the potential impacts of community growth to MBNMS resources.

Action Plan Partners: California Coastal Commission, Central Coast Regional Water Quality Control Board, State Water Resources Control Board, local jurisdictions, counties, land use and environmental organizations, California Department of Fish and Game, Scientific consultation, C-Clean monitoring project, Elkhorn Slough National Estuarine Research Reserve

Table DESAL.1: Measuring Performance of the Desalination Action Plan

Desired Outcome(s) For This Action Plan:	
Minimize entrainment, concentrated discharges and impacts to the seabed from desalination facility construction and operation.	
Performance Measure	Explanation
100% of new desalination plants permitted in the MBNMS have been reviewed in a coordinated regional approach and constructed consistent with MBNMS siting guidelines and environmental standards for intakes and outfalls.	MBNMS will track the review of new facility applications and determine the number of projects reviewed in a coordinated regional approach.

Table DESAL.2: Estimated Timelines for the Desalination Action Plan

Desalination Action Plan	YR 1	YR 2	YR 3	YR 4	YR 5
Strategy DESAL-1: Develop and Implement Regional Desalination Program	●————●				
Strategy DESAL-2: Develop Facility Siting Guidelines	●————●				
Strategy DESAL-3: Identify Environmental Standards for Desalination Facilities	●————●				
Strategy DESAL-4: Develop Modeling and Monitoring Program	●————●●			
Strategy DESAL-5: Conduct Outreach and Information Exchange	●————▶				
Legend					
Year Beginning/Ending	: ●————●	Major Level of Implementation: —————			
Ongoing Strategy	: ●————▶	Minor Level of Implementation:			

Table DESAL.3: Estimated Costs for the Desalination Action Plan

Strategy	Estimated Annual Cost (in thousands)*				
	YR 1	YR 2	YR 3	YR 4	YR 5
Strategy DESAL-1: Develop and Implement Regional Desalination Program	\$24	\$25	\$21	\$9	\$8
Strategy DESAL-2: Develop Facility Siting Guidelines	\$20	\$20	\$4	\$0	\$0
Strategy DESAL-3: Identify Environmental Standards for Desalination Facilities	\$16	\$16	\$4	\$0	\$0
Strategy DESAL-4: Develop Modeling and Monitoring Program	\$8	\$284.4	\$29.8	\$176.4	\$0
Strategy DESAL-5: Conduct Outreach and Information Exchange	\$31.5	\$59.5	\$15.5	\$13	\$9
Total Estimated Annual Cost	\$99.5	\$404.9	\$74.3	\$198.4	\$17

* Cost estimates are for both “programmatic” and “base” (salaries and overhead) expenses.

Harbors and Dredge Disposal Action Plan

Goal

Address the need for disposal of dredged material and the continued protection of MBNMS resources and qualities.

Introduction

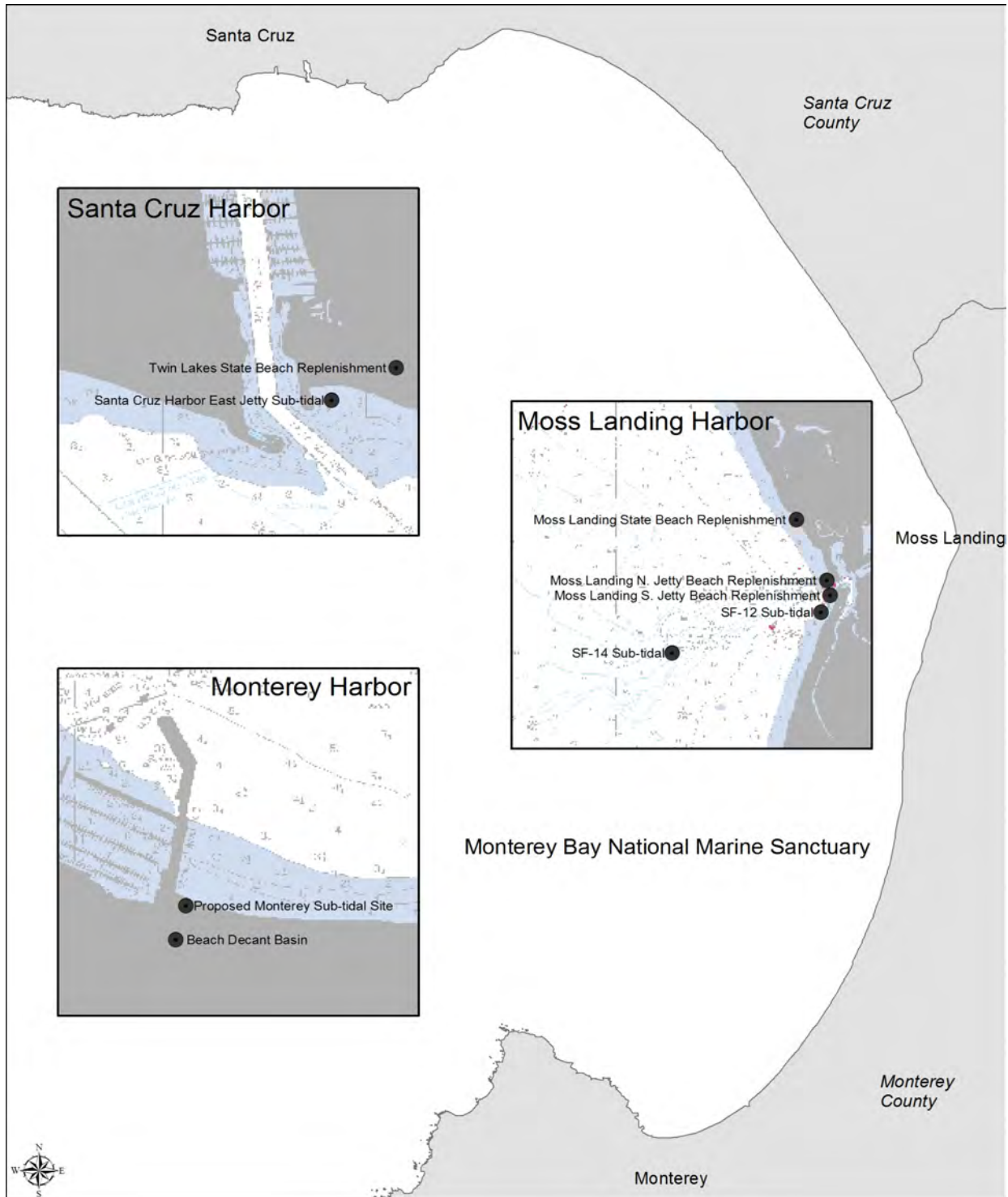
There are four major harbors adjacent to the Monterey Bay National Marine Sanctuary (MBNMS): Pillar Point, Santa Cruz, Moss Landing and Monterey (See Figure HDD-2). The periodic dredging of the local harbors is a necessary component of keeping the harbor channels clear and allowing access for vessels. Dredging generally occurs within a port or harbor and therefore outside of MBNMS boundaries. Santa Cruz and Moss Landing regularly dredge the bottom of the harbor. Harbors dispose of their dredged material either in the ocean, on land at landfill sites, or at designated beach nourishment sites adjacent to the harbors. When the MBNMS was designated in 1992, two existing offshore sites for dredge disposal were identified, and the establishment of new sites was prohibited within its boundaries. While dredging itself, within the confines of harbors, is not prohibited by MBNMS regulation, disposal of dredged material is prohibited within the MBNMS except for dredged material deposited at authorized disposal sites.

Figure HDD-1 – Moss Landing Harbor



The MBNMS works with other state and federal agencies to ensure that MBNMS resources are protected during dredge disposal. The MBNMS coordinates with the California Coastal Commission, the US Army Corps of Engineers (ACOE), Environmental Protection Agency (EPA), the Regional Water Quality Control Board (RWQCB), California Department of Fish and Game (CDFG), National Marine Fisheries Service (NMFS), and the US Fish and Wildlife Service (FWS) to review and authorize dredge disposal, as well as other discharges within the MBNMS. The MBNMS reviews the composition of the sediment, volumes, grain size, and associated contaminant load to determine if the dredge sediments are appropriate for disposal in the ocean and comply with the provisions of the NMSA.

Figure HDD-2. Harbors and Dredge Disposal Sites



Strategy HDD-1: Improve Agency Coordination

The MBNMS will continue to authorize, as appropriate, other agency's permits for dredge disposal and consider improving the interagency review process.

Activity 1.1: Continue to Improve and Participate in Coordinated Permit Review

Increased efficiency, collaboration and coordination are necessary in the review of permits for dredge disposal. The MBNMS will continue to coordinate with the Coastal Commission, ACOE, and EPA to review permits and authorizations. The MBNMS will work collaboratively with others to establish an interagency Central Coast Dredge Team that would meet at regular intervals and develop a regional plan to:

- A. Improve understanding of joint agency roles
- B. Encourage harbors to undertake advanced planning and coordination that may minimize the need for emergency permits
- C. Schedule permit planning meetings with agencies and harbors in advance of the application process to address needs and collectively evaluate both the regular and emergency permit process, to include agency concerns and conditions in the permit
- D. Evaluate other joint-permit programs
- E. Where possible, align agency permits so each permit or authorization is valid for the same time interval
- F. Evaluate changes to dredge disposal practices, methods, and operations to benefit the resources, such as timing disposal events with winter storms, changing the methodology to increase oxygen levels or adding an additional pipe, where appropriate, or attempt to mimic natural sedimentation processes

Activity 1.2: Issue Multi-year Authorizations for Dredge Disposal Activities

The authorization intervals may be increased to provide efficiency for both the harbor as well as the MBNMS. MBNMS will work with partners to coordinate the timing and conditions of the multi-year permit process. The MBNMS will also work with partners to evaluate multi-year authorizations and the conditions of the authorizations to include additional testing, or sampling and monitoring requirements as necessary.

Activity 1.3: Enforcement and Permit Compliance

The MBNMS will coordinate with partners to monitor dredge activities and follow up to ensure compliance with conditions of permits and authorizations.

Strategy HDD-2: Review Offshore Dredge Disposal Activities

MBNMS recognizes four sites as approved for disposal of dredged material including SF-12, SF-14, and limited disposal sites at Monterey and Santa Cruz Harbor. MBNMS will review and process permit applications for these sites consistent with these locations. Further analysis of additional sites or modifications to existing sites may occur as necessary; however, a modification to the Designation Document and regulations would be required to allow dredged material to be deposited at a disposal site not authorized prior to January 1, 1993.

Activity 2.1: Review Santa Cruz Dredge Disposal Activities

MBNMS will continue to work with its partners and the Santa Cruz Port District in reviewing proposals to dispose of dredged material at the Twin Lakes Disposal Site adjacent to the harbor entrance. The MBNMS will also coordinate with partners in reviewing future applications to modify the disposal area or location.

Activity 2.2: Review Dredge Disposal Activities at Monterey Harbor

MBNMS staff will continue to work with its partners and the City of Monterey in reviewing proposals to dispose of dredged material at its site adjacent to Wharf 2, adjacent to the harbor.

Activity 2.3: Review Dredge Disposal Activities at Redefined SF-12 (Moss Landing)

MBNMS staff will continue to work with its agency partners including the Environmental Protection Agency, Army Corps of Engineers, and California Coastal Commission in reviewing proposals to dispose of dredged material at EPA Dredge Disposal Site SF-12. Proposals will utilize the redefined location of SF-12 adopted in 2005 to ensure disposal of dredged material at the head of the Monterey Canyon.

Activity 2.4: Coordinate with Gulf of the Farallones National Marine Sanctuary (GFNMS) in Evaluation of Dredge Disposal Site for Pillar Point Harbor

The Pillar Point Harbor has not been dredged since the 1980's when the inner harbor was created. The harbor is considering dredging the outer and inner harbor areas to eliminate sedimentation that has accumulated. The estimated volume of this project would be approximately 72,000 cubic yards for the maintenance-dredging component. Upon submission of a project application, MBNMS will coordinate with the GFNMS to evaluate options for allowing maintenance of this local harbor disposal. MBNMS will also coordinate with GFNMS to explore ways to better manage dredging needs as identified in Strategy HDD-3. Any addition of dredge disposal sites to the MBNMS would require modifications to the regulations and Designation Document.

Strategy HDD-3: Coordinate with Sediment Monitoring and Reduction Programs

This strategy recognizes the need to track and evaluate the call for increased disposal volumes, identify areas where improvements could be made to reduce increased sedimentation in harbors, evaluate contamination levels and sources, and conduct research to minimize information gaps.

Activity 3.1: Assess Changes in Aquatic Disposal Volumes

Harbors abutting the MBNMS have applied for and received significant increases in the permit volume of dredge disposal sediments over the past ten years. The Santa Cruz Harbor has increased its allowable permit volume by greater than 275 percent of the disposal quantity identified at the time of MBNMS designation. The Moss Landing Harbor has increased its allowable permit volume by 100 percent since MBNMS designation. In both instances, the MBNMS has authorized these increases. There are currently information gaps as to why this permitted increase is needed. MBNMS will work with the EPA, ACOE and harbors to develop an interagency database for tracking volumes and sediment types while facilitating submittal of electronic data, increase accessibility for the public via a website, and work with others to

promote monitoring at designated disposal sites to establish and evaluate long-term trends and related habitat and biological impacts from increased volumes.

Activity 3.2: Coordinate with Sediment Reduction Programs

In order to reduce the amount of material dredged from harbors, the MBNMS will encourage reduction of the amount of sediment entering the harbors by evaluating the watershed as a whole to determine where sediment reduction efforts could be implemented. MBNMS will work with partners to promote retention of sediment in the watershed. The MBNMS will continue to encourage these efforts with the agricultural and rural community as part of the MBNMS Agriculture and Rural Lands Plan, which encourages farmers, ranchers, and rural landowners to use conservation practices on their properties to reduce runoff in the form of sediments, nutrients and pesticides. The MBNMS will also work with others to prevent urban runoff and sedimentation into the watersheds. The MBNMS will also work with partners to explore tools to reduce entrapment of sediments by harbors, breakwaters, and other structures.

Activity 3.3: Address Dredge Sediments Contamination

Contamination is typically associated with fine-grain sediment where higher sand contents and larger grain sizes are relatively free of contamination. The physical characteristics of the sediment play a role in the strength of chemical adsorption and the active surface area of the particles. Contamination is a particularly acute problem in the sediments at Moss Landing. MBNMS will encourage partners to coordinate with the MBNMS Water Quality Protection Program to identify the upland sources of contaminated sediment and actively manage contamination, including pesticides, biological contaminants, PCB's, Butyltins, DDT, and other pollutants.

Activity 3.4: Coastal and Estuarine Erosion and Sediment Flow

In coordination with implementation of the Coastal Armoring Action Plan, the MBNMS will encourage partners to analyze coastal and estuarine erosion associated with harbor dredging and dredge disposal and to further characterize sediment flow. Further monitoring of dredging and disposal activities must be associated with future projects to evaluate the fate of sediments at Santa Cruz Harbor and Moss Landing Harbor and to evaluate potential exacerbation of tidal scour in Elkhorn Slough associated with dredging of Moss Landing Harbor.

Strategy HDD-4: Disposal of Fine-Grained Material

The disposal of fine-grained material is authorized at SF-12 and SF-14 and on a limited basis at the Santa Cruz Harbor/Twin Lakes disposal site. When determining if material is suitable for intertidal and subtidal disposal on local beaches adjacent to the harbors, EPA guidelines state that material for disposal must be at least 80 percent sand.

Activity 4.1: Continue to Evaluate Grain Sizes of Dredged Material

MBNMS will continue to coordinate with EPA/ACOE to evaluate sediment disposal suitability and coordinate on any project that would vary from EPA national guidelines on a case-by-case basis. The MBNMS will analyze any variances from those guidelines to ensure adequate protection of MBNMS resources and qualities and coordinate with other agencies to determine criteria for disposing dredged material that is less than 80 percent sand.

Strategy HDD-5: Alternative Disposal Methods

Approximately 98 percent of harbor sediments appropriate for unconfined aquatic disposal have been authorized by the MBNMS for disposal in the marine environment. Occasionally, there may be other uses for dredged sediments that meet standards for the given beneficial use. The Santa Cruz Harbor and the Moss Landing Harbor both have areas adjacent to the harbors that have been designated as beach nourishment sites. Both harbors dispose dredged material below mean high water at those locations. Two additional areas at Moss Landing (Zmudowski Beach and the north jetty) are deemed beach nourishment sites. These sites are above mean high water and therefore outside of the MBNMS. These sites are not authorized by the MBNMS for subtidal disposal. Disposal at Zmudowski Beach and the north jetty has not taken place since MBNMS designation. Any future disposal there would need to be accomplished above mean high water. At this time there does not seem to be a need for additional beach nourishment sites within the MBNMS, except for possibly at Pillar Point Harbor. However, the MBNMS will work together with other state and federal agencies to evaluate the potential future need for beach nourishment at locations within the Sanctuary and will collaborate with other agencies to conduct long-term planning and analysis related to this issue.

Activity 5.1: Evaluate Potential Beneficial Use of Dredged Materials

MBNMS will work with partners to examine the potential beneficial uses for dredged material. Recognizing that littoral sand is a MBNMS resource for various habitat, recreation, access and shoreline protection reasons, MBNMS and other agencies should identify if, when and where beach nourishment is appropriate. As discussed in the Coastal Armoring Action, MBNMS may identify the criteria and data needed to make that determination, including an evaluation of sand transport and science needs and pursuit of a comprehensive research strategy. In addition, MBNMS will work with partners to assess individual and cumulative impacts to sand transport and shoreline dynamics due to existing harbors and artificial groins within the MBNMS. Studies should estimate the quantity of sand and sand-generating beach material that is trapped by such structures and assess means to bypass such material and replicate natural processes to the degree feasible. If investigations indicate that employment of additional beach nourishment sites using clean dredged harbor material would be possible and appropriate, MBNMS may examine whether revision of MBNMS regulations and Designation Document may be warranted; or if a beneficial program might occur via MBNMS permit or authorization in concert with other agencies.

Action Plan Partners: California Coastal Commission, US Army Corps of Engineers, Environmental Protection Agency, Regional Water Quality Control Board, California Department of Fish and Game, National Marine Fisheries Service, US Fish and Wildlife Service, Santa Cruz Port District, City of Monterey, Moss Landing Harbor District, San Mateo County Harbor District, Santa Cruz Harbor District, City of Santa Cruz

Table HDD.1: Measuring Performance of the Harbors and Dredge Disposal Action Plan

Desired Outcome(s) For This Action Plan:	
Increase interagency coordination to ensure protection of MBNMS resources while allowing harbors to remain open for navigation.	
Performance Measure	Explanation
By 2012, dredge disposal permits will be authorized for the same duration among the EPA, CCC, ACOE, and MBNMS, where appropriate.	MBNMS staff will work with the various agencies to align the permitting of dredging and disposal of material where appropriate in the four approved sites in the MBNMS.

Table HDD.2: Estimated Timelines for the Harbors and Dredge Disposal Action Plan

Harbors and Dredge Disposal Action Plan	YR 1	YR 2	YR 3	YR 4	YR 5
Strategy HDD-1: Improve Agency Coordination	●————●				
Strategy HDD-2: Review Offshore Dredge Disposal Activities	●————●				
Strategy HDD-3: Coordinate with Sediment Monitoring and Reduction Program			●————▶		
Strategy HDD-4: Disposal of Fine-Grained Material			●————●		
Strategy HDD-5: Alternative Disposal Methods			●————●		
Legend					
Year Beginning/Ending	: ●————●	Major Level of Implementation: _____			
Ongoing Strategy	: ●————▶	Minor Level of Implementation:			

Table HDD.3: Estimated Costs for the Harbors and Dredge Disposal Action Plan

Strategy	Estimated Annual Cost (in thousands)*				
	YR 1	YR 2	YR 3	YR 4	YR 5
Strategy HDD-1: Improve Agency Coordination	\$14	\$14	\$5	\$5	\$5
Strategy HDD-2: Review Offshore Dredge Disposal Activities	\$33.8	\$20	\$4	\$4	\$0
Strategy HDD-3: Coordinate with Sediment Monitoring and Reduction Program	\$16	\$122.9	\$18.9	\$14.9	\$14.9
Strategy HDD-4: Disposal of Fine-Grained Material	\$8	\$0	\$0	\$0	\$0
Strategy HDD-5: Alternative Disposal Methods	\$0	\$0	\$25.2	\$25.2	\$25.2
Total Estimated Annual Cost	\$71.8	\$156.9	\$53.1	\$49.1	\$45.1

* Cost estimates are for both “programmatic” and “base” (salaries and overhead) expenses.

Submerged Cables Action Plan

Goal

Provide clear guidance regarding installation, operation, or removal of submerged cables to protect the resources and qualities of the MBNMS.

Introduction

Installation of submerged cables in the MBNMS alters the seabed, causing environmental impacts and potential hazards for fishing activities. Submerged cables are typically used for commercial, defense or research related activities. MBNMS regulations currently prohibit alteration of the seabed, yet allow, via permit or authorization, for some otherwise prohibited activities.

MBNMS regulations in effect prohibit the installation of submerged cables. Such regulatory prohibitions include those against: drilling into, dredging or otherwise altering the seabed of the MBNMS; constructing, placing or abandoning any structure, material or other matter on the seabed of the MBNMS; moving or injuring historical resources; and discharging or depositing any material or other matter in the MBNMS. Therefore, installing submerged cables would involve violations of MBNMS prohibitions. The NMSA prohibits destroying, causing the loss of, or injuring any MBNMS resource managed under law or regulations for that Sanctuary. Prohibited activities may be conducted under certain limited circumstances to the extent they are compatible with the resource protection mandate and meet regulatory and other requirements for a MBNMS permit or other authorization.

Currently submerged cable applications are reviewed on a case-by-case basis. Policy guidance for future applicants would provide for a more efficient permitting process and inform future applicants as to preferred alternatives prior to submitting an application. In 1999, due to expanding interest in constructing submerged telecommunications cables in national marine sanctuaries, including the MBNMS, the National Marine Sanctuaries Program (NMSP) initiated a process to consider guidance for cable projects proposed for national marine sanctuaries. Also, there has been a recent increase in interest to develop cabled observatories nationwide for research and monitoring purposes, including in the MBNMS. In implementation of this action plan, the MBNMS will develop a framework to identify sensitive areas of the seafloor within the MBNMS and provide clear structure with which to review future submerged cable development applications.

MBNMS regulations recognize certain activities that may benefit the MBNMS, such as education, research, or management; thus a submerged cable that provides these benefits could be permitted under existing regulations. A proposed research cable project must demonstrate the benefit that it would provide to MBNMS, as well as that the project would have only negligible, short-term, adverse effects on Sanctuary resources and qualities. In deciding whether to issue a permit, the Superintendent shall consider such factors as: the professional qualifications and financial ability of the applicant as related to the proposed activity, the duration of the activity, and the duration of its effects; and the appropriateness of the methods and procedures proposed

by the applicant for the conduct of the activity. In addition, the Superintendent may consider other factors, as he or she deems appropriate.

The MBNMS may allow construction and operation of a cable for commercial purposes, such as a trans-ocean fiber optic cable. The MBNMS may issue a Special Use permit to allow specific activities in the MBNMS if such authorization is necessary to establish conditions of access to and use of any MBNMS resource. A commercial submerged cable project's continued presence on the seabed during operation is considered a special use. (Special Use Permits may be issued for the narrow range of activities that are both prohibited by NMSP regulations and will result in no adverse effect to the MBNMS resource or qualities, and thus, must meet a higher standard than other categories of permits.) The MBNMS does not consider intrusive activities related to commercial submarine cables such as installation, removal, and maintenance/repair work to qualify for a Special Use permit. Those activities would require a permit or an authorization of another agency's permit. These authorizations, if approved, generally include a variety of conditions to minimize impacts to MBNMS resources and qualities.

The NMSA requires that Special Use permits shall:

- A. Authorize the conduct of an activity only if that activity is compatible with the purposes for which the MBNMS is designated and with protection of MBNMS resources
- B. Not authorize the conduct of any activity for a period of more than five years
- C. Require that activities carried out under the permit be conducted in a manner that does not destroy, cause the loss of, or injure MBNMS resources
- D. Require the permittee to purchase and maintain comprehensive general liability insurance, or post an equivalent bond, against claims arising out of activities conducted under the permit and to agree to hold the United States harmless against such claims

Existing Submerged Cables in MBNMS

Projects that include submerged cables for research, military and commercial uses are already in place within MBNMS. Known cables include:

- A. San Francisco-Honolulu 1903 telegraph cable, decommissioned
- B. Pioneer Seamount Cable (formerly Acoustic Thermometry of Ocean Climate (ATOC)), presently under the responsibility of the National Oceanic and Atmospheric Administration (NOAA) Oceanic and Atmospheric Research Division, used for passive acoustic research, <http://oceanexplorer.noaa.gov/explorations/sound01/sound01.html>
- C. Pt. Sur cable, U.S. Navy, used for research
- D. Monterey Inter-Shelf Observatory (MISO) cable, owned and operated by the Naval Postgraduate School for oceanographic research, www.oc.nps.navy.mil/~stanton/miso/
- E. Orpheus, National Marine Sanctuaries Program, video link to the Mystic Aquarium and Institute for Exploration, <http://www.mysticaquarium.org/index.cgi/1670>
- F. Monterey Acoustic Research System (MARS) Cable, Monterey Bay Aquarium Research Institute, <http://www.mbari.org>
- G. Unknown coaxial cable, near ATOC cable

Strategy SC-1: Identify Routing and Zones for Submerged Cable Projects

The MBNMS recommends keeping submerged cables out of special management areas such as national marine sanctuaries and state marine protected areas. The MBNMS exercises a precautionary, comprehensive approach to installation of cables in the MBNMS. Before permitting any installation of a cable, the MBNMS will consult with the affected state and federal agencies and interested persons to determine the route which best meets the MBNMS requirements.

Activity 1.1: Identify Environmentally Sensitive Areas

The MBNMS will develop, and update annually as more refined data become available, Geographic Information System (GIS) data layers of environmentally sensitive habitat areas on a broad, MBNMS-wide scale, using the best available data. The MBNMS's permitting staff will use this data as a guide to identify areas to avoid, as well as potential cable laying regions. Initially this map will include fragile habitats, known archaeological sites, and other areas of concern:

- A. High-relief rocky substrate and other hard bottom areas
- B. Sea grass communities
- C. Areas known or likely to have maritime heritage resources
- D. Kelp forests
- E. Critical habitat for endangered or threatened species
- F. Areas set aside as state or federal marine protected areas
- G. Known spawning aggregation areas
- H. Estuarine habitats
- I. Essential Fish Habitat
- J. Cold seep communities
- K. Marine trenches, valleys or canyons, regarding the likelihood of (a) cable breakage and resulting repair impacts and (b) suspensions and resulting entanglement risk

The map will also include:

- A. All known cables in the MBNMS, active, inactive and stored
- B. Other known structures, such as pipelines, outfalls, and buoys
- C. Known research sites where cable construction would interfere with the research
- D. Location of present and historic trawling areas within the MBNMS
- E. Characterization of the coast and landfalls (e.g. cliffs, dunes, sediment type)

This database system should become integrated with Sanctuary Integrated Monitoring Network (SIMoN) to facilitate use by other agencies and the public.

Activity 1.2: Develop Guidelines for Siting Constraints for Submerged Cables

Submerged cables will generally not be permitted in the environmentally sensitive habitat areas. However, the MBNMS may allow submerged cables to be built into or through these areas where they will have clear and demonstrable resource management, research, and/or educational value.

- A. The MBNMS may set restrictions for the number of cables that will be allowed in certain areas, as “corridors” for future cables. This is designed to establish clearer guidance for future cable applicants and more predictability about future routing of cables.
- B. The MBNMS will produce these guidelines after completing Activity 1.1 and consulting with interested parties and stakeholders.

These guidelines would be considered a work in progress, to be updated by MBNMS annually. MBNMS will continue to work to improve the level of understanding and knowledge about the laying and operation of submarine cables. As new information and technology develops, the policies and permit requirements and conditions will evolve accordingly.

Strategy SC-2: Develop Submerged Cable Project Permit Guidelines

MBNMS regulatory prohibitions require issuance of a permit or authorization before any proposed submerged cable project can be built. If the MBNMS decides to allow a cable project, it may impose terms and conditions on such authorization consistent with the purposes for which the MBNMS is designated.

Activity 2.1: Refine and Implement Permit Pathway and Applicant Guidelines

The following steps in the permit and application process will be refined and/or implemented.

A. Permit Process

The MBNMS has distinct authorities to allow for the conduct of specific prohibited activities, such as cable installation, within national marine sanctuaries. The most commonly used authority is found in NMSP regulations (15CFR Part 922) to allow certain types of activities, such as, research, education and resource management, to occur in instances where it would otherwise be prohibited by the NMSP regulations. In addition NMSP regulations also allow “authorization” of other-agency permits for prohibited activities that do not qualify for a research or other permit. The other authority derives from Section 310 of the NMSA. This authority, named “special use permits” by the statute, is generally used for commercial activities requiring access to or use of sanctuary resources, whereas research permits are issued for bona fide research activities. The installation, maintenance, or removal of the cable would require a permit or an authorization, whereas the continued presence of a commercial cable could be permitted in appropriate circumstances with a Special Use Permit. Permits would be required by MBNMS for the following activities related to submerged cables:

- B. Discharging or depositing, from within the boundary of the MBNMS, any material or other matter

Drilling into, dredging or otherwise altering the seabed of the MBNMS; or constructing, placing or abandoning any structure, material or other matter on the seabed of the MBNMS

Taking any marine mammal, sea turtle or seabird in or above the MBNMS

C. Project Description

The project applicant initially provides a complete and thorough application in order to facilitate the permit process. Specifics and detail enable MBNMS permitting staff to evaluate the proposed project more quickly.

D. Site Characterization and pre-construction surveys

Biological, cultural and habitat surveys along the proposed and alternative cable routes must be completed in advance by the project applicant. Project applicants may be required to collect baseline data in order to properly assess post-deployment impacts.

The site characterization shall include the percent of the route where the cable can be buried and expect to remain buried over the cable lifetime. This characterization should also include penetration depths of bottom fishing activities and expected anchor penetration depths of vessels using the area. Other factors such as wave energy intensity, bottom current strength, seasonal sand/sediment movement, coastal erosion rates of the shore landing relative to the cable project's life, landslide and other geological hazards should also be addressed.

- E. *National Environmental Policy Act (NEPA) Review and Interagency Cooperation*
MBNMS will coordinate with other federal and state agencies throughout the permitting process. MBNMS will usually act as a Federal Lead Agency in the NEPA process, and as such will work with the State Lead Agency to produce a joint NEPA/CEQA document. For every project considered, the environmental impact analysis must evaluate, at a minimum, the following topics:

Potential cumulative impacts

Feasible alternatives to transiting MBNMS, including alternative routes over land

Potential impacts to habitat from laying the cable (e.g., trenching) and long-term placement of the cable in its location

Potential for impacts on sensitive, threatened and endangered species and their habitats

Potential impact on submerged cultural resources, and traditional cultural uses

Potential impacts of removing the cable at the end of its useful life

Potential socioeconomic impacts (e.g., fishing interests, ecotourism, etc.)

Activity 2.2: Identify Development Standards

MBNMS staff will identify development standards for the following issues:

- A. *Cable Laying, Installation and Burial*

Required burial depth and preferred cable laying techniques will be identified. Cables shall be buried to a depth pre-determined by the project applicant and approved by the MBNMS Superintendent. Optimal burial depth is specific to site, other human uses, and bottom type. It accounts for the uses of seabed, including the cable, and is required to be at a depth sufficient to avoid conflicts with other ocean users and industries. Optimal burial depth also ensures that the natural sediment conditions will not unbury the cable with time. The project applicant shall also use the best available proven technology to bury the cable and to alleviate the potential for strumming when passing through rocky habitats. MBNMS will develop criteria to determine the preferred method of installation for a new conduit in a given location.

- B. *Onshore Landing and Drilling*

All proposed sites for shore crossings and cable landings must first consider using any pre-existing available onshore conduits. If there are no pre-existing conduits, or available conduits do not suit the project, then a new conduit may be proposed. Additionally, proposed sites for shore crossings and cable landings must first consider utilizing co-landings or the installation of more than one cable in a single conduit through the nearshore environment. The use of co-landings would minimize the potential impacts associated with directional drilling or beach trenching operations.

C. *Cable Removal*

MBNMS regulations prohibit “drilling into, dredging, or otherwise altering the seabed of the MBNMS, or constructing, placing or abandoning any structure, material or other matter on the seabed of the MBNMS.” Therefore, per the regulations, the project applicant must remove all of the cable within MBNMS at the termination of the cable project. Upon the conclusion of the cable project, MBNMS may support the transfer of a cable to a new project applicant, provided that applicant is granted the necessary MBNMS permits. Permit review for a transfer would include a cable integrity analysis to evaluate the status and expected future viability of the cable and other information as required by MBNMS. New project applicants would have to agree to all existing terms of existing permits or authorizations, including cable removal. Storage of cable offshore, within the MBNMS boundary, would not be allowed.

D. *Cable Monitoring*

A monitoring strategy will be developed for both post-construction and for the life of the project. The project applicant will be required to monitor the cable throughout its permitted life for cable integrity, burial depth and its effects on the benthos. The feasibility of monitoring may be challenging and the costs associated with monitoring are likely to be high. MBNMS may also choose to monitor the cable, and if so, will notify the cable applicant and provide it with the results of the survey.

Activity 2.3: Identify Standard Permit Conditions

In addition to developing a list of general and special permit conditions, MBNMS will work with other agencies to develop a comprehensive list of all permit requirements for submerged cable projects.

Activity 2.4: Consider Standard Fee Structure for Submerged Cable Continued Presence on Seafloor and Operation

MBNMS staff will consider a Special Use Permit standard fee structure for monitoring and operation of submerged cables within the MBNMS. Special Use Permits can be issued for appropriate commercial activities that require access to and use of any MBNMS resource. Pursuant to the NMSA, a fee may be assessed for any approved commercial submerged cable project. This fee includes:

- A. The costs incurred, or expected to be incurred by MBNMS, to issue the permit (including labor, printing costs, and contracts for the preparation of supporting documentation). The MBNMS Superintendent would provide a cost estimate once a project is defined. However, if additional environmental studies are required by MBNMS, the applicant is responsible for study costs.
- B. The costs incurred, or expected to be incurred by MBNMS, as a direct result of the conduct of the activity for which the permit is issued, including the costs of monitoring the conduct of the activity (includes amounts to fund monitoring projects designed to assess the success or failure of the permittee to comply with the terms and conditions of the permit. Costs may also include money to fund a compliance monitoring program and to recoup any costs incurred by the NMSP in enforcing permit terms and conditions). These costs on existing projects tend to be very high due to the challenging nature of monitoring a project on the ocean floor.

- C. An amount that represents the fair market value of the use of the MBNMS resource (calculated using economic valuation methods appropriate to the situation).

MBNMS will require the project applicant to post a bond to cover the costs of negative impacts resulting from the cables, to ensure permit condition compliance, and to provide for cable removal.

Activity 2.5: Enforcement and Permit Compliance

The MBNMS will inspect and evaluate permitted cable activities including cable laying, maintenance and removal, and follow up to ensure that permit conditions are met.

<p><i>Action Plan Partners:</i> National Marine Fisheries Service, California Department of Fish and Game, California Coastal Commission, California State Lands Commission</p>

Table SC.1: Measuring Performance of the Submerged Cables Action Plan

Desired Outcome(s) For This Action Plan:	
To minimize impacts to MBNMS seafloor and habitats from installation, maintenance and removal of submerged cables.	
Performance Measure	Explanation
By 2009, complete mapping of best available data on sensitive areas to avoid for cable routes.	Performance toward meeting the objectives can be measured incrementally by identifying the amount of mapping that has been gathered, identified as sensitive and made available to the public.
By 2010, identify standard interagency list of permit conditions to minimize disturbance of sensitive habitats.	Staff will also track the development of permit conditions that will provide the public and applicant an understanding of standard requirements prior to project application.

Table SC.2: Estimated Timelines for the Submerged Cables Action Plan

Submerged Cables Action Plan	YR 1	YR 2	YR 3	YR 4	YR 5
Strategy SC-1: Identify Routing and Zones for Submerged Cable Projects	● — ●				
Strategy SC-2: Develop Submerged Cable Project Permit Guidelines	● — ●				
Legend					
Year Beginning/Ending	: ● — ●	Major Level of Implementation: —			
Ongoing Strategy	: ● —>	Minor Level of Implementation:			

Table SC.3: Estimated Costs for the Submerged Cables Action Plan

Strategy	Estimated Annual Cost (in thousands)*				
	YR 1	YR 2	YR 3	YR 4	YR 5
Strategy SC-1: Identify Routing and Zones for Submerged Cable Projects	\$56	\$115	\$101	\$4	\$4
Strategy SC-2: Develop Submerged Cable Project Permit Guidelines	\$27	\$13	\$11	\$4	\$4
Total Estimated Annual Cost	\$83	\$128	\$112	\$8	\$8
* Cost estimates are for both “programmatic” and “base” (salaries and overhead) expenses.					
** Contributions from outside funding sources also anticipated.					



Section III

Ecosystem Protection

- **Big Sur Coastal Ecosystem Action Plan**
- **Bottom Trawling Effects on Benthic Habitats Action Plan**
- **Davidson Seamount Action Plan**
- **Emerging Issues Action Plan**
- **Introduced Species Action Plan**
- **Sanctuary Integrated Monitoring Network (SIMoN) Action Plan**
- **Marine Protected Areas Action Plan**

Ecosystem Protection Action Plans

Background

Several issues under the theme of Ecosystem Protection involve how NOAA addresses the impacts of fishing on the ecosystem in the MBNMS. Members of the public and the science community raised several issues during the scoping phase of management plan review. Certain recommendations during the JMPR involved regulatory action and coordination with other agencies as part of the rulemaking process. The MBNMS Advisory Council also discussed and recommended MBNMS take certain actions at the present time and for the MBNMS to implement certain action plans that may involve fishing regulations. Other action plans involved further analysis and work with stakeholders prior to a identifying a specific action. Following is a description of some of the issues that relate to fishing and their potential outcomes regarding fishing related regulations.

Development of Fishing Regulations in National Marine Sanctuaries

The regulation of fishing in a national marine sanctuary requires certain steps to be taken that are different from regulation of other activities. Specifically, NOAA must consult the regional fishery management council (i.e., Pacific Fishery Management Council) and provide the council with the opportunity to prepare draft NMSA regulations in the Exclusive Economic Zone. Section 304(a) (5) of the NMSA requires this step in the rulemaking process. Following this consideration by the appropriate Fishery Management Council, NOAA determines whether to address the issue with certain statutory authorities. In these areas, NOAA has two statutory authorities, the NMSA and the Magnuson-Stevens Fishery Conservation and Management Act (MSA) that can be used to regulate fishing. NOAA uses two regulatory tools, either exclusively or in conjunction with one another, to manage fishing in the national marine sanctuaries to meet the various goals and objectives identified to fulfill the resource protection mandates of the NMSA. It is NOAA policy to consider, on a case-by-case basis, the appropriate authorities for issuing fishing regulations, including establishing no-take marine reserves, in national marine sanctuaries.

Krill Harvesting Recommendations from Sanctuary Advisory Council

Krill are a critical component of the marine ecosystem and fundamental to the trophic structure of the marine life within the Sanctuary. These species are preyed upon by many commercially important species within Sanctuary waters including salmon, rockfish, squid, sardine, mackerel and flatfish. Blue whales, humpbacks, and numerous seabirds including sooty shearwaters, marbled murrelets, and common murre are dependent on krill as forage. Reliable regional estimates of biomass and prey requirements do not exist. However, it has been estimated that krill makes up between 15 and 60 percent of the diet of commercially significant fish in ecosystems with comparable trophic structures.

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 target species are directly or indirectly dependent on the resource. A krill fishery may have serious adverse impacts on many of the local commercially important fish populations including salmon, rockfish, sardine and squid as these species are heavily dependent on krill as a food source.

To address this issue, MBNMS, as part of the JMPR, explored the potential for the future harvest of krill, outlined the current regulatory framework, and presented the recommendations from the working group to the Sanctuary Advisory Council. The Monterey Bay Sanctuary Advisory Council recommended that MBNMS provide a presentation to the Pacific Fishery Management Council and recommend permanent restrictions in the Sanctuary. This concluded the necessary actions in this case and, therefore, the Krill Harvesting Action Plan was not included in this management plan. If krill harvesting were to evolve as a fishery in the MBNMS, the MBNMS would revisit the recommendations of the working group, Advisory Council, and actions taken to protect the ecosystem.

Davidson Seamount Recommendations

The Davidson Seamount working group and Sanctuary Advisory Council recommend that the Davidson Seamount met standards for designation as a national marine sanctuary after consideration of the resources and qualities of the area. The Advisory Council also recommended that if existing fishing practices within the area around Davidson Seamount would not be affected, then the MBNMS should restrict all potential forms of disturbance to the seabed and those activities above the seabed that may have the potential to harm the fragile coral and sponge communities should also be restricted. One activity with the potential to disturb the area is fishing with a bottom trawl. The peak of Davidson Seamount is approximately 3,700 feet below the ocean's surface. The MBNMS therefore proposed a regulation to restrict any disturbance, collection, or harvest, including by fishing, below 3,000 feet in these areas. While currently there is no fishing that takes place at that depth range, the MBNMS provided the Pacific Fishery Management Council with the opportunity to draft fishing regulations. The Pacific Fishery Management Council, while unanimously supporting the goals and objectives of the MBNMS proposal, recommended changes to the Groundfish Management Plan to address the MBNMS proposal to restrict fishing below 3,000 feet in that area. To address other types of disturbance, collection, or harvest in the area, the MBNMS proposed a regulation that reflects the restrictions found in the Groundfish Management Plan as well as the in the MBNMS regulations. With both regulations in place, no disturbance, including by fishing may occur below 3,000 feet in the area.

Marine Protected Areas Action Plan Implementation

The Marine Protected Areas Action Plan, as implemented, will look to determine if additional MPAs are to be created in the MBNMS. The action plan provides a framework for the investigation and outlines how the MBNMS will work with the State of California during its implementation of the Marine Life Protection Act (MLPA). For federal waters of the MBNMS, NOAA may propose MPAs to complement the State's network component to ensure an appropriate range of habitats and ecosystems are protected.

As stated above, it is NOAA’s policy to consider, on a case-by-case basis, the appropriate authority for issuing fishing regulations including establishing no- take marine reserves, for national marine sanctuaries. NOAA will include a range of spatial and regulatory alternatives in the Environmental documents for fishing actions in California national marine sanctuaries and does not preclude use of either the NMSA or MSA to implement the goals and objectives of those sanctuaries. For example, in the Channel Islands National Marine Sanctuary and NOAA used the authority of both the NMSA and MSA to implement marine reserves and marine conservation areas.

Bottom Trawling Effects on Benthic Habitats Action Plan Implementation

The Bottom Trawling Effects on Benthic Habitats Action Plan, when implemented, will assess current trawling activity in the MBNMS, identify the habitats vulnerable to trawling, and identify protection measures. In this case, the MBNMS will present potential management measures to the relevant fishery management agency.

Big Sur Coastal Ecosystem Action Plan

Goal

The MBNMS will lead an effort to design and facilitate a program to enhance communication between the public and agencies with jurisdiction in the Big Sur coastal region while improving resource agency coordination and providing enhanced protection and management of coastal and marine resources.

Introduction

Presently, there are several local, state and federal agencies producing new or revised management plans affecting the Big Sur coast. Public groups and individuals have raised a

concern that all these agencies will develop separate plans for pieces of the Big Sur coastal ecosystem, rather than a single plan that identifies the related roles and interconnectedness among agencies and components of the ecosystem. MBNMS is working to identify a framework for a comprehensive, multi-agency “Big Sur Coastal Ecosystem Plan,” integrating resource protection, education and outreach, and research and monitoring activities specifically for the Big Sur area. Many of these agencies currently coordinate on several of these issues. However, no formal plan or guidelines exists that offers the agencies clear guidance on existing programs, contact information and resource collaboration opportunities.



Specific planning efforts underway or in the early stages of development include:

- A. Joint Management Plan Review, MBNMS (United States Department of Commerce (DOC) / National Oceanic and Atmospheric Administration (NOAA) / Monterey Bay National Marine Sanctuary)
- B. Monterey County Periodic Review (California Coastal Commission)
- C. Monterey County General Plan Update (Monterey County)
- D. Los Padres National Forest, Forest Plan Update (USDA/LPNF) – United States Department of Agriculture / Los Padres National Forest
- E. Caltrans Big Sur Coast Highway Management Plan (California Dept. of Transportation)
- F. California Coastal National Monument Management Plan (United States Department of the Interior (DOI)/Bureau of Land Management)
- G. Regional General Plan Updates (California State Parks)

Multi-agency coordination of programs and projects can be difficult. At the same time, most agencies lack adequate resources to fully implement all of their mandates, and expectations often exceed capabilities. Partnerships between agencies, the public and/or nonprofit groups help ease the lack of resources and extend an agency’s capabilities to meet its mandates. Along the Big Sur coast, the timing of all seven agencies updating or producing management plans enhances the ability of the coordinating efforts of these agencies. More effective coordination in the

development and implementation of programs along the Big Sur coast should help the public understand agency roles and ensure more efficient management and protection of natural resources.

Implementation Overview

Three strategies have been developed to meet the goals of the Big Sur Coastal Ecosystem Coordination Plan. First, before attempting to integrate the programs and policies of all agency management systems for the Big Sur area, MBNMS will facilitate coordination of agency actions on priority resource issues. The first strategy integrates the relevant data and mapping information for the public and provides access to all of the plans and documents for the various agencies. As this information is developed and made available and usable online, this will form the foundation for an online integrated management plan that integrates the plans, policies, and programs for the public agencies involved in resource management in the Big Sur area. The second strategy lays out the framework for each of the agencies and stakeholders to coordinate on producing action plans for priority issues as identified in this plan. The third strategy is the integration of these issue action plans. The MBNMS offers to facilitate this process in order to meet the goals. However, MBNMS implementation priorities will focus on the following products as they best address the mission of the MBNMS. The following specific outcomes or products should result from this effort:

- A. Coordinated online access to planning documents
- B. Increased understanding of watershed resource protection, research, and monitoring needs
- C. Coordinated coastal and marine resource education programs
- D. Coordinated enforcement programs
- E. Provide a forum to address resource issues among and between agencies
- F. Integrated management planning document

Strategy BSP-1: Provide Integrated Data and Information to the Public

The purpose of this strategy is to provide a simple way for the public to access all of the various agencies, plans, programs, notices, documents, and contact information for the main resources agencies with jurisdiction in the Big Sur Region.

Activity 1.1: Create Multi-Agency Website for Big Sur Region

MBNMS staff will work with the multiple government agencies to provide an initial “one-stop-shop” online portal allowing access to the multiple agencies with jurisdiction, programs, policies and operations in the Big Sur region. This will be a first step towards making access easier and less confusing. The website will have an internet domain name that will be easily recognizable and intuitive such as www.bigsur.gov or www.bigsur.ca.us; this will be determined after exploration of availability of domain names.

Activity 1.2: Provide Online Access for Planning Documents

MBNMS staff will work with other agency staff to provide links to public agency management processes such as Draft and Final Management Plans, agency contact information, public notice information and a meeting calendar. Other suggested information includes emergency

information and the public mapping and database information such as geographic information system data. This website and users’ manuals will be available for public access at the Big Sur Library, Big Sur Station, and the Henry Miller Library.

Activity 1.3: Develop Integrated Geographic Information System (GIS) Database for Big Sur Coastal and Marine Resource Management

The website will provide many layers of information related to resource data for the Big Sur region. MBNMS GIS staff will facilitate meetings of agencies with information related to the Big Sur area to compile one integrated GIS Database for Big Sur Coastal and Marine Resource Management. Additional layers can be added through “live” portals to the various agency servers and as information is updated by individual agencies, the integrated Big Sur Database would also be updated.

Activity 1.4: Update Website as Agencies Update Plans and Programs

The website described in Activity 1.2 will need to be updated as plans and programs are adopted or updated. While the update of the plans will be accomplished by the individual agencies, a group of agency representatives must meet to ensure that the website is accurate and up to date. This should be accomplished through the portal system of linking to the agency website, however the quarterly meetings of stakeholders described in Strategy BSP-2 must discuss the status of the updates and “enforce” the updates as agencies take actions or make modifications to plans or programs.

Activity 1.5: Develop and Implement Process to Keep Public Informed About Website

MBNMS staff will work with agencies to provide links on other agency websites as well as commercial or informational websites that involve the Big Sur area. MBNMS staff will work with the Big Sur Multi-Agency Advisory Council to ensure that the public is aware of updates and has the ability to comment or provide suggested modifications in order to better attain the program goals. This could include a bulletin board or an email address to provide suggestions or public input on various issues.

Activity 1.6: Attend and Participate in the Big Sur Multi-Agency Advisory Council (MAAC)

The Big Sur Multi-Agency Advisory Council is administered by the 5th Supervisorial District Office of Monterey County. Members include representatives from the 5th District Supervisor, 17th Congressional District, State Assembly 27th District, California State Senate, Monterey County Planning and Building, California Coastal Commission, Monterey Regional Parks District, California Department of Transportation, local residents, the Coast Property Owners Association, Big Sur Chamber of Commerce, California State Parks, and the MBNMS. The Big Sur MAAC provides a forum for agencies to coordinate and interact with the Big Sur residents. The meetings occur four times per year.

Strategy BSP-2: Develop an Interagency Coordination Program

This second strategy identifies the framework for each of the agencies and stakeholders to coordinate in addressing priority issues as identified in this plan. Overlapping jurisdictions, different agency mandates and limited resources necessitate the development of a relationship bringing together multiple agencies for the common purpose of ecosystem management. The long-term goal will be one ecosystem plan, identifying all agency responsibilities and programs

with identified areas of common management mandates and opportunities for coordination. This plan would live “online” at a website maintained by NOAA, but controlled by the Agency Coordination Team.

Activity 2.1: Facilitate an Ad Hoc Agency Coordination Team

The MBNMS will facilitate regular coordination sessions for agency planning staff and stakeholders to address agency coordination needs and implementation progress. Agency representatives will identify technical representatives for coordination meetings to address specific priority issues. All agencies must commit to implementation of the plan and participation in the Coordination Team. Reporting of progress should be brought to the Big Sur Multi-Agency Advisory Council. Advice from the Council would be provided to the Coordination Team.

Activity 2.2: Facilitate Priority Issue Coordination Task Forces

The MBNMS will facilitate certain agency coordination task forces charged with addressing coastal and marine resource management issues. Other agencies will likely facilitate as “lead agencies” on certain issues, depending on agency mandates and responsibilities. Task forces composed of agencies, stakeholders, experts, and partners would address all priority issues by developing action plans to address specific priority issues. Each agency with relevant programs or policies must bring their relevant sections of management plans, programs and policies to the table and work with other agencies and stakeholders to identify the coordination objectives, potential overlapping programs, complementary policies, mutual needs, and potential policy or program conflicts. Depending on the outcome of issue discussions, an agency may need to modify regulations and policies.

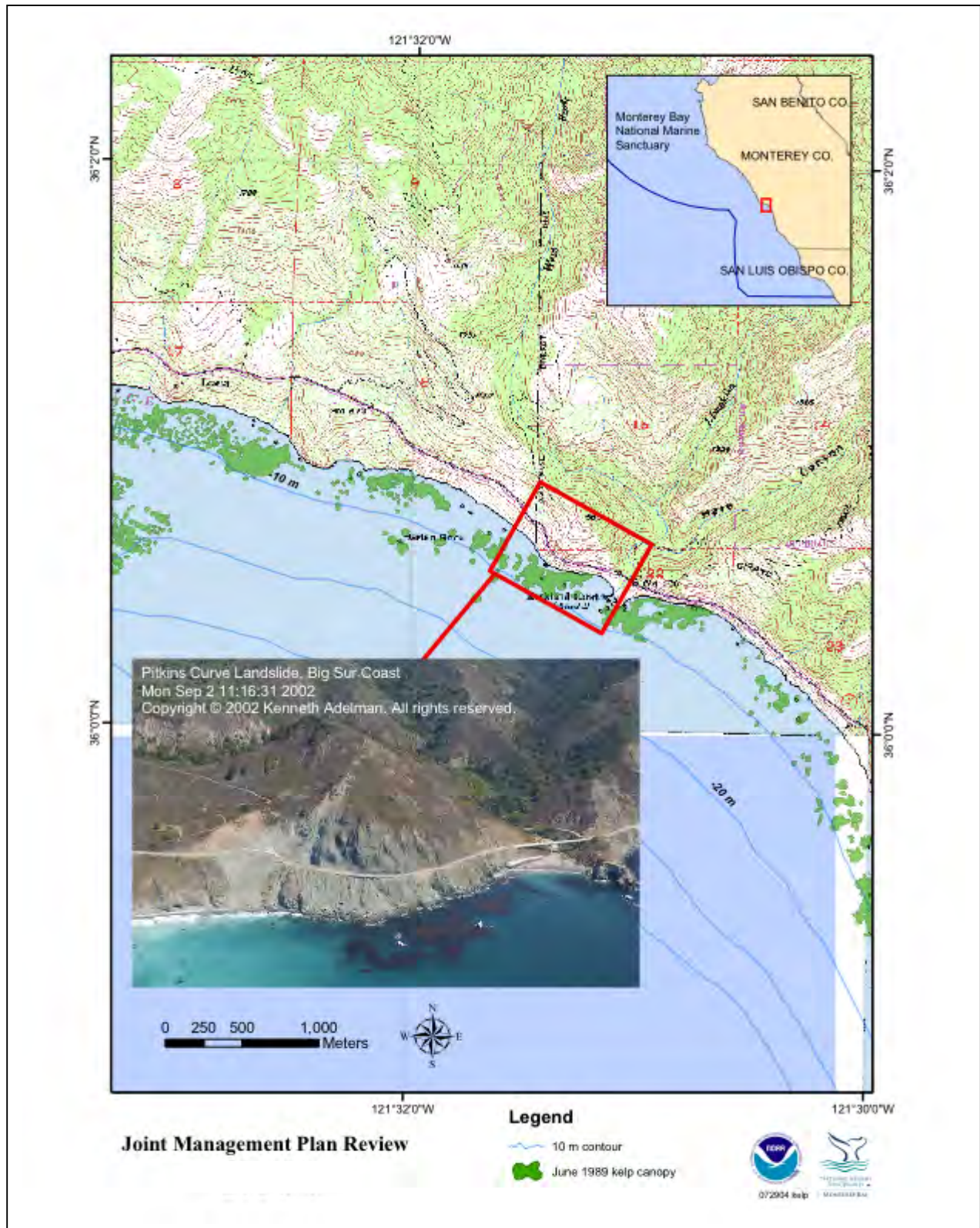
A. Big Sur Coastal Oil Spill Response Plan

The Big Sur coast remains one of the most exposed and vulnerable coastlines in central California for a major oil spill given the extensive vessel traffic between San Francisco and Los Angeles and the relative distance of oil spill response vessels and equipment. Adding to the risk and lack of immediate responders, many areas of the coastline are inaccessible to typical shore-based clean up response equipment. In addition to the MBNMS, a major oil spill in the area would directly impact lands managed by U.S. Forest Service, State Parks, the California Coastal National Monument, and Caltrans, as well as private landowners. Strategies and activities that should be undertaken by the MBNMS to address this issue would include:

1. Coordinate with NOAA’s Office of Response and Restoration, U.S. Coast Guard and California Department of Fish and Game Office of Spill Prevention and Response (DFG OSPR) to assess current response capabilities and equipment resource gaps in the Area Contingency Plan;
2. Assess available research, characterization and monitoring of the intertidal and nearshore subtidal resources, and seabird and marine mammal aggregation areas to identify the most sensitive areas of the coastline;
3. Determine need and location for immediate contingency measures planning;

4. Determine if a specific subsection of the U.S. Coast Guard’s Area Contingency Plan could be identified to allow for additional coordination with MBNMS, Caltrans and U.S. Forest Service, California Coastal National Monument, State Parks, County OES, and local experts;
 5. Based on above assessments, update Area Contingency Plan subsection to clearly articulate the resource protection and management responsibilities of the MBNMS and other agencies, as well as the necessary additional equipment, training, and storage locations; and
 6. Work with U.S. Coast Guard and DFG OSPR to conduct a major oil spill drill involving all agencies to ensure readiness and identify additional resource or contingency needs.
- B. *Potential Offshore Disposal of Landslide Material*
- As portions of the Big Sur coast are highly erosive, Highway 1 along the Big Sur coast is subject to landslides from above the highway that bury it, and from below the highway that undercut it. Caltrans *Coast Highway Management Plan* (CHMP) identifies strategies for prevention and handling landslides. The CHMP identifies the need to consider offshore disposal of excess landslide debris into the marine environment. Strategies and activities that must be undertaken by the MBNMS include:
1. Conduct research, characterization and monitoring of the intertidal and nearshore subtidal resources, and seabird and marine mammal aggregation areas below the highway;
 2. Assess sensitivity of various habitat types and locations to landslide disposal;
 3. Integrate above data with GIS data layers from Caltrans and U.S. Forest Service, California Coastal National Monument, and State Parks to map all sensitive resource areas;
 4. With best data available, determine offshore sediment transport along Big Sur coast, including estimating natural inflows and outputs, and physical characteristics of sediment;
 5. With California Coastal National Monument, Coastal Commission, U.S. Forest Service, State Parks and possibly other resource management agencies, consider natural resource constraints, and work with Caltrans to develop a proposal to address Caltrans’ disposal needs, while protecting MBNMS resources and qualities; and
 6. Facilitate appropriate interagency environmental review of proposals.

Figure BSP-2: Landslide Area and Kelp Mapping in Big Sur



The MBNMS will work with other agencies, residents, NGO's, stakeholders and constituents to address other issues requiring coordination. Implementation of this management plan will involve addressing many issues identified that require interagency coordination and public involvement.

Activity 2.3: Integrate Priority Action Plans

The Agency Coordination Team will compile the completed action plans to form a coordinated and integrated plan identifying agency responsibilities, stakeholders, and partners in implementation of the plans to address the individual natural resource issues.

Activity 2.4: Maintain Plan with Agency Coordination Team and Task Force Representatives

The MBNMS will work with partners to update action plans' program actions or as new priorities are identified.

Activity 2.5: Conduct Workshops to Facilitate Public Comment on Integrated Comprehensive Plan

The Agency Coordination Team will conduct public workshops to facilitate public comment and input on the Integrated Plan and individual action plans as they are developed. These workshops may serve to provide input to agencies as they relate to individual agency programs or policies. This input would then be provided to decision makers at the appropriate agencies.

Action Plan Partners: Monterey County, Caltrans, State Parks, U.S. Forest Service, Coastal Commission, Big Sur Volunteer Fire Department, U.S. Coast Guard, California Department of Fish and Game (Office of) Oil Spill and Prevention and Response, California Department of Forestry, California Highway Patrol, Fire Departments, Pacific Valley School, Bureau of Land Management, U.S. Fish and Wildlife Service, volunteer groups (BAY NET, Friends of the Elephant Seal), fishing community, (Monterey, Morro Bay, Port San Luis Harbors), NOAA OR&R, Clean Seas, Clean Bay, Bureau of Land Management/California Coastal National Monument

Table BSP.1: Measuring Performance of the Big Sur Coastal Ecosystem Coordination Action Plan

Desired Outcome(s) For This Action Plan:	
Protection of the Big Sur coastal ecosystem through increased agency coordination and public involvement to address resource protection issues in the coastal watersheds and nearshore marine environment.	
Performance Measure	Explanation
By 2007, complete and implement a landslide disposal policy for the Big Sur Coast.	MBNMS will track the implementation of this plan by first developing a landslide disposal policy. If the outcome is successful on this initiative, MBNMS will initiate other activities for agency coordination in the plan.

Table BSP.2: Estimated Timelines for the Big Sur Coastal Ecosystem Coordination Action Plan

Big Sur Ecosystem Protection Plan	YR 1	YR 2	YR 3	YR 4	YR 5
Strategy BSP-1: Provide Integrated Data and Information to the Public			●————●	●…………→	
Strategy BSP-2: Develop an Interagency Coordination Program	●…………→		●————→		
Legend					
Year Beginning/Ending:	●————●		Major Level of Implementation: —————		
Ongoing Strategy:	●————→		Minor Level of Implementation: ……………		

Table BSP.3: Estimated Costs for the Big Sur Coastal Ecosystem Coordination Action Plan

Strategy	Estimated Annual Cost (in thousands)*				
	YR 1	YR 2	YR 3	YR 4	YR 5
Strategy BSP-1: Provide Integrated Data and Information to the Public	\$84	\$52	\$32	\$32	\$28
Strategy BSP-2: Develop an Interagency Coordination Program	\$307	\$255	\$259	\$251	\$231
Total Estimated Annual Cost	<i>\$391</i>	<i>\$307</i>	<i>\$291</i>	<i>\$283</i>	<i>\$259</i>

* Cost estimates are for both “programmatic” and “base” (salaries and overhead) expenses.

** Contributions from outside funding sources also anticipated.

Bottom Trawling Effects on Benthic Habitats Action Plan

Goal

To maintain the natural biological communities and ecological processes in the MBNMS by evaluating and minimizing adverse impacts of bottom trawling in benthic habitats while allowing the long-term continuation of sustainable local fisheries in the MBNMS.

Introduction

International studies have examined the direct effects of bottom trawling, including the incidental killing of benthic and demersal species, and mortality caused by increased vulnerability to predation. Increased food availability is another direct effect as trawling creates fish offal, discarded fish, and dead benthic organisms that provide food for scavenging species. As in any fishery, indirect effects include reductions in the total biomass of non-target fish, which could be expected to affect predators, prey, competitors of a target species, and overall seafloor community structure. These downstream consequences also encompass potential changes in the flow of materials and energy through ecosystems and shifts in the balance of production and consumption.

Figure BH-1: Bottom trawling involves towing a net along the seafloor



Bottom trawling is widely believed to adversely affect benthic habitats based on numerous scientific studies. In other marine protected areas such as the Great Barrier Reef Marine Park in Australia as well as others in New Zealand, Canada and Italy, managers have banned benthic trawling while allowing for other fishing activities within protected areas because of the indiscriminate damage to seafloor habitats and the associated bycatch. In the MBNMS, there is an incomplete picture about the extent of these impacts and the potential need for local protective action. In a 1994 report, the National Research Council stated, “Habitat alteration by fishing activities is perhaps the least understood of the important environmental effects of fishing.” Since that report was published, there has been extensive research on the effects of trawl gear on the seafloor. However, the inherent difficulty in studying offshore habitats, and the problems associated with determining causation under shifting environmental conditions (current, temperature variation, natural migration, storm activity), have left many questions unanswered.

Both despite and because of the uncertainty that remains, the use of trawl gear is a source of concern for the MBNMS. This is due in part to the potential modification of the substrate, the possible disturbance of benthic communities, and the removal of non-target species. There has been little research conducted within the MBNMS boundaries; however, a 1998 study indicated the occurrence of many of these suspected impacts. There is also a perception that declines in many traditional fisheries could lead to increased efforts to find under-exploited fish populations

in more remote and lightly fished areas. These efforts would be facilitated by the development of new types of gear and navigational aids, possibly exposing new regions of the continental shelf, slope, submarine canyons, and seamounts to the effects of bottom trawling.

The Sustainable Fisheries Act of 1996 required that fishery management plans describe and identify essential fish habitat (EFH) and address how it is affected by fishing activities. The seafloor has thus become an area of acute environmental concern and a focus of scientific research. Legal challenges have been brought alleging that the Fishery Management Councils, who help implement the Sustainable Fisheries Act, have not adequately addressed this issue. However, in 2006, the Pacific Fishery Management Council and NOAA Fisheries took a major step by designating and protecting Essential Fish Habitat for Pacific groundfish. This initiative created large trawl closures that in essence, froze the existing trawling effort patterns.

The EFH measures will likely soon be complemented by a Individual Trawl Quota (ITQ) program which will allow trawlers to fish at their own pace instead of rushing to try to catch their share of the sector's quota. This may also lead to trawlers taking the time to fish in areas where they know there is likely to be less bycatch. There are also efforts underway to purchase local trawl vessels and their permits with private funding. These efforts have been successful in Morro Bay and are proceeding within the Sanctuary with an eye towards maintaining local fishing communities and infrastructure.

The MBNMS is concerned not only with the nexus between habitat and the health of a particular species or assemblage, but with the role the benthic habitat plays in the health of the ecosystem. Therefore, the MBNMS is looking to address both the direct and indirect effects on seafloor habitat that can result from the fishing practice of bottom trawling.

Strategy BH-1: Develop Partnerships with Fishermen

Fishermen have a wealth of knowledge not only about their fishery but also about the physical and biological environment. The MBNMS recognizes that tapping into this knowledge base is critical to obtain quality information regarding the extent and potential impacts of bottom trawling. Working cooperatively with fishermen is critical to effectively accomplish this goal.

Activity 1.1: Engage Fishermen to Work with the MBNMS to Address Impacts from Bottom Trawling

The MBNMS will work with fishermen to help identify potential impacts from bottom trawling and find workable solutions. This type of coordination will in part be conducted through implementation of the Fishing Related Research and Education Action Plan. Given recent regulatory actions, fishermen may be reluctant to engage in a discussion on this issue. However, the MBNMS has worked to create partnerships with fishermen in the past and would continue to draw from and build on these relationships.

Strategy BH-2: Assess Trawl Activity

In order to determine when and where trawling is taking place, the MBNMS will need to examine a number of existing indicators. The MBNMS and its partners will evaluate the need for recommending measures that would improve the quality of the data available. Existing tools will be utilized to determine where and when trawling is taking place, including landing receipts,

logbooks, and anecdotal information. The MBNMS realizes many of these activities may require additional work from partners, in particular California Department of Fish and Game staff, which may be limited by resource availability. In addition, some data collection may be limited by confidentiality. The Sanctuary will work with partners to ensure that the confidentiality is protected.

Activity 2.1: Compile Fishing Data

Building off existing databases, MBNMS staff will work with California Department of Fish and Game, National Marine Fisheries Service, and fishermen to agree on an appropriate level of resolution for existing trawl data. This will involve the consideration of logbook, landing receipt, and anecdotal information regarding where, when, and what kind of trawling has been taking place in the MBNMS.

Activity 2.2: Evaluate Effect of Current and Projected Regulations on Future Fishing Effort

The MBNMS will facilitate the assessment of the capabilities and potential impacts of a full-scale fishery, including potential displacement from other areas. Determining the number of potential participants will help establish the spectrum of effort that can be applied in MBNMS waters. This will affect the range of potential impacts on benthic habitats. This analysis will also evaluate the potential for a shift to factory vessels, the impact of buy-back programs, retiring permits, individual trade quotas, individual fishing quotas, and the potential revision of existing regulations.

Activity 2.3: Improve Data Gathering

MBNMS staff will encourage the continued development of a more refined system of gathering data, as this has been initiated by federal fishery agencies. The MBNMS will examine the data collected by fishery management agencies and will assess the need for recommending measures that could produce more refined or reliable data that would help managers to effectively manage and protect resources.

Strategy BH-3: Identify Habitats Vulnerable to Trawling

The level of adverse impacts to benthic habitats from trawling depends on the vulnerability of the specific habitat. The MBNMS will examine what habitats are particularly susceptible and identify these locations within its jurisdiction.

Activity 3.1: Consult Literature and Scientists to Develop Criteria for Selecting and Prioritizing Habitats Vulnerable to Effects of Bottom Trawling

The MBNMS will work to identify what makes a given habitat vulnerable to trawling, and it will address them in the order of this susceptibility. Initially defining habitat vulnerability is a critical first step of this process. Vulnerability will be established in part by reference to stressed local species. The MBNMS's partners will help establish criteria for this assessment.

Activity 3.2: Consult with Local Scientists, Fishermen, and Primary Literature to Determine What and Where Vulnerable Habitats are Located

There is an extensive amount of international research focused on the effects of trawling in benthic habitats. The MBNMS in partnership with local scientists and fishermen will seek to

identify what habitats within the MBNMS are vulnerable (as defined in 3.1) and what the specific impacts are likely to be.

Activity 3.3: Gather Existing Data on Habitat Distribution and Incorporate into Geographic Information System (GIS) Format

There are several existing mapping projects that have focused on portions of the MBNMS. These include work by United States Geological Survey, Moss Landing Marine Laboratories, California Department of Fish and Game, and California State University Monterey Bay. Using the Sanctuary Integrated Monitoring Network (SIMoN) program, the MBNMS will generate a series of habitat maps that depict where vulnerable habitats are located and the level of threat posed by trawling activity.

Activity 3.4: Evaluate the Need for and Develop Strategy to Obtain Additional Habitat Distribution Data if Necessary

The MBNMS will determine the availability of habitat information in areas where trawling is occurring. It will identify data gaps and will work with local scientists to design research projects that target these needs.

Strategy BH-4: Develop a Management Tracking Program

Trawlers are heavily regulated by existing laws and regulations. In order to assess the risk of adverse impacts to benthic habitats and identify appropriate management strategies, the MBNMS and community members helping with this action plan must have a comprehensive understanding of the current regime. Additionally, given that laws and regulations are subject to alteration, the MBNMS must be able to stay abreast of regulatory and statutory changes.

Activity 4.1: Compile Database of Regulations and Restrictions

The MBNMS will work with fishery management agencies to compile the relevant regulations and restrictions and incorporate this information into a series of GIS maps. Having an easily accessible and updateable database is critical to making informed decisions and in identifying important issues. The National Marine Fisheries Service and California Department of Fish and Game have done much of this work. The MBNMS will offer its support to these agencies in its continued evolution. Additionally, the MBNMS will incorporate the information into its own GIS program and update information as needed.

Activity 4.2: Track Changes in Regulatory Environment

The MBNMS will seek to partner with fishery management agencies to address mutual concerns and interests, and will create a means for staying apprised of the current and pending regulatory environment. Developing a relationship with fishery management agencies early in this process will be critical to forming an effective partnership and will help the MBNMS stay apprised of the current regulatory setting. Staying up to date will require that the MBNMS allocate sufficient staff resources to the issue and maintain relationships with fishery managers who can keep the MBNMS current with regard to regulation changes and pending management action.

Strategy BH-5: Develop an Impact Identification and Research Program

This strategy recognizes the need to articulate what the potential impacts are to benthic habitats from trawling. Being as specific as possible in this regard will help ensure that any remedial action recommended will be narrowly tailored and as effective as possible at addressing MBNMS concerns. Additionally, clearly identifying impacts will help design specific solutions that have as little impact as possible on the economic viability of commercial fishing within the MBNMS. Information gaps will be identified and research projects to address data needs will be pursued with MBNMS partners.

Activity 5.1: Identify Impacts from Bottom Trawling in MBNMS

The MBNMS will draw on the local scientific expertise to create an inventory of local impacts from trawling. Identifying the extent of some of these impacts will be the subject of additional activities focusing on research needs. However, it is important to generate a preliminary list of known impacts in order to guide plan development and to allow the MBNMS to address issues while data needs are identified and more information is obtained. The following is an initial list of direct and indirect impacts from trawling that will be augmented by future discussion and research.

Direct Impacts:

- Altered ecosystem function due to removal of target species
- Incidental mortality of non-target species
- Alteration or damage to habitat
- Increased short-term food availability for scavengers from discards, offal, and dead benthic organisms
- Shift towards smaller organisms

Indirect Impacts:

- Alteration of the seafloor community structure
- Shift in the flow of materials and energy in the ecosystem
- Shift in production and balance between non-human consumers
- Alteration of biodiversity
- Increased vulnerability to other natural or anthropogenic stressors

Activity 5.2: Identify and Conduct Necessary Research on Trawling Impacts

Conducting, supporting, and coordinating research in benthic habitats is a critical aspect of the MBNMS's role in protecting this resource. Further study should be performed on the impacts of trawling on benthic habitats, particularly at a local level. Once MBNMS identifies what areas are most at risk, it will be able to determine what the research needs are for that habitat. Initial efforts will be to promote study that addresses the recovery rates and dynamics of community structures through post-regulatory monitoring. In order to discern the severity of trawling impacts, it is necessary to examine the rate at which a trawled site recovers and the ecological dynamics of that recovery over time. Evaluating these on a local, habitat specific level can help identify the severity of impacts and the need for and design of tailored remedial action. This

study would also examine the impact on the physical structure of these habitats as it relates to benthic ecology.

Strategy BH-6: Identify and Implement Potential Ecosystem Protection Measures

After assessing the location and extent of impacts from trawling and consulting with fishermen, the MBNMS will present potential management measures to the relevant fishery management agency.

Activity 6.1: Generate Socio-economic Profile of Local Trawl Fishery

A socio-economic profile of the trawl fishery needs to be created and considered in any management action or recommendation. Understanding the socio-economic characteristics of the trawl fishery and fishermen is critical in the ability to appropriately consider the economic effects of regulation and impact mitigation measures. Fisheries within the MBNMS are a critical component of the region's economy and culture. The study would consider potential future impacts, and the spatial and temporal distribution of markets and the relative value/impact of the market vs. regulations. The MBNMS will also work with economists and fishermen to describe the effects that recent regulatory changes such as the groundfish closure have had on markets and employment.

Activity 6.2: Develop Considerations For Potential Ecosystem Protection Measures

After defining the benthic habitats in need of protection, the MBNMS will consider the type of protection needed, and the expected costs and benefits of that protection. The MBNMS will develop considerations, including the impact of trawling on vulnerable habitats in the MBNMS, the socio-economics of the local trawl fishery, protection afforded by existing management, and costs and benefits of increased protection.

Activity 6.3: Explore Regulatory Modifications with Fishermen, Other Stakeholders, and Fishery Managers

The MBNMS will consult with fishermen, researchers, and agencies to evaluate the potential benefits, effectiveness, and costs of different management options, including marine protected areas.

Activity 6.4: Consider Socioeconomic Impacts of Proposed Management Actions

Any proposed restrictions on trawling activities should consider the impact on the fishery participants and the community.

Activity 6.5: Identify Proposed Ecosystem Protection Measures

The Sanctuary may recommend management changes with input from stakeholders and agencies. Action may involve coordination with the MBNMS marine protected areas working group.

Activity 6.6: Evaluate Utility of Economic Mitigation Measures

The MBNMS recognizes that the trawling industry has been subject to regulation that has made it economically challenging for many participants. These fishermen are frequently heavily invested in the fishery and may find it difficult to find other employment. Mitigation measures

such as buy-out programs, money required for gear changes, and re-education programs that are designed to ameliorate the economic condition of these fishermen are options that the MBNMS will evaluate and consider endorsing.

Strategy BH-7: Develop Education and Outreach Program

Fishermen, managers, and researchers must be able to effectively communicate and share information with one another. All three of these groups have valuable information to share with the public at large. The MBNMS has a separate action plan for incorporating fisheries' issues into research and education. Activities specifically identified for this plan will likely fit into broader strategies identified by that group, and efforts will therefore be closely coordinated. The goal of this strategy is to educate the public regarding the impacts of bottom trawling and to facilitate and encourage information exchange between managers, researchers, and fishermen.

Activity 7.1: Define Educational Needs and Develop Outreach Program

MBNMS staff will conduct a needs assessment based on determined target audiences and synthesize and package the results of research, analysis, and recommendations into an educational and outreach program.

Action Plan Partners: Alliance of Communities for Sustainable Fisheries, Pacific Coast Federation of Fisherman's Associations, UC Sea Grant, Fisherman's Marketing Association, California Department of Fish and Game, National Marine Fisheries Service, Pacific Fishery Management Council, Pacific States Marine Fisheries Commission, regional research institutions, fishermen, local trawlers, California State University Monterey Bay, UCSB - Bren School, Sea Studios, Monterey Bay Aquarium, Sanctuary Education Panel, United States Geological Survey, NOAA's National Undersea Research Program, Maritime Museum of Monterey, The Nature Conservancy, Environmental Defense

Table BH.1: Measuring Performance of the Bottom Trawling Effects on Benthic Habitats Action Plan

Desired Outcome(s) For This Action Plan:	
Maintain the natural biological communities and ecological processes in the MBNMS and evaluate and minimize impacts of bottom trawling in benthic habitats.	
Performance Measure	Explanation
By 2012, spatial identification of 100% vulnerable areas in the MBNMS and identification of protective measures under a range of potential authorities.	MBNMS staff will measure its performance in implementing the action plan by developing habitat vulnerability criteria; assessing the progress in engaging the fishery management agencies, scientists and fishermen in identifying the areas that have been trawled in the MBNMS and assessing impacts and recovery.

Table BH.2: Estimated Timelines for the Bottom Trawling Effects on Benthic Habitats Action Plan

Bottom Trawling Effects on Benthic Habitats Action Plan	YR 1	YR 2	YR 3	YR 4	YR 5
Strategy BH-1: Develop Partnerships with Fisherman	●	●	▶
Strategy BH-2: Assess Trawl Activity	●	●
Strategy BH-3: Identify Habitats Vulnerable to Trawling	●	●
Strategy BH-4: Develop a Management Tracking Program	●	●	▶
Strategy BH-5: Develop an Impact Identification and Research Program	●	●
Strategy BH-6: Identify and Implement Potential Ecosystem Protection Measures	●	●
Strategy BH-7: Develop Education and Outreach Program	●	▶
Legend					
Year Beginning/Ending	: ●	●	Major Level of Implementation: _____		
Ongoing Strategy	: ●	▶	Minor Level of Implementation:		

Table BH.3: Estimated Costs for the Bottom Trawling Effects on Benthic Habitats Action Plan

Strategy	Estimated Annual Cost (in thousands)*
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Monterey Bay National Marine Sanctuary – Final Management Plan
 Section III – Ecosystem Protection: Bottom Trawling Effects on Benthic Habitats Action Plan

	YR 1	YR 2	YR 3	YR 4	YR 5
Strategy BH-1: Develop Partnerships with Fishermen	\$16	\$12	\$12	\$0	\$0
Strategy BH-2: Assess Trawl Activity	\$125	\$15.5	\$0	\$0	\$0
Strategy BH-3: Identify Habitats Vulnerable to Trawling	\$152	\$128	\$128	\$128	\$0
Strategy BH-4: Develop a Management Tracking Program	\$4	\$4	\$0	\$0	\$0
Strategy BH-5: Develop an Impact Identification and Research Program	\$12	\$298	\$298	\$16	\$0
Strategy BH-6: Identify and Implement Potential Ecosystem Protection Measures	\$0	\$0	\$5	\$13	\$47
Strategy BH-7: Develop Education and Outreach Program	\$8	\$26.5	\$70	\$8	\$18
Total Estimated Annual Cost	<i>\$317</i>	<i>\$484</i>	<i>\$513</i>	<i>\$165</i>	<i>\$65</i>

* Cost estimates are for both “programmatic” and “base” (salaries and overhead) expenses.

Davidson Seamount Action Plan

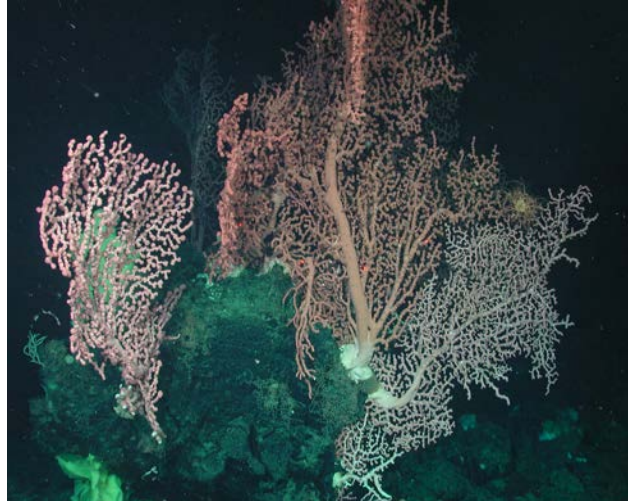
Goal

Develop and implement a resource protection plan for the Davidson Seamount, increase understanding of the seamount through characterization and ecological process studies, and develop education programs for the seamount and other seamounts throughout the nation.

Introduction

Less than 0.1 percent of the world’s seamounts have been explored for what species live on them, and many species found on seamounts are new to science. Seamounts are often dominated by suspension feeders, like corals, that grow on rock in an otherwise flat, low biomass, sediment-covered abyssal plain. In addition, seamounts create complex current patterns that can influence sea life above them. Commercially valuable fish species often concentrate around relatively shallow seamounts due to enhanced upwelling caused by current deflection. Conservation issues relevant to seamounts revolve around endemism, harvest, and the low resilience of species. A survey in the southwest Pacific suggests that up to one-third of the species on seamounts can be endemics.

Figure DS-1: Fragile cold-water corals (*Paragorgia arborea*) at Davidson Seamount



Davidson Seamount is located seventy-five miles to the southwest of Monterey, due west of San Simeon, and is one of the largest known seamounts in U.S. waters. It is twenty-six miles long and eight miles wide. From base to crest, Davidson Seamount is 7,480 feet tall; yet, it is still 4,101 feet below the sea surface at its highest point. Davidson Seamount has an atypical seamount shape, having northeast-trending ridges created by a type of volcanism only recently described, and it last erupted about 9.8 million years ago. This large geographic feature was the first underwater formation to be characterized as a “seamount” and was named after the Coast and Geodetic Survey (forerunner to the National Ocean Service) scientist George Davidson.

Species associated with Davidson Seamount can be divided into habitats including: the sea surface habitat (birds in flight and on the sea surface), the midwater habitat (0 – 4,100 feet below sea surface), the seamount crest habitat (4,100 – 4,900 feet), the seamount slope habitat (4,900 – 8,200 feet), and the seamount base habitat (8,200 – 11,500 feet). The surface habitat hosts a variety of seabirds, marine mammals, and surface fishes, including albatross, shearwaters, jaegers, sperm whales, killer whales, albacore tuna, and ocean sunfish. At this time, there is no published evidence that the species composition in this surface habitat is different than adjacent areas without a seamount below, although in some years Davidson Seamount may enhance albacore fishing. Organisms in the midwater habitat have a patchy distribution with marine snow, organic matter that continually “rains” down from the sea surface, most likely providing

an important food source for deep-sea animals. Swimming worms, and an undescribed mollusk have been seen above Davidson Seamount.

The seamount crest habitat is the most diverse, including *Paragorgia arborea* (a large gorgonian coral) forests, vast sponge fields (consisting of both described and undescribed species), crabs, deep-sea fishes, shrimp, and basket stars. The seamount slope habitat is composed of cobble and rocky areas interspersed with areas of ash and sediment that host a diverse assemblage of sessile invertebrates and rare deep-sea fishes. The seamount base habitat is the interface between rocky outcrops and the deep soft bottom. Species here are similar looking to their relatives in the nearshore, including sea cucumbers, urchins, anemones, and sea stars.

Anthropogenic influence on Davidson Seamount has been detected in the form of DDT in sediments near its base, and trash (e.g., bottles, cans, brooms, newspapers, buckets, curtains) discarded from the sea surface.

However, because of the abundance of large, fragile species (e.g., corals greater than eight feet tall, some at least 200 years old, as well as vast fields of sponges) and an apparently, physically undisturbed seafloor, the area appears relatively pristine. The top of the seamount is too deep for most fish trawling technology; moreover, fish density is very low, and the species seen to date are not commercially desirable. The existing albacore tuna and swordfish/shark fisheries operate in the top 150 feet of water, thousands of feet above the summit of the seamount.

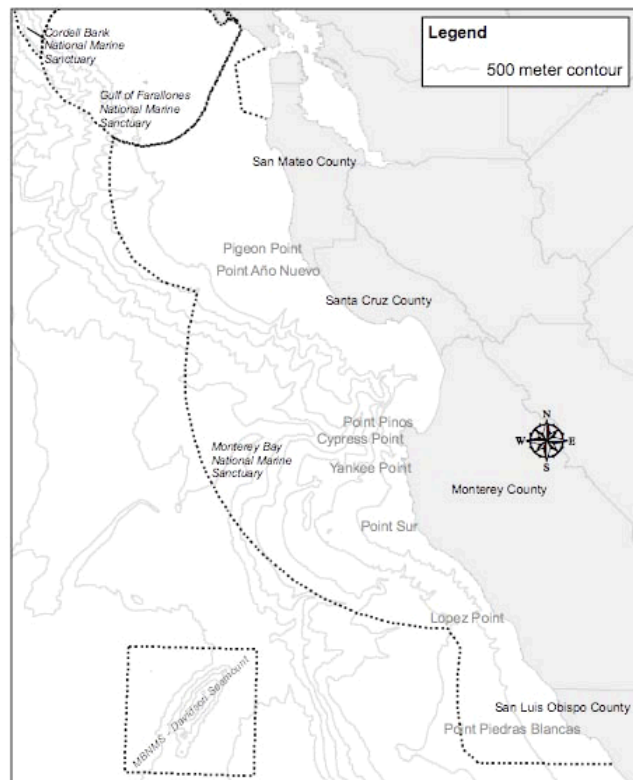
Davidson Seamount is important for science to study how the seamount is ecologically linked with the coastal waters, nearshore canyons, and species currently protected in the MBNMS. Protecting it will help facilitate research to

understand how the Monterey Bay and Big Sur Canyon complexes have an effect on Davidson Seamount and what the migration pattern of species is between the seamount and nearshore.

Threats to the Davidson Seamount

Conservation issues related to seamounts revolve around endemism (species only found on a specific seamount), harvest, and low resilience of species. Existing and potential threats to Davidson Seamount include bio-prospecting, cumulative impacts from research collecting of

Figure DS-1: Davidson Seamount Management Zone within the Monterey Bay National Marine Sanctuary.



long-lived species, new or unknown forms of seafloor disturbance, new technologies to harvest from the seabed, “exploratory” benthic fishing which could destroy habitat and long-lived species, and marine debris/dumping. Although management agencies are responsible for some activities that may occur at the seamount, there is currently no comprehensive protection and management of organisms on the seamount or the surrounding ecosystem, and coordinated education or research programs addressing Davidson Seamount issues are in their infancy. By incorporating the seamount into the MBNMS, its resources will be protected and opportunities will be provided for a better understanding of the seamount.

Expansion of the MBNMS to Include Davidson Seamount Management Zone

The Davidson Seamount Management Zone (DSMZ) is a recent addition to the MBNMS, as part of the adoption of this management plan. This area encompasses approximately 585 square nautical miles of ocean waters and the submerged lands there under. The boundary resembles a square box, approximately twenty-five nautical miles per side, centered on the summit of Davidson Seamount. The uniform lines and symmetry of the boundary configuration offer easy navigation by longitude and latitude even though the seamount is physically disconnected from the MBNMS boundaries contiguous with the shoreline (See Figure DS-1). Standard MBNMS regulations apply within the DSMZ, without the exceptions for seabed alteration. Below 3,000 feet, in addition to a general prohibition by the MBNMS, a prohibition on fishing was implemented by NMFS in June of 2006 to address potential threats to the seamount and natural resources.

Strategy DS-1: Conduct Site Characterization

The purpose of this strategy is to complete a number of already initiated studies on the DSMZ ranging from geological and biological characterization to zoological and oceanographic surveys, while further initiating a socioeconomic survey. The strategy will also result in a complete cultural history analysis and site characterization document for Davidson Seamount.

Activity 1.1: Complete Geologic and Biological Characterization of the Seamount

In addition to initiated studies, a complete analysis of existing video transects from the Davidson Seamount Management Zone (DSMZ) of species and habitat types from past NOAA and the Monterey Bay Aquarium Research Institute (MBARI) research cruises will be completed. In 2006, a collaborative research cruise with MBARI and the British Broadcasting Corporation (BBC) successfully obtained information from other unvisited areas of Davidson Seamount to produce an education video.

Activity 1.2: Identify Taxonomy and Natural History of Rare or New Species

Seamounts are known to have a high percentage of endemism. This creates many taxonomic questions concerning the possible discovery of new deep-water corals. Past surveys of Davidson Seamount indicate species that are rare or new to science altogether.

Activity 1.3: Conduct Zoological Survey of Surface and Midwater Areas Above the Seamount

Additional cruises from the NOAA ships are necessary to describe surface and mid-water species, sea turtles, birds, and mammals. The Sanctuary Aerial Monitoring and Spatial Analysis Program (SAMSAP) has been established within the area using local NOAA aircraft and has

been incorporated into the MBNMS’s monitoring program. The SAMSAP program is designed to monitor the locations of different kinds of commercial and recreational vessels as well as distributions of some species of interest, including cetaceans (whales and dolphins), and some physical conditions, such as spilled oil. During aerial surveys, observers document the precise locations of the vessels, animals and physical characteristics using a Global Positioning System (GPS). Observers distinguish between commercial and recreational vessels, and between consumptive and non-consumptive activities. When observers see fishing gear in the water, the type of fishing activity is noted.

Activity 1.4: Initiate Oceanographic Surveys of Seamount Region

Oceanographic surveys will be conducted using the NOAA ships and satellite imagery. The data from the surveys will be linked with national coastal observatories (i.e., Central and Northern California Ocean Observing System) resulting in a better understanding of ocean current patterns on and around Davidson Seamount. This will also enable researchers to determine how the ocean current patterns affect life on and around Davidson Seamount and generally, how Davidson Seamount has an influence on the regional ecology.

Activity 1.5: Complete Socioeconomic (Commercial, Recreational, Research Uses) Analysis

In comparison to the rest of the MBNMS, there are relatively few user groups in the Davidson Seamount region. However, a comprehensive understanding of key users of the seamount region is needed. Learning more about who uses the seamount region over a period of time is critical to effective education and protection.

Activity 1.6: Characterize Cultural History of Davidson Seamount

Throughout history Davidson Seamount has played a role in mapping, fishing, whaling, and research. By working with the Monterey History and Art Association/Maritime Museum of Monterey, the MBNMS can characterize and further highlight the role of the seamount in the region’s rich maritime past, and the history of the seamount’s namesake, George Davidson. His many contributions to maritime history and his personality as a maritime figure are important and have heritage value. Additionally, a history concerning the types of seamounts nationally and worldwide will be included. Among the results of this activity will be reports. A video for visitor centers was created and disseminated among the public, stimulating interest that has heuristic value.

Activity 1.7: Incorporate Site Characterization Document in MBNMS Websites

All relevant data from above activities (1.1-1.6) will be incorporated into the MBNMS websites, updating all physical and biological information. A Davidson Seamount chapter will be added to the MBNMS Site Characterization, while incorporating all seamount information into the geology chapter.

Strategy DS-2: Conduct Ecological Processes Investigations

In addition to characterizing the seamount region, Strategy DS-2 will result in the description of process studies to determine the causes of distribution and abundance of species. Several hypotheses to be tested include the role of seamounts as either: 1) islands, where seamounts serve as a sink for larval recruits originating in adjacent habitats; or 2) oases, where seamounts serve as a source of larvae integral to the surrounding areas. Another proposed hypothesis is

seamounts may acquire heightened biodiversity through the presence of coral and sponge fields, which promote local species coexistence by offering increased habitat complexity. High biodiversity of seamounts may also reflect rapid habitat turnover associated with substrate type, currents, temperature, oxygen concentration, and other abiotic/biotic parameters encountered across the flanks and summits of the seamount. Currently, we are assessing these hypotheses, and other ecological process studies, utilizing data collected from Remotely Operated Vehicle (ROV) dives at Davidson Seamount conducted in 2000, 2002, 2006, and 2007 through a collaboration of MBARI, MBNMS, and other NOAA partners.

Activity 2.1: Conduct Regular Benthic Surveys of Davidson Seamount

The DSMZ benthos must be monitored. Based on information from early site characterization and preliminary studies, a benthic monitoring plan will be developed for Davidson Seamount. Data from this monitoring program will be made available through the Sanctuary Integrated Monitoring Network (SIMoN) website.

Activity 2.2: Conduct Deep-water Coral Age Determination and Restoration Studies

Cold-water corals are receiving increased attention in terms of scientific studies and conservation. The relatively pristine nature of Davidson Seamount and its diverse coral populations provide for a number of opportunities for age determination, and restoration efforts to historical locations of corals in impacted areas of the MBNMS. A research plan for deep-water coral studies will be developed, linking the activities to the resource protection portion of Davidson Seamount action plan.

Activity 2.3: Perform Research on Seamount to Expand Understanding Distribution and Abundance of Species

Designation of Davidson Seamount as a managed area provides the status and opportunity for advancing the basic ecological understanding of seamounts. One such example would be to determine causes of high diversity and patchiness of Davidson Seamount corals and sponges.

Activity 2.4: Understand Links with Coastal Area of Sanctuary

It is important to understand how the seamount is linked ecologically with the coastal area of the Sanctuary. For effective ecosystem management, we should understand questions, such as how the Monterey Bay and Big Sur Canyon complexes have an effect on the DSMZ, or what the migration and dispersal patterns of species are among these diverse systems.

Activity 2.5: Initiate up-to-date faunal inventory for Davidson Seamount

A single cohesive database of existing biota will be created including information on the species' biogeography (known distribution of the species on Davidson, Eastern Pacific Seamounts, seamounts globally, and non-seamount habitats), habitat preference, trophic level, and range of densities.

Activity 2.6: Development of long-term monitoring plan through analyses of faunal database

Analyses of a faunal database will enable a long-term monitoring plan to be developed to understand ecological processes at the seamount, and the sensitivity and resilience of seamount biological communities to anthropogenic perturbations.

Strategy DS-3: Develop Resource Protection Program

MBNMS regulations will protect and enhance understanding of Davidson Seamount. Two modifications to standard MBNMS regulations were established to address resource threats: (1) because of the depth of the seamount, there is no need to have exceptions to the regulation prohibiting drilling into, dredging or otherwise altering the seabed that allow for anchoring vessels, aquaculture, kelp harvesting or lawful fishing operations, harbor maintenance, or collection of jade, therefore these exceptions will not apply in the DSMZ; and (2) an additional regulation has been issued to prohibit the disturbance, collection or harvesting of any sanctuary resources in areas below 3,000 feet of the sea surface (unless a permit is obtained for this activity).

Activity 3.1: Continuously Characterize the Potential Threats to Davidson Seamount

A threats and protection plan will be developed based on a thorough literature review, workshops with experts, and a socioeconomic and biological characterization. Initial research has enabled the identification of potential threats to Davidson Seamount and associated resources, including the following.

A. *Bio-prospecting*

Some groups of organisms found on Davidson Seamount have been targeted for collection in other areas of the world for developing medicine. Discovering medicinal uses for natural products is important for enhancing human health services, however over-collection of rare or sensitive species can disrupt natural habitats.

B. *Cumulative research collecting of long-lived species*

Where there are limited populations of slow growing species, research collection can be detrimental. Over the last two years, there has been increased worldwide interest in studying deep-sea corals such as the large pink gorgonian coral, *Paragorgia arborea*, found on Davidson Seamount, and they are often collected. This problem is exacerbated on seamounts that have a high degree of endemism, and Davidson Seamount has several other taxa that are slow growing and rare. Research is critical to understanding and managing ecosystems, so appropriate scientific collecting is often encouraged with permits to ensure minimal impacts.

C. *New or unknown forms of seafloor disturbance, including exploratory fishing / new technologies to harvest from the seabed*

Harvesting from Davidson Seamount is not a currently known commercial activity. With new discoveries of precious corals or other commercial species, in concert with more effective harvest technologies being explored at depths of greater than 4,000 feet, commercial harvest at Davidson Seamount could quickly cause severe impacts before protective regulations could be issued. The concerns relative to impacts to Davidson Seamount are largely for protecting a fragile area before it is severely impacted.

D. *Marine debris / dumping*

The Davidson Seamount area should be excluded from targeted dumping, and education about the site's significance could augment existing federal regulations regarding at-sea dumping.

E. *Ocean acidification*

Although changes in ocean chemistry due to anthropogenic release of CO₂ are relatively well established, what needs more attention is determining what impact this drop in pH will have on deep-sea organisms.

Activity 3.2: Initiate Resource Protection Measures as Necessary

Characterization of the potential threats to Davidson Seamount may require initiation of additional protective measures or enhanced enforcement of existing regulatory measures to ensure adequate protection. Integration of the SAMSAP program will enable enhanced monitoring abilities for the DSMZ including vessel traffic monitoring and fishing use that currently occurs in the DSMZ. In addition SAMSAP will provide biological monitoring capabilities to the MBNMS to establish potential conflicts between the surface use of marine organisms such as cetaceans and vessels.

Activity 3.3: Develop and Implement Enforcement Plan for DSMZ

Based on Activities 3.1 and 3.2, a threats management plan will be developed. Incorporated into this plan will be the identification of collaborative agencies to develop enforcement partnerships. Enforcement of Sanctuary regulations relevant to Davidson Seamount will be integrated into the MBNMS enforcement program. The distance of Davidson Seamount from the coastline will require coordination of the U.S. Coast Guard, NOAA Office of Law Enforcement, and the California Department of Fish and Game to establish surveillance and response capabilities for the area. Aerial surveys, such as SAMSAP, will be incorporated into the enforcement effort as well as patrols on USCG and NOAA ships.

Activity 3.4: Develop Permitting Considerations to Facilitate Continued Appropriate Research and Education

This permit process should facilitate the continuation of appropriate research and education while minimizing impacts to the benthic habitat of the seamount, to accompany extending the regulations and the MBNMS permit program into this new habitat.

Strategy DS-4: Conduct Seamount Education and Outreach Initiatives

Davidson Seamount has captivated the public through numerous media reports (including the CBS Nightly News and American Airlines in-flight news) and through NOAA’s Ocean Explorer web site (<http://oceanexplorer.noaa.gov/explorations/06davidson/welcome.html>). A recent survey of the public, related to developing a visitor center for the MBNMS, found that one of their top interests was in “seafloor topography” of which canyons and seamounts are dramatic examples. Proximity to the Monterey Bay Aquarium and other education institutions provides excellent education opportunities (e.g., displays on seamounts). The proximity of education and research institutions in the Monterey Bay region facilitates interdisciplinary collaborations that enhance research and education. Davidson Seamount and MBNMS’s research efforts have generated significant interest in the Cambria and San Simeon area and will be prominently featured in the San Simeon Visitor Center.

Activity 4.1: Conduct an Educational Needs Assessment

The MBNMS will actively work with the Sanctuary Education Panel to identify target audiences. Subsequently, an educational needs assessment will be completed. Finally, relevant information regarding the DSMZ will be synthesized.

Activity 4.2: Develop and Implement Davidson Seamount Education and Outreach Program

Information on the DSMZ will be incorporated into educational material and interpretive centers. These will include items such as CD-ROMs, a website, and print material. Building on the opportunity that the DSMZ is the only seamount in the National Marine Sanctuaries Program, educational information on seamount biological diversity, habitats, and species of related interest, such as cold-water corals and sponges will be provided to all relevant NOAA programs.

Activity 4.3: Explore the Potential Use of Davidson Seamount Footage within the MBNMS Interpretive Center and Other Virtual Experiences

Incorporate Davidson Seamount video and still photos into the exhibits of the San Simeon Coastal Discovery Center. Creating a narrative of selected footage will encourage use of the video footage obtained beyond the MBNMS. As the National Marine Sanctuary Program (NMSP) telepresence program develops, the potential for use of this high quality footage is very likely; creating prepared footage for use will be key to its use across the nation.

Activity 4.4: Involve MBNMS Education Staff in Davidson Seamount Research

Involvement by the education staff in research on Davidson Seamount will increase public knowledge of the seamount, expose the uniqueness of the region, and ensure necessary outreach pieces are created for use in resource management decision making.

Activity 4.5: Involve the Education and Outreach Mechanisms within NOAA to Promote the Existing and New Research on Davidson Seamount

The 2002 mission to the seamount, in conjunction with NOAA's Office of Exploration and Research (OER), was hugely successful due to the combined efforts of the MBNMS, NMSP, and OER. This relationship and others should always be considered when new cruises and campaigns are considered.

Activity 4.6: Expand Outreach and Education Efforts in San Simeon / Cambria Region

MBNMS will develop outreach materials and displays for the San Simeon Coastal Discovery Center to address the increased interest in the region regarding the natural resources of Davidson Seamount. MBNMS staff will also incorporate discussion of Davidson Seamount into local presentations and outreach events.

<p><i>Action Plan Partners:</i> Monterey History and Art Association / Maritime Museum of Monterey, Monterey Bay Aquarium Research Institute, Moss Landing Marine Labs, Monterey Bay Aquarium, Save The Earth, United States Coast Guard, National Marine Fisheries Service, UC Sea Grant, fishermen, The Ocean Conservancy, California Department of Fish and Game</p>

Table DS.1: Measuring Performance of Davidson Seamount Action Plan

Desired Outcome(s) For This Action Plan:	
Protect Davidson Seamount from potential threats while increasing understanding of the seamount through characterization, public education efforts and ecological process studies.	
Performance Measure	Explanation
By 2012, Davidson Seamount is adequately characterized.	Implementation of this action plan will result in protection of the seamount, but more importantly, an understanding of the fragile communities and habitat associated with Davidson Seamount. The 2006 research cruise to Davidson Seamount created a valuable addition to the body of knowledge in the site characterization, which must be built upon through further research and monitoring. Performance will be measured for this action plan through an annual assessment of our understanding of the habitats and species of Davidson Seamount.
Develop education and outreach opportunities about the seamount at visitor centers by 2010 and a series of media products related to its incorporation into MBNMS by 2009.	NMSP will incorporate awareness of Davidson Seamount into surveys related to national marine sanctuaries and the sanctuary system.

Table DS.2: Estimated Timelines for Davidson Seamount Action Plan

Davidson Seamount Action Plan	YR 1	YR 2	YR 3	YR 4	YR 5
Strategy D S-1: Conduct Site Characterization			●—————▶		
Strategy DS-2: Conduct Ecological Processes Investigations		●—————▶			
Strategy DS-3: Develop Resource Protection Program	●.....●—————▶				
Strategy DS-4: Conduct Seamount Education and Outreach Initiatives			●—————▶		
Legend					
Year Beginning/Ending	: ●—————●	Major Level of Implementation: _____			
Ongoing Strategy	: ●—————▶	Minor Level of Implementation:			

Table DS.3: Estimated Costs for Davidson Seamount Action Plan

Strategy	Estimated Annual Cost (in thousands)*				
	YR 1	YR 2	YR 3	YR 4	YR 5
Strategy DS-1: Conduct Site Characterization	\$24	\$28	\$16	\$8	\$12
Strategy DS-2: Conduct Ecological Processes Investigations	\$285	\$0	\$33.5	\$10	\$6
Strategy DS-3: Develop Resource Protection Program	\$36	\$40	\$40	\$72	\$76
Strategy DS-4: Conduct Seamount Education and Outreach Initiatives	\$30	\$70	\$14.5	\$8	\$14
Total Estimated Annual Cost	\$375	\$138	\$104	\$98	\$108

* Cost estimates are for both “programmatic” and “base” (salaries and overhead) expenses.

Emerging Issues Action Plan

Goal

Develop a system to identify, track and appropriately respond to emerging issues that present potential threats to Monterey Bay National Marine Sanctuary (MBNMS) resources.

Introduction

The goals and objectives set forth by the NMSA direct each of the sanctuaries to take an ecosystem-based approach to managing marine areas. The ecosystems include habitat structure, species assemblages and ecological processes, as well as the many interactions with humans and their activities. The MBNMS needs to develop a system to look ahead to emerging issues that should be addressed to meet the priority goal of resource protection.

Although a wide range of issues have been included in the existing management plan, many other issues are not addressed. These include issues that are currently considered to have relatively small impacts, but which may grow to have large impacts in the future, as well as issues that have arisen in other coastal areas but have not yet appeared in the MBNMS. They also include unforeseen issues that may emerge in the future due to technological advances, changes in operations, growing population sizes, etc. This plan focuses on development of a framework to identify and address future resource protection issues.

The following constitutes a partial list of potential issues that may emerge more fully in future years. However, there are undoubtedly many other issues, either partly known or wholly unforeseen, that are not listed here. Examples of recent or potential issues that may emerge for future consideration include:

- A. Coastal and Offshore Energy Development
 - Wave or tidal powered energy generators
 - Wind powered energy generators
 - Offshore oil development – slant drilling
 - Deep-sea mineral development
- B. Commercial/Private Activities
 - Rapid ferry service between MBNMS harbors (e.g., hydrofoils)
 - Increase in private airports along the coast for helicopters, fixed-wing and vertical takeoff planes
 - Importation of fresh water via large floating bags from Oregon or Washington (Spragg Bags)
 - Pyrotechnic disposal of cremation remains
 - Aquaculture net pens in nearshore and offshore (>3 miles) coastal regions

C. Recreational Activities

- One-man submersibles and hydro-boats
- Remotely operated ski sleds
- Surf kites/parachutes and water skiing in Elkhorn Slough

D. Military/Coast Guard/NASA Activities

- New marine acoustic technologies
- Discharges of fuel from aircraft
- Live weapons firing/training
- Expanding military overflights/at-sea activities

E. Research Activities

- Impacts of Automated Underwater Vehicles on marine wildlife
- Monitoring to detect responses to climate change
- Bioengineering and potential release of organisms

F. Coastal Development and Access

- Human population growth issues and pressures
- Increased erosion and runoff from expanding development
- Artificial reefs to prevent coastal erosion of developments, or for other purposes
- Numerous human access sites to the coast, reducing number of wild areas left
- California Coastal Trail development and expansion
- Significant expansion of elephant seal populations and human/marine mammal interactions (new conflicts between haul out sites and human access)

G. Water Quality

- Micro pollutants (e.g., contaminants that can't be tested for or are not tested for, like antibiotics, caffeine, sun tan lotion derivatives, etc.)
- High levels of small plastic debris in the marine environment

H. Threats From Well Beyond MBNMS Boundaries (but which affect Sanctuary resources)

- Many possibilities, e.g. a serious poaching problem in Papua New Guinea threatening small remaining population of highly migratory leatherback sea turtles

Strategy EI-1: Identify and Track Emerging Issues

The MBNMS will identify and track emerging issues as they arise. The following activities provide a framework for the MBNMS to understand and track emerging coastal and marine management issues in order to prevent harm to the resources of the MBNMS.

Activity 1.1: Drawing on Existing Knowledge, Develop a List of Potential Emerging Issues, Building on the List Provided Above

Activity 1.2: Prioritize the List to Identify Those Issues That Currently Warrant Some Level of Additional Tracking

Activity 1.3: Consider Development of an “Early Warning” System, Which Would Assist MBNMS in Receiving Early Information on New and Unforeseen Issues, Including Efficient Pathways and Processes for Receiving This Information

Strategy EI-2: Develop Process to Address Emerging Issues

The MBNMS must use a process to determine the importance and priority of issues as they arise. This management plan is based on addressing the top priority resources issues as they have been identified in a public process of scoping, prioritization and selection with the Sanctuary Advisory Council (SAC). However, the MBNMS recognizes that certain unforeseen issues may pose a threat, and must be understood and addressed in a timely manner.

Activity 2.1: Identify and Define Criteria for Assessing the Importance of Emerging Issues, Including Consideration of:

- A. Intensity, duration and geographic extent of threat to MBNMS resources or qualities
- B. Whether the issue falls within the MBNMS’s mandate
- C. Rate at which the issue or threat is growing or emerging
- D. Degree of public or SAC interest in MBNMS involvement in issue
- E. Priority ranking relative to other MBNMS initiatives

Activity 2.2: Outline Alternative Categories and Processes to Address Emerging Issues, Including:

- A. Issues that are new, but are relatively small issues which staff address internally
- B. Issues that appear to be large or significant, but where we lack adequate information and need additional research to determine
- C. Issues that appear to be large or significant, but are actually relatively small, and should be addressed by an effective communication plan
- D. Large issues that are deferred due to lack of time and resources to address
- E. Large issues that are short-term and can be addressed with no formal action plan
- F. Large, complex, long-term issues with multiple interested parties that require an action plan developed by either staff or a multistakeholder working group of the SAC

Strategy EI-3: Develop Emerging Issues Staffing and Operations Structure

Activity 3.1: Evaluate and Develop Staff Options for Tracking Emerging Issues, Including Consideration of Utilizing one Designated Staff Member, or Distributing Responsibility Among Various Staff Working on Related Issues

Activity 3.2: Identify Process for Bringing Emerging Issues Forward to the Sanctuary Advisory Council Where Necessary

Activity 3.3: Coordinate with the National Marine Sanctuary Program (NMSP) on Issues That Are Not Site Specific and May Require Action for Other Sanctuaries in Region or System

Table EI.1: Measuring Performance of the Emerging Issues Action Plan

Desired Outcome(s) For This Action Plan:	
Address emerging resource issues per process outlined in issue identification, tracking, and response system	
Performance Measure	Explanation
By 2008, develop and implement a system to identify, track and appropriately respond to emerging issues that threaten the resources and qualities of the MBNMS.	MBNMS will measure the performance toward meeting this goal by first, in the short-term, developing a system to identify, track and respond to issues and second ensuring that as issues arise, they are tracked and routed through the process. Each issue should have an identified outcome whether it is addressed or deferred.

Table EI.2: Estimated Timelines for the Emerging Issues Action Plan

Emerging Issues Action Plan	YR 1	YR 2	YR 3	YR 4	YR 5
Strategy EI-1: Identify and Track Emerging Issues	●	—————			●
Strategy EI-2: Develop Process to Address Emerging Issues	●	●			
Strategy EI-3: Develop Emerging Issues Staffing and Operations Structure		●	●		
Legend					
Year Beginning/Ending	: ● ——— ●	Major Level of Implementation: ———			
Ongoing Strategy	: ● ———▶	Minor Level of Implementation:			

Table EI.3: Estimated Costs for the Emerging Issues Action Plan

Strategy	Estimated Annual Cost (in thousands)*				
	YR 1	YR 2	YR 3	YR 4	YR 5
Strategy EI-1: Identify and Track Emerging Issues	\$27	\$27	\$22	\$27	\$27
Strategy EI-2: Develop Process to Address Emerging Issues	\$9	\$0	\$0	\$0	\$0
Strategy EI-3: Develop Emerging Issues Staffing and Operations Structure	\$9	\$0	\$0	\$0	\$0
Total Estimated Annual Cost	\$45	\$27	\$22	\$27	\$27

* Cost estimates are for both “programmatic” and “base” (salaries and overhead) expenses.

Introduced Species Action Plan

Goal

To maintain the natural biological communities and ecological processes in the MBNMS and protect them from the potentially adverse impacts of introduced species by preventing new introduced species from establishing in the MBNMS; and detecting, controlling (limiting the spread) and where feasible, eradicating environmentally harmful species that are introduced to the MBNMS waters.

Introduction

Introduced species are a major economic and environmental threat to the living resources and habitats of the MBNMS and to the commercial and recreational uses that depend on these resources. Once established, introduced species are extremely difficult if not impossible to eradicate. Introduced species are an increasingly common global threat, and the rate of invasions continues to accelerate at a rapid pace. Although the open coast is resistant to invasions, estuaries are particularly vulnerable to invasion. Large ports, such as San Francisco Bay, can support hundreds of introduced species, many of which significantly impact native ecosystems.

There are a variety of terms used to describe introduced species. Some of the more common terms are exotic, invasive, alien, nuisance and non-indigenous species. This action plan generally uses the term “introduced” except when citing other authorities or when specifically referring to introduced species that are known to have “invasive” characteristics (i.e., spread rapidly, out-compete native species and are likely to cause environmental harm). In using the term “introduced,” this action plan refers to species that have been moved dramatically beyond their original distribution by human activities. This plan is not intended to address gradual changes in species composition caused by climate change.

In general, introduced species in the marine and estuarine environment alter species composition, threaten the abundance and/or diversity of native marine species, especially threatened and endangered species, interfere with ecosystem function and disrupt commercial and recreational activities. Introduced species may cause local extinction of native species either by preying upon them directly or through competing for prey. For example, the European green crab, now found in Elkhorn Slough, both preys on the young of valuable species such as oysters and Dungeness crab and competes with them for resources. Introduced species may cause changes in physical habitat structure. For example, burrows caused by the isopod *Sphaeroma quoyanum*, originally

Figure IS-1: MBNMS Divers work to remove *Undaria* at Monterey Harbor



from New Zealand and Australia, are found in banks throughout Elkhorn Slough and may exacerbate the high rate of tidal erosion in the Slough. Introduced species pose a significant threat to the natural biological communities and ecological processes in the MBNMS and may significantly impact threatened and endangered species. Introduced species also pose significant economic costs to industries such as water and power utilities, commercial and recreational fishing, and agriculture.

Strategy IS-1: Address Known Pathways of Introduction

There are multiple pathways that can lead to introductions of species within the MBNMS.

Activity 1.1: Develop and Implement Action Plans to Address Pathways, Threats, and Effective Prevention/Management

MBNMS will identify and characterize each of the following known pathways with an assessment of the severity of the threat. The severity of the threat will be based on:

Likelihood of the pathway leading to introductions

Feasibility of the MBNMS addressing the pathway

Severity of the threat posed by the pathway (or the likelihood of a species being introduced by a particular pathway)

Effectiveness of prevention or management efforts

An action plan focusing on most likely pathways of introduction will then be developed with strategies to prevent new introductions. The following represents a list of the most likely pathways for introduced species entering the MBNMS.

A. *Aquaculture*

Aquaculture has been a historic pathway for both intentional and unintentional introductions of non-native species. Cultured non-native species can escape from captivity. Aquaculture operations can also result in the unintended introduction of species associated with the cultivated species.

B. *Aquarium Trade*

Wholesale importers, culture facilities and retail pet stores transport and sell non-native fresh and saltwater plants, fishes and invertebrates. The release or escape of specimens into the environment by the industry and the hobbyist aquarium owner has led to introductions in the United States. There are numerous pet store and aquarium supply stores in communities adjacent to the MBNMS.

C. *Ballast Water*

Ballast water can contain aquatic plants, animals, pathogens, and other contaminants. Marine vessels take on and discharge millions of tons of ballast water daily in ports and harbors around the world. The discharge of ballast water is considered the single largest pathway for coastal aquatic introductions because of the huge volume of water carried as ballast. Although few large vessels visit ports within the MBNMS, the Ports of San Francisco and Oakland have been subject to invasions of introduced species due to ballast water discharge. The San Francisco Bay's proximity to the MBNMS makes it a likely source of past and future introductions within the MBNMS, as species first introduced to San Francisco Bay through ballast waste discharge can then be transported to the

MBNMS through coastal ballast transport, vessel fouling, and natural spread via currents, swimming and ingestion by other organisms such as migratory birds.

D. *Biological Control*

In terrestrial and freshwater environments, selected non-native species, usually specialist predators, have been intentionally introduced in an effort to control the growth and spread of other introduced species. However, the specificity and selective abilities of these predators are often poorly known. For example, grass carp introduced to control unwanted aquatic plants in inland lakes resulted in native plant species being decimated.

E. *Fisheries Enhancement*

U.S. federal and state agencies imported nineteen game fish species into Washington State between 1890 and 1980 to enhance recreational fishing. Accidental release and unplanned spread of some species was a by-product of this activity. Private citizens may also transport and release their favorite fish or shellfish species into a body of water, hoping to establish a harvestable population.

F. *Hull Fouling and other Non-Ballast Vessel Introductions*

Once introduced to a neighboring area, introduced species can spread within a region due to local small boat traffic. It is likely that many of the introduced species found in Elkhorn Slough were transported via frequent boat traffic between Moss Landing and other regional harbors, such as San Francisco Bay. Fishing vessels in MBNMS harbors can regularly travel from as far as Baja, California and Alaska, potentially transporting species that have been introduced in other areas along the West Coast back to the MBNMS.

Recreational boaters transport introduced species in bait buckets or boat wells, often without realizing it. Fouling of vessel hulls by encrusting organisms also provides a mechanism for transfer of species. Aquatic plants, in particular, are easily transported when plant fragments get tangled on boat propellers, anchors, trailers and fishing gear of recreational boats. Once a new species is introduced into one MBNMS harbor, it becomes more likely that adjacent harbors will also become invaded as the species can be transported by local boat traffic.

G. *Other Intentional Introduction*

In some cases, non-natives species have been introduced to areas deliberately. For example, three invasive *Spartina* species were introduced into the San Francisco Bay in the 1970's as part of marsh restoration projects. *Spartina alterniflora* readily hybridizes with and out-competes the native California cord grass and threatens this native cord grass and other native plants with local extinction. All California estuaries are considered threatened by invasive *Spartina* species. The Chinese mitten crab (*Eriocheir sinensis*) may have been introduced to the San Francisco Estuary through deliberate release to establish a fishery. Mitten crabs pose several threats to the ecosystem and local communities, including burrowing activity that accelerates the erosion of banks and levees, and may imperil salmon populations due to their appetite for juvenile salmon. The mitten crab is also the secondary intermediate host for the Oriental lung fluke, with mammals, including humans, as the final host.

H. *Live Bait*

Recreational fishers buy commercially sold live worms and other aquatic organisms for use as bait. Both the bait species and its packing material (frequently invertebrate-laden seaweeds) can result in introductions through intentional and accidental release.

- I. *Restaurants, Seafood Retail, Seafood Wholesaling and Processing*
Packing materials for live seafood such as seaweed and seawater contain a number of living organisms and provide an opportunity for species introductions when the unused product, packing materials and shipping containers are disposed of improperly. Live organisms either in or on live seafood may pose an additional threat. There are numerous seafood restaurants and fish markets located on the waterfront or wharves in MBNMS communities, especially Santa Cruz and Monterey, presenting a very direct means of potential introduction through seafood or packing material discards.
- J. *Scientific Research Institutions, Schools and Public Aquariums*
Private and public research laboratories, schools and aquariums use non-native species for testing, teaching, research and display. Accidental release of specimens can occur when strict protocols for animal management are not followed or when protocols do not exist. Many of these institutions rely on seawater intake and discharge systems that can provide a direct means of accidentally transporting introduced species from the lab or aquarium to the ocean.
- K. *Dispersal of Adults, Eggs, and Larvae*
Once introduced to a particular site, introduced species can spread within a region due to dispersal of adults, eggs, and larvae on currents.

Strategy IS-2: Develop Prevention and Response Programs for Introduced Species

Introduced species can become established very quickly and once established are costly and difficult, if not impossible, to eradicate. Therefore, it is critical that resource managers focus efforts on the prevention of new introductions by addressing known pathways of introduction. When new introductions do occur, it is important to be able to quickly assess the threat posed by a newly introduced or newly identified species. Ideally, resource protection agencies would be able to quickly identify a newly introduced species and respond with effective eradication efforts.

PREVENTION:

Activity 2.1: Develop and Implement Introduced Species Outreach and Prevention Program

An outreach program should include components to address targeted audiences most likely to introduce non-native species. Targeted audiences may include the shipping industry, harbors, boaters, fishermen, research and teaching institutions, aquaculture facilities, private aquarium shops, etc. Potential audiences should be assessed to determine the most effective way to reach them, including the best message and tools to communicate the message.

Activity 2.2: Identify Incentives and Necessary Infrastructure and Training to Reduce Risk of Introduction

The MBNMS will work with partners to develop an outreach program to encourage businesses to implement precautionary practices. The MBNMS will also evaluate implementing programs to provide financial incentives for hull cleaning and help find funding for sewerage boat yards or installing filters. The MBNMS will also investigate whether areas where hull cleaning occurs drain directly to the ocean, and whether the likelihood of introductions could be reduced by having wash down areas for boats and boatyards that drain to sewer systems. The MBNMS will

coordinate with partners in providing technical training for boat yards, underwater hull cleaners, and aquaculture operations. The MBNMS will also conduct regulatory agency coordination for discharge permits.

Activity 2.3: Coordinate Use of Regulations/Permits/Enforcement and Inspect Discharge Logs

MBNMS will coordinate with its partners and support state and federal efforts to address introductions through regulatory promulgation, permitting, and interpretive and regulatory enforcement. The MBNMS will coordinate with the Coast Guard to inspect vessel discharge logs for evidence of unauthorized ballast discharges and take appropriate enforcement action. The MBNMS will coordinate with the California State Lands Commission (CSLC) ballast water program. The MBNMS will also continue to review and comment on National Pollutant Discharge Elimination System (NPDES) applications and coordinate with Regional Water Quality Control Boards to ensure that all dischargers adequately address introduced species prevention.

RESPONSE:

Activity 2.4: Develop and Conduct an Early Detection Training Program

The MBNMS will continue to work with the Elkhorn Slough National Estuarine Research Reserve (ESNERR) to implement and expand the Early Detection program and develop enhanced detection capabilities, such as training dive volunteers. Area researchers and others who spend a significant amount of time in and adjacent to the water should be targeted for detection training.

Activity 2.5: Develop and Implement Response Plan

The MBNMS will work with partners to identify species already introduced to MBNMS waters, or the harbors and evaluate the feasibility and efficacy of eradication efforts or other management measures designed to limit their spread. The MBNMS will also work with appropriate partner agencies to develop a decision-making framework to help guide response to detection of an introduced species. The plan will identify eradication and treatment methods, restoration and long-term monitoring.

Strategy IS-3: Develop Baseline Information, Research & Monitoring Program

Over the past five years, a few studies have attempted to determine the extent of established introductions in portions of the MBNMS. To date, these studies have focused largely on Elkhorn Slough, which is part of the MBNMS, and to a lesser degree, harbors adjacent to the MBNMS. The overall goal of Strategy IS-3 is to improve the knowledge of existing introduced species in the MBNMS, including possible prevention and remediation responses.

Activity 3.1: Increase Baseline Research

MBNMS staff and partners will assist with additional baseline research, especially expansion of surveys to uninvestigated areas such as Santa Cruz and Pillar Point harbors and the outer coast, and uninvestigated habitats such as pier pilings. MBNMS will also coordinate with the California Department of Fish and Game on its biological surveys currently underway.

Activity 3.2: Develop Monitoring Plan for New Invasions Through SIMoN

MBNMS will develop a monitoring plan targeted at detecting new introductions. This plan will identify how to coordinate monitoring efforts conducted by other agencies, the frequency of the monitoring and who will be conducting the monitoring in which areas. The monitoring plan should also identify the role of volunteers and any necessary training for identification and removal of introduced species.

Activity 3.3: Synthesize Research Results and Make Results Publicly Available

Research and monitoring data will be integrated and made available via the SIMoN website.

Activity 3.4: Assess Ecological and Economic Impacts of Introduced Species in the MBNMS

MBNMS staff will coordinate with partners in facilitating analysis of the impacts of introduced species in the MBNMS. Results of these efforts will be used to focus prevention efforts and to block the pathways of introduction.

Action Plan Partners: Scientific institutions, Regional Water Quality Control Board, California Department of Boating and Waterways, UC Sea Grant, California Department of Fish and Game (Marine Region - Office of Spill Prevention and Response), Marine Pollution Control Studies Lab, Office of Spill Prevention and Response, Elkhorn Slough National Estuarine Research Reserve (ESNERR), Smithsonian Environmental Research Center (SERC), California State Lands Commission, local researchers, divers, boaters, municipalities, harbor masters

Table IS.1: Measuring Performance of the Introduced Species Action Plan

Desired Outcome(s) For This Action Plan:	
Prevent new introduced species from becoming established as well as detect, control and eradicate harmful introduced species that may already be established in the MBNMS.	
Performance Measure	Explanation
By 2012, develop and implement action plans to address four key known pathways to prevent introduction of non-native species.	MBNMS will measure progress and performance by evaluating progress in the development and implementation of the action plans for key pathways. Implementation of each of the pathway strategies will also require further identification of performance measures including numbers or tonnage of introduced species removed, monitoring of rates of introduction, and comprehensiveness of monitoring programs.

Table IS.2: Estimated Timelines for the Introduced Species Action Plan

Introduced Species Action Plan	YR 1	YR 2	YR 3	YR 4	YR 5
Strategy IS-1: Address Known Pathways of Introduction	●.....		●.....		→
Strategy IS-2: Develop Prevention Program for Known Pathways of Introduction		●.....	●.....		→
Strategy IS-3: Develop Baseline Information, Research & Monitoring Program	●.....		●.....	●.....	→
Legend					
Year Beginning/Ending	: ●.....●	Major Level of Implementation: _____			
Ongoing Strategy	: ●.....→	Minor Level of Implementation:			

Table IS.3: Estimated Costs for the Introduced Species Action Plan

Strategy	Estimated Annual Cost (in thousands)*				
	YR 1	YR 2	YR 3	YR 4	YR 5
Strategy IS-1: Address Known Pathways of Introduction	\$24	\$24	\$8	\$18	\$18
Strategy IS-2: Develop Prevention Program for Known Pathways of Introduction	\$89.5	\$104	\$133	\$300	\$318
Strategy IS-3: Develop Baseline Information, Research & Monitoring Program	\$20	\$204	\$162	\$27	\$0
Total Estimated Annual Cost	\$133.5	\$332	\$303	\$345	\$336
* Cost estimates are for both “programmatic” and “base” (salaries and overhead) expenses.					
** Contributions from outside funding sources also anticipated.					

Sanctuary Integrated Monitoring Network (SIMoN) Action Plan

Goal

Provide an ecosystem-wide monitoring program within MBNMS to determine human induced and natural changes and to disseminate information to the public and agencies.

Introduction

Comprehensive, long-term monitoring is a fundamental element of resource management and conservation. Numerous reviews and studies recognize that coordinated, standardized approaches to monitoring are essential for effectively determining temporal and spatial trends. However, despite the substantial efforts by private and government organizations, monitoring programs are typically incomplete, inconsistent, fragmented, and inaccessible. This is commonly a result of insufficient infrastructure, minimal funding from too few sources, slow and focused dissemination of information, and limited interpretation of data. A comprehensive, integrated and long-term perspective to marine protected areas is difficult to achieve. To assure the effective and continuous evaluation of a region and its resources, particularly large areas on the scale of the MBNMS, a commitment towards a stable network of flexible ecosystem and issue-based monitoring programs is needed.

Figure SIMoN-1: SIMoN scientists prepare launch for subtidal surveys



The management plans for all national marine Sanctuaries mandate implementation of a monitoring program. When the MBNMS was designated in 1992, its original management plan specifically included a requirement that the NOAA monitor ecosystem change, determine those adverse changes that are due to human actions, and take steps to eliminate or lessen adverse changes through education and possibly new regulation. Given the size and complexity of this national marine sanctuary, and number of potential human impacts, this is not a trivial task. The Joint Management Plan Review (JMPR) process to update the MBNMS Management Plan identified the priority issues that must be addressed. The issue-related action plans identified in the management plan each identify research and monitoring needs. These will be the focus of integration efforts for existing data and new monitoring efforts by Sanctuary Integrated Monitoring Network (SIMoN).

The MBNMS, in collaboration with the regional science and management community, designed SIMoN to identify and track natural and human induced changes to the MBNMS. SIMoN's

integration of high quality scientific research and long-term monitoring data furnishes the information needed for effective management and provides a greater basic understanding of the MBNMS, its resources, and natural processes.

SIMoN utilizes existing data sets, supports and augments current research and monitoring efforts, and initiates new efforts to address important gaps in our knowledge of the MBNMS. The strength of this program is that SIMoN serves as the hub for regional ecosystem monitoring as requested by the science community. Local scientists continue to collect the large majority of monitoring data, but the MBNMS helps generate funds required to maintain or expand some existing efforts and to initiate new studies. The funds secured by the MBNMS allow SIMoN to contract with researchers and institutions for specific monitoring efforts through annual SIMoN requests for proposals (RFPs). RFP topics are decided on by a committee of scientists and managers working from a list of priority areas of need, developed largely from Management Plan issues, whereas experts from around the nation rigorously review proposals.

Through SIMoN, the MBNMS also integrates and interprets results of individual efforts in a large ecosystem-wide context and continuously updates and disseminates data summaries to facilitate communication between researchers, managers, educators, and the public. Timely and pertinent information is provided to all parties through tools such as a SIMoN web site, an annual symposium, and a series of technical and public reports.

Strategy SI-1: Implement Monitoring Programs Needed to Support Management Priorities

Activity 1.1: Identify and Compile Priorities as Identified in Management Plan

Activity 1.2: Use the SIMoN Process to Address Priorities from Management Plan

Activity 1.3: Solicit Outside Funds and Partners to Address New Priorities

Strategy SI-2: New Monitoring Efforts for Basic MBNMS Characterization and Understanding of Changes in Natural Resources

Although the central California marine environment is well studied, resource managers lack critical information on many locations, resources, and processes within the MBNMS. In particular, there is very little basic information on remote areas such as the Big Sur Coast and critical management concerns such as the population dynamics and trophic interactions of key prey species (e.g., krill and squid). For effective resource management and conservation, and for a comprehensive, integrated ecosystem understanding of the entire MBNMS, additional work is imperative.

To identify where new efforts should be focused, the MBNMS held a two-day workshop with over eighty regional academic scientists and resource managers in April 2000. The workshop produced a series of priority questions that are being addressed for effective monitoring of the MBNMS, its resources, and its processes. These results were then evaluated for common themes, compared with information on historic data sets and existing monitoring efforts to identify gaps, and synthesized into MBNMS-wide “areas of need” by a scientific advisory committee and MBNMS staff.

All new SIMoN monitoring efforts to address these areas of need are either detailed surveys or characterizations, specific question-driven monitoring with fixed durations, or essential long-term monitoring efforts focused on key indicators of resource or ecosystem change and health.

Some examples of new monitoring efforts SIMoN has initiated are:

- A. *Characterization of the Benthic and Planktonic Communities of Elkhorn Slough*
An ecosystem description of Elkhorn Slough that compares current data to baseline data and also collects new data that will serve as a baseline for future assessments of rapid changes in this coastal habitat.
- B. *Coastal Ocean Mammal & Bird Education and Research Surveys*
A beach survey program called Coastal Ocean Mammal and Bird Education and Research Surveys (Beach COMBERS), using trained volunteers to survey beached marine birds and mammals, monthly, at selected sections of beaches from the Santa Cruz/San Mateo County line through Cambria.
- C. *Midwater and Benthic Trawl Surveys on Moss Landing Marine Laboratories Class Cruises in Monterey Bay*
Developing a database of historic and current information from marine ecology, invertebrate zoology, and ichthyology field cruises at Moss Landing Marine Laboratories. Class data from several research vessels' programs to survey the fishes and invertebrates in both shallow- and deep-benthic and midwater habitats in Monterey Bay.
- D. *Ecological Effects of the Moss Landing Thermal Discharge*
A quantitative evaluation of the impacts of the thermal discharge into the MBNMS from the Moss Landing Power Plant.
- E. *Monitoring and Management of the Invasive Alga Undaria pinnatifida*
Monitoring the spread of the invasive seaweed *Undaria pinnatifida* within the Monterey Harbor, studying the effectiveness of manual removal of *Undaria* from harbor docks and pier pilings, and describing the phenology of this alga in its new environment.

While the SIMoN program selects and coordinates new monitoring efforts, data collection is largely conducted by outside scientific experts under contract. This includes basic surveys, maps, and characterizations of all areas of the MBNMS, and long-term monitoring of key indicators of status and trends.

Activity 2.1: Initiate New and Continue Existing Monitoring Efforts to Distinguish Natural Versus Human Caused Changes Through Time

A formal SIMoN Science Committee meets with SIMoN staff a minimum of two times per year. The SIMoN Science Committee provides guidance on the specific topics covered by the RFPs, reviews full proposals, and makes recommendations to the SIMoN staff on proposal finalists.

To determine topics for the RFP process, SIMoN staff presents to the Science Committee a working list of focused priority topics for characterizing and monitoring the MBNMS and proposes funding levels given the total budget available for that particular year. This list is based on areas of need, which are updated as needed, and coordinated with other MBNMS staff. A final list of topics to be addressed is selected and prioritized by SIMoN staff and the Science Committee based on the following criteria:

- A. Consistency with the overall goals of the MBNMS and SIMoN
- B. Urgency and ability to address identified resource management priorities
- C. Fundamental nature relative to the understanding of resources or processes
- D. Unique or limited opportunities
- E. Significance of threat to the ecosystem or human health (relevance to needs identified in the action plans addressing priority issues)
- F. Importance beyond the MBNMS boundaries and to other national marine sanctuaries
- G. Ability to gather sufficient information with the funds and technology available
- H. Availability of matching funds; complementary nature to existing studies

For each topic on the final priority list, SIMoN staff, with aid from the Science Committee, drafts requests for pre-proposals for each new monitoring effort to be funded. Pre-proposals are then evaluated for their ability to address specific monitoring and management needs, and those that qualify are asked to submit a full proposal. All full proposals are first sent out for thorough and objective review by two to four scientists, not affiliated with the MBNMS office, who are experts in the particular fields represented by the proposal. The Science Committee and SIMoN staff evaluate proposals and external reviews to grade them on: (1) ability to provide the specific information needed for resource management decisions; (2) feasibility and scientific merit; (3) ability to link with other ongoing efforts and existing data sets; and (4) ability to supply a broader, long-term understanding of the MBNMS.

Activity 2.2: Continue Rapid Response Programs to Address Monitoring Related Questions

In the event of a major catastrophe or unforeseen natural event, the rapid response program can be used to initiate monitoring identify cause, impacts, and extent of unforeseen extraordinary changes (e.g., oil spills, harmful algal blooms) facilitating swift and appropriate management responses. This will be limited by availability of contingency funds.

Activity 2.3: Continue Review of Internal MBNMS Proposals

In some cases, MBNMS staff and closely affiliated programs may submit pre-proposals for review by SIMoN staff and the Science Committee. These proposals can be submitted at any time.

Activity 2.4: Continue Review of Unsolicited Proposals

Twice each year (May and November), SIMoN staff will accept unsolicited pre-proposals. These proposals have no limitations on topic, but generally do not exceed \$15,000 per year and will be evaluated using the criteria listed in Activity 2.1.

Activity 2.5: Solicit Outside Funds and Partners to Address Priorities

Strategy SI-3: Integrate Regional Monitoring Efforts

There are multiple on-going research and monitoring efforts that provide valuable insight into how resources and processes of the MBNMS are changing through time. Providing summary information on a large portion of these is a “value-added” process that has already been completed as part of SIMoN’s development. However, bringing together, interpreting, and disseminating information on the various ongoing but disconnected regional efforts will continue

throughout the life of this program by the SIMoN staff. There is enormous value to resource management, education, and research in simply integrating and interpreting the large body of existing information for a long-term, ecosystem understanding of the MBNMS.

Activity 3.1: Coordinate and Synthesize Historic Data Sets with Information from the Various Regional Research Institutions Working within the MBNMS

Activity 3.2: Integrate Existing Data Sets into the SIMoN Database

Activity 3.3: Create and Disseminate Synthetic Products Based on Data from Various Monitoring and Research Efforts

Activity 3.4: Expand the Metadata Database to Include all On-going Monitoring Projects, Add New Projects, and Periodically Update and Review all Projects in the Database

Activity 3.5: Expand the SIMoN Database (i.e., PDERM) to Include Research (Non-monitoring) Projects That Complement Historic and Current Monitoring Efforts

Activity 3.6: Participate in the Development of Regional Ocean Observatory Programs

Strategy SI-4: Integrate, Synthesize, and Analyze New and Existing Data

A central objective of SIMoN is to produce an integrated analysis of the state of the resources and qualities of the MBNMS. Marine research conducted in the Sanctuary includes long-term monitoring programs that are essential to furthering our understanding and to determining the health, of the marine ecosystem. The MBNMS will develop the methods and tools to analyze the multiple data sources that comprise SIMoN.

Activity 4.1: Identify Valuation Tools (e.g., Ecosystem Models) and Indicators for Species, Habitat, and Ecosystem Change

Activity 4.2: Analyze Selected Indicators for Species, Habitats, Ecosystem Change

Activity 4.3: Produce a “SIMoN Says” Report, Annually Reporting on the State of the Sanctuary

Activity 4.4: Develop a Framework for Regional Water Quality Data Integration and Analysis that will be Useful for Evaluating the Overall Status of Water Quality in the Sanctuary and its Watersheds.

Strategy SI-5: Increase Outreach and Information Dissemination

Monitoring data are most useful if they are readily available and provide timely and pertinent information to managers and decision makers, the research community, and the general public. SIMoN, therefore, is not only a hub for initiating and integrating data collecting efforts, but also for disseminating information through a data sharing “network.” Information dissemination must package and interpret data relevant to the management plan’s action plans and present or discuss data with MBNMS resource protection staff and management, as well as coordinate with education staff to incorporate data results into education programs and products.

Activity 5.1: Continue Development and Maintenance of Monitoring Database and Mapping Tools on SIMoN Website

Activity 5.2: Produce State of the Sanctuary Report and Other Technical Reports

Activity 5.3: Conduct Annual Monitoring Symposia and Workshop

Activity 5.4: Provide Timely Information for Management Decisions

As part of all funding contracts, each new SIMoN effort is responsible for providing the following to allow rapid information dissemination by SIMoN staff:

- A. Detailed materials, methods, and maps of study area(s) within two months of receiving initial funding and all protocol updates as they occur
- B. Continuous access to all data in a standardized format
- C. Periodic site visits and personal contact with SIMoN staff
- D. Statistical summaries, progress reports, and budget updates every six months
- E. A comprehensive final report with literature review
- F. Publication of results in a peer-reviewed journal when possible

Activity 5.5 Continue to Create Geographic Information Systems (GIS) Products to Support Monitoring Efforts

Activity 5.6: Produce Periodic Reports on the State of Sanctuary Water Quality that will be Useful for management Decisions and Accessible to a General Audience

Strategy SI-6: Expand SIMoN as a Model for the National Marine Sanctuary System

SIMoN has received backing from the National Marine Sanctuary Program (NMSP). Besides their aid in the development of SIMoN and providing financial and personnel support for its operation, the NMSP is now using SIMoN as a model for how integrated monitoring programs should be developed and operated at all other sanctuary sites nation-wide. Using a phased approach, all national marine sanctuaries will implement monitoring in the future with the assistance of SIMoN staff.

As a part of a national system of marine sanctuaries, staff from SIMoN will aid the national effort to produce ecosystem monitoring and observatory programs at all sanctuaries. The national program has fully embraced the concept behind SIMoN – involving local researchers along with agency staff to share existing monitoring data and identify and collect new, critical monitoring data.

Activity 6.1: Establish SIMoN Programs at all Sites

Establishing a SIMoN program will allow concentration on producing programs that, like in Monterey Bay, have local support from marine scientists and agencies. The NMSP has prepared a schedule for creating new SIMoN or SIMoN-like programs at other national marine sanctuaries in the following order: Gulf of Farallones and Cordell Bank; Channel Islands and Olympic Coast; Fagatele Bay, Hawaiian Humpback Whale, Northwestern Hawaiian Islands; Grays Reef and Stellwagen Bank; Florida Keys and Flower Garden Banks.

Activity 6.2: Involve Local Researchers Along with Agency Staff to Share Existing Monitoring and Identify and Collect New, Critical Monitoring Data

Activity 6.3: Identify “Sentinel” Locations for Long-term Monitoring Locations at all Sanctuaries in the Development of Ocean Observatories

Activity 6.4: Develop Indicators, or Metrics, for each Site to Assess, to the Extent Possible, the Health of the MBNMS’s Ecosystem

Action Plan Partners: University of California, Stanford University, Moss Landing Marine Laboratories, Elkhorn Slough National Estuarine Research Reserve, Naval Postgraduate School, National Marine Fisheries Service, US Geologic Survey, Monterey Bay Aquarium, National Undersea Research Program, UC Sea Grant, National Oceanographic Data Center, Center for Marine Integrated Technologies, Central and Northern California Ocean Observing System, Center for Integrative Coastal Observation, California Department of Fish and Game , Research and Education, Other National Marine Sanctuaries, Other Research Institutions

Table SIMoN.1: Measuring Performance of the Sanctuary Integrated Monitoring Network (SIMoN) Action Plan

Desired Outcome(s) For This Action Plan:	
Provide ecosystem-wide monitoring program within MBNMS to determine human induced and natural changes and to disseminate information to public and agencies.	
Performance Measure	Explanation
By 2012, adequately characterize 100% of MBNMS habitats and species in a web-enabled database with identified monitoring system for each habitat type.	MBNMS will measure the number of habitats that have been characterized and monitored in the MBNMS to determine whether performance of the SIMoN program is effective.

Table SIMoN.2: Estimated Timelines for the Sanctuary Integrated Monitoring Network (SIMoN) Action Plan

Introduced Species Action Plan	YR 1	YR 2	YR 3	YR 4	YR 5
Strategy SI-1: Implement Monitoring Programs Needed to Support Management Priorities	●—————▶				
Strategy SI-2: New Monitoring Efforts for Basic MBNMS Characterization and Understanding of Changes in Natural Resources	●—————▶				
Strategy SI-3: Integrate Regional Monitoring Efforts	●—————▶				
Strategy SI-4: Integrate, Synthesize, and Analyze New and Existing Data	●—————▶				
Strategy SI-5: Increase Outreach and Information Dissemination	●—————▶				
Strategy SI-6: Expand SIMoN as a Model for the National Marine Sanctuary System	●————●.....▶				
Legend					
Year Beginning/Ending	: ●————●		Major Level of Implementation:	—————	
Ongoing Strategy	: ●————▶		Minor Level of Implementation:	

Table SIMoN.3: Estimated Costs for the Sanctuary Integrated Monitoring Network (SIMoN) Action Plan

Strategy	Estimated Annual Cost (in thousands)*				
	YR 1	YR 2	YR 3	YR 4	YR 5
Strategy SI-1: Implement Monitoring Programs Needed to Support Management Priorities	\$40	\$40	\$40	\$40	\$40
Strategy SI-2: New Monitoring Efforts for Basic MBNMS Characterization and Understanding of Changes in Natural Balances	\$80	\$80	\$80	\$80	\$80
Strategy SI-3: Integrate Regional Monitoring Efforts	\$80	\$80	\$80	\$80	\$80
Strategy SI-4: Integrate, Synthesize, and Analyze New and Existing Data	\$40	\$40	\$40	\$40	\$40
Strategy SI-5: Increase Outreach and Information Dissemination	\$40	\$40	\$40	\$40	\$40
Strategy SI-6: Expand SIMoN as a Model for the National Marine Sanctuary System	\$40	\$20	\$0	\$0	\$0
Total Estimated Annual Cost	\$320	\$300	\$280	\$280	\$280

* Cost estimates are for both “programmatic” and “base” (salaries and overhead) expenses.

Marine Protected Areas Action Plan

Goal

To determine the role, if any, of additional marine protected areas (MPAs) in maintaining the integrity of biological communities in the MBNMS, and to protect, and, where appropriate, restore and enhance natural habitats, populations and ecological processes. If additional MPAs are to be created, design and ensure implementation of MPAs that meet the Sanctuary's goals and are compatible with the continuation of long-term sustainable fishing in the region.

Introduction

The action plan outlines the framework for coordinating with and providing input to appropriate state and federal agencies on the need for, purpose, design and implementation of MPAs within the MBNMS region, whether initiated or coordinated by the MBNMS or other agencies. A multi-stakeholder workgroup will work together to implement the components of the action plan.

MPAs are a management tool that may fully restrict take of marine life within a designated geographic area or may allow take of selected species. Scientific research has indicated that carefully crafted MPAs can be effective tools for conservation of biodiversity and habitats. MPAs may be used as a means to restore degraded areas and as a precautionary tool to conserve a range of representative habitats and biodiversity. Well-designed MPAs generally contain higher species diversity, more abundant species, and larger fish within their boundaries relative to impacted areas of similar habitat outside the reserve. These larger fish produce many more young than do smaller fish and for some species larger females produce healthier young that survive better. MPAs are one of several useful tools that can be used to prevent, slow, or reverse negative habitat and ecosystem changes within the MBNMS. MPAs may also have positive or negative ecological, social or economic consequences. As the science of MPAs is evolving, care must be given to actively look to emerging MPA studies to assess both the positive or negative impacts of MPAs. The MBNMS will also consider other management tools that may enable the program to meet its goals.

Consideration of MPAs will be a joint effort with the participation of many diverse stakeholders, and as fishing is a key cultural and economic component of the region, this will include strong participation of the fishing community to tap into their extensive knowledge and to consider socioeconomic impacts of alternative MPA designs. It will also involve participation from other agencies, scientists, environmental organizations and the public. Strong interagency collaboration with the National Marine Fisheries Service, the Pacific Fishery Management Council, and the California Department of Fish and Game will be an essential component of this process.

Regarding state waters (within 3 nautical miles of shore with some exceptions), in early 2005 the California Resources Agency reinitiated a process pursuant to the 1999 Marine Life Protection Act (MLPA) to develop an improved network of MPAs. While the MBNMS will be an active participant in the MLPA process, the Resources Agency will be the lead agency for the consideration and implementation of MPAs in state waters within the MBNMS. The Sanctuary plans to continue to defer to the MLPA process for consideration of MPAs in state waters as long

as the process is actively progressing. In addition to providing its perspective during the MPA designation phase under MLPA, MBNMS staff will also seek to be active partners in research, enforcement, and education as state MPAs are implemented.

To consider MPAs in federal waters, the MBNMS will facilitate continuation of a multi-stakeholder workgroup representing agencies, the fishing community, environmental organizations, scientists and other stakeholders to carry out the evaluations outlined in the plan below. If the workgroup ultimately recommends the establishment and locations of specific MPAs in federal waters, they could be implemented by a variety of mechanisms. Depending on the final design of MPAs, their implementation could draw on the authorities of the NMSA, or the Magnuson Stevens Fishery Conservation and Management Act.

Workgroup Planning

To address the issue of the role, if any, of MPAs in protecting MBNMS resources, the MBNMS developed a workgroup of the Sanctuary Advisory Council in January 2003 to provide guidance on several aspects of MPAs. The workgroup was asked to outline the framework for the need for, purpose, design and implementation of MPAs within federal waters the MBNMS region. The framework describes the process, goals and criteria for effective MPAs and provides recommendations for future steps to evaluate the issue. Although the revised management plan itself does not specify exact locations for MPAs, the MBNMS will continue the planning effort in the future with the workgroup using the framework document as a guide in developing MPA alternatives and assessing their role in achieving Sanctuary mandates. To conduct a thorough evaluation of the issue, much detailed work remains, including a more detailed assessment of the need for MPAs; identification of specific habitats and ecological processes to be protected; identification of potential and existing threats; development of site-specific goals; consideration of design criteria that incorporate biological and socioeconomic issues; integration with other management efforts; development of alternative MPA designs, and articulation of monitoring, education and enforcement needs.

The workgroup refined a draft list of future work topics that address these and other issues in the MPA plan. This list, shown below, will provide the basis for a longer-term work program for implementation, with continued involvement by the Workgroup. The Workgroup identified the strategies below as necessary steps to achieving the objectives laid out in the goal statement. Strategy one addresses the need to form working partnerships with stakeholders and other agencies that will facilitate the implementation of the plan. Strategy two focuses on the evaluation of the need for MPAs and identification of the resources to be protected. Strategies three through six focus on effective design of MPAs, considering biological issues, patterns of use, socioeconomics and potential for integration with other management measures. Strategies seven through nine focus on considering education, enforcement and research programs during both MPA design and implementation phases. Strategies ten and eleven focus on implementation issues related to phasing of MPAs and to coordination of interagency designation processes, assuming a decision is reached in the future regarding the need for MPAs and on their locations.

Strategy MPA-1: Develop Partnerships

Activity 1.1: Develop Partners During Evaluation, Goal Setting, and Design Phases

- A. Continue multi-stakeholder workgroup for evaluation and design, and allow for continued involvement of local communities
- B. Ensure constituent involvement and adequate notification for public involvement
- C. Outline roles and steps for involvement of MBNMS, National Marine Fisheries Service, Pacific Fishery Management Council, and California Department of Fish and Game, and identify common goals
- D. Develop partnerships with California Department of Fish and Game, National Marine Fisheries Service, Pacific Fishery Management Council and consider joint staffing during evaluation and design phases
- E. Evaluate linking to and coordination with potential Pacific Fishery Management Council evaluation of MPAs
- F. Ensure coordination with MLPA process in state waters
- G. Marine Reserve issues in the Northern Management Area first go to the GFNMS Advisory Council for action. Their recommendations are then forwarded to the MBNMS Advisory Council for comment and action.

Strategy MPA-2: Define Goals and Objectives and Habitats and Resources to be Protected

This strategy outlines activities the working group must address in defining more specific objectives for MPAs, considering the range of habitats and ecological interactions, which may warrant protection, and the threats to those resources.

Activity 2.1: Develop Specific Conservation, Education, Research, and Compatible Use Goals and Objectives for MPAs Program, Building on General Goal Statement Above as Part of Ongoing Multi-stakeholder Process

Activity 2.2: Consider Range of Representative Habitat Type- e.g. Hard Bottom, Soft Bottom, Pelagic, etc.

Activity 2.3: Identify Key Ecological Interactions, Including Predator-Prey Relationships, Migratory Patterns, Life History Stages, and the Role of Biogenic Habitat (e.g. corals)

Activity 2.4: Identify Emerging or Existing Threats to These Habitats, Resources or Interactions

Activity 2.5: Identify Resource or Habitat-specific Objectives for MPAs and/or Network/Collection of MPAs

Activity 2.6: Include Mix of Degrees of Habitat Health Ranging from Areas that are Minimally Disturbed and Set Aside for Protection, to Historically Productive, Currently Underused Habitats Set Aside to Allow Recovery

Strategy MPA-3: Develop General Design Criteria and Incorporate into MPA Siting Alternatives

This strategy outlines the various criteria the working group must describe and evaluate in designing MPAs, including biological issues, human use patterns, questions of scale and size, and practical implementation issues.

Activity 3.1: Consider Biological and Physical Factors

- A. Consider biological factors identified above in Strategy MPA-2
- B. Consider proximity to ecological “hotspots”
- C. Evaluate physical oceanographic factors such as currents, upwelling, etc.
- D. Consider biological relationships between state and federal waters for a network/collection of MPAs

Activity 3.2: Consider Human Use Patterns

- A. Evaluate distribution of human activities on the water
- B. Evaluate how locations and distances may impact different user groups and local communities
- C. Consider distances from port and safety issues
- D. Evaluate potential impacts of displacement of fishing effort to other areas
- E. Consider access by other target users, such as researchers
- F. Map location of existing small reserves, areas closed to certain types of fishing, and other types of MPAs
- G. Consider locations of other types of human threats—e.g. water quality and vessel traffic,

Activity 3.3: Address Considerations of MPA Size and Scale

- A. Ensure that MPAs are sized appropriately to meet objectives, considering biological and socioeconomic factors
- B. Consider distances between MPAs and between types of MPAs
- C. Evaluate the need for a network of MPAs as opposed to individually sited MPAs
- D. Determine appropriate scale of a network
- E. Incorporate variability in MPA design to improve effectiveness evaluations

Activity 3.4: Consider Design Issues Specific to Federal Waters

- A. Define conditions where it is beneficial to extend state MPAs to federal waters, and when separate MPAs may be more appropriate
- B. Evaluate type and orientation of extension that may be appropriate across state and federal waters, and consider the benefits and disadvantages of doing so
- C. Evaluate potential for separate offshore MPAs focused on biological hotspots correlated with persistent physical and oceanographic features
- D. Evaluate the persistence of pelagic hotspots over time
- E. Consider practical feasibility of pelagic restrictions, including possibility for temporary closures

Activity 3.5: Consider Practical Implementation Issues

- A. Consider proximity and ability to enforce
- B. Consider ability to monitor for effectiveness evaluation

Activity 3.6: Design MPA alternatives in the working group setting that incorporate and reflect the criteria and considerations developed in this strategy.

- A. Utilize a decision support tool in the working group to look at different spatial alternatives,
how they help achieve Sanctuary mandates, and their associated costs and benefits

Strategy MPA-4: Determine Types of Use

MPAs may vary from full no-take reserves that allow no harvest to areas that allow some levels of harvest, and areas that allow varying types of non-extractive uses. This strategy outlines the need for the working group to evaluate options for varying types of use in designing MPAs.

Activity 4.1: Consider Mix of Options that May Restrict Certain Human Activities at Selected Sites in a MPA or MPA Network

Activity 4.2: Consider Relationship Between State of California’s Marine Managed Areas Improvement Act (MMAIA) Classifications and MBNMS Designations

Strategy MPA-5: Develop Integrated Management System

This strategy outlines issues the working group must consider in coordinating the development of MPAs with other types of management measures.

Activity 5.1: Identify and Evaluate Other Existing or Planned Ecosystem, Fishery, or Land-based Management Tools as Feasible Within Staff Limitations

Activity 5.2: Identify and Evaluate Gaps, Limits and Constraints of Existing Tools, as Feasible Within Staff Limitations

Activity 5.3: Evaluate Means to Effectively Integrate and Coordinate MPAs With the Efforts Identified in 5.1 to Leverage and Strengthen Efforts and Avoid Duplication

Activity 5.4: Use MPAs to Help Leverage Agency Resources to Address Multiple Threats to Key Sites

Strategy MPA-6: Conduct Socioeconomic Impact Analysis and Identify Mitigation

This strategy outlines activities to assess potential negative and positive socioeconomic impacts of MPAs during the design and post-design stages, and steps to mitigate potential negative effects and maximize potential positive effects.

Activity 6.1: Identify Types of Socioeconomic Analyses to Assist in the Design and Evaluation of Biologically Effective MPAs That Will Allow Continuation of Sustainable Fishing Practices and Sustainable Communities

- A. Evaluate how the community is affected, including cultural and economic sustainability of both consumptive and nonconsumptive factors and values
- B. Evaluate user groups and ports affected, short- and long-term effects, and potential for buffering or reducing negative effects
- C. Consider economic uses that may be improved by designation of MPAs
- D. Consider social values of a wide variety of different people in evaluating MPAs

Activity 6.2: Prioritize Studies Needed and Ensure Their Implementation, Including Those Required by the National Environmental Policy Act (NEPA)

Activity 6.3: Work with the NOAA and Department of Commerce to Expand/Develop Potential Economic Mitigation Programs for Users That May be Impacted

Strategy MPA-7: Develop Enforcement and Compliance Program

This strategy outlines activities needed to design an effective enforcement program.

Activity 7.1: Identify Components of an Effective Enforcement Program and Implementation Mechanisms to Provide Adequate Surveillance on the Water and in the Air

Activity 7.2: Develop Partnerships and Cooperative Interagency Enforcement Plans

Activity 7.3: Ensure Adequate Training of Enforcement Officers in MPA Management and Regulations

Activity 7.4: Work to Facilitate Compliance via Tools such as GPS Systems

Activity 7.5: Enlist Community Participation in MPA Management and Enforcement to Maximize Cost-effectiveness of Enforcement Program and Enhance Compliance

Strategy MPA-8: Develop Education and Outreach Program

This strategy outlines outreach and education needs during both the design and post-design phases.

Activity 8.1: Identify Target Audiences and Develop Components of an Effective Education and Outreach Program

Activity 8.2: Conduct Regional Workshops to Share Information and Gather Input From Fishing Leaders and the Community After MPA Design Criteria are Suggested by Multi-stakeholder Groups

Activity 8.3: Consider Ongoing Education Potential of Individual Reserve Locations

Activity 8.4: Link Efforts to Strategies in the Fishing Related Research and Education Action and to MBNMS Regional Education and Outreach Plans

Activity 8.5: Integrate Education with Enforcement and Research

Strategy MPA-9: Build Research and Monitoring Program

This strategy outlines activities needed to develop a research and monitoring program that will assess and disseminate information on the biological effectiveness of the MPAs and their impacts on patterns of human use.

Activity 9.1: Design and Conduct Biological Effectiveness Evaluations Linked to Specific Goals of MPAs

- A. Evaluate biological changes within and outside of MPAs
- B. Include comparisons to adequate control sites
- C. Distinguish between natural and anthropogenic changes
- D. Evaluate potential spillover effect to local populations

Activity 9.2: Evaluate Human Activities and Changes Relative to Specific Goals of MPAs

- A. Assess consumptive and non-consumptive use patterns inside and outside MPAs
- B. Determine effects of scientific monitoring
- C. Include observer program on research and fishing vessels
- D. Monitor socioeconomic changes in user groups after MPAs are established

Activity 9.3: Coordinate Monitoring and Data Distribution

- A. Coordinate MPA monitoring with other biological monitoring in the region and link to Sanctuary Integrated Monitoring Network (SIMoN)
- B. Involve fishermen and recreational divers in monitoring activities
- C. Coordinate with other sanctuaries conducting MPA monitoring
- D. Package and distribute readily understood monitoring information and effectiveness evaluations to decision makers, fishermen and public

Strategy MPA-10: Determine Timing Strategies and Phasing / Effectiveness Evaluations

This strategy outlines activities for evaluating the potential for phasing in the implementation of MPAs over time, as well as development of a defined process for adaptive management.

Activity 10.1: Evaluate Potential Benefits and Disadvantages of Phasing

Activity 10.2: If Phasing is Considered Appropriate, Develop Criteria for Establishing a Reasonable First Phase

Activity 10.3: Determine Criteria for Frequency of Effectiveness Evaluation of MPAs, Linking Criteria to Site-specific Goals

Activity 10.4: Establish Criteria for When Evaluations Should Lead to Adaptive Management or Changes in MPAs Based on Improved Knowledge

Strategy MPA-11: Develop Interagency Coordination and Implementation Mechanisms in Federal and State Waters

This strategy outlines the procedures and coordination for MPA implementation and for ensuring interagency coordination in the process.

Activity 11.1: After Identification of MPA Needs, Feasibility, Site-specific Goals, and Designs as Outlined Above, Identify and Recommend the Most Appropriate Process and Agency to Implement

Note: The MBNMS MPA working group did not try to reach consensus on the options for implementing MPAs and did not recommend which of these options or others may be appropriate once strategies one through ten are completed. The group recommended further legal review of the current and future options. The MBNMS has chosen to present these options essentially verbatim as outlined in the MPA working group.

A. For federal waters, options and considerations include:

- Drawing on the authorities on the NMSA, the Pacific Fishery Management Council would be given the opportunity to prepare draft Sanctuary regulations.
- If the Pacific Fishery Management Council declines to prepare draft Sanctuary regulations under the NMSA or drafts regulations that fail to meet the goals and objectives of the Sanctuary, NOAA could prepare the draft regulations drawing on the authority of the NMSA.
- Promulgation of regulations under the NMSA requires amendment of the MBNMS Designation Document since fishing is currently not an activity subject to regulation. As outlined in the Designation Document, amendment of the Designation Document to

regulate fishing would occur in consultation with fishery management agencies, the fishing community, and the public, and would be subject to public hearings, preparation of environmental review, and government notification requirements. Revision of the Designation Document could be constrained to focus only on MPA designation and not on fishery regulations in general.

- The Pacific Fishery Management Council could adopt MPAs under its own statutory authority under Magnuson-Stevens, provided the species covered are addressed by a Fishery Management Plan (FMP) and state landing laws could be used to restrict landings of non-FMP species.

B. For state waters, options and considerations include:

- The State of California (through the Fish and Game Commission, California Department of Fish and Game, and the Parks Commission) could adopt MPAs pursuant to its authorities under the Marine Life Protection Act or under the Marine Managed Areas Improvement Act. The MBNMS plans to defer to the MLPA process for the consideration of MPAs in state waters so long as it is actively progressing. MBNMS staff will participate in and will coordinate with that process.

Activity 11.2: Ensure Coordination between State and Federal Implementation Measures and Timelines

Since state and federal implementation may occur via different agencies, ensure adequate coordination of implementation outcomes related to design and phasing.

Action Plan Partners: National Marine Fisheries Service, California Department of Fish and Game, fishermen, MPA working group members, Pacific Fishery Management Council, United States Coast Guard, harbor masters, California Department of Boating and Waterways, fishing clubs, California Resources Agency, dive shops, whale watchers, kayak companies, yacht associations, MPA Center, divers, researchers, local research institutions, socioeconomists, user groups, California Department of Parks and Recreation, community groups, NOAA OLE, Sanctuary Education Panel, fishing interest organizations, other stakeholders, NOAA General Counsel, Sea Grant

Table MPA.1: Measuring Performance of the Marine Protected Areas Action Plan

Desired Outcome(s) For This Action Plan:	
Collaborate with regional stakeholders and agencies in the designation of marine protected areas, which limit extraction to ensure the protection of natural biological communities and, where appropriate, restore and enhance habitats, populations, and processes.	
Performance Measures	Explanation
Complete description of the compositions, structure and function of the various habitats and ecosystems in the MBNMS.	Protection of the natural biological communities and the need to restore and enhance those habitats, population, and processes begins with an understanding of what change is occurring with the ecosystem and how the removal of certain species affects the various processes. A common goal of the many stakeholders and agencies is to understand and describe the many habitats and then to examine the methods and effects of extraction on the various habitats and ecosystem. Various legal mandates and planning processes are underway by several agencies to examine the manner in which to designate MPAs as one tool in ensuring the protection of ecosystems, habitats, and resources. To understand the need and effect of management actions, the MBNMS must begin with descriptions and mapping of the various habitats and ecosystems. MBNMS will measure the number and development of the habitats described and mapped as part of this action plan.

Table MPA.2: Estimated Timelines for the Marine Protected Areas Action Plan

Marine Protected Areas Action Plan	YR 1	YR 2	YR 3	YR 4	YR 5
Strategy MPA-1: Develop Partnerships	●——●				
Strategy MPA-2: Define Conservation Goals and Objectives and Habitats and Resources to be Protected	●——●				
Strategy MPA-3: Develop General Design Criteria	●.....●——●				
Strategy MPA-4: Determine Types of Use	●.....●——●				
Strategy MPA-5: Develop Integrated Management System	●.....●——●.....▶				
Strategy MPA-6: Conduct Socioeconomic Impact Analysis and Identify Mitigation	●——●				
Strategy MPA-7: Develop Enforcement and Compliance Program				●——▶	
Strategy MPA-8: Develop Education and Outreach Program				●——▶	
Strategy MPA-9: Build Research and Monitoring Program		●——▶			
Strategy MPA-10: Determine Timing Strategies and Phasing/ Effectiveness Evaluations			●——●		
Strategy MPA-11: Develop Interagency Coordination and Implementation Mechanisms in Federal and State Waters	●——▶				
Legend					
Year Beginning/Ending	: ●——●	Major Level of Implementation: ———			
Ongoing Strategy	: ●——▶	Minor Level of Implementation:			

Table MPA.3: Estimated Costs for the Marine Protected Areas Action Plan

Strategy	Estimated Annual Cost (in thousands)*				
	YR 1	YR 2	YR 3	YR 4	YR 5**
Strategy MPA-1: Develop Partnerships	\$37	\$29	\$29	\$25	\$0
Strategy MPA-2: Define Conservation Goals and Objectives and Habitats and Resources to be Protected	\$153	\$48	\$28	\$60	\$0
Strategy MPA-3: Develop General Design Criteria	\$67	\$257	\$57	\$37	\$0
Strategy MPA-4: Determine Types of Use	\$0	\$83	\$8	\$0	\$0
Strategy MPA-5: Develop Integrated Management System	\$16	\$20	\$16	\$16	\$0
Strategy MPA-6: Conduct Socioeconomic Impact Analysis and Identify Mitigation	\$67	\$166	\$17	\$16	\$0
Strategy MPA-7: Develop Enforcement and Compliance Program	\$0	\$0	\$16	\$16	\$0
Strategy MPA-8: Develop Education and Outreach Program	\$67	\$72	\$39	\$43	\$0
Strategy MPA-9: Build Research and Monitoring Program	\$0	\$8	\$24	\$641	\$0
Strategy MPA-10: Determine Timing Strategies and Phasing/ Effectiveness Evaluations	\$0	\$0	\$16	\$16	\$0
Strategy MPA-11: Develop Interagency Coordination and Implementation Mechanisms in Federal and State Waters	\$0	\$0	\$20	\$20	\$0
Total Estimated Annual Cost	\$407	\$683	\$270	\$890	\$0

* Cost estimates are for both “programmatic” and “base” (salaries and overhead) expenses.

** Costs for year five will depend on the what implementing authority is used to establish any MPAs



Section IV

Operations and Administration

- **Operations and Administration Action Plan**
- **Performance Evaluation Action Plan**

Operations and Administration Action Plan

Introduction

This action plan addresses necessary operations and administration activities required for implementation of an effective program, including identifying staffing, infrastructure resource needs and operational improvements such as permit processing. The plan identifies office locations and staffing dispersal, operational needs such as research and patrol vessels, and coordination needs for the volunteer and outreach programs.

The desired outcome of the Operations and Administration Action Plan is the increased protection of Monterey Bay National Marine Sanctuary (MBNMS) resources and qualities, achieved with the budget and staff necessary for adequate implementation of the action plans. The MBNMS will coordinate with the Gulf of the Farallones National Marine Sanctuary (GFNMS) and the Cordell Bank National Marine Sanctuary (CBNMS) on administrative and operational matters in addition to resource management, outreach and research activities.

Strategy OA-1: Assess Staffing Needs

An objective of the Operations and Administration Action Plan is to develop a comprehensive Program Operations Plan identifying staffing resources necessary to adequately implement all programs identified in the revised management plan. The MBNMS may also need to evaluate more office locations and staffing decentralization. Increased support geographically may be driven by requirements in those areas for staff from all MBNMS departments.

Activity 1.1: Revise Internal Organization to Implement Action Plans in Multi-Disciplinary Effort

A. *Departments*

MBNMS staff is organized into four departments: Research and Monitoring, Resource Protection, Education and Outreach, and Program Operations. MBNMS management will continue to evaluate the effectiveness of this organization model versus organizing by specific issue areas of the revised Management Plan, such as water quality, which could require staff from all four of the original departments to function on a Water Quality Team. Other alternatives are being considered, such as organization by subregion to better address priority issues. This is a model similar to that used by the Florida Keys National Marine Sanctuary and State Parks in California.

B. *Implementation of Action Plans*

MBNMS staff will implement the action plans in this management plan on a “cross-team basis” where certain action plans will require efforts of staff from the Research, Resource Protection, Education and Outreach, and Program Operations teams working together to implement the various action plans in this management plan. Each action plan will be assigned a staff contact member from each of the four programs to work as a team to address each of the priority issues to be addressed in this management plan.

C. *Satellite Offices*

MBNMS staff will evaluate the potential need for more staff at the satellite locations. There are currently six staff members at the Santa Cruz office, which is co-located with the Southwest Fisheries Science Center. There is currently one Education Team staff

member located at the San Simeon Coastal Discovery Center, which is a joint partnership with California State Parks. An additional Research or Resource Protection staff member and two State Park staff are slated for future workstations.

Activity 1.2: Identify Instruments for Employing Staff and Contractors

Due to limitations in adding and hiring for Government Service (GS) positions, MBNMS contracts much of its work to small business or other independent contractors and other agencies, or to nonprofit organizations. The MBNMS will continue to identify the most efficient options for program implementation while maintaining consistent staffing and continuity. Implementation of this management plan will require additional staff to fully address each of the action plans.

Activity 1.3: Develop a Structured Intern Program

The MBNMS and its partners will offer a variety of volunteer internship opportunities for undergraduate and graduate level college students. Internships are available at the main office in Monterey, as well as at the satellite offices in Santa Cruz and San Simeon. Each MBNMS internship position will provide the opportunity for the individual to develop skills specific to the needs of the project to which they are assigned. The MBNMS Program Operations Coordinator will manage the MBNMS intern program as the Internship Coordinator. The Internship Coordinator will liaison between intern applicants and the corresponding MBNMS mentor to interview and place interns. The Internship Coordinator will work with the MBNMS mentor to manage MBNMS intern requirements, including hours worked, as well as the intern’s academic requirements, if applicable. The MBNMS staff member to whom an intern is assigned will serve as that intern’s mentor. Each intern will be assigned at least one mentor. The responsibilities of the mentor will include defining the MBNMS expectations of the intern, defining the internship expectations from the respective academic institution, if applicable, and providing supervision and adequate training for the intern, including an initial orientation with the MBNMS.

Strategy OA-2: Develop Volunteer Program

Volunteers provide a vital mechanism for involving the community and a valuable resource for accomplishing a variety of tasks, including research and monitoring, education and outreach programs, underwater projects, representation at selected events and functions and administrative tasks. The goal of the volunteer program is to assist staff in implementing the various MBNMS programs and develop a system of public involvement supporting MBNMS in a “hands-on” manner. Volunteers support many activities that would otherwise not be accomplished as efficiently or cost effectively. The MBNMS Volunteer Program requires staff and administrative support in order to function efficiently. MBNMS staff strives to recruit, place, orient, train, recognize, and maintain volunteers. Several docent programs have also been formed in high visitor use areas of the MBNMS.

MBNMS Volunteer Programs

Team OCEAN (Ocean Conservation Education Action Network)

Team OCEAN is an effort to address the disturbance of marine mammals and seabirds by recreational users of the MBNMS. The Team OCEAN Kayaker Outreach Program puts staff and

volunteer Sanctuary naturalists on the water in Sanctuary kayaks to outreach to fellow ocean kayakers in Elkhorn Slough and along the Monterey waterfront. These naturalists serve as MBNMS docents, providing guidance on respectful wildlife watching, and protecting marine wildlife from disturbance. Team OCEAN includes sixty volunteers collectively spending up to fifty-four hours per week (maximum) at two locations throughout the MBNMS. More information can be found at: <http://www.montereybay.noaa.gov/educate/to/welcome.html>

Beach COMBERS (Coastal Ocean Mammal/Bird Education and Research Surveys)

Beach COMBERS is a beach-monitoring program established by MBNMS and Moss Landing Marine Labs to obtain information on rates of stranding for all species of marine birds and mammals. In addition, mortality events are detected, causes of mortality events are assessed, and oil and tar deposition is monitored. The long-term objectives of the program are to provide baseline information on the average presence of beachcast marine organisms and to assist the MBNMS in the early detection of mortality events triggered by natural and anthropogenic environmental perturbations such as red tides and oil spills. Beach COMBERS involves pairs of trained volunteers who survey their beach segment during the first week of each month at low tide. The program includes fifty-five volunteers, spending three to four hours during one week per month at eleven beaches in and around Monterey Bay and five beaches in the Cambria area within the MBNMS boundaries. More information can be found at: <http://www.montereybay.noaa.gov/research/bchmon.html>

Sanctuary Citizen Watershed Monitoring Network

The Sanctuary Citizen Watershed Monitoring Network is a consortium of approximately twenty local citizen monitoring groups, monitoring the health of the watersheds flowing into the MBNMS. It provides support, training, and a central forum and database for citizen monitoring programs. The volunteers collecting this valuable information play a key role in the community as stewards of the watersheds. In order to protect and improve the health of local streams, resource agencies, local governments, and community groups use the data collected by the volunteers. More information can be found at the Network's website: <http://montereybay.noaa.gov/monitoringnetwork/welcome.html>

The Network provides training, equipment, data base access, quality certification and coordination on a year-round basis to the volunteer groups. In addition, it sponsors three annual volunteer events:

First Flush: The first major storm event of the season, in which there are "sheet flows" of water on the roadways, is defined as "First Flush." The goal of this effort is to characterize the first flush storm water runoff that is flowing into MBNMS, particularly coliform contamination. This program includes fifty-five volunteers spending eight hours each at nineteen locations throughout the Sanctuary.

Snapshot Day: In the spring of each year, volunteers participate in this Sanctuary-wide volunteer water quality monitoring event designed to increase information and public awareness about water quality issues affecting watersheds that drain to MBNMS. This community event provides a one-day "snapshot" of the health of the rivers and streams that flow into the MBNMS. The

program includes 160 volunteers spending eight hours each at 170 locations throughout the MBNMS.

Urban Watch: The Urban Watch Water Quality Monitoring Program is a collaborative effort between the Cities of Monterey, Pacific Grove, Capitola, the Coastal Watershed Council, and MBNMS. Urban runoff is one of the leading sources of pollution into coastal waters. The Urban Watch monitoring program provides a way for local residents and community members to monitor water quality and urban pollution in the dry weather months (June-October), where volunteers sample a variety of contaminants from storm drains. The program includes forty volunteers spending twenty hours at fifteen locations throughout the Sanctuary.

Bay Net

Bay Net is a seaside naturalist program that has been in operation since 1995. Bay Net volunteers station themselves along with a spotting scope or binoculars on tripods in areas of high pedestrian traffic close to where marine wildlife congregate. By engaging passers-by, Bay Net reaches the general public and teaches them about local wildlife, natural history of this wildlife and the MBNMS. Bay Net volunteers work to promote understanding and appreciation of the MBNMS and its resources while fostering stewardship of the sanctuary and oceans worldwide. Bay Net volunteers are in Pacific Grove, Monterey, Santa Cruz and Moss Landing.

Activity 2.1: Coordinate and Incorporate MBNMS Volunteer Efforts on Specific Projects into a Single Team OCEAN Program

MBNMS will establish a comprehensive and cohesive volunteer program in collaboration with the National Marine Sanctuary Program (NMSP) effort to establish a Team OCEAN volunteer program in every NMS. The MBNMS Team OCEAN will serve as an “umbrella” program to include all MBNMS volunteer activities. The MBNMS Team OCEAN will also function as a means to assist other local volunteer groups whose efforts relate to the MBNMS. A Volunteer Coordinator will manage the MBNMS Team OCEAN. Strategies for continuing and improving volunteer programs on kayaker outreach, Beach COMBERS and Sanctuary Citizen Watershed Monitoring Network are described in other action plans (e.g., Wildlife Disturbance, Water Quality) in the management plan but will be administered by linking with this activity.

Activity 2.2: Continue Volunteer Recruitment and Placement

MBNMS volunteers are recruited based on particular skills, experience, aptitude and interest. Recruitment sources include community groups, churches, neighborhood associations, other volunteer groups, government agencies, universities, and local schools. Once recruited, volunteers are paired with a project matching their interest, expertise and experience.

Activity 2.3: Provide Volunteer Orientation and Training

MBNMS will provide volunteer orientation in order to familiarize volunteers with the mission of MBNMS and NMSP. MBNMS will also provide program specific training to help volunteers accomplish resource protection activities. Volunteer program training will also include safety instruction for each volunteer activity. Structured volunteer training will result in a corps of trained MBNMS volunteers and greater retention of volunteers. MBNMS will also provide continuing education opportunities to volunteers when possible. This will include cross-training between sub groups of the MBNMS volunteer programs. For instance, a Team OCEAN kayak

volunteer may be provided the opportunity and training to become a watershed monitoring volunteer.

Activity 2.4: Recognize the Efforts and Services of Volunteers

MBNMS will make every effort to place volunteers in the position they desire, as well as make that position fulfilling to the volunteer and meaningful to the management of MBNMS resources, including informing the volunteer of how their efforts were used to benefit the MBNMS. MBNMS will provide formal and informal recognition and awards as well as appropriate items associated with the service.

Activity 2.5: Create a Mechanism to Retain Volunteers

MBNMS will explore various means to continue volunteer education and provide various enrichment opportunities and incentives. Providing cross-training for other MBNMS volunteer programs could help to increase interest in being, or remaining, a MBNMS volunteer.

Strategy OA-3: Coordinate and Support Sanctuary Advisory Council

Section 315 of the NMSA authorizes the Secretary of Commerce to establish Sanctuary Advisory Councils to advise and make recommendations to the Secretary of Commerce in the designation and management of national marine sanctuaries. This authority was delegated to the Director of the National Marine Sanctuary Program who, working with local community interests, established the MBNMS Advisory Council in 1994. The Council functions in an advisory capacity to the MBNMS Superintendent to:

Help strengthen and provide support for the growth of the MBNMS program;

Assist in the protection of MBNMS resources by helping identify needed research to rebuild or protect MBNMS resources; and

Assist in building community support through problem solving, consensus building, new constituency development, increasing opportunities for revenue enhancement, and increasing understanding about the MBNMS.

The MBNMS Advisory Council has been instrumental in helping develop policies, program goals, and identify education, outreach, research, long-term monitoring, resource protection and revenue enhancement priorities. The Advisory Council works in concert with the MBNMS Superintendent by keeping him or her informed about issues of concern throughout the MBNMS, offering recommendations on specific issues, and aiding the Superintendent in achieving the goals of the Sanctuary program within the context of California’s marine programs and policies. The Advisory Council represents a coordination link between the MBNMS and state and federal management agencies, user groups, researchers, educators, policy makers, and other groups that help to focus efforts and attention on the central California coastal and marine ecosystems.

As with all Sanctuary Advisory Councils, the MBNMS Advisory Council operates under a Charter that describes the objectives and scope of the Advisory Council’s activities, its duties and conduct, procedural requirements on the appointment of Advisory Council members, and other requirements (see Appendix F, National Marine Sanctuaries Act, Section 315, Advisory Councils). Nothing in the Charter constitutes authority to perform operational or management

functions or to represent or make decisions on behalf of the MBNMS. The Advisory Council draws on the expertise of its members to provide advice to the MBNMS Superintendent.

The Advisory Council’s twenty voting members represent a variety of local user groups, as well as the public, plus seven local, state and federal governmental jurisdictions. Advisory Council membership is designed to reflect balance in terms of representatives’ viewpoints, geographic diversity, and the advisory functions the Advisory Council will perform. Non-governmental members are selected through a very public, competitive process detailed in the Charter. The Advisory Council makes recommendations on the appointments that are thoroughly considered by the MBNMS Superintendent and the NMSP. Other interested parties are also welcome to endorse or recommend individuals who have applied. Applicants are chosen based on their particular expertise and experience in relation to the seat for which they are applying; community and professional affiliations; philosophy regarding the protection and management of marine resources; and possibly the length of residence in the area affected by the MBNMS. Appointed members generally serve three-year terms.

Table SAC-1.0 Sanctuary Advisory Council Member Seats

Non Government Seats		Government Seats	
Voting Seats		Non-voting Seats	
Agriculture	Citizen At-Large (3 seats)	Local Government	US Coast Guard
Business / Industry	Recreation	Harbors	GFNMS Manager
Conservation	Research	CA Dept. of Fish and Game	CINMS Manager
Diving	Recreational Fishing	CA Coastal Commission	CBNMS Manager
Education	Commercial Fishing	CA Resources Agency	MBNMS Superintendent
Tourism		CA EPA	
		CA State Parks	

The MBNMS will assure effective operation of the MBNMS Advisory Council and maintain its role as a key advisory body and conduit for bringing community concerns, ideas and needs to the attention of MBNMS management.

Activity 3.1: Conduct Sanctuary Advisory Council Operations

The MBNMS Advisory Council assists in carrying out the goals and objectives of the MBNMS. MBNMS programs promoting research, education and resource protection are a major focus for the Advisory Council, and members serve as ambassadors promoting Sanctuary stewardship. The Advisory Council has proven to be a powerful voice for the general public, responding to citizen concerns, ideas and needs. The Advisory Council provides an important public forum for

MBNMS constituents, working to enhance communications and provide a conduit for bringing the concerns of user groups and stakeholders to the attention of the MBNMS Superintendent, the NOAA, and the Department of Commerce. The Advisory Council meets six times per year in open sessions located throughout the MBNMS.

More information on the Advisory Council can be found on the Advisory Council website at: <http://montereybay.noaa.gov/intro/advisory/advisory.html>

Activity 3.2: Provide MBNMS Staff Support for the Sanctuary Advisory Council

Several MBNMS staff members support the Advisory Council and its operations. The Sanctuary Advisory Council Coordinator provides primary service. The Community and Public Affairs Coordinator and the Superintendent both assist the Advisory Council Coordinator and Advisory Council Chair in providing support to the Advisory Council.

Activity 3.3: Conduct at Least Six Sanctuary Advisory Council Meetings Per Year at Locations throughout the MBNMS

The Advisory Council Coordinator organizes at least six Advisory Council meetings a year that are held throughout the MBNMS. Organization of these meetings may include, but is not limited to: arranging conference services and lodging, coordinating with the Advisory Council Chair and MBNMS Superintendent to develop meeting agendas, printing all required materials, and processing reimbursement for traveling Advisory Council members.

Activity 3.4: Maintain Sanctuary Advisory Council Web Site and List Serves

The Advisory Council Coordinator works with the MBNMS Network Manager to provide and maintain the Advisory Council web site and list serve. The Advisory Council web site provides up to date access to the materials produced for and from each Advisory Council meeting. It includes the Advisory Council meeting schedule, agendas, meeting minutes, membership contact information and log of Advisory Council actions. The Advisory Council list serve is maintained to reflect current Advisory Council membership. An Advisory Council “interests” list is also maintained and available for members of the public to receive Advisory Council meeting notices and other information.

Activity 3.5: Distribute Notices of Sanctuary Advisory Council Meetings to the Public and Interested Parties

The MBNMS Advisory Council Coordinator widely distributes notices of Advisory Council meetings. These notices are distributed through the Advisory Council list serves, as well as the MBNMS’s other list serves (e.g., education, research, conservation, business and tourism). The MBNMS Community and Public Relations Coordinator also releases community or calendar notices of Advisory Council meetings to local and regional media.

Activity 3.6: Periodically Update Sanctuary Advisory Council Charter and Protocols

The Superintendent and the Advisory Council periodically review the Charter to ensure it is up to date and to adequately address problems or needs of the Advisory Council, or any new legal or programmatic requirements of the program. The Advisory Council Charter and Protocols outline the objectives and scope of the Advisory Council’s activities, description of duties for which the Advisory Council is responsible, procedural requirements on the appointment of Advisory

Council members and Officers, requirements for the conduct of Advisory Council members and meetings, and other requirements. All Advisory Council activities must be conducted pursuant to this charter and the protocols attached to and incorporated as part of this Charter. The complete MBNMS Advisory Council Charter and Protocols can be viewed at:

<http://montereybay.noaa.gov/intro/advisory/chartprot.html>

Activity 3.7: Periodically Review Sanctuary Advisory Council Membership

The Advisory Council may periodically review its membership to determine if it has the appropriate membership for community and agency involvement. The MBNMS Advisory Council was created before a congressional restriction was enacted limiting the size of Advisory Councils to fifteen voting members. However, for sites not subject to this restriction NMSP Advisory Council guidelines strongly urge Advisory Councils like Monterey Bay to limit its voting members to twenty. The Advisory Council may also review the focus and membership of its working groups as necessary to implement MBNMS programs.

Activity 3.8: Continue Coordination Between the Monterey Bay and Gulf of the Farallones (GFNMS) Advisory Councils

To ensure integration on issues and opportunities for the northern management area (NMA) of the MBNMS, a meeting of the MBNMS and the GFNMS Advisory Councils will be held annually. The MBNMS and GFNMS Advisory Councils may also chose to appointment liaisons from their Advisory Councils to attend each other's meetings.

Activity 3.9: Support Sanctuary Advisory Council Working Groups

The MBNMS Advisory Council is supported by four standing working groups: the Research Advisory Panel, the Sanctuary Education Panel, the Conservation Working Group, and the Business and Tourism Advisory Panel, each respectively dealing with matters concerning research, education, resource protection, business and tourism. Individuals selected to fill the conservation, education, research, and business and tourism seats on the Advisory Council serve as the chair of each respective working group. The working groups are composed of experts from the appropriate fields of interest and most meet monthly or bimonthly, serving as advisors to the Advisory Council and the MBNMS Superintendent.

A. Research Activity Panel (RAP)

The RAP is presently composed of representatives from twenty-one research institutions and organizations. The Research representative on the Advisory Council chairs the RAP. The RAP meets eight times per year, at different member institutions, to discuss the latest developments in regional science and upcoming research opportunities. The RAP advises the Advisory Council on research priorities that are primarily related to management of the MBNMS. In a coordinated effort with SIMoN, the RAP also promotes, encourages, and reviews research projects in the MBNMS. The RAP reviews and advises MBNMS management on the MBNMS research permits process and assists with the organization and dissemination of information on research activities within the MBNMS. The RAP also participates in developing the theme and program presentations for the Annual Sanctuary Currents Symposium and provides a mechanism for facilitating the integration of marine research and policy.

More information on the RAP can be found on the RAP website at:
http://montereybay.noaa.gov/intro/advisory/rap_objectives.html

B. *Sanctuary Education Panel (SEP)*

The Education representative on the Advisory Council chairs the SEP. The SEP assists the MBNMS in fulfilling its education mission to promote MBNMS awareness, understanding, appreciation and stewardship through public education and conservation programs. The SEP helps facilitate MBNMS collaboration with regional organizations, agencies and individuals who share similar educational goals and who, through partnerships, can help strengthen the effectiveness of MBNMS education efforts. SEP membership includes educators from aquariums, universities, conservation organizations and agencies, as well as K-12 classroom teachers. The SEP reviews program proposals, advises on educational priorities, provides feedback on the development of exhibits, publications, programs, events and services to educate the public about the MBNMS, and helps facilitate collaboration with organizations that provide marine-oriented on-site, outreach and teacher programs.

More information on the SEP can be found on the SEP website at:
<http://montereybay.noaa.gov/intro/advisory/sep.html>

C. *Conservation Working Group (CWG)*

The Conservation representative on the Advisory Council chairs the CWG. The mission of the CWG is to help promote and achieve comprehensive and long-lasting stewardship of the MBNMS through continued oversight and advocacy. CWG members work to ensure that the MBNMS is not neglected or exposed to new threats. The CWG identifies resource protection and management needs and makes recommendations on protection and management priorities, strategies, and policies. The Advisory Council and associated working groups, and other appropriate parties. CWG members collaborate in building a well-informed and supportive constituency for the MBNMS through pro-active education, organization memberships, public and media outreach, and citizen involvement activities. The CWG also promotes communication and coordination among conservation organizations and other non-governmental organizations, user groups, MBNMS staff, the Advisory Council and other MBNMS-related working groups, and other appropriate parties.

More information on the CWG can be found on the CWG website at:
<http://montereybay.noaa.gov/intro/advisory/cwg.html>

D. *Business and Tourism Activity Panel (BTAP)*

The BTAP is co-chaired by the Business/Industry representative and Tourism representative on the Advisory Council. Membership includes representatives from local ocean-related businesses and organizations, hotels, commercial industries, harbors, chambers of commerce and visitors and convention bureaus. The BTAP provides input on policy-related matters and advises the Advisory Council and MBNMS Superintendent on issues affecting local businesses. The goals of the BTAP are to provide a recognized mechanism for communicating Business and Tourism interests to the Advisory Council

and thus the MBNMS Superintendent, and to help Business and Tourism industries and the MBNMS build cooperative and effective partnerships of benefit to both the MBNMS and business.

More information on the BTAP can be found on the BTAP website at:
<http://montereybay.noaa.gov/intro/advisory/btap.html>

Activity 3.10: Continue to provide MBNMS Staff Support for Advisory Council Working Groups

The MBNMS provides a member of the MBNMS staff for all regularly scheduled Advisory Council Working Group meetings. This staff member works closely with the Working Group Chair to develop meeting agendas, facilitate meetings and to provide other support as needed. MBNMS staff also works closely with the Advisory Council and the Advisory Council Working Groups and their Chairs to ensure the missions of the Working Groups are relevant to implementation of the MBNMS's management plan.

Activity 3.11: Assist Working Groups in Defining Each Group's Membership Protocols and Decision-making Protocol

The Advisory Council Charter and Protocols direct the working groups to develop a process for selecting membership and making decisions. MBNMS staff will continue to work with each working group to refine membership and decision-making protocols.

Activity 3.12: Work with Business and Tourism Activity Panel Members and Other Business and Tourism Leaders to Develop Collaborative Partnerships of Benefit to the MBNMS and the Business Community.

MBNMS staff will work with BTAP members and other key business and tourism leaders to develop a strategic marketing and outreach plan. Interactive workshops and other mechanisms will be used to engage the business/tourism community in structured conversations that 1) help forge a better understanding between the Sanctuary program and the business community, and 2) identify, evaluate and prioritize projects of mutual benefit and the ways to implement them. These workshops will serve as important building blocks for a longer range plan.

Strategy OA-4: Conduct Facilities Assessment

MBNMS will develop a comprehensive facilities plan that identifies staffing and other resources necessary to adequately implement all programs identified in the management plan. MBNMS will evaluate the physical office space needs, as well as the geographic needs along the MBNMS coastline for projected staff. The need for different office locations and staffing decentralization will also be addressed. Other facility needs to be addressed include the need for a research and patrol vessel for MBNMS.

Activity 4.1: Assess Facility Adequacy

Monterey Office – 299 Foam Street

The Monterey office is leased through a property management firm.

Square footage: 7,168

Personnel capacity: 28
Space occupied: 25
Lease expiration: June 30, 2010

Satellite Office – Southwest Fisheries Science Center

The National Marine Fisheries Service and the MBNMS have a joint partnership concerning a small office space co-located at the Fisheries Lab in Santa Cruz.

Square footage: 726
Personnel capacity: 8
Space occupied: 6
Agreement expiration: December 31, 2015

Satellite Office – Hearst Castle State Beach, San Simeon

The San Simeon office is located at San Simeon Coastal Discovery Center at the William Randolph Hearst Memorial State Beach. The facility is owned by the California Department of Parks and Recreation and the program is operated by the MBNMS. State Parks has provided the space to the MBNMS through a Memorandum of Agreement (MOA). The space also serves as a visitor center, which was a MBNMS priority to establish in the region.

Square footage: 1,380
Personnel capacity: 4
Space occupied: 4 (2 MBNMS staff and 2 State Parks staff)

Activity 4.2: Assess Needs for Existing and Future Office Space

The Strategy OA-1, Assess Staffing Needs, addresses the need to refine the staffing plan and organization method for the MBNMS. These staffing needs are directly related to facilities needs and office space.

Activity 4.3: Develop and Pursue a Comprehensive Facilities Plan for MBNMS Facilities Throughout the MBNMS

Working with the NMSP HQ, MBNMS will develop a Master Facilities Plan. The plan will feed into a NMSP Facilities Plan that addresses comprehensive facility needs for all sites.

Activity 4.4: Assess Other Facility Needs

The MBNMS will assess other facility needs and develop plans for acquisition or construction of:

A. *Boat Needs*

The NMSP owns and operates the R/V FULMAR, a state-of-the-art 67ft Teknicraft hydrofoil-assisted, aluminum-hulled catamaran. The vessel is homeported in Monterey Harbor in the MBNMS, yet also serves the Gulf of the Farallones and Cordell Bank national marine sanctuaries. MBNMS also owns and operates a 30ft patrol boat SHARKCAT that is used for enforcement, research and diving operations.

B. *Slip Space Needs*

MBNMS currently utilizes the 100ft NOAA floating dock located on the United States Coast Guard Pier in Monterey for the 67ft R/V FULMAR and the 30ft P/B SHARKCAT. See Strategy OA-6, Coordinate and Conduct Boat Operations.

C. *Dive Locker Needs*

MBNMS currently utilizes space on the Monterey United States Coast Guard Pier for a dive locker. The United States Coast Guard is remodeling the pier after which they may be able to offer the MBNMS an additional or remodeled dive locker space. See Strategy OA-7, Oversee and Conduct Dive Operations.

D. *Santa Cruz Visitor Center*

An interpretive center is needed to help raise public awareness of ocean issues, promote environmental stewardship, foster community support, and give the MBNMS a more tangible presence. Facilities for education, research, and outreach provide a critical vehicle for interaction and developing a sense of stewardship with the constituent base of the MBNMS. The Interpretive Facilities Action Plan addresses the need for these types of facilities and develops a plan for a MBNMS Visitor Center.

E. *Research Facility and Laboratory*

MBNMS will require a research facility and laboratory to analyze data collected from monitoring efforts along the shoreline as well as from the new research vessel. This should be located in close proximity to the slip for the vessel. Other options could include partnering with one of the research institutions at Moss Landing, UCSC's Long Marine Laboratory in Santa Cruz, or Stanford University's Hopkins Marine Station in Monterey.

Strategy OA-5: Conduct Administrative Initiatives

MBNMS will develop a comprehensive operations program that identifies staffing and other resources necessary to adequately implement all programs identified in the revised management plan unless otherwise reorganized. MBNMS will continue to conduct administrative operations through the Program Operations Team in support of the Research, Education and Resource Protection Teams. The Program Operations Team carries out the MBNMS's effective, day-to-day administration, providing the services necessary to fulfill the mission of the MBNMS and facilitate management of the MBNMS.

Activity 5.1: The Sanctuary Superintendent Will Continue to:

- A. Direct MBNMS operations
- B. Manage MBNMS resources
- C. Address the input of stakeholders from the communities within the MBNMS boundaries
- D. Serve as primary point of contact for the Sanctuary Advisory Council, as well as local government officials and representatives of state and federal government offices in the region
- E. Liaison with the Superintendents or Managers of the other national marine sanctuaries

- F. Work with the Director of the NMSP on facets of MBNMS and NMSP operations

Activity 5.2: The Deputy Superintendent Will Continue to Manage Human Resources in Coordination with the Superintendent and Other Team Coordinators

This includes:

- A. Recruitment and retention
- B. Training and career enhancement
- C. Employee performance and recognition
- D. Time and attendance
- E. Contractor invoice management

Activity 5.3: The Deputy Superintendent Will Continue to Administer Financial Operations

MBNMS works with NOAA’s Western Regional Center (WRC), which provides a comprehensive suite of administrative services, including procurement, personnel services, health and safety, administrative payments, space management, regional engineering, environmental compliance, publications, IT support, and security. The Program Operations Coordinator’s responsibilities include:

- A. Oversee budget, contracting and acquisitions
- B. Produce an Annual Operating Plan
- C. Conduct procurements for supplies and services
- D. Submit required reports to NMSP headquarters

Activity 5.4: MBNMS Will Operate, Track and Maintain Government Vehicles

- A. Produce a monthly mileage report
- B. Produce a quarterly report that outlines gallons of gas consumed, mileage used, and any maintenance costs

Activity 5.5: MBNMS Will Continue to Process Travel Orders/Vouchers in Travel Manager

Activity 5.6: MBNMS Will Develop Office Safety and Emergency Response Procedures for All Office Locations to Address Emergency Risks, Homeland Security Requirements, and Natural Disasters

Activity 5.7: MBNMS Will Maintain Interagency Cooperation Agreements and All Other Memorandums of Agreement

Activity 5.8: MBNMS Will Continue to Partner with the Monterey Bay Sanctuary Foundation, a Nonprofit Organization Whose Mission is to Advance the Understanding and Protection of MBNMS, Other National Marine Sanctuaries in California, and with Other Nongovernmental Partners

Activity 5.9: MBNMS Will Continue to Manage Community Relations and Public Affairs, Including Drafting Press Releases, and the Coordination of Media Coverage Related to MBNMS Activities

Activity 5.10: MBNMS Will Continue to Maintain a Local Office Computer Network and Manage the MBNMS Website

Activity 5.11: The MBNMS Research Coordinator Will Continue to Manage the Research Team and Participate in NMSP-wide Activities Relating to Research

Activity 5.12: The MBNMS Education Coordinator Will Continue to Manage the Education Team and Participate in NMSP-wide Activities Relating to Education, Including General Outreach Products and Events. Products Include Quarterly Newsletters, an annual State of the Sanctuary Report, and an Annual Sanctuary Currents Symposium Event

Activity 5.13: The MBNMS Resource Protection Coordinator Will Continue to Manage the Resource Protection Team and Participate in NMSP-wide Activities Relating to Resource Protection

Strategy OA-6: Coordinate and Conduct Boat Operations

MBNMS conducts boat operations in support of MBNMS management, research, education, and enforcement programs. Field operations enable MBNMS staff to maintain a direct connection to the resources they are charged to protect and provide real-time assessment of conditions in the MBNMS. Staff spend many hours in the field each year performing scientific research, collecting information for educational programs, monitoring various human activities and natural phenomenon, and conducting enforcement surveillance, investigation, and response.

MBNMS staff must be a presence on the waters of the MBNMS to ensure effective and efficient Sanctuary research and management and protection of MBNMS resources. Boat operations are necessary to support:

- A. Ecosystem-focused research, monitoring and resource characterization to assist with resource management
- B. Research, monitoring, characterization, and protection of maritime heritage resources
- C. Monitoring key activities and resources to understand how the environment is responding to changing human uses and environmental conditions
- D. Enforcing MBNMS regulations and monitoring regulatory compliance
- E. Emergency response to spills and groundings
- F. Maintenance of MBNMS infrastructure (mooring buoys, ocean observatories, special navigation markers, environmental remediation sites)
- G. Education and outreach

The MBNMS small boat program is currently used to complete the following activities:

- A. Habitat mapping
- B. Sea bird and marine mammal observations
- C. Kelp forest research surveys
- D. Benthic monitoring along the remote Big Sur coastline
- E. West Coast Observation Program buoy installation and maintenance
- F. Collaborative research with National Marine Fisheries Service, and other NOAA agencies
- G. Oceanographic monitoring
- H. Archeological/ cultural research
- I. Baseline data collection for introduced species and marine reserves
- J. Investigation and surveillance activities
- K. Monitoring of permitted activities such as fireworks, overflights and whale watch operations
- L. Support for dive operations
- M. Ship to shore transfers of personnel and/or equipment
- N. Inter-agency support such as training with United States Coast Guard
- O. Assistance for vessels in distress

Figure OA-2: R/V Fulmar supports education, research and resource protection programs



Program Operations Coordinator

The Program Operations Coordinator is assigned by the Sanctuary Superintendent to supervise all aspects of MBNMS watercraft operations, including boat maintenance and repair, equipment procurement, safety standards, training guidelines and requirements, boat operator and crewmember selection and designation, and boat use policies and procedures.

Marine Operations Coordinator

The Marine Operations Coordinator is responsible for the day-to-day operation of vessels and for implementing all requirements in accordance with this NOS Small Boat policy. General

responsibilities include: creation and maintenance of a 12-month schedule for each vessel, reflecting research, education, outreach, maritime heritage, maintenance, inspection, and other related activities.

Operator-in-Charge (OIC)

USCG qualified OICs are required for operation of the R/V FULMAR. The OIC makes the decision whether to conduct, postpone, or cancel operations based on weather, the status of the vessel, available personnel, and other pertinent factors.

Vessel Operators

MBNMS vessel operators are designated MBNMS staff members that have successfully completed an approved boater familiarization and safety course or an advanced boat operations course, as well as operational proficiency training aboard the P/B SHARKCAT. All boat operators also have current Red Cross or equivalent certification in cardiopulmonary resuscitation (CPR) and First Aid.

Crewmembers

Crewmembers are MBNMS staff that has completed a practicum on basic boat operations (including underway operations, docking, anchoring, communications, and emergency procedures). The Program Operations Coordinator in consultation with the appropriate Team Coordinators schedules crewmembers so that sea time and periods of operational time are equitably distributed among MBNMS staff involved in boat operations.

Partnership Agreements

United States Coast Guard (USCG)

MBNMS coordinates all of its boat operations with United States Coast Guard Station, Monterey. The United States Coast Guard holds “guard” during MBNMS boat operations by maintaining radio contact with the MBNMS boat operators every thirty minutes. MBNMS may also call upon United States Coast Guard vessels for aid with enforcement operations.

California Department of Fish and Game (CDFG)

MBNMS has an agreement with CDFG that allows the MBNMS to call upon CDFG boats for aid with enforcement operations. This mechanism has rarely been used due to staffing limitations for CDFG.

Others

MBNMS may also purchase sea time aboard other research and private vessels in the area.

Activity 6.1: Maintain and Implement Boat Operations Guidelines

MBNMS currently operates the R/V FULMAR and the P/B SHARKCAT under the NOAA Small Boat Safety & Procedures Manual and the NOAA Administrative Order on the management of small boats¹⁴. MBNMS also utilizes a vessel policy that includes standing orders

and risk management documents that enable the Captain to evaluate whether the conditions indicate that operations should be conducted. These conditions shall include weather and sea state, as well as the qualification levels of the personnel conducting the operation.

Activity 6.2: Maintain and Implement Vessel Operator and Crew Member Qualification Plan

To effectively meet MBNMS mission requirements through operational boat crews, the Program Operations Coordinator shall monitor qualifications of crew and set qualification goals. The Program Operations Coordinator will also compile a list of specific upcoming activities and events that will require boat support.

Operational schedules will be structured to ensure that training and proficiency requirements are met by developing an annual schedule to include scheduled operations for boat maintenance and personnel proficiency training. All boat operations will be coordinated with each other to ensure that a boat maintenance, qualification, research, or resource protection objective is met whenever possible.

Activity 6.3: Implement Small Boat Operations to Address Activities Identified in Other Action Plans

MBNMS will develop a small boat operation plan that articulates the needs of a boat program for the MBNMS, including the projected needs as indicated in other plans. In coordination with other west coast sanctuaries, the boat will be operated to support identified priority activities including:

- Subtidal characterization
- Remote coastline access
- Seafloor characterization
- Storm water runoff monitoring
- Bird / mammal surveys
- Surveying of trawling effects
- Submerged cable monitoring
- Student field trips
- Teacher training
- Training / orientation
- Enforcement / permit compliance
- Dive proficiency training
- Large animal tagging
- Buoy deployment and maintenance

Strategy OA-7: Oversee and Conduct Dive Operations

The mission of the NOAA Dive Program is to ensure that all NOAA diving operations are conducted safely, efficiently, and economically in support of NOAA's goals and objectives. The strategic vision, goals and objectives of the NOAA Dive Program are:

- To establish standards and procedures for conducting safe diving operations
- To provide professional, comprehensive, and innovative instruction
- To provide safe, state-of-the-art, and well maintained dive equipment
- To investigate new diving technologies and techniques
- To foster cooperative working relationships with the local diving community, including other research diving programs
- To promote NOAA and the Dive Program through educational outreach

The MBNMS dive team is part of the NOAA Dive Program. The MBNMS dive team currently consists of three NOAA certified Dive Masters. MBNMS utilizes the service of the Unit Dive Supervisor on staff at the NOAA National Marine Fisheries (National Marine Fisheries Service) Lab located in Santa Cruz. Research divers certified through the University of California (Santa Cruz) and the California State University (Moss Landing Marine Laboratories) may also participate in NOAA diving operations under reciprocal diving agreements. The MBNMS dive program supports the goals and objectives of the NOAA Dive Program. Field operations enable MBNMS staff to maintain a direct connection to the resources they are charged to protect and provide real-time assessment of conditions in the MBNMS.

Activity 7.1: Identify Needs for Diving Operations from Other Action Plans

MBNMS will develop a dive operations plan that articulates the needs of a diving program for the MBNMS, including the projected needs as indicated in other action plans.

Present and potential dive activities include:

- Kelp monitoring along the Big Sur Coastline
- NOAA dive training, testing and maintenance of proficiency
- Invasive and introduced species detection, monitoring and eradication
- Boat hull inspections and de-fouling of propellers on NOAA and other vessels
- Shipwreck groundtruthing of the MBNMS shipwreck database and archaeological surveys (e.g., mapping of subtidal artifacts)
- Inspection of submerged structures and pre-surveys for potential permit sites
- Collection of evidence for enforcement
- Damage assessment of subtidal areas affected by a recent shipwreck or grounding
- Recovery of debris from the seabed such as dive cleanup events
- Fish identification surveys such as Great Annual Fish Count
- Support underwater interpretive programs such as JASON Expeditions and the NMSP telepresence program
- Deploy and recover equipment/instruments and assist in Remotely Operated Vehicle (ROV) operations
- Sample collections and subtidal monitoring activities
- Buoy inspection, retrofitting, repair, and maintenance
- Assist in Search and Rescue (SAR) operations

Activity 7.2: Establish a Staff Qualification Plan

In order to operate a qualified dive team that can fully utilize the R/V FULMAR, MBNMS requires at least three staff members that are qualified as a Dive Master and a minimum of three staff members that are qualified as NOAA certified scientific divers. MBNMS divers that hold dive qualifications from the Professional Association of Diving Instructors (PADI) or the National Association of Underwater Instructors (NAUI) may also apply to participate in NOAA diving operations as Working Divers. The Program Operations Coordinator will identify the qualification levels of the MBNMS staff members who are interested in attaining NOAA diving status and develop a plan for these staff members to gain that status. The Program Operations Coordinator will also identify the MBNMS staff members who are interested in basic or

advanced dive qualifications and will develop a plan for these staff members to attain those qualifications in order to ultimately gain NOAA Working Diver status.

Activity 7.3: Improve Outreach Efforts to the Local Dive Community in Order to Foster Collaborative Working Relationships

Activity 7.4: Develop Reciprocity Agreements with Other Research Diving Programs to Facilitate Collaborative Research

Strategy OA-8: Oversee and Conduct Aircraft Operations

The MBNMS conducts aircraft operations in support of Sanctuary management, research, education, and enforcement programs. The Monterey Bay and Channel Islands National Marine Sanctuaries have, in the past, shared a NOAA aircraft. The former Air Force single engine plane, a Lake Amphibian, stationed in Santa Barbara, is scheduled to make weekly trips around each Sanctuary.

Activity 8.1: Assess Aircraft Needs Based on the Management Plan Priorities

In order to meet MBNMS aircraft operations requirements, MBNMS will investigate cooperative agreements with other local agencies, such as the Center for Interdisciplinary Remotely-Piloted Aircraft Studies (CIRPAS), a research center at the Naval Postgraduate School in Monterey, that have sufficient aircraft available. MBNMS will also coordinate with the NOAA regional facilities coordinator to investigate MBNMS needs and requirements to support a NOAA twin otter.

Activity 8.2: Based on Needs Assessment, Develop and Implement Aircraft Operations Plan

MBNMS aircraft operations would require a twin engine, high wing, propeller or turbo-prop aircraft that is built for observations, including bubble windows and observation software. The aircraft must be able to fly slowly and remain aloft for extended periods. Perhaps a twin otter or a NOAA Shrike would meet the MBNMS needs. If MBNMS were allocated an aircraft, it would also require a NOAA pilot or another pilot with qualifications that allow NOAA personnel on board. MBNMS would also require hangar space and a maintenance contract or mechanic.

Strategy OA-9: Maintain and Enhance Permit Program

The MBNMS permit program provides a mechanism to review requests to conduct prohibited activities within the MBNMS, and where appropriate, permit or authorize their conduct in such a way as to have only negligible, short-term adverse effects on MBNMS resources and qualities. The permit program provides a mechanism to develop modifications or conditions on proposed projects, which will reduce impact to MBNMS resources. The MBNMS has issued permits for the following activities:

Substrate collection (seabed alteration) – the MBNMS has issued, and will continue to issue under appropriate circumstances, permits to alter the seabed by researchers or educators that have an interest in collecting substrate for studies or displays that will in turn further research or education efforts related to MBNMS resources.

Placement of bolts (seabed alteration) – the MBNMS has issued, under appropriate circumstances, permits to alter the seabed by the drilling of bolts into rock for the purpose of intertidal or subtidal (scuba depth) research or monitoring studies.

Operating aircraft within the MBNMS Overflight Restriction Zone – the MBNMS has issued, under appropriate circumstances, permits for conducting aircraft operations for research purposes within the MBNMS overflight restriction zones. These MBNMS permits have modified or conditioned the proposed projects and subsequent permits to ensure that there would be no adverse impacts to MBNMS resources or qualities.

Conduct of management activities – the NMSP has issued a Sanctuary Managerial Permit to the MBNMS which has allowed certain activities to be permitted under this permit and has included, but is not limited to, enforcement training, installation of equipment for research and educational purposes, and sediment collection.

Research trawling (seabed alteration) – the MBNMS has issued permits to NOAA Fisheries, the agency primarily tasked with understanding and assessing the populations of commercially harvested species, to conduct trawl studies within the MBNMS. Though MBNMS regulations prohibit alteration of the seabed, lawful fishing operations are excepted from this prohibition, whereas research is not; hence the need for NOAA Fisheries to obtain a permit.

Scattering of remains – the MBNMS has authorized the US Environmental Protection Agency General Permit For Burial At Sea (CFR Part 229.1) and the State of California Health and Safety Code §7116 and §7117, which allows for the discharge of cremated human remains within the boundaries of the MBNMS. Special conditions apply, including that no such scattering may take place within 500 yards of the shoreline.

Shark attraction – the MBNMS has issued, under appropriate circumstances, permits to researchers to attract white sharks to the waters surrounding Año Nuevo, a known white shark feeding area, for the purpose of furthering marine research on this protected species.

Discharges – the MBNMS has issued, under appropriate circumstances, permits to discharge a small volume of non-toxic fluids or materials for research purposes within the MBNMS. This has included dye tests to determine fluid movement for research purposes.

Coring (seabed alteration) – the MBNMS has issued, under appropriate circumstances, permits to researchers interested in obtaining sediment cores for geophysical or biological analysis.

Equipment placement (seabed alteration) – the MBNMS has issued, under appropriate circumstances, permits for the placement of equipment upon the seabed, an activity that is prohibited by the seabed alteration regulation. Past permitted equipment has included moorings, anchors, passive receivers, monitors, placement of invertebrate traps, etc.

Activity 9.1: Maintain Review of Projects via the Permit Program

In order for the MBNMS to understand, measure, and control all otherwise prohibited activities within the MBNMS, and to minimize the cumulative impacts of these activities, the MBNMS will continue to improve its permit program, including:

- A. Continue to evaluate permit requests on a case-by-case basis by conducting environmental review to evaluate potential impacts and issue or deny permits accordingly
- B. Continue tracking relevant projects that may require a permit, as well as evaluating environmental documents and coordinating with other scientists in an effort to discern potential impacts
- C. Develop modifications and conditions on projects to reduce impacts to MBNMS resources, and communicate with applicants regarding procedures and operations
- D. Monitor permitted activities to ensure compliance with permit conditions, and increase the current level of monitoring to encompass a broader number of permits. This could be better accomplished by developing partnerships with other regulatory agencies to meet this goal
- E. Require permittees to provide the MBNMS with the data and results gained through research conducted with research permits, to enrich knowledge of the ecosystem, helping MBNMS to better manage the resource
- F. Work with others to develop, maintain and refine use of a searchable GIS database for permit data, including locations of permitted activities and type of permit or authorization issued. This is particularly important for priority concern issues such as overflights or coastal armoring. Working in collaboration with other agencies that issue permits for such activities is a likely nexus
- G. Continue to provide a permit report for each Sanctuary Advisory Council meeting and the public via the MBNMS website,
<http://montereybay.noaa.gov/intro/Advisory/advisory.html>

Activity 9.2: Improve Coordination and Consistency with Regulatory Agencies

MBNMS staff will coordinate with other regulatory agencies issuing permits to ensure consistency with applicable laws.

Activity 9.3: Review Permit Process to Improve Efficiency and Effectiveness

The MBNMS will examine methods to improve the efficiency and effectiveness of the permit process for certain prohibited activities that are determined to have negligible short-term adverse individual and cumulative impacts on MBNMS resources and qualities. MBNMS intends to work with NMSP Headquarters to develop an online process that will aid researchers in determining if their project would qualify for this type of permit and would include application instructions.

The goal of a more efficient review process for minor permits is to obtain:

Greater compliance from researchers

A reduction of paper for researchers and the MBNMS throughout the application and permitting process

Efficiency and additional staff time devoted to larger projects requiring more rigorous review

Continued and improved tracking of small-scale research projects by MBNMS staff

The MBNMS will identify research activities that will have minimal impacts on MBNMS resources and qualities and identify a threshold for expedited review of these activities. Minimal

impact research activities considered include: small-scale research projects that may include, but not be limited to, installation of bolts for quadrats for the purpose of monitoring, minor equipment placement, sand sampling, or other similar activities.

Activity 9.4: Conduct Outreach to Inform the Public About the Permit Process

Many prohibited activities that may qualify for a permit are being conducted without proper approval from MBNMS. To increase awareness about the MBNMS prohibitions and permit process, MBNMS will coordinate with the RAP to educate local scientists and work with the BTAP to educate local business owners on the MBNMS permitting and authorization process. MBNMS will also work with Elkhorn Slough National Estuarine Research Reserve (ESNERR) in their coastal decision-maker program.

Activity 9.5: Improve Website Information

The MBNMS should improve website information so that potential permittees can easily understand and use the permit program and application process.

- A. Update the website to ensure that other agency information about prohibited activities and permit contacts is current.
- B. Include a checklist of all statutes and other agencies that may issue a particular permit so that the applicant is made aware of other applicable laws or regulations. This website information will increase education about other state or federal authorizations or permits that may be required for the conduct of certain activities.

Activity 9.6: Improve Authorization Coordination

The MBNMS reviews authorizations on a case-by-case basis. MBNMS will work with partners to improve coordination and ensure that agency permit approvals are consistent with the MBNMS mandate of ecosystem protection. The MBNMS will continue to issue authorizations to conduct prohibited activities, where appropriate. The MBNMS will continue to utilize the following three options when issuing authorizations as outlined in the September 1992 *Federal Register* at §922.133 and summarized below:

- A. The MBNMS Superintendent notifies the applicant and authorizing agency that he does, or does not, object to issuance of the permit for a project.
- B. If the MBNMS does not object to the project, the MBNMS may ask the primary permitting agency to include special terms or conditions on the other agency's permit license, approval or authorization permit that alleviates damage to MBNMS resources or qualities.
- C. If the primary permitting agency will not include MBNMS special conditions in the permit, or there is insufficient time for that to occur, then the MBNMS Superintendent imposes terms or conditions to the applicant through a separate MBNMS authorization.

Activity 9.7: Develop a Fee Process for the Special Use Permit

The MBNMS will continue to coordinate with the NMSP headquarters to develop the fees associated with Special Use Permits. This consideration will help determine the value of using the resources, often for commercial gain, while ensuring that the MBNMS is able to recoup any

costs that may be associated with permit issuance. The MBNMS will evaluate when fees are appropriate to be levied for this purpose.

Activity 9.8: Develop a Permit Compliance Program

The MBNMS will develop a permit compliance program to track permittee compliance. It will include a mechanism to improve future permits based on results of compliance monitoring. The MBNMS issues about sixty permits or authorizations a year, with approximately fifteen conditions on each permit. Each condition requires the permittee to take or avoid an action. Often, these include special construction or operations strategies to reduce or avoid impacts to MBNMS resources. Most permits require one or more report(s) to be produced. A permit compliance program is necessary to ensure that the permit program is effective in preventing injury to MBNMS resources.

Activity 9.9: Strengthen Enforcement

It is critical to strengthen the availability of surveillance and enforcement capabilities and to increase the visibility of MBNMS enforcement to ensure protection of the resources, and to enhance outreach, streamlining, and inter-agency coordination efforts.

- A. Increase the field presence of MBNMS enforcement to detect the occurrence of prohibited activities in an effort to ensure greater protection of the MBNMS
- B. The MBNMS Enforcement Officer will monitor activities permitted within the MBNMS to ensure compliance with MBNMS permit requirements
- C. The MBNMS Enforcement Officer will coordinate with other regulatory agencies involved to monitor activities authorized within the MBNMS to ensure compliance with MBNMS permit requirements
- D. Improve inter-agency coordination on enforcement to leverage field efforts, including MBNMS, California Department of Fish and Game, State Parks, and local police
- E. NOAA will finalize and use a summary settlement process, when appropriate, that would allow tickets to be levied on offenders conducting prohibited activities without a permit or authorization

Strategy OA-10: Increase Interagency Program Review

The goal of this strategy is to address the need to provide policy guidance to local, state and federal agencies and stakeholders in order to implement the resource protection, education, and research programs, policies, and regulations of the MBNMS. This occurs often through commenting on other agencies' programs, policies, regulation modification, and environmental review during public processes such as general plan updates, local coastal plan updates, and fishery management plan development.

Activity 10.1: Conduct Outreach to Agencies and Stakeholders

MBNMS staff will provide ongoing guidance to local, state, and federal agencies, developers, and the public at large through targeted issue-specific outreach programs.

Activity 10.2: Review and Comment on Local Land Use Decisions

MBNMS staff will track and evaluate local and regional land use decisions where coastal development may negatively impact MBNMS resources.

Activity 10.3: Review and Comment on Local Coastal Program Updates

MBNMS staff will work with Local Coastal Program updates to improve existing policies and incorporate these guidelines where possible.

Activity 10.4: Review and Comment on Fishery Management Plan Updates

MBNMS staff will work with fishery managers and fishery management agencies as updates to existing fishery management plans occur or new fishery management plans are proposed.

Activity 10.5: Testify at Local Hearings on Issues Affecting the MBNMS

MBNMS staff will offer comment and testimony at public workshops or hearings where decisions are being made or input is being sought regarding a decision that has the potential to affect the resources or qualities of the MBNMS.

Activity 10.6: Review and Comment on Other Plans and Projects

MBNMS will also review and comment on other types of plans, projects and policies that may impact MBNMS resources.

Action Plan Partners: Monterey Bay Sanctuary Foundation, Monterey Bay Aquarium, NOAA’s Western Administrative Services Center, Monterey Bay Aquarium Research Institute, Bureau of Land Management, California State University Monterey Bay, Friends of Hearst Castle, California Department of Parks and Recreation, Monterey Institute of International Studies, Marine Advanced Technology Education Center at Monterey Peninsula College, local public high schools, local private institutions, local cities, local colleges and universities, NOAA/National Marine Fisheries Service, United States Coast Guard, City of Santa Cruz, Civil Air Patrol, United States Coast Guard Auxiliary, California Department of Fish and Game, State Parks, other regulatory agencies, Team OCEAN or BayNet, academic and other research institutes.

Table OA.1: Measuring Performance of the Operations and Administration Action Plan

Desired Outcome(s) For This Action Plan:	
Effectively administer and operate the programs necessary to understand, protect, and educate the public about the resources and qualities of the MBNMS.	
Performance Measures	Explanation
<p>By 2012, increase by 30% the number of volunteer hours dedicated to MBNMS public awareness, ecosystem monitoring and resource protection activities.</p> <p>By 2012, the MBNMS Sanctuary Advisory Council will provide significant input on at least 8 priority issues per year.</p> <p>By 2008, R/V Fulmar is fully staffed and adequately supporting safe and effective boat operations.</p>	<p>The Operations and Administration Action Plan is unique in that its implementation ensures the operation of various programs to address the various issues outlined in other action plans. Two important activities in support of other programs is the operation of our volunteer program and the Sanctuary Advisory Council.</p> <p>MBNMS will continue to track the number of volunteer hours contributed to MBNMS programs.</p> <p>MBNMS currently tracks the number of actions taken by the Sanctuary Advisory Council each year. MBNMS will also track items to considered to be ‘significant input’ which may be include actions such as a) passing of a formal resolution; b) reaching consensus or by vote on item; or c) dedication of three or more SAC meetings to a particular issue.</p> <p>At a minimum, the crew includes a licensed captain and mate and a vessel operations coordinator. Missions aboard the R/V Fulmar are tracked and evaluated each year for safe operations.</p>

Table OA.2: Estimated Timelines for the Operations and Administration Action Plan

Operations and Administration Action Plan	YR 1	YR 2	YR 3	YR 4	YR 5
Strategy OA-1: Assess Staffing Needs	● — ●				
Strategy OA-2: Develop Volunteer Program		● — ●▶		
Strategy OA-3: Coordinate and Support Sanctuary Advisory Council	● —▶				
Strategy OA-4: Conduct Facilities Assessment	● — ●				
Strategy OA-5: Conduct Administrative Initiatives	● —▶				
Strategy OA-6: Coordinate and Conduct Boat Operations	● —▶				
Strategy OA-7: Oversee and Conduct Dive Operations	● —▶				
Strategy OA-8: Oversee and Conduct Aircraft Operations	●● —▶				
Strategy OA-9: Maintain and Enhance Permit Program	● —▶				
Strategy OA-10: Increase Interagency Program Review	● —▶				
Legend					
Year Beginning/ Ending	: ● — ●	Major Level of Implementation: —			
Ongoing Strategy	: ● —▶	Minor Level of Implementation:			

Table OA.3: Estimated Costs for the Operations and Administration Action Plan

Strategy	Estimated Annual Cost (in thousands)*				
	YR 1	YR 2	YR 3	YR 4	YR 5
Strategy OA-1: Assess Staffing Needs	\$44	\$40	\$40	\$40	\$40
Strategy OA-2: Develop Volunteer Program	\$151	\$151	\$151	\$151	\$151
Strategy OA-3: Coordinate and Support Sanctuary Advisory Council	\$112.5	\$112.5	\$112.5	\$124.5	\$124.5
Strategy OA-4: Conduct Facilities Assessment	\$12	\$12	\$12	\$12	\$12
Strategy OA-5: Conduct Administrative Initiatives	\$620	\$620	\$620	\$644	\$641
Strategy OA-6: Coordinate and Conduct Boat Operations	\$264	\$298	\$438	\$438	\$438
Strategy OA-7: Oversee and Conduct Dive Operations	\$51	\$74	\$74	\$74	\$74
Strategy OA-8: Oversee and Conduct Aircraft Operations	\$12	\$0	\$0	\$0	\$0
Strategy OA-9: Maintain and Enhance Permit Program	\$154	\$211	\$204	\$204	\$212
Strategy OA-10: Increase Interagency Program Review	\$106	\$106	\$106	\$106	\$106
Total Estimated Annual Cost	<i>\$1,526.5</i>	<i>\$1,624.5</i>	<i>\$1,757.5</i>	<i>\$1,793.5</i>	<i>\$1,798.5</i>

* Cost estimates are for both “programmatic” and “base” (salaries and overhead) expenses.

Performance Evaluation Action Plan

Goal

Provide a clear mechanism to evaluate progress in implementing the MBNMS management plan and present a set of performance targets to demonstrate progress towards desired outcomes for each action plan.

Introduction

Ongoing and routine performance evaluation is an emerging priority for the MBNMS and NMSP as part of an effort to improve overall management of MBNMS. Both site-specific and programmatic efforts are underway to better understand the MBNMS's ability to meet stated objectives and to address the issues identified in this management plan. Beyond these principal goals, performance evaluation has many other benefits, including:

- A. Highlighting successful or not so successful efforts of MBNMS management;
- B. Keeping the public, Congress, and other interested parties apprised of MBNMS effectiveness;
- C. Helping MBNMS management identify resource gaps;
- D. Improving accountability;
- E. Improving communication among sites, stakeholders, the general public and partners in plan implementation;
- F. Fostering the development of clear, concise and, measurable outcomes;
- G. Providing a means to comprehensively evaluate MBNMS management in both the short and long term;
- H. Fostering an internal focus on problem solving and improved performance;
- I. Providing additional support for the resource allocation process; and
- J. Motivating staff with clear policies and a focused direction.

With the measures in this management plan, MBNMS is initiating the performance measurement process for the Sanctuary and, therefore, beginning to establish a baseline of information that can be used by the MBNMS and the NMSP to evaluate effectiveness of the site over time.

A key component to the measuring of performance will be the involvement of the public in understanding the progress of the MBNMS action plans. The MBNMS will provide annual updates to the public through the Sanctuary Advisory Council where feedback can be provided on the program assessment.

Strategy PE-1: Measure Sanctuary Performance Over Time

This strategy will allow MBNMS to effectively and efficiently incorporate performance measurement into the regular cycle of management. This strategy and related activities are to be implemented by staff from all functional areas. This strategy details the process by which the MBNMS will measure its management performance over time.

Issues and problems are identified during the scoping process relative to site goals and objectives. Staff then works to develop desired outcomes or targets based on a desired change in

the status quo of something, such as the MBNMS’s environmental condition or management capacities. Activities, 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. Measures can and should be developed to provide information on results over time, from the near term (e.g. within one year) to the long term (over the span of ten or more years). As these measures are monitored over time, data is collected on progress towards the achievement of outcomes and the production of outputs. Outcomes being achieved and outputs being produced are reported as accomplishments. Inabilities to achieve outcomes or produce outputs are also reported, but as areas that are falling short of targets. In these areas, staff will work to identify the obstacles preventing management from reaching targets. This internal review is one of the primary benefits of the performance evaluation process to produce feedback about why particular actions are or are not meeting stated targets and how they can be altered to do so. The information the performance measures in the site management plans produce will be used not only to improve the management of individual Sanctuaries, but to inform programmatic performance evaluation as well. Although this will be an internal process, results will be compiled, synthesized and then reported by the MBNMS Superintendent in a public document, such as the State of the Sanctuary Report.

There are five activities in this action plan. Each is designed to carry the Sanctuary through the performance evaluation process and integrate performance measurement into the regular cycle of site management.

Activity 1.1: Consider Development of Logic Models for each Strategy Focusing on those Strategies Requiring Greater Cross-team Interaction

Logic models provide a “picture” of how a strategy will work. Logic models link outcomes in the short, near and long term with desired outcomes, outputs and inputs. Use of the logic model can also incorporate assumptions and underlying theory of the strategies. Logic models can also be used as reporting tools and help to identify ‘smart’ (i.e., realistic and specific) objectives.

The model will also enable MBNMS staff to see:

- A. How activities fit within the strategies and likewise, how the strategies fit within the action plans
- B. How staff can contribute on an individual level to strategies
- C. How to distinguish between desired outcomes and outputs
- D. How to determine optimal allocation of resources
- E. How to develop methods to allow for meaningful evaluations

Activity 1.2: Monitor Existing Performance Measures Consistently Over Time

MBNMS staff will conduct routine performance evaluations to collect and record data on MBNMS performance over time. Using these data, staff will determine effectiveness 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 1.3: Annually Assess Implementation of the Management Plan

This assessment will be conducted internally on an annual basis by MBNMS staff and 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 situation. Successful activities will be recognized with application of positive lessons learned to other programs.

Activity 1.4: Report Evaluation Results to the Sanctuary Advisory Council, MBNMS Management, and NMSP

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 will also be presented in a site-specific annual report that will explain each measure and how it was evaluated, and describe the next steps. Based on this analysis, MBNMS staff, in cooperation with the Advisory Council, will identify accomplishments as well as work to determine those management actions that need to be changed to better meet their stated targets. The targets themselves also may be analyzed to determine their validity if, for instance, they are too ambitious or unrealistic. The public may have opportunity to comment on the Sanctuary’s perception of its performance, ways in which the MBNMS could be more effective, and methods for improving performance measurement when evaluation is on the agenda at future Sanctuary Advisory Council meetings.

Activity 1.5: Collaboratively Evaluate the Action Plans in this Document

As the NMSP continues to increase the rigor of its internal evaluation process, MBNMS will begin to increase the frequency with which partners formally join with the MBNMS to assess 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. At the beginning of year three, it is envisioned that MBNMS staff will facilitate quarterly collaborative evaluation of a particular partner-specific strategy. A systematic rotation through the action plans will be completed every four years.

Table PE.1: Action Plan Performance Measure Summary

Action Plan	Outcome	Performance Measure
Coastal Development Issues		
Coastal Armoring	Reduce expansion of hard coastal armoring in the coastal areas near MBNMS through proactive regional planning, project tracking, and comprehensive permit analysis and compliance.	By 2012, complete three collaborative coastal erosion response plans for the planning sub-regions of the MBNMS.
Desalination	Minimize entrainment, concentrated discharges and impacts to the seabed from desalination facility construction and operation.	100% of new desalination plants permitted in the MBNMS have been reviewed in a coordinated regional approach and constructed consistent with MBNMS siting guidelines and environmental standards for intakes and outfalls.

Action Plan	Outcome	Performance Measure
Harbors and Dredge Disposal	Increase interagency coordination to ensure protection of MBNMS resources while allowing harbors to remain open for navigation.	By 2012, permits will be authorized for the same duration among the EPA, CCC, ACOE, and MBNMS, where appropriate.
Submerged Cables	Minimize impacts to MBNMS seafloor and habitats from installation, maintenance and removal of submerged cables.	1) By 2010, complete mapping of best available data on sensitive areas to avoid for cable routes 2) By 2012, identify standard interagency list of permit conditions to minimize disturbance of sensitive habitats.
Ecosystem Protection Issues		
Big Sur Coastal Ecosystem Coordination	Protect the Big Sur coastal ecosystem through increased agency coordination and public involvement to address resource protection issues in the coastal watersheds and nearshore marine environment.	By 2007, complete and implement a landslide disposal policy for the Big Sur Coast.
Bottom Trawling Effects on Benthic Habitats	Maintain the natural biological communities and ecological processes in the MBNMS and evaluate and minimize impacts of bottom trawling in benthic habitats.	By 2012, spatial identification of 100% vulnerable areas in the MBNMS and identification of protective measures under a range of potential authorities.
Davidson Seamount	Protect the Davidson Seamount from potential threats while increasing understanding of the seamount through characterization, public education efforts and ecological process studies.	1) By 2012, the Davidson Seamount is adequately characterized. 2) Develop educational and outreach opportunities about the Seamount at visitor centers by 2012, and a series of media based products related to its incorporation into the MBNMS by 2008.
Emerging Issues	Address emerging resource issues per process outlined in issue identification, tracking, and response system	By 2012, develop and implement a system to identify, track and appropriately respond to emerging issues that threaten the resources and qualities of the MBNMS.
Introduced Species	Prevent new introduced species from becoming established as well as detect, control and eradicate harmful introduced species that are already be introduced to the MBNMS.	By 2012, develop and implement action plans to address four key known pathways to prevent introduction of non-native species.

Action Plan	Outcome	Performance Measure
Marine Protected Areas	Collaborate with regional stakeholders and agencies in the consideration and possible designation of marine protected areas to ensure the protection of natural biological communities and habitats.	1) By 2009, complete an evaluation of the utility of and alternative location and network designs for MPAs within the MBNMS. 2) If MPAs are found to be appropriate for meeting Sanctuary mandates, by 2009, MBNMS will obtain 100% of the information required for an adequate NEPA alternatives analysis and initiate designation.
SIMoN	Provide ecosystem-wide monitoring program within MBNMS to determine human induced and natural changes and to disseminate information to public and agencies.	By 2010, adequately characterize 100% of MBNMS habitats and species in a web-enabled database with identified monitoring system for each habitat type.
Operations and Administration		
Operations and Administration	Effectively administer and operate the programs necessary to understand, protect, and educate the public about the resources and qualities of the MBNMS.	1) By 2010, increase by 30% the number of volunteer hours dedicated to MBNMS public awareness, ecosystem monitoring and resource protection activities. 2) By 2010, the MBNMS Sanctuary Advisory Council will provide significant input on at least 12 priority issues per year. 3) By 2008, R/V Fulmar is staffed and operated to adequately support safe and effective boat operations.
Performance Evaluation	Provide a clear mechanism to evaluate progress in implementing the MBNMS management plan, and present a set of performance targets that demonstrate progress towards desired outcomes for each action plan.	One annual report will be developed each year to report the MBNMS progress in achieving the specified targets.
Partnerships and Opportunities		
Fishing Related Research and Education	Increase public awareness about fishing issues in the MBNMS and involve fishermen in research activities to add to the body of research available for fishery related decision-making processes.	By 2010, increase Fishermen in Classroom program to provide outreach to 300 students each year.

Monterey Bay National Marine Sanctuary – Final Management Plan
 Section IV – Operations and Administration: Performance Evaluation Action Plan

Action Plan	Outcome	Performance Measure
Interpretive Facilities	Provide a critical vehicle for interaction and developing a sense of stewardship with the constituent base by developing facilities for education, research and outreach.	Construct and operate one major interpretive facility by 2010 and two minor interpretive facilities by 2008.
Ocean Literacy and Constituent Building	Increase our diverse communities' understanding of ocean related threats within the MBNMS and affect change in individual behavior.	1) Increase MBNMS outreach programming efforts to reach 15,000 individuals in 2009 to 50,000 individuals in 2012. 2) By 2012, increase participation of culturally diverse individuals in MBNMS programming by 50%.
Water Quality Issues		
Beach Closures and Contamination	Reduce beach closures and postings by reducing anthropogenic microbial contamination in MBNMS waters.	By 2012, eliminate beach closures and reduce the number of beach warnings by 50% due to anthropogenic microbial contamination in the MBNMS.
Cruise Ship Discharges	Prevent impacts to MBNMS resources from cruise ship discharges through enforcement of regulations and outreach to the cruise ship industries.	No discharges from cruise ships in the MBNMS by 2012.
Water Quality Protection Program	Prevent impacts to MBNMS resources and qualities from point and nonpoint source pollution resulting from urban, rural and agricultural runoff.	1) Increase acreage of agricultural lands with improved water quality management practices from 77,500 acres in 2005 to 150,000 acres by 2012. 2) Reduce the concentrations of urban water quality contaminants by 50% by 2012.
Wildlife Disturbance Issues		
Marine Mammal, Seabird, and Turtle Disturbance	Reduce wildlife disturbance by strengthening and expanding the Team OCEAN education and enforcement efforts.	By 2012, reduce by 50% the number of incidents of disturbance observed by Team OCEAN education program.
Motorized Personal Watercraft	Minimize disturbance of marine wildlife by MPWCs, minimize user conflicts and provide opportunities for MPWC use within the Sanctuary through education and enforcement of MPWC zones.	By 2012, no observed disturbance of wildlife as a result of MPWC operation.
Tidepool Protection	Increase understanding of impacts to rocky intertidal areas and protect the habitat and resources from impacts associated with visitation, pollution, harvest, or development.	Develop and implement education and enforcement programs at five most "at risk" tidepool locations by 2012.

Cross-cutting Issues		
Administration and Operations	Improved communication and coordination among sanctuary staff resulting in more integrated and coordinated resource protection for sanctuary resources.	Increase the number of cross-cutting AOP activities that each site includes in their site-specific AOP by 10% each year.
Community Outreach	Expand joint education and outreach efforts in a manner that enhances protection for sanctuary resources and the delivery of programs and services to local communities.	Increase the number of joint education and outreach efforts directed at communities from 1000 individuals in Year 1 to 5000 individuals in Year 5.
Ecosystem Monitoring	Increased collaboration among the three sanctuaries in planning, developing and implementing short- and long-term research and monitoring activities that enhance our understanding of the ecosystem(s) in this region and those natural and human factors affecting them.	1) Increase the number of cooperative research and monitoring activities from 2 in Year 1 to 6 in Year 5. 2) Extend the geographic range of SIMoN to include Cordell Bank and Gulf of the Farallones and expand its infrastructure so that it can be integrated with other coastal and ocean observation systems along the West Coast by Year 5.
Maritime Heritage	Establish a joint maritime heritage program that identifies and assesses known shipwrecks; protects sites from unauthorized disturbance; develops heritage partnerships and education programs.	By Year 5, the Maritime Heritage program will identify and list all known heritage resources in these three sanctuaries in a digital resource and, identify shipwrecks that could pose environmental threats. When appropriate, develop plans to protect these resources from threats and provide public outreach and education.
Northern Management Area Transition	Transfer management responsibilities in the NMA from MBNMS to GFNMS in a manner that enhances protection for sanctuary resources and the delivery of programs and services to local communities.	1) By Year 5, 100% of the resource protection, education and research activities identified in this plan are fully implemented. 2) Increase the number of education and outreach programming efforts directed at communities in the NMA from 1000 individuals in Year 1 to 5000 individuals in Year 5

Table PE.2: Measuring Performance of Performance Evaluation

Desired Outcome(s) For This Action Plan:	
Provide a clear mechanism to evaluate progress in implementing the MBNMS management plan, and present a set of performance targets that demonstrate progress towards desired outcomes for each action plan.	
Performance Measure	Explanation
One annual report will be developed each year to report the MBNMS progress in achieving the specified targets.	Successful implementation of this action plan will result in annual reporting of performance of each action plan in this management plan. Performance will be measured by evaluating the number of action plans evaluated, the development of the report and distribution of the report to the public and the NMSP.

Table PE.3: Estimated Timelines for the Performance Evaluation Action Plan

Davidson Seamount Action Plan	YR 1	YR 2	YR 3	YR 4	YR 5
Strategy PE-1: Measure Sanctuary Performance Over Time	●—————▶				
Legend					
Year Beginning/Ending	: ●————●		Major Level of Implementation: _____		
Ongoing Strategy	: ●————▶		Minor Level of Implementation:		

Table PE.4: Estimated Costs for the Performance Evaluation Action Plan

Strategy	Estimated Annual Cost (in thousands)*				
	YR 1	YR 2	YR 3	YR 4	YR 5
Strategy PE-1: Measure Sanctuary Performance Over Time	\$4	\$4	\$4	\$4	\$4
Total Estimated Annual Cost	\$4	\$4	\$4	\$4	\$4

* Cost estimates are for both “programmatic” and “base” (salaries and overhead) expenses.



Section V

Partnerships and Opportunities

- **Fishing Related Education and Research Action Plan**
- **Interpretive Facilities Action Plan**
- **Ocean Literacy & Constituent Building Action Plan**

Fishing Related Education and Research Action Plan

Goal

Educate the public about fishing issues in the MBNMS and involve fishermen in research activities to add to the body of research available for resource management decisions.

Introduction

There is a need to increase the public’s understanding of fishes and invertebrates, their role in the ecosystem, the various fishing activities that occur in the MBNMS and how they are managed. This action plan provides strategies to expand the knowledge base of the public about fishery management in the MBNMS and increase public education about sustainable fisheries. There has traditionally been a lack of fishermen involvement in research activities related to fish and invertebrate populations in the MBNMS. This action plan addresses that issue by increasing their involvement and providing a mechanism to bring their knowledge and data into the pool of information used in resource management and decision making.

The commercial and recreational fishing industry constitutes a key component to the economic, historical, and cultural fabric of the region. More than 1,200 commercial fishing vessels operate in the region annually, along with substantial recreational fishing. More than 200 species of invertebrates and fishes were caught in the commercial and recreational fisheries in this region from 1981-2000, with more than 70 percent of the commercial fish landings composed of market squid, Pacific sardine, rockfishes, Dover sole, northern anchovy, Chinook salmon, mackerel, albacore, and sablefish.

Current involvement of the MBNMS in issues related to fishing includes conducting fisheries-related research, sponsoring educational events, commenting to other agencies on fishery and ecosystem management issues and the development of ecosystem protection plans related to fishing. The MBNMS has also continued its active role in the protection of the salmon and steelhead populations of the region through preservation of the watershed habitat and water quality that sustain these species during their migration and spawning activities. This includes watershed management and outreach activities with the agricultural community, cities and counties, education of the public about salmonid life cycles and habitat threats, and citizen monitoring of water quality in streams and rivers.

Strategy FER-1: Educate About Fisheries Management

Different organizations such as the California Department of Fish and Game (CDFG), National Marine Fisheries Service (NMFS), Pacific Fishery Management Council (PFMC), and National Marine Sanctuary Program (NMSP) have different responsibilities regarding fishing. Sometimes they overlap, while providing different protections. This can lead to confusion among the public regarding the role of the MBNMS in fisheries issues, regulations, and mandates. The role of the MBNMS is to protect sanctuary resources using an ecosystem approach while facilitating uses compatible with the primary goal of resource protection. This strategy will help to clarify the role of the MBNMS in fisheries issues by creating outreach materials for the public outlining the roles, responsibilities, regulations, and mandates of the MBNMS and the National Marine

Sanctuary Program, and how the MBNMS's role compares to fisheries management agencies and non-governmental organizations.

Activity 1.1: Develop Information Identifying MBNMS's Role in Fishery Issues

The MBNMS will develop necessary information identifying the NMSP's and MBNMS's roles and responsibilities related to fishing activities, fishing regulation, and the management of fisheries in the MBNMS. The MBNMS will produce outreach materials including written products and a web page to provide more information on the roles and responsibilities of the MBNMS in fishing issues. As the first step in embarking on this campaign, the target audience(s) needs to be identified (e.g., MBNMS visitors, non-visitors, local residents, families, or school children). The MBNMS may also conduct forums or other events to increase awareness of MBNMS responsibilities.

Strategy FER-2: Enhance Stakeholder and Public Communication

Historically, communication between fishermen and fishery managers has often been inconsistent and sometimes lacking, but certain individuals have maintained good working relationships for decades. The MBNMS and fishing community would like to improve the communication between these groups in an effort to educate the public about fishing issues, and partner in research activities to better understand fishery resources in the MBNMS and provide a better understanding of the relationship between fishing issues and resource protection. Beginning in 2001, the MBNMS began working collaboratively with the Alliance of Communities for Sustainable Fisheries (Alliance) to evaluate the potential benefits and drawbacks of using marine protected areas to facilitate ecosystem conservation and sustainable fisheries. The Alliance is a self-formed group consisting of representatives of fishermen from most gear types from the main harbors around the MBNMS, and harbor office representatives.

Activity 2.1: Continue to Meet with Fishermen, Incorporate them into Relevant Committees and the Sanctuary Advisory Council (SAC)

The MBNMS currently has a recreational fishing seat and commercial fishing seat on the SAC. Members of the Alliance and other commercial and recreational fishing representatives should continue to be included in fishing related workgroups (Marine Protected Area [MPA] workgroup) or events, and MBNMS staff should assist fishermen in gathering or presenting information as needed. The MPA workgroup, which includes fishermen, scientists, and environmental organizations, is attempting to develop solutions that can protect MBNMS resources while sustaining the region's critical fishing industry.

Activity 2.2: Conduct Outreach to Fishermen to Increase Awareness of MBNMS's Roles, Responsibilities and Goals in Ecosystem Protection.

MBNMS will increase efforts to communicate to fishermen the responsibilities and goals of the MBNMS in protecting the ecosystem. Essential components of the outreach regarding ecosystem protection include the mandates set forth in the National Marine Sanctuaries Act (NMSA), the goals and objectives of the MBNMS management plan, and processes of coordination between MBNMS and fishery management agencies.

Activity 2.3: Develop a Communication Plan Between Parties Interested in Education and Research Issues Related to Fishing in the MBNMS

The MBNMS will develop a plan to identify the channels, methods and messages necessary for communicating with fishermen, California Department of Fish and Game, National Marine Fisheries Service, Pacific Fishery Management Council, and others regarding actions taken by the MBNMS to protect the ecosystem that may affect fishing activities.

Activity 2.4: Investigate Partnership with the Fishermen’s Collaborative Research Programs (e.g., San Luis Obispo Marine Interests Group, Pacific Marine Conservation Council’s (PMCC) West Coast-Wide Program)

The MBNMS should investigate a partnership with collaborative research programs to identify an MBNMS specific research project that fulfills research needs and uses fishermen’s assets. The goal would be to identify research priorities, find funding, and improve communication and trust between fishermen, scientists, and fishery managers.

Activity 2.5: Develop a Series of Meetings Outlining Projects with Science Needs Using Fishermen’s Skills and Assets

The MBNMS will investigate existing cooperative research programs, inform the regional community about existing programs, and provide an opportunity for fishermen to help design fisheries related research projects. The MBNMS will work with PMCC, fishermen, scientists, and resource managers to identify projects that will involve fishermen in collection of information, add to the body of knowledge of fisheries, and aid decision makers’ fishing related actions. Particular attention needs to be given to coordinating research within the MBNMS with that which is being conducted elsewhere on stock that are found beyond the Sanctuary boundaries and managed on a regional or coastwide basis.

Activity 2.6: Facilitate Public Forums and Development of Educational Materials for the General Public and Interested Parties to Understand Local Fisheries, Fish Populations and Habitats, and the Role of the MBNMS in Protecting the Ecosystem

The MBNMS will include fishermen, scientists, environmental representatives, and managers as speakers at public forums to educate the public and each other on the historical and current status, health, and practices of fisheries, fish populations, and habitats. The role of ecosystem protection by the Sanctuary in these habitats and populations will be included. This should include basic educational materials for the public.

Strategy FER-3: Facilitate Sustainable Fisheries Definition and Promotion

Fisheries resource management agencies make management decisions with the best available data, which is often limited. The fishing community within the MBNMS would like to know what information is needed to manage fisheries effectively and in a sustainable manner, what information is actually available, what data are used and how data-limited status translates into fishery regulations, and what types of data are lacking. In addition, they would like to know the causes of related discrepancies. Some fishermen would like to participate in programs to collect data for fisheries management (e.g., observer and monitoring data). The public and fishing community would like more information to be disseminated on sustainable fisheries and practices. Information dissemination should include defining and identifying sustainable fisheries, identifying sustainable fishing techniques, and identifying the pros and cons of

aquaculture. Audiences should include the public, consumers, markets, suppliers, and fishermen. In addition, the facilitation of research on sustainable fisheries and how to minimize fishing impacts should be investigated.

Activity 3.1: Promote Biological and Socioeconomic Research on Sustainability

The MBNMS will work with partners to promote increased research on identifying and creating sustainable fisheries. The MBNMS will work with scientists, the fishing community, resource managers, and non-governmental organizations to develop collaborative research projects aimed at sustainable fisheries definition.

Activity 3.2: Work with Partners to Identify, Promote, and Certify Healthy Fisheries in the MBNMS

The MBNMS should work with NOAA Fisheries and other partners to explore and implement various outreach methods to existing and potential programs that promote healthy fisheries or healthy seafood choices. Various methods of outreach could include symposia, workshops, or “Fishing Day for Families.”

Activity 3.3: Increase Outreach and Awareness of How Sustainability is Assessed

MBNMS will conduct outreach efforts to fishermen and the public regarding sustainable fishing practices. After determining the target audiences, outreach should help the public understand how stock size is estimated and determined sustainable, the costs and economics of fishing and not fishing sustainably, as well as understanding the sustainability of an ecosystem. The MBNMS should consider supporting or participating in events at a “Sustainable Fishing Festival.”

Strategy FER-4: Involve Fishermen in Education and Outreach Programs

The fishing community possesses a wealth of historical fishery and at-sea knowledge that should be shared to create educational programs and products to better characterize the fishery resources, and historical and current user groups. Developing education programs and products on fishing issues should also involve other interested parties to achieve the educational goals and strategies outlined in this action plan. The MBNMS will provide the opportunity for the fishing community and other interested parties to review and comment on documents used for educating the public about fisheries. The MBNMS Advisory Council and Working Groups will also be instrumental in implementation of this strategy.

Activity 4.1: Evaluate Existing Outreach Efforts at a Sanctuary Education Panel (SEP) Meeting and Include Input from Fishermen and Other Interested Parties

The SEP currently meets to review program proposals, advise on educational priorities, and assist in implementation of programs to increase understanding and stewardship of the MBNMS. A SEP meeting should be dedicated to the evaluation of the progress of existing outreach efforts that address fishing, fish populations, and issues related to fish habitat. Input from fishermen and other interested parties should be solicited and considered.

Activity 4.2: Develop and Implement Interpretive Signage of Local Fishing Activities at Harbors

The MBNMS is currently planning interpretive signage at MBNMS harbors to describe maritime history and/or site-specific fishing activities (e.g., target species, vessel types, gear types). This activity should build upon the existing MBNMS effort.

Activity 4.3: Create Fishing Related Exhibits at MBNMS Visitor Center

The MBNMS is currently involved in developing a Visitor Center in Santa Cruz and creating other smaller interpretative exhibits. The Visitor Center and/or other exhibit space should include an exhibit highlighting fishing activities, information on fish populations, and current threats in the MBNMS. The fishing community will be invited to be involved in the planning and development of the exhibit(s).

Activity 4.4: Develop and Implement Education Program for K-12, “Mariners in the Classroom”

Educating the public often starts with children, who then teach their parents. “Mariners in the Classroom,” is an education program for grades K-12, featuring fishermen in the classroom. Fishermen, fisheries scientists, or academics visit classrooms and present topics such as fishing techniques, natural history, biology, fisheries science, social science, and economics. Fishermen are compensated for their travel and time spent in the classroom. In addition, these visits often occur off-season. The MBNMS is exploring the implementation of a similar local program.

Strategy FER-5: Collect and Distribute Fisheries and Habitat Related Data

The general public and fishing community would like more information about the health and trends of fishery populations, fish populations, and habitats in the MBNMS. Information collection and dissemination should address biodiversity, stock abundance, landings, habitats climatic and oceanographic cycles, and anthropogenic inputs. Collaborative research among fishermen, researchers, and other stakeholders is currently taking place on the east and west coasts of the United States. This type of collaborative effort is for those who wish to work together and better understand the fisheries and their role in marine ecosystems. Such a collaborative effort provides an opportunity for involved parties to add to the body of research available for fishery-related and marine ecosystem decision-making processes.

Activity 5.1: Coordinate with Fishery Management Agencies in Developing a Recurring Workshop Series with Interested Parties to Determine Existing Data, Efforts, Gaps, Overlap, and Develop a Coordinated Plan for Collection and Distribution of Marine Ecosystem and Fisheries Relevant Data

Note: Since the PFMC already sponsors a considerable amount of work in this area; there is a strong possibility that adding to the existing process would be redundant, or a waste of time and resources. Consequently, the first step should be for the MBNMS to participate in the existing process, and then determine the advisability or need for coordinating additional activities.

Activity 5.2: Consider Input from Fishermen and other Stakeholders in the Development, Synthesis, Collection, and Analyses of Data When Participating in Cooperative Fisheries Research

Activity 5.3: Include Fisheries Relevant Data in the Sanctuary Integrated Monitoring Network (SIMoN) Metadata Files and Website

Strategy FER-6: Collect and Distribute Socioeconomic, Cultural, and Historical Data

The commercial and recreational fishing industry constitutes a key component to the economic, historical, and cultural fabric of the region. There is a need to better understand fisheries as they relate to prehistory, maritime history, and present day socioeconomics, and to better educate the public about the fishing community. This activity will be conducted in close coordination with implementation of similar actions in the Maritime Heritage Action Plan.

Activity 6.1: Gather Oral Histories and Photographs of Fisheries and their Cultural Evolution (Past and Present) in the MBNMS

The MBNMS will work with the Monterey History & Art Association/Maritime Museum of Monterey to facilitate fishery related socioeconomic, cultural, and historical data collection and distribution of outreach materials. Implementation will also include a joint internship program between the Maritime Museum and MBNMS to assist in the collection and distribution.

Activity 6.2: Support and Develop Closer Involvement with the J.B. Phillips Historic Fisheries Symposium

The J.B. Phillips Historic Fisheries symposium hosted by the Monterey History & Art Association/Maritime Museum of Monterey brings together scientists, fishermen, historians, sociologists and fish market owners. Goals and objectives of the symposium and report are to (1) introduce the public to the history and science of the fisheries in Monterey Bay; (2) raise public awareness about the historic, economic, and political importance of the fisheries in Monterey Bay; and (3) give the public an opportunity to discuss these issues with scientists, policy makers, historians, and fishermen in a non-academic framework. Supporting and closely participating in the annual symposium may create a larger awareness of the local, historical fisheries.

Activity 6.3: Generate Cultural Profile and History of the Bottom Trawling Industry

Trawling is one of the oldest fisheries in the rich fishing culture of central California. However, the number of trawlers operating in the region has decreased over the years as increasingly restrictive laws and regulations and declining stocks have forced some out of business while discouraging others from entering the fishery. The MBNMS will create a cultural and historical report profiling trawling in recognition of the region's fishing tradition and to preserve the history of the fishery. This activity will support and be conducted in coordination with implementation of the Impacts of Bottom Trawling to Benthic Habitats Action Plan.

Strategy FER-7: Conduct Public Outreach on Links Between Healthy Ecosystems and Fish Populations

Decreasing trends in fish populations are not always solely attributed to fishing pressure. Many aspects contribute to ecosystem health, stock size, and a healthy fishery. There is a need to increase public awareness about various impacts to ecosystems including fishing, pollution, climate change, the role of estuaries as nursery grounds for some marine species, and watershed health.

Activity 7.1: Consider Development of a Symposium to Focus on Coastal Water Quality Issues and the Influence of Water Quality on Healthy Fisheries

Activity 7.2: Facilitate an Assessment of What Is Known about the Links Between Ecosystems and Fisheries

MBNMS will work with partners to facilitate a report or literature review on the link between fisheries and healthy ecosystems. The report should identify all threats to MBNMS resources and discuss ecosystem changes associated with regime shifts, impacts associated with agriculture and water quality and the health of wetlands and local river systems as it relates to salmonid and other fish populations.

Activity 7.3: Add Information Regarding Various Components of Ecosystem to Interpretive Signage on Wharfs

MBNMS will develop interpretive materials that identify the importance of a healthy ecosystem to healthy fisheries.

Activity 7.4: Conduct Outreach to Target Audiences

MBNMS will use the information collected from Activity 7.1 and 7.2 and incorporate the information into ecosystem health discussions targeted at schools, adults, ocean and beach user groups, and others with appropriate connections with the Water Quality Protection Program (WQPP).

Action Plan Partners: Fisheries management agencies (e.g., California Department of Fish and Game, National Marine Fisheries Service, Pacific Fishery Management Council), Fishing organizations (e.g., Alliance), individual fishermen, scientists, educators, Pacific Marine Conservation Council, Monterey History & Art Association/Maritime Museum of Monterey, academic institutions, Ocean Conservancy, Institute for Fisheries Resources, World Wildlife Fund (WWF's Community-Based Certification Program), Marine Stewardship Council, Monterey Bay Aquarium, Seafood Choice Alliance, California State Parks, Colleges/Universities with maritime concentrations, NGOs, UC Sea Grant

Table FER 1: Measuring Performance of the Fishing Related Education and Research Action Plan

Desired Outcome(s) For This Action Plan:	
Increase public awareness about fishing issues in the MBNMS and involve fishermen in research activities to add to the body of research available for fishery related decision-making processes.	
Performance Measures	Explanation
By 2010, increase Fishermen in Classroom program to provide outreach to 300 students each year.	Performance can be measured by tracking the number of students included in the Fisherman in Classroom program each year.

Table FER 2: Estimated Timelines for the Fishing Related Education and Research Action Plan

Fishing Related Education and Research Action Plan	YR 1	YR 2	YR 3	YR 4	YR 5
Strategy FER-1: Educate About Fisheries Management	●.....●.....●.....▶				
Strategy FER-2: Enhance Stakeholder and Public Communication	●.....●.....●.....▶				
Strategy FER-3: Facilitate Sustainable Fisheries Definition and Promotion		●.....●			
Strategy FER-4: Involve Fishermen in Education and Outreach Programs	●.....▶				
Strategy FER-5: Collect and Distribute Fisheries and Habitat Related Data	●.....●.....▶				
Strategy FER-6: Collect and Distribute Socioeconomic, Cultural, and Historical Data	●.....●.....▶				
Strategy FER-7: Conduct Public Outreach on Links Between Healthy Ecosystems and Fish Populations	●.....●.....●.....▶				
Legend					
Year Beginning/Ending	: ●.....●	Major Level of Implementation: _____			
Ongoing Strategy	: ●.....▶	Minor Level of Implementation:			

Table FER 3: Estimated Costs for the Fishing Related Education and Research Action Plan

Strategy	Estimated Annual Cost (in thousands)*				
	YR 1	YR 2	YR 3	YR 4	YR 5
Strategy FER-1: Educate About Fisheries Management	\$54.5	\$0	\$0	\$0	\$0
Strategy FER-2: Enhance Stakeholder and Public Communication	\$78.5	\$42.5	\$42.5	\$42.5	\$42.5
Strategy FER-3: Facilitate Sustainable Fisheries Definition and Promotion	\$20	\$20	\$29	\$25	\$20
Strategy FER-4: Involve Fishermen in Education and Outreach Programs	\$22	\$44	\$14	\$10	\$6
Strategy FER-5: Collect and Distribute Fisheries and Habitat Related Data	\$40	\$135	\$135	\$135	\$103
Strategy FER-6: Collect and Distribute Socioeconomic, Cultural, and Historical Data	\$8	\$8	\$112	\$12	\$12
Strategy FER-7: Conduct Public Outreach on Links Between Healthy Ecosystems and Fish Populations	\$0	\$0	\$101	\$26	\$9
Total Estimated Annual Cost	\$223	\$249.5	\$433.5	\$250.5	\$192.5

* Cost estimates are for both “programmatic” and “base” (salaries and overhead) expenses.

Interpretive Facilities Action Plan

Goal

Guide development of the MBNMS centers and signage while exploring new opportunities for reaching constituents.

Introduction

An important issue facing the MBNMS is the lack of awareness of resource issues and threats to our local oceans. Facilities for education, research, and outreach provide a critical vehicle for interaction and developing a sense of stewardship with the constituent base of the MBNMS. The MBNMS must strive to increase interpretation of ocean resources through interpretive centers and other means.



Figure IF-1: Interpretive signage at Point Pinos tidepools.

Currently, only one small visitor center exists within MBNMS boundaries specifically interpreting the MBNMS, the National Marine Sanctuary Program (NMSP), or the natural and cultural resources found therein. However, limited information and small exhibits are located in several State Parks and private visitor centers, including the Monterey Bay Aquarium (MBA). There is a three-sided interpretive kiosk (with audio) installed on the Municipal Wharf in Santa Cruz, interpreting the MBNMS, kelp forests and wildlife. The MBNMS currently has fifty-one general interpretive signs along the MBNMS shoreline located at strategic State Beaches, Parks and a variety of municipalities, extending from Pillar Point Harbor in Half Moon Bay, San Mateo County, south to Cambria, San Luis Obispo County. More recently, the MBNMS has focused on resource issue signage. Due to increased visitation and harvesting, there are a series of signs specific to tide pool resources and etiquette in Pacific Grove, the central region of the MBNMS, designed to reduce the threat of human impacts at locations where there is high public visitation. The MBNMS has also partnered with Friends of the Elephant Seal (FES) in the southern region to develop and install extensive interpretive signage at a highly visited turnout.

In conjunction with the resource protection plans related to water quality, harbor issue signs at Monterey and Moss Landing harbor boat launches that discuss discharge, pollution, and prevention have been installed along with oily bilge and sewage pump station signs. Regulatory signs for motorized personal watercraft (MPWCs) are posted at all four harbors. As of June 2003, two Internet Weather Kiosk interactive turnkey units were installed at the Monterey and Pillar Point Harbors at the harbormasters' offices. These have glass touch screens that are connected to the Internet to access up to date weather, sea state, surface temperature, and a variety of other links. These were piloted and updated with input from harbor users during the summer and fall of 2003.

Strategy IF-1: Construct and Operate Visitor Center

An interpretive center was identified in the original 1992 MBNMS Management Plan. The need is ever greater now to help raise public awareness of ocean issues, promote environmental stewardship, foster community support, and give the Sanctuary a more tangible presence. Visitor Centers can provide opportunities for more in-depth interpretation and exploration of MBNMS resources than coastal signage or publications. The 2001 Market Analysis and Interpretive Strategy for the NOAA National Marine Sanctuary System includes Visitor Centers as an interpretive medium that can effectively deliver clear messages to a diverse audience. The 2000 National Marine Sanctuary System Education Plan includes a goal of developing a network of interpretive facilities to heighten visitors' experiences and convey Sanctuary messages.

The MBNMS has an extensive coastline and could benefit from having a string of marine-themed, interpretive Visitor Centers to reach visitors equally in the northern, central, and southern portions of the coastline. Realistically, it will not be financially feasible to outfit and operate more than one large Visitor Center. The long-term vision, supported by numerous public scoping comments, is therefore to open one large Center and up to three smaller, regional interpretive facilities. One location exists at the William Randolph Hearst Memorial Park/State Beach in San Simeon – the Coastal Discovery Center. A second location at Pigeon Point Lighthouse in San Mateo County has been identified as a potential site for a small “storefront” exhibit center.

In the City of Santa Cruz, the MBNMS envisions an interactive Visitor Center highlighting the MBNMS's extraordinary natural and cultural resources, the National Marine Sanctuary System and other NOAA programs, and the vital role citizens play as ocean stewards. Anticipated audiences include local residents, tourists, and school groups on field trips. Exhibits will be interactive and multimedia, and will include the possibility of real-time ocean images, virtual sanctuary experiences, aquaria and a wet touch tank. Many exhibits will be bilingual in English and Spanish. A secondary function of the facility is to be an orientation or “Welcome” Center to provide visitor information on the variety of nearby opportunities to experience the MBNMS or learn about the ocean.

MBNMS envisions a facility in the range of 10,000-12,000 square feet. The Visitor Center should blend well with the surrounding environment and utilize the best “green” technologies. Ideally, the Visitor Center will include exhibit and welcome space, a multimedia teaching lab/classroom, a public meeting room, a small bookstore, and ample support space including staff offices, storage areas, and restrooms. All public areas of the facility must meet ADA standards.

Activity 1.1: Develop Interpretation and Exhibit Plan for the Visitor Center

For the Santa Cruz Visitor Center site, the MBNMS will develop a comprehensive interpretation plan elaborating on the Center's intended mission, goals, audiences, interpretive themes and messages. The focus of the Center will be interpretation of the MBNMS, the NMSP, and all of the West Coast Sanctuaries. The Center will be designed to be a stand-alone educational experience, but will also include information referring visitors to complementary Sanctuary-related experiences, facilities, and marine education opportunities. As part of this activity, the MBNMS will:

- A. Explore how other NOAA education facilities have provided for community involvement, and will consider establishing an advisory group for community participation in the Visitor Center planning process. Activities 1.2 and 1.3 should occur concurrently so they are well coordinated, synergistic, and ensure the best possible match between the facilities and the interpretation.
- B. Develop the interpretive themes and messages, to include messages representative of the MBNMS and the NMSP.
- C. Identify potential visitor and school/youth group programming for the Center.
- D. Work with a contracted exhibit designer to develop specific exhibits for communicating the themes and messages, to include hands-on activities and multimedia displays.
- E. Identify the regional interpretive opportunities and experiences to which visitors can be referred for further learning.

Activity 1.2: Develop Visitor Center Facilities and Operations Plan

For the Santa Cruz Visitor Center site, the MBNMS will develop a comprehensive facilities plan, elaborating on the Center’s environmental, architectural, and financial requirements. The Center should blend well with the surrounding environment and utilize the best “green” technologies. Activities 1.1 and 1.2 should occur concurrently so they are well coordinated, synergistic, and ensure the best possible match between the facilities and the interpretation.

- A. Review the preliminary geologic assessment provided by the initial feasibility study and conduct further site-specific geotechnical studies, as necessary.
- B. Review sample architectural plans and work with a contracted architect to finalize external (if appropriate) and internal building designs and blueprints.
- C. Develop a maintenance plan and schedule.
- D. Refine rough estimates of capital cost and operating cost provided in the initial feasibility study.
- E. Work with NMSP headquarters staff to initiate the necessary procedures and process for building construction, if needed.
- F. Work with contracted experts to assess the need for and complete the appropriate environmental analyses, e.g., the National Environmental Policy Act (NEPA) or California Environmental Quality Act (CEQA) requirements.
- G. Apply for and obtain the necessary permits.

Activity 1.3: Develop Visitor Center Business Plan and Implement Fundraising Strategies

While some federal construction funds may become available from NMSP appropriations, it is anticipated federal funds will not cover all of the Santa Cruz Visitor Center’s capital costs. Significant fundraising from the public and private sectors will be needed to raise construction funds. A fundraising plan will be developed and implemented most likely with the assistance of the Monterey Bay Sanctuary Foundation (MBSF) and potentially the National Marine Sanctuary Foundation.

- A. Develop a successful business plan including the following elements: a market analysis, an operations plan, a staffing/management plan, a marketing plan, and a financial plan.
- B. Identify local community members who can provide fundraising guidance, and consider establishing a capital campaign committee to assist with efforts.
- C. Identify potential funding sources in both the private and public sectors.
- D. Identify a range of sponsorship opportunities that potential funders can support.
- E. Utilize the interpretation plan and the facilities plan to demonstrate and promote the feasibility of the chosen site as a successful and effective Sanctuary Exploration Center.
- F. Implement fundraising campaign.

Activity 1.4: Develop Visitor Center Education Plan

For the Santa Cruz Visitor Center site, the MBNMS will develop a comprehensive education plan, including programming for K-12 students, K-12 teachers and the public. This programming will be developed in alignment with multicultural pedagogy and may draw from existing MERITO education materials. The level of programming offered will be balanced by the financial realities of the Center.

- A. Utilize the SEP as an advisory board for the development, implementation and assessment of education programs for the MBNMS Visitor Center.
- B. Recruit, train, retain and motivate a dependable volunteer team, knowledgeable of the MBNMS program and resources, to support the Center’s education programs and to offset staffing costs.
- C. Develop an understanding of existing educational programs around Monterey Bay. Create MBNMS education programs for the Center to meet the needs of the community and the goals of the MBNMS while striving to complement existing programs.
- D. Develop standards-based K-12 programs reinforcing California state science standards, the National Science Education Standards, NOAA Science and the mission of the MBNMS.
- E. Develop professional development programs that empower K-12 teachers to integrate standards and resource-based marine science content and curriculum materials into their classrooms.
- F. Develop a suite of public programs designed to engage visitors of all audiences in resource-based issues.
- G. Ensure educational programs offered at the Visitor Center incorporate strategies, designs and materials to reach Hispanic audiences by utilizing the staff and strengths of the MERITO program.
- H. Develop assessment instruments for programs and evaluate program effectiveness. Redesign programs based on evaluation results, as needed.

Activity 1.5: Construct and Outfit Visitor Center

With advice from facilities experts at NMSP headquarters, follow all NOAA construction guidelines and procedures. All interpretive installations will be done in conjunction with NMSP contractors, MBNMS staff, NMSP staff, and partners.

Strategy IF-2: Develop Smaller Regional Interpretive Facilities

Activity 2.1: Complete Exhibits at San Simeon and Pigeon Point Facilities

Opportunities for in-depth Sanctuary interpretation to geographically diverse audiences will be expanded by the development of several small regional interpretive facilities, or “storefront” Visitor Centers. Two locations were identified at Pigeon Point Lighthouse, Santa Cruz District, California State Parks in San Mateo County, and in the San Luis Obispo Coast District, California State Parks in San Luis Obispo County. These smaller interpretive venues focus primarily on the unique resources (natural and cultural) of the regions in which they reside.

The Coastal Discovery Center at San Simeon Bay opened in July 2006. Its theme is “Connecting Land and Sea,” a theme that supports both sponsoring agencies, California State Parks and MBNMS. The facility is located in William R. Hearst State Park in San Simeon, the southern gateway to Big Sur. Trained docents staff the facility, which includes a live rainbow trout tank, video voyages to Davidson Seamount and a local shipwreck, and a talking tidepool sculpture. Public outreach and education programs are in development. The permanent exhibition at Pigeon Point Lighthouse in San Mateo County explores the rich cultural and maritime history of the lighthouse and its role in society over time. The exhibit opened in November 2007.

Activity 2.2: Develop Monterey Peninsula Regional Interpretive Facility

A smaller regional interpretive facility will be developed on the Monterey Peninsula after completion of the main Visitor Center in Santa Cruz. The MBNMS anticipates this will also highlight other NOAA Line offices located here – the National Marine Fisheries Service and the National Weather Service. This facility will complement other facilities around the Monterey Bay as well as other interpretive facilities operated by the MBNMS. The Monterey Peninsula facility will be closely integrated with the Sanctuary Scenic Trail, which extends from Davenport to Pacific Grove.

Strategy IF-3: Increase Sanctuary-Wide Interpretive Signage

With over 275 miles of coastline, and almost as many access points, the MBNMS has a wealth of opportunities to reach visitors visiting its shores. A comprehensive interpretive signage program, implemented with partners having land-based jurisdiction over the coastline, will provide one piece of the overall Interpretive Facilities Plan. These potential partners include California State Parks, US Forest Service, local counties, cities, and other land trust entities.

In its first ten years, MBNMS focused on general signage with the basic MBNMS message. Now the MBNMS needs to focus on individual, custom messages to maximize resource protection and personal enjoyment of the MBNMS, highlighting the features of each location. The messages on these signs will increase general awareness of the unique nature of the MBNMS and its resources, interpret the ecosystems, human links, management initiatives of the MBNMS, and encourage stewardship of the MBNMS. Specific messages for signage may be identified through other action plans such as the Marine Mammal, Seabird, and Turtle Disturbance; Motorized Personal Water Craft; Tidepools; and other resource protection related plans. In addition to interpretive signs, this strategy includes interpretive kiosks and weather station kiosks.

The MBNMS is also fortunate to be surrounded by jurisdictions and agencies interested in enhancing public education about the MBNMS and the inspiring natural and cultural resources it protects. Since 1992, several regional plans have been developed for scenic coastal trails envisioned not only as recreation and transportation corridors but also as interpretive pathways highlighting the MBNMS. These trails have been planned to feature interpretive signs and displays that foster appreciation and stewardship of the marine Sanctuary and its shoreline communities. The regional government entities or community groups leading the planning efforts approached the MBNMS to solicit staff involvement early in the trail planning processes.

Activity 3.1: Develop and Maintain a Signage Inventory

A comprehensive inventory of the existing network of signs that interpret various aspects of the marine environment along the coastline of the MBNMS is needed to determine the baseline for additional signage. This inventory will include MBNMS signage as well as signage efforts of other agencies and organizations based along the central California coast.

- A. Identify existing MBNMS signage, locations, type/materials used, and messages
- B. Identify existing marine interpretive signage established by other agencies/organizations, locations, type/materials, messages and responsible entities (potential partners)
- C. Create a matrix/map of current messages, locations, and partners

Activity 3.2: Develop an Implementation Plan for Signage

It is likely there will be some gaps in the placement of signs and/or interpretive messages along the coastline. Once new interpretive opportunities are identified, an implementation plan must be designed to determine the “when, where, who, how, and funding” for new signs. Since funding may be the main limiting factor, a tiered schedule for short-, medium-, and long-term projects will be incorporated, along with a periodic reassessment to determine if specific needs still exist. This must also include an assessment of the applicable environmental regulations, such as NEPA, CEQA, and other federal/state/local requirements. Finally, it must include a plan to maintain and upgrade signage to ensure that damage and weathering are addressed in a timely manner and that messages do not become obsolete.

- A. Work with partners to identify additional signage needs, including locations and messages identified in other action plans
- B. Assess the need for bilingual signage at specific locations based on user/visitor populations
- C. Prioritize the need for signage at each location using a multi-year horizon (short-, medium-, and long-term projects)
- D. Identify costs and create a project-specific budget based on the multi-year plan
- E. Assess environmental impacts based on the multi-year plan
- F. Develop a schedule for reassessing priorities, maintaining, and upgrading signs
- G. Work with partners on the installation of signs

Activity 3.3: Support MBNMS-Related Interpretive Trail Projects

The MBNMS recognizes the valuable contribution to public education and awareness that an integrated system of “sanctuary scenic trails” along the coastline could bring. Since these coastal trails provide additional interpretive opportunities, it is our policy to provide support to other agencies and organizations involved in coastal trail development when there is a formal commitment to Sanctuary-related interpretation along the trail. MBNMS support may be provided to these partners through staff time and/or financial contributions for trail planning or implementation, resources allowing. Interpretive trail projects currently underway or on the horizon include:

A. *Santa Cruz County Sanctuary Scenic Trail*

Since 1998 MBNMS staff have assisted with planning for this thirteen-mile urban trail originally envisioned by local governments in Santa Cruz, with heavy involvement in development of interpretive messages and content. MBNMS funded the production of eight interpretive displays, and will continue to provide staff time for thematic guidance and content development as the trail interpretation is fully implemented.

B. *Monterey Bay Sanctuary Scenic Trail*

MBNMS staff have participated in planning for this trail (which will include the Santa Cruz County Sanctuary Scenic Trail) since the project’s inception in 2001. Currently MBNMS is coordinating development of the trail’s interpretive plan. This long-term effort will ultimately result in a forty-five-mile continuous coastal trail between Santa Cruz and Monterey.

C. *Half Moon Bay Coastal Trail*

MBNMS is currently exploring partnerships to provide interpretive signage along this partially completed nine-mile trail.

D. *Moonstone State Beach Trail*

MBNMS and State Parks are currently developing a signage plan for a new one-mile walkway at Moonstone State Beach in Cambria.

Strategy IF-4: Increase Virtual Experiences

In addition to the millions of people who visit the MBNMS each year, many more would like to but cannot travel to the central California coast. The technology to educate and reach these potential visitors exists in the form of “virtual experiences.” These programs and products can be made available via the Internet, at Visitor Centers located far from the MBNMS, and as marketable products at museums and aquaria throughout the world. They can be made available in multiple languages and to those with auditory, visual or physical impairments. By combining live and pre-produced materials, a variety of informal learning environments can be created. These “virtual interpretive facilities” invite millions of people who may never come to Monterey to visit the MBNMS.

The NMSP considers telepresence to be an important outreach component for all National Marine Sanctuaries. MBNMS became a leader in telepresence technology in 2002 when images from a video camera installed in Monterey Bay were observed by visitors to the Immersion Theater in Mystic, Connecticut. The camera, attached to a tether, can be controlled by an

operator 3,000 miles away. Now, visitors to the Mystic Aquarium regularly observe bat stars on the Monterey Bay seafloor, watch sea lions on the breakwater, and observe a cormorant nesting site. Plans for the future include adding camera sites at Florida Keys, Channel Islands, and Thunder Bay National Marine Sanctuaries, so visitors to a single location have the opportunity to visit several marine Sanctuaries. The MBNMS will coordinate with other sanctuaries to provide a comprehensive message of conservation throughout the NMSP program, using educational themes consistent with the NMSP educational goals.

Three primary mechanisms have been identified to visit the MBNMS from a distance: (1) the MBNMS and SIMoN websites, (2) telepresence technology, and (3) videotapes and CD ROM's containing the best images and footage of MBNMS habitats and wildlife. Each of these methods is discussed in the following activities.

Activity 4.1: Expand Virtual Interpretive Opportunities on MBNMS Website

A variety of options already exist for off-site users to appreciate the MBNMS. The MBNMS's award-winning website offers myriad learning opportunities and resources. The website can be expanded further to add more virtual experiences including:

- A. Links to the numerous "Web cams" already in use throughout the MBNMS, including weather cams, critter cams, and surf cams.
- B. Links to partner programs and sites, including sensitive species programs and safe wildlife viewing guidelines.
- C. Development of a Web tour of certain highlighted areas in the MBNMS. Building on SIMoN interactive maps, visitors using the Web might be able to see and hear about the diversity of habitats and wildlife within MBNMS waters. The tour may include hard-to-reach areas such as the deep sea and open ocean. Informational and conservation messages would be included.

Activity 4.2: Expand Interpretive Opportunities Using Telepresence Technology

The term "telepresence" refers to the use of interactive technology, including live video cameras, operation of remote camera systems, robots, and underwater vehicles. Currently, images are transmitted using satellite and microwave technology coupled with Internet2 to distant locations. They provide opportunities for verbal, video or robotic interaction between the camera site and the visitor site. Visitors to telepresence sites may be able to ask questions of researchers, operate an underwater camera along a tether, explore a shipwreck, and observe marine organisms in their natural environment. Telepresence allows "real-time" interaction with our Sanctuaries by school groups, researchers, and the public, allowing them to watch researchers conduct their research and hear live accounts about their experiences. The telepresence idea has been piloted here in the Monterey Bay to the Mystic Aquarium and Institute for Exploration in Mystic Connecticut.

- A. Continue MBNMS' participation in NOAA's developing telepresence program.
- B. Explore the expansion of existing partnership with Mystic's program and the Institute For Exploration by adding a "diver cam" equipped with a speaker so that an underwater diver in Monterey can describe current conditions to visitors at the Mystic Aquarium in Connecticut.

- C. Add telepresence capabilities to additional interpretive facilities, including the MBNMS Exploration Center and storefront exhibits as available.
- D. Participate in research and education programs similar to those offered by the JASON Foundation for Education (JASON) as they arise.
- E. Install additional topside video cameras at selected sites providing unique viewing opportunities in the MBNMS. Future potential camera locations include the Monterey Canyon, a mid-ocean site, a kelp forest, an elephant seal pupping beach, and a seabird rookery.

Activity 4.3: Expand Interpretive Opportunities Using Virtual Education Products

Consumers are interested in purchasing or receiving products to view or enjoy from the comfort of their home or vehicle. MBNMS has produced videos now available to education programs and teachers. Other possible products include:

- A. CD-ROM, an interactive CD about Davidson Seamount.
- B. CD Audio tour of MBNMS from southern to northern boundary (and the reverse) along Highway 1. As visitors drive along the Highway, they will stop at designated locations and listen to natural history information about the area.
- C. Video of MBNMS ecosystems and habitats (20-30 minutes).
- D. Podcast technologies.

Action Plan Partners: California State Parks, San Mateo Coast Natural History Association, Friends of Hearst Castle, Monterey Bay Sanctuary Foundation, City of Santa Cruz, Monterey Bay Aquarium, Santa Cruz Museum of Natural History, US Forest Service, Bureau of Land Management’s California Coastal National Monument, Gulf of the Farallones National Marine Sanctuary (in San Mateo County), San Luis Obispo, Monterey, Santa Cruz, and San Mateo Counties, numerous cities, and other land trust entities, National Marine Sanctuary Foundation, private parties, The NMSP Telepresence Initiative, Institute for Exploration,

Table IF 1: Measuring Performance of the Interpretive Facilities Action Plan

Desired Outcome(s) For This Action Plan:	
Provide a critical vehicle for interaction and developing a sense of stewardship with the constituent base by developing facilities for education, research and outreach.	
Performance Measures	Explanation
Construct and operate one major interpretive facility by 2010 and two minor interpretive facilities by 2008.	The MBNMS will evaluate implementation of this action plan by measuring the progress in the construction, staffing, and operation of a major interpretive center, the MBNMS Interpretive Center, in Santa Cruz as well two minor interpretive facilities in San Simeon and Monterey. The long-term goal of increasing the knowledge about the MBNMS and development of the sense of stewardship will be evaluated separately.

Table IF 2: Estimated Timelines for the Interpretive Facilities Action Plan

Interpretive Facilities Action Plan	YR 1	YR 2	YR 3	YR 4	YR 5
Strategy IF-1: Construct and Operate Visitor Center	●		●		▶
Strategy IF-2: Develop Smaller Regional Interpretive Facilities	●			●	▶
Strategy IF-3: Increase Sanctuary-Wide Interpretive Signage	●		●		▶
Strategy IF-4: Increase Virtual Experiences		●	●		▶
Legend					
Year Beginning/Ending	: ● — ●	Major Level of Implementation: —————▶			
Ongoing Strategy	: ● —▶	Minor Level of Implementation:▶			

Table IF 3: Estimated Costs for the Interpretive Facilities Action Plan

Strategy	Estimated Annual Cost (in thousands)*				
	YR 1	YR 2	YR 3	YR 4	YR 5
Strategy IF-1: Construct and Operate Visitor Center	\$220	\$4,172	\$2,300	\$520	\$1,470
Strategy IF-2: Develop Smaller Regional Interpretive Facilities	\$60	\$0	\$80	\$880	\$80
Strategy IF-3: Increase Sanctuary-Wide Interpretive Signage	\$0	\$24	\$524	\$508	\$508
Strategy IF-4: Increase Virtual Experiences	\$8	\$29	\$25	\$25	\$25
Total Estimated Annual Cost	\$288	\$4,225	\$2,929	\$1,933	\$2,083

* Cost estimates are for both “programmatic” and “base” (salaries and overhead) expenses.

Ocean Literacy and Constituent Building Action Plan

Goal

Increase protection of sanctuary resources by building a greater understanding, in our highly diverse coastal communities, of the ocean’s influence on people, and their influence on the ocean.

Introduction

This action plan addresses the need to cultivate an informed, involved constituency who cares about restoring, protecting and conserving our precious ocean resources. The Sanctuary will implement an integrated outreach program to pull together specific outreach and education activities outlined in other sections of this management plan and coordinate their execution, further developing the Sanctuary’s relationships with its constituencies.

The NMSA, NMSP, NOS and NOAA all identify the need to build a more informed and involved ocean literate public. The U.S. Commission on Ocean Policy’s Final Report - *An Ocean Blueprint for the 21st Century*, also stresses the need to strengthen the nation’s ocean awareness and to improve ocean-related education efforts as “critical to building an ocean stewardship ethic, strengthening the nation’s science literacy, and creating a new generation of ocean leaders.” The report concluded an interested, engaged public is an essential prerequisite “to successfully address complex ocean- and coastal-related issues, balance the use and conservation of marine resources, and realize future benefits from the ocean.”

Ocean Literacy

A national survey by the Ocean Project (1999) indicates the American public has a superficial awareness of the importance of the ocean to their daily lives, let alone its importance to all life on the planet. The *Ocean Blueprint* goes on to state, “The ocean is a source of food and medicine, controls global climate, provides energy, supplies jobs, supports economies, and reveals information about the planet not gained from any other source. While most people do not recognize the number of benefits the ocean provides, or its potential for further discovery, many do feel a positive connection with it, sensing perhaps the vitality of the sea is directly related to human survival.”

In an effort to correct this lack of awareness, the Office of National Marine Sanctuaries has partnered with the National Geographic Society, the Centers for Ocean Sciences Education Excellence (COSEE) and the College of Exploration to identify the critical elements of ocean literacy in the context of science. Ocean literacy is defined as “an understanding of the ocean’s influence on you – and your influence on the ocean.” An ocean-literate person:

- *understands* the essential principles and fundamental concepts of ocean science (listed below),
- can communicate about the oceans in a meaningful way,
- is able to make informed and responsible decisions regarding the oceans and its resources.

Seven Essential Principles of Ocean Literacy

1. The Earth has one big ocean with many features.
2. The ocean and life in the ocean shape the features of the earth.
3. The ocean is a major influence on weather and climate.
4. The ocean makes the Earth habitable.
5. The ocean supports a great diversity of life and ecosystems.
6. The ocean and humans are inextricably linked.
7. The ocean is largely unexplored.

Each of these seven essential principles has a series of fundamental concepts – clarifying basic concepts within each principle. For a complete listing of the essential principles and fundamental concepts, please see <http://www.coexploration.org/oceanliteracy>.

Ocean Stewardship

Ocean stewardship is the end point to the path that starts with ocean literacy. Without a passionate and ocean literate constituency, the goal of true ocean stewardship is meaningless. The *Ocean Blueprint* stresses, “The public should be armed not only with the knowledge and skills needed to make informed choices, but also with a sense of excitement. Individuals need to understand the importance of the ocean to their lives and realize how their individual actions affect the marine environment. Public understanding of human impacts on the marine environment will engender recognition of the benefits to be derived from well-managed ocean resources. Because of the connection among the oceans, the atmosphere, and the land, inland communities need to be as informed and involved as seaside communities.”

Repeatedly, through scoping, public comments echoed these statements. These comments very clearly fell into 5 categories: Increase efforts to inform the community about the issues affecting the sanctuary and how they can get involved; Develop a plan to better use volunteers; Create partnerships with community businesses, tourism boards and chambers of commerce; Increase K-12 public education efforts and; Address multicultural programming. Sanctuary constituents know there are issues facing the Sanctuary, they want to know more, and they want to get involved.

Outreach to the diverse constituents of the MBNMS should be coordinated closely with issues and activities identified in the individual action plans detailed throughout this plan. A vigorous, public outreach and education effort bridging community concerns and needs with measures applied to protect the resources of the Sanctuary will galvanize broader support for ocean conservation and the Sanctuary’s work. Such support will increase the Sanctuary’s ability to effectively protect central California’s marine resources.

Strategy OLCB-1: Develop and Implement Constituent Outreach Programs to increase Ocean Literacy.

Research has shown a healthy marine environment is essential for high quality of life and ecosystem health on land (consider the effects of beach closures). However, recent surveys indicate that many people consider the marine environment a second-tier environmental concern, overshadowed problems of air and water pollution and toxic waste disposal. In addition, while most Americans realize the marine environment can be degraded as a result of human activities, they are less clear about the role individuals play in contributing to this damage. Nearly half the public mistakenly agrees with the statement, “What I do in my lifetime doesn’t impact ocean health much at all,” as referenced in *An Ocean Blueprint for the 21st Century*.

Public information needs are as varied as our population is diverse. Some individuals benefit from detailed information on how specific issues directly affect their jobs or business. Others may need information presented in a language or media tailored to their culture and community. Others may seek advice on how to alter their own activities to support responsible ocean stewardship. This information is as critical for those who live in the heartland as for those who live near the shore. Informal education requires outreach programs, in partnership with local communities, to make contact with individuals where they live and work, regarding issues affecting how they live and work, in a style that speaks to them.

The Blueprint goes on to state, “Information supplied to the public must be timely and accurate. It should also be supported by a system that allows for follow-up and the acquisition of additional information or guidance. The roles of, and relationships among, scientists, educators, and journalists in translating research results for the public are especially critical. Innovative partnerships with media outlets and industries that interact with the public offer opportunities to raise visibility of ocean issues and increase public awareness. Informal education facilities and the academic community must work closely with the media to transform the latest scientific discoveries into publicly accessible displays, materials, and programs.”

Activity 1.1: Offer general ocean awareness programs and sanctuary information

Offerings will include presentations to general audiences including service clubs, Chambers of Commerce, non-profit organizations, partner groups/agencies. Staff will develop print materials, including brochures, newsletters, posters, annual and special reports, fact sheets and other materials with ocean literacy related messaging. Respond to requests from individuals and organizations. Hosting or participation in public events like the *Currents* Symposium, Earth Day, Whale Fest, Coastal Cleanup Day, and other similar events are essential for exposing the public to ocean and sanctuary messages. Staff will develop and deliver public outreach programs at MBNMS visitor centers to enhance their ocean knowledge. In addition, MBNMS will utilize the “Telepresence” technologies identified in the Interpretive Facilities Action Plan to increase public interest in the ocean and the nation’s sanctuaries.

Activity 1.2: Partner with local and national partners to develop coordinated ocean literacy messages

Outreach and Communications staff will participate in the newly developed Ocean Communicator's Group to insure consistent Sanctuary messages throughout the MBNMS, the State of California and the NMSP. Incorporating ocean literacy messages into the NMSP Ocean Etiquette Program, and creating consistent messages with NMSP, National Marine Fisheries Service, and Watchable Wildlife, Inc will be key to a successful targeted effort. The Sanctuary staff will work through the Sanctuary Education Panel, an Advisory Council working group, to create a conduit of information locally with other marine education programs. Working collaboratively on specific ocean literacy elements will create a much larger impact.

Activity 1.3: Increase public awareness of the Sanctuary and ocean literacy issues through media exposure and marketing

The MBNMS will utilize contacts within the Ocean Communicator's Group to deliver consistent sanctuary messages to media outlets. Staff will work cooperatively with local media outlets by providing appropriate ocean literacy messages and materials (PSA's, radio, newspapers, weekly publications, and non-English media outlets), and explore travel and leisure magazine article opportunities.

Strategy OLCB-2: Develop and Implement a Comprehensive Volunteer Program

Sanctuary staff alone cannot meet the goals set out in the Ocean Literacy and Constituency Building and other action plans without the assistance of trained and educated volunteers. Scoping comments not only confirmed the need for the Sanctuary to create a volunteer program but also reflected the desire of many individuals to volunteer for the Sanctuary. A well thought out volunteer plan is required to move this strategy forward. In addition to a plan, a program requires well defined volunteer roles, appropriate training, an organized system of maintaining contacts, tracking training and education programs, and a recognition component.

Activity 2.1: Assessment of volunteer needs within the Sanctuary's programming

Elements of this plan will include identifying the variety of volunteers required to support a broad spectrum of Sanctuary needs (administrative, outreach & education, research & monitoring, resource protection) and requirements related to recruitment, training, tracking and retention of volunteers. An internal volunteer needs assessment will be conducted to determine how to best integrate the existing volunteer programming.

Activity 2.2: Identify funds and hire a Volunteer Coordinator

The Sanctuary will assess the current staff composition to determine how it can best create a full time Volunteer Coordinator position.

Activity 2.3: Evaluate volunteer recruitment, retention and effectiveness of roles

Sanctuary staff will conduct informal assessments on a regular basis to identify and track the needs of the volunteer program. It is essential for volunteers to participate in the assessment of their positions in terms of value and purpose.

Strategy OLCB-3: Create Partnerships with Local Businesses

Partnerships form the backbone of many MBNMS programs. Partnerships encourage creative solutions to difficult issues while fostering a sense of ownership of programs from a wide-ranging audience. Without partnerships, the goals of the Sanctuary could not be accomplished easily or seamlessly. Many members of the public are truly concerned and interested in being part of the Sanctuary’s mission of ocean literacy and education, as was mentioned from the scoping comments. With the correct materials and training the influence of the sanctuary can spread far and wide through partnerships with business leaders, technicians, and staff members.

Activity 3.1: Implement partnership opportunities with the restaurant and lodging industries.

MBNMS will offer staff training and outreach materials to members of the lodging and restaurant industries to identify ocean literacy, sustainability and other Sanctuary concepts appropriate to their businesses. Trained business owners and staff can then use Sanctuary materials to convey these messages to their clientele.

Activity 3.2: Explore partnership opportunities with “on-the-water” businesses.

MBNMS will work with appropriate SAC members to identify potential staff training and outreach materials to develop for recreational providers of “on the water experiences” to help identify ocean literacy, sustainability and other Sanctuary concepts appropriate to their businesses. Trained business owners and staff can then use Sanctuary materials to convey these messages to their clientele.

Activity 3.3: Explore additional partnership opportunities with businesses participating in the Water Quality Protection Program or identified in MBNMS Action Plans.

MBNMS will work with professional trade businesses to accomplish the goals of the WQPP, Beach Closure Program and other action plans. Through training and materials dissemination, trades workers will become outreach educators for the Sanctuary to specialized target audiences who can influence water quality within the sanctuary. Other programs may utilize other professionals to assist in the education of specific audiences on their influence upon the MBNMS.

Strategy OLCB-4: Develop and Implement K-12 Education Programs to increase Ocean Literacy.

Among all disciplines, ocean and aquatic sciences are underrepresented in K-12 education. Concepts and topics about our ocean and hardly appear in K-12 curriculum materials, text books, assessments or standards. Educational standards are the strategic point of leverage for bringing about significant systemic change in the content of science education.

This strategy focuses on programs, designed to provide greater depth of information and attention to schools and non-formal education programs. Working cooperatively with the ONMS Education Team, MBNMS can develop messages consistent with both ocean literacy and MBNMS Action Plans. Regionally, MBNMS will work with other west coast sanctuaries to develop programs to educate people throughout CA/WA on ocean literacy concepts. The model for this already exists with the LiMPETS program. General classroom education programs will also be provided through the Visitor Centers in Santa Cruz and San Simeon.

Activity 4.1: Develop educational programs and supporting materials for school groups including those visiting MBNMS visitor centers.

The MBNMS will develop and implement K-12 education programs geared to increase ocean literacy and ocean stewardship among students. Programs will be based upon MBNMS resources and issues, relevant to what is being taught in K-12 classrooms, and relevant to existing and emerging California state standards. Programming content will be meaningful in ways aiding schools in addressing California standards. Ultimately, increased knowledge of ocean issues, and in particular the MBNMS, will allow students to be more active ocean stewards and to better understand the issues related to ocean management.

Activity 4.2: Provide teacher professional development programs utilizing sanctuary educational materials and promoting ocean literacy.

As the purveyors of education, teachers play an integral role in ocean literacy among students. The MBNMS will provide teachers with meaningful professional development experiences incorporating oceans, MBNMS issues, and instructional pedagogy. These experiences will be instrumental in ensuring long-term benefits to students, to the other community members they serve as teachers, and ultimately to the oceans.

Activity 4.3: Develop and make available Sanctuary educational tools for use in schools.

Teachers continue to lack resources to provide quality science and environmental education. In response, and based upon input from teachers, the MBNMS will develop a suite of educational tools for use in schools designed to increase ocean literacy, understanding of the MBNMS, and understanding of resource-use issues within the MBNMS. Tools should also support programming outlined in strategies 4.1 and 4.2 and thus should be developed for both student and teacher audiences.

Activity 4.4: Develop ocean stewardship programming for K-12 students in conjunction with education partners.

The MBNMS, in conjunction with education partners, will develop programming for K-12 students designed to put ocean literacy into action through stewardship. The MBNMS and its partners will provide opportunities for students to conduct research tied to conservation, to participate in conservation related activities and programs, and to participate in meaningful outdoor experiences in which conservation and stewardship are a key element. MBNMS will explore the development of “Ocean Weeks,” using these partners, for schools adjacent to the Sanctuary.

Strategy OLCB-5: Implement the MBNMS Multicultural Education for Resources Threatening Oceans (MERITO) Program

In 2001, the Monterey Bay National Marine Sanctuary (MBNMS) developed a multicultural education program named Multicultural Education for Resource Issues Threatening Oceans (MERITO), in response to the changing demographics in Central California. Latinos represent the fastest growing population in this region. Developing relationships with this large citizen group is a priority for the MBNMS. Although this action plan will focus on programs for Latino citizens, future plans will include efforts to reach additional culturally diverse groups.

The MERITO program was developed in collaboration and partnership with agencies and organizations serving Latinos in an effort to provide expanded bilingual outreach and education about marine and coastal environments and their conservation to youth, teachers, adults, migrant families and community leaders. From October of 2000 to January 2001, MBNMS staff collected information, using a needs assessment tool, through thirty individual meetings with regional community leaders representing different community groups, school districts, universities, non-profit organizations, city, state and federal agencies, and the farm industry. Personal interviews resulted in a list of critical needs to address in order for the MBNMS to provide effective education for the Latino community. Based on needs identified through an assessment process, this strategy will seek to develop and deliver bilingual outreach programs and materials that will effectively inform Latino citizens about threats to marine and coastal environments. In addition, this strategy will strive to effectively engage Latino constituents in marine and coastal issues addressed in this management plan through programs and materials geared for diverse audiences. The needs, which represent the first phase of this effort include providing increased opportunities for classroom and field outreach experiences, bilingual outreach materials, college internships, teacher and youth leader professional development and training opportunities.

Activity 5.1: Community-Based Bilingual Outreach Program (After-school program, adult ed, field experiences)

MBNMS's MERITO Program will collaborate with K-12 schools, adult schools and community groups to build upon and foster new community-based outreach for Latino youth, adults, migrant families, and community leaders. Outreach programs will include the implementation of the existing Watershed Academy After-school program, adult education presentations, and MERITO's community field experiences.

- A. Continue to provide classroom support, training and curriculum at the middle school level to increase marine and watershed education awareness and knowledge of water quality issues in Hispanic-serving schools through the Sanctuary's MERITO "Watershed Academy" program. Please visit MERITO website for more information on the "Watershed Academy."
- B. Continue to deliver a train-the-trainer workshop to prepare teachers and youth leaders to implement the MERITO Watershed Academy at their site.
- C. Involve agricultural, automotive and hospitality industry representatives and community leaders in the "Watershed Academy" programs and youth leader trainings.
- D. Continue to provide a field-tested "lesson plan" to adult and community groups with the goal of developing an awareness and interest in visiting coastal sites and increasing their knowledge of specific MBNMS protection issues. Each "lesson plan" will be presented by a bilingual education specialist and include a Power Point presentation focused on particular priority issues related to MBNMS resource management such as coastal water quality issues, beach closures, wildlife disturbance, fishing, marine protected areas, and more. The presentation will also include an interactive watershed model demonstration and a written evaluation.
- E. Develop, pilot and implement a series of community leader briefings related to MBNMS priority issues. Each issue-based topic will become a campaign to inform community

leaders about specific issues that affect their community such as water quality, beach closures and marine protected areas, and provide a forum for increasing Latino participation in marine protection.

- F. Develop a comprehensive schedule of marine and watershed conservation seminars, presentations and public meetings for Latino community members to participate in.
- G. MBNMS will continue to provide a variety of field experiences for Latino families, adults, youth and community leaders, incorporating fun and learning in the context of important “take-home” conservation messages related to priority resource issues. This field experience program includes a three-part field series offering Latino community members the opportunity to participate in the MERITO “Tidepool Day,” “Kayak Day,” and “Slough Hike.” This three-part series is offered in spring and again in fall for a total of six field experiences per year. MERITO staff will recruit for field experiences from adult education programs, community events and community leader briefings.
- H. Continue to collaborate with the Water Quality Protection Program (WQPP) Agricultural and Rural Lands Plan to provide Spanish bilingual agricultural technical trainings addressing best practices.
- I. Expand programs to additional Hispanic-serving schools and communities, if deemed effective.

Activity 5.2: Site-Based Bilingual Outreach Program (Demographic surveys, develop bilingual materials w/partners, support partner events)

Encouraging visitation by Hispanic and other culturally diverse groups is a huge challenge for many natural resource sites, centers, and parks across the nation. Many of these coastal sites fall under the jurisdiction of other governmental agencies, such as Elkhorn Slough National Estuarine Research Reserve (ESNERR) and California Department of Parks and Recreation (DPR) and assist in conveying the MBNMS message through these partnerships. By collaborating with these agencies, MBNMS will increase the understanding of currently existing barriers for audiences in coastal use areas and be more effective in reaching the Latino public. Increased visitation to such coastal sites will provide an opportunity for the Latino community to better understand the relationship of land to sea. Encouraging visitation to coastal partner sites that provide an introduction or information on the importance of the MBNMS will help bring awareness about the existence of a national marine sanctuary and provide a forum to expand our message to new audiences.

- A. Collect and compile existing and ongoing demographic data from coastal visitation sites, identify gaps in the data, and make recommendations on how to improve the survey data and methods.
- B. Develop a formalized plan outlining the necessary survey tools and methods required to better understand how the Latino public utilizes coastal sites.
- C. Assist partner sites in collecting demographic survey data in order to measure increased Latino visitation both related and unrelated to MERITO site-based outreach efforts.
- D. Continue to support partner field experiences that involve Latinos in environmental activities including bilingual, in-nature programs such as (kayaking, tidepooling, whale watching) and walks (dune walks, birding hikes).

- E. Increase marine and watershed education activities at identified Latino community events by providing an exhibit booth. MERITO staff will identify events and continued participation will be determined annually based on evaluation.
- F. Partner with agencies to identify the need to develop bilingual outreach materials including, but not limited to, lesson plans for adults and schools, a series of adult education worksheets, coloring books on storm drain pollution, books with stories of interest, newsletter articles, media products such as radio and TV Public Service Announcements (PSAs) and other interpretive brochures and materials. Currently, a limited number of Spanish-language products are available within the NMSP. Bilingual materials will be distributed through the appropriate community-based programs.

Activity 5.3: Teacher Training and Internship Program

This activity addresses the need for increased professional development opportunities for Hispanic-serving teachers focused on marine science, and increased paid-internship opportunities for Hispanic undergraduate and graduate level students.

- A. Our partners at California State University, Monterey Bay (CSUMB) identified the need to provide effective professional development focused on marine science to in-service teachers. In addition, they state that the large influx of new teachers flooding Central California schools need effective tools to teach science to diverse students. Based on that data, the MBNMS will also continue to support partner institutions with professional development workshops.
- B. CSUMB has also identified the need to provide marine-focused internships to undergraduate and graduate level students and, in the past, has received funding from NOAA’s Environmental Entrepreneurship Program/Minority Serving Institution (NOAA MSI) grant to support this goal. The MERITO Bilingual Outreach Internship was implemented through this partnership for 2003 and 2004. MBNMS will continue to work with CSUMB to recruit, train and mentor Latino interns to assist MBNMS staff with implementing MERITO, collecting survey data, and a variety of other tasks listed on the MBNMS website.

This activity anticipates partnering with additional institutions as both the MERITO program and its internship opportunities grow. Potential partners could include Monterey Institute of International Studies and community colleges such as Hartnell and Monterey Peninsula College.

Activity 5.4: Comprehensive Communications Plan

Media is an effective outreach tool that will continue to be involved in all MERITO programs and projects. MBNMS will work with the NMSP West Coast Communication Team to effectively engage Spanish and other media groups, including print, radio, TV, and internet in delivering bilingual messages related to marine and coastal watershed protection.

- A. Develop and implement targeted media products related to key MBNMS issues for Latino adults, migrant families, industry representatives and community leaders. Identify target audiences within the Latino community and develop targeted media products addressing specific resource issue outreach as part of the larger MBNMS communications plan. Such audiences may include automotive shops, restaurants, car

washes and more.

Activity 5.5: Integration of Multicultural Elements To Existing MBNMS Programs And Materials

MBNMS will build multicultural elements into existing programs and materials for education, resource protection, and research based on needs identified in the 2005 MBNMS Management Plan. Potential elements include Spanish-language signage, management plan materials, interpretive center information and new outreach materials. Costs for translation service, reprinting and production for existing outreach materials exist. Lastly, MERITO staff may need to provide bilingual services for outreach programs outside of education.

- A. Over the next ten years, the MBNMS will transition into having Hispanic serving programs integrated into general education programs with the long-term goal of providing multicultural education and outreach in all of its programming strategies. In addition, MERITO will serve as a guide in shifting the education and outreach approach in the MBNMS and other Sanctuaries to better serve our entire communities using multicultural planning and pedagogy in program development and implementation.

Activity 5.6: Intra-Sanctuary Expansion of MERITO (CINMS expansion, regional website, expansion to other sanctuaries)

NOAA's NMSP supports using the MBNMS's Multicultural Education Program as a model multicultural marine conservation outreach and education program for other national marine Sanctuaries across the nation. This activity will focus on providing support to those Sanctuaries interested in developing a multicultural education initiative.

- A. The MBNMS and CINMS will manage a contractor to conduct a thorough needs assessment of the gaps in marine and ocean education reaching multicultural audiences for the Channel Islands region. This contractor will work with the MBNMS and CINMS education coordinators to develop a plan for expanded program implementation.
- B. The MBNMS, CINMS and the NMSP will recruit a contractor to develop a regional MERITO website to include current MBNMS and CINMS Web pages and act as a template for other sanctuaries as they develop their multicultural programs.
- C. Over the next ten years, MERITO programming will be built into education programs throughout the California, west coast and other national marine sanctuaries as identified through regional needs.

Activity 5.7: Evaluation of MERITO Programs

In order to evaluate success in meeting the needs identified by the Latino community, MERITO developed a comprehensive evaluation plan for all MERITO programs. Through a partnership with NOAA's Coastal Services Center, MERITO now has in place a full evaluation plan allowing the MBNMS to track progress of short-, mid- and long-term outcomes for eight target audiences within the Latino community. Using a logic model as the main tool to develop the evaluation plan involved developing outcomes also reflecting those outcomes identified in other MBNMS priority issues. The evaluation process will include correlating the measurable goals identified for each activity and comparing their related short-term (one year) and long-term (five

year) outcomes, in order to measure the success/failure rate. MBNMS will continue to evaluate the MERITO program on an annual basis, making revisions as needed to improve tracking for outreach methods and strategies. Specific tools developed to evaluate program success include:

- A. Individual community interviews to guide direction of MERITO programs done on an ongoing basis.
- B. Pre and post-tests for students involved in the MERITO “Watershed Academy” as front end and formative assessment of knowledge gained through the program.
- C. Pre and post community field experience interviews conducted over the phone to determine the impact of field experiences and retention of first time and repeat participants.
- D. Adult presentation assessments conducted post presentation as a representative baseline for the community and comparison with the field experience evaluations.
- E. Teacher training assessments given during the MERITO Watershed Academy Workshop and throughout the year.
- F. Demographic surveys at partner sites to demonstrate the success/failure of the MERITO effort to promote partner sites through community-based programming.

For more information on critical needs, MERITO programs developed to meet those needs, or the MERITO evaluation plan visit <http://montereybay.noaa.gov/educate/merito/welcome.html> or request a MERITO program report.

Action Plan Partners: California Department of Parks and Recreation Monterey District; City of Salinas; City of Watsonville; Elkhorn Slough National Estuarine Research Reserve; Channel Islands National Marine Sanctuary; Monterey Bay Sanctuary Foundation; California State University, Monterey Bay – Recruitment in Science Education; California State University, Monterey Bay – Return of the Natives; City of Salinas; City of Watsonville; Monterey Bay Kayaks; Salinas Adult Education; Watsonville Adult Education; Agricultural Land-Based training Association; Municipal MPDS Permittees; Resource Conservation District of Monterey County; University of California Cooperative Extension; Boys & Girls Club of Monterey County; Monterey County Office of Education – Migrant Education; Monterey Peninsula Unified School District - Under the Big Top; Pájaro Valley Unified School District; Salvation Army; Monterey Bay – Earth System, Science & Policy Institute; Monterey Bay – Recruitment in Science Education; Monterey Bay – Service Learning Institute; Newspaper partners: The Californian and El Sol; The Register-Pajaronian; Radio partners: KLOK – Entravision Communications, KSES – Tres Colores/La Estrella; KHDC- Radio Bilingue; and Radio Campesina Television partners: KSMS – TV 67 Univision; Channel Islands National Marine Sanctuary; Gulf of the Farallones National Marine Sanctuary; Cordell Bank National Marine Sanctuary; National Marine Sanctuary Program; other Sanctuaries as identified

Table OLCB 1: Measuring Performance Ocean Literacy and Constituent Building Action Plan

Desired Outcome(s) For This Action Plan:	
Increase our diverse communities' understanding of ocean relationships and threats within the MBNMS and affect change in individual behavior.	
Performance Measures	Explanation
Increase MBNMS Outreach programming efforts to reach 15,000 individuals in 2005 to 50,000 individuals in 2012.	MBNMS staff will track the number of individuals that the program has reached on an annual basis. Additional tracking of performance will be conducted and reported through program funding and feedback mechanisms and may also be included in overall management plan tracking.
Increase participation of culturally diverse individuals in MBNMS events from 15,000 in 2005 to 30,000 in 2012	MBNMS will track the number of culturally diverse individuals participating in MBNMS events.

Table OLCB 2: Estimated Timelines For The Ocean Literacy and Constituent Building Action Plan

Ocean Literacy and Constituent Building Action Plan	YR 1	YR 2	YR 3	YR 4	YR 5
Strategy OLCB-1: Develop and Implement Constituent Outreach Programs to increase Ocean Literacy	●—————▶				
Strategy OLCB-2: Develop and Implement a Comprehensive Volunteer Program	●.....●—————▶				
Strategy OLCB-3: Create Partnerships with Local Businesses	●—————▶				
Strategy OLCB-4: Develop and Implement K-12 Education Programs to Increase Ocean Literacy	●—————▶				
Strategy OLCB-5: Implement the MBNMS Multicultural Education for Resource Issues Threatening Oceans (MERITO) Program	●—————▶				
Legend					
Year Beginning/Ending	: ●—————●	Major Level of Implementation: —————			
Ongoing Strategy	: ●—————▶	Minor Level of Implementation:			

Table OLCB 3: Estimated Costs For The Ocean Literacy and Constituent Building Action Plan

Strategy	Estimated Annual Cost (in thousands)*				
	YR 1	YR 2	YR 3	YR 4	YR 5
Strategy OLCB-1: Develop and Implement Constituent Outreach Programs to increase Ocean Literacy	\$219.6	\$219.6	\$209	\$209	\$209
Strategy OLCB-2: Develop and Implement a Comprehensive Volunteer Program	\$75	\$151	\$151	\$151	\$151
Strategy OLCB-3: Create Partnerships with Local Businesses	\$0	\$150	\$175	\$175	\$150
Strategy OLCB-4: Develop and Implement K-12 Education Programs to Increase Ocean Literacy	\$0	\$0	\$231.8	\$231.8	\$231.8
Strategy OLCB-5: Implement the MBNMS Multicultural Education for Resource Issues Threatening Oceans (MERITO) Program	\$376	\$367.5	\$384	\$370.5	\$391
Total Estimated Annual Cost	<i>\$670.60</i>	<i>\$888.10</i>	<i>\$1,150.80</i>	<i>\$2,937.3</i>	<i>\$1,132.80</i>

* Cost estimates are for both “programmatic” and “base” (salaries and overhead) expenses.



Section VI

Water Quality

- **Beach Closures and Microbial Contamination Action Plan**
- **Cruise Ship Discharges Action Plan**
- **Water Quality Protection Program Action Plan**

Beach Closures and Microbial Contamination Action Plan

Goal

Eliminate beach closures by reducing microbial contamination in Monterey Bay National Marine Sanctuary (MBNMS) waters.

Introduction

The central coast of California is internationally known for its incomparable shoreline. Travelers come from around the world to enjoy outstanding recreational opportunities including swimming, surfing, diving and kayaking; to view the spectacular coastal scenery; to observe wildlife resources such as sea otters, whales, and seabirds; and to enjoy the seemingly pristine beauty of the ocean. Public concern over the conservation of this exceptional resource led Congress to designate the MBNMS for its ecological significance and singular beauty.

During the designation of the Sanctuary in 1992, eight key water quality agencies within the Sanctuary region entered into a Memorandum of Agreement (MOA) to provide an ecosystem-based water quality management process. The agreement led to the development of the Sanctuary's Water Quality Protection Program (WQPP), a partnership of twenty-five federal, state and local agencies, and public and private groups dedicated to protecting and enhancing water quality in the Sanctuary and its watersheds. This partnership of MOA signatories, additional public agencies, non-governmental and private organizations are working as members of the WQPP Committee, which oversaw the development of four action plans entitled: Implementing Solutions to Urban Runoff; Regional Monitoring, Data Access, and Interagency Coordination; Marinas and Boating; and Agriculture and Rural Lands. Since the designation in 1992, runoff and spills along the MBNMS's coastline have periodically resulted in high levels of coliform bacteria being detected in coastal waters, resulting in hundreds of beach closures or warnings annually. This plan was initiated to address the issue of beach closures and will constitute the fifth action plan as part of the WQPP.

Microbial Contamination

Coliform bacteria are used as indicator organisms, and while they may not cause disease in humans, their presence tells us that water may be contaminated with organisms that do cause health impacts ranging from fever, flu-like symptoms, ear infection, respiratory illness, gastroenteritis, cryptosporidiosis, and hepatitis. Not only can humans be affected, but research into the cause of an alarming rise in mortality among the threatened southern sea otter population shows that infectious agents have been implicated in nearly 40 percent of these deaths. Preliminary data suggest that many of these deaths are caused by protozoal parasites and bacteria that are spread by fecal contamination of nearshore marine waters by terrestrial animals or humans.

The local economies are also affected by beach closures. Tourism is the second largest industry in the Central California region after agriculture. Although definitive statistics are lacking, because much of the tourism is related to the coast, an image of closed or contaminated beaches

could be a multi-million dollar threat to the local economy. A significant aquaculture and kelp harvesting industry within the MBNMS is highly dependent upon unpolluted water, and beach closures cost local economies tourist dollars and jobs, and represent a loss to those who had planned beach visits.

Sources of contaminated water include runoff from urban, suburban and rural areas, an aging sewer infrastructure system pressed to meet increasing demands, contaminated flows from creeks and rivers and unidentified sources. Contributing factors that generate these sources include illicit storm drain connections, improper disposal of materials that clog pipes and cause overflows, cracked or damaged pipes, overflow of sewer systems during storm events, septic system leaching, nonpoint pollutant loading exposed to storm runoff, and various domestic and wildlife sources.

Beach Closures and Warnings

Beach closures or warnings result from a known discharge of sewage, or laboratory results that indicate that the probable number of indicator organisms contained in a water sample exceed water quality standards. Since the identification of pathogens such as viruses in ocean water is difficult, time consuming, and expensive, current water quality testing methodology relies on the usage of the more readily detected and quantified coliform and fecal streptococci bacteria as indicator organisms. These organisms include total coliform, fecal coliform and enterococcus.

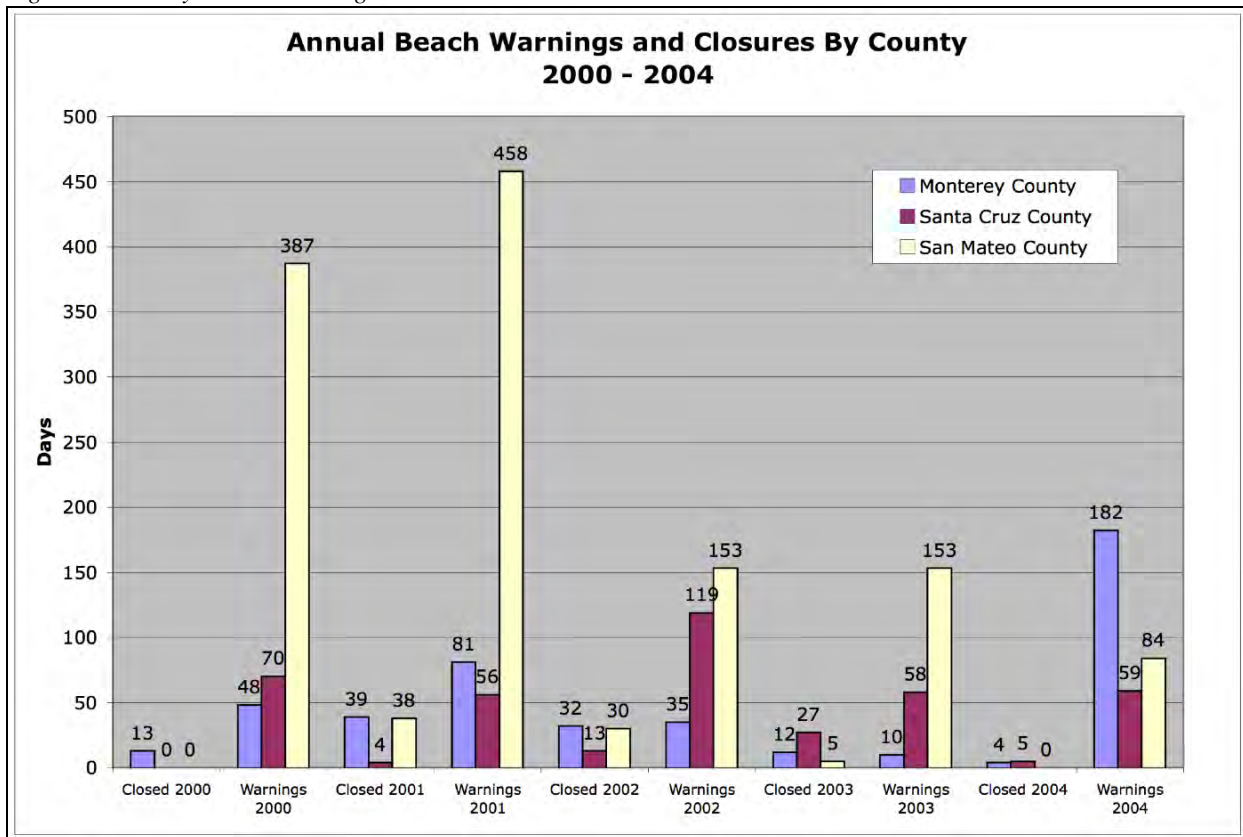
County Health Officers can take three discrete actions including closing a beach, issuing a warning, or announcing a rain advisory based on beach water quality monitoring data, sewage spills, and storm events.

- A. “Beach (ocean) Closure” occurs because of a known sewage spill or from repeated incidences of exceeding bacterial standards due to an unknown source. A closure is a notice to the public that the water is unsafe for contact and that there is a high risk of getting ill from swimming in the water. When a beach is closed, signs are posted alerting the public to stay out of the water.
- B. A “Beach Warning” sign means that at least one bacterial standard has been exceeded, but there is no known source of human sewage. The posting of warning signs alerts the public of a possible risk of illness associated with water contact. The placement of signs may be short-term, when a single bacterial indicator standard is exceeded, or more permanent where monitoring indicates repeated contamination (e.g., from a storm drain). Warnings may also be posted where sources of contamination are identifiable and can be explained as not of human origin (e.g., resident marine mammals or seabirds).
- C. A “Rain Advisory” is often issued when it rains because it is known from past experience that rainwater carries pollution to the beach. After a rain, bacteria counts usually exceed the state standards for recreational water use.

It is important to recognize that there is a fundamental difference between beach closures and beach warnings. Beach closures result from known sewage spills or repeated exceedances of standards from unknown sources, whereas beach warnings are a result of an exceedance of standards, but where there is no known source of human sewage. Domestic discharges account for a high percentage of beach closures, but closures occur less frequently than warnings.

Beginning in 1999, AB411 required local health officers to conduct weekly bacterial testing between April 1 and October 31, of waters adjacent to public beaches having more than 50,000 visitors annually and that are near storm drains flowing in the summer. This increased monitoring is responsible for a pronounced jump in the number of beach closures and postings between 1998 and 1999. Since this initial jump, MBNMS beaches have continued to suffer from hundreds of closures or postings annually.

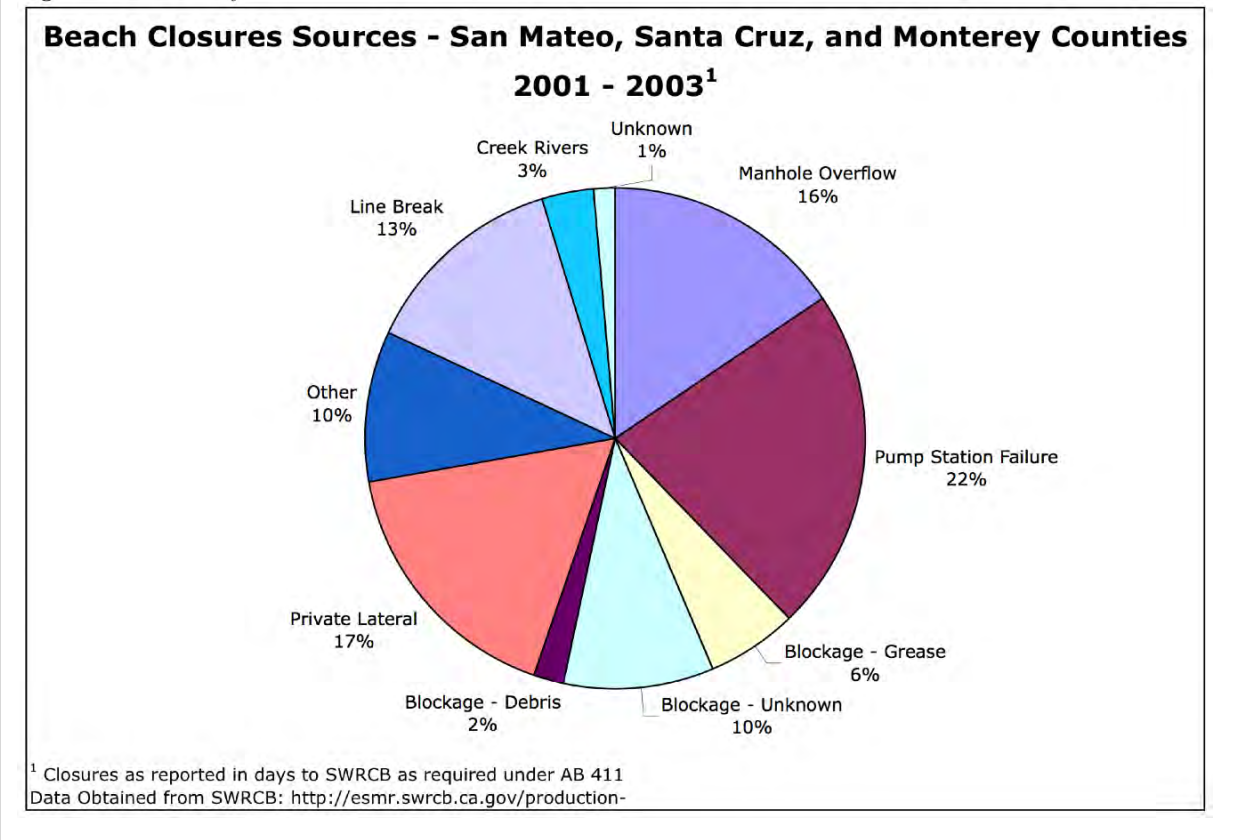
Figure 1. County Beach Warnings and Closures



While California has instituted the most comprehensive water quality monitoring programs in the nation, the program is compromised because current methods of enumerating indicator bacteria are too slow to provide full protection from exposure to waterborne pathogens. The methods used to monitor and post beaches are insufficient to accurately detect contamination and warn the public accordingly. Indicator bacteria assays take eighteen to thirty-six hours to complete, and during this time beachgoers may be exposed to harmful pathogens. By the time the beach is posted, the indicator bacteria may no longer be present in the nearshore waters. Thus, a beach may be open when it is contaminated, and posted when it is clean. In addition, this lag time makes it difficult to track sources of microbiological contamination as the source has often become dispersed over a wide area by the time investigators arrive on the scene. Beach water quality monitoring is also temporally and geographically limited. Resources preclude environmental health departments from monitoring entire stretches of beaches, and at most, these locations are monitored bi-weekly. Recently published data show that temporal changes in indicator bacteria levels in beach water occur much more rapidly.

Many types of animals produce the indicator organisms, and a high percentage of beach closures and warnings are the result of unknown or diffuse sources. Data contained in the 2000 California Beach Closure Report shows statewide sources of contamination.

Figure 2. Sources of Closures



Strategy BC-1: Enhance Use of Geographic Information System (GIS)

GIS can be a powerful tool that decision makers can use to define problems and allocate resources. Local jurisdictions are encouraged to utilize GIS when making decisions about infrastructure replacement or when performing upstream analysis. Project prioritization could be determined by their proximity to sensitive areas or heavily used beaches. For the purpose of this plan, GIS refers to any mapping or drawing package, whether or not data is externally referenced.

Activity 1.1: Map of Beach Sampling

The MBNMS will work with water quality program partners to produce a beach sampling database with maps indicating the sites and beaches in MBNMS that are sampled, the sampling stations, and a time series function to visually display an individual beach’s record of closures or of being “clean.” This data will be prepared and used by MBNMS staff.

Activity 1.2: Expand and Continue to Encourage Local Jurisdictions to Map Septic Sewer and Storm Drain Lines, and to Record Data on Reported Spills, Blockages, and Lateral Line Cleaning Work

MBNMS staff will continue to encourage increased data recordation for infrastructure problems and improvements. MBNMS will facilitate and work with partners to coordinate local and

regional efforts and methods with those developing Sewer System Management Plans and to encourage data and technology sharing between jurisdictions.

Activity 1.3: Encourage Local Jurisdictions to Map Problem Infrastructure Areas, Sensitive Habitats, Land Uses, Outfall Locations, and Critical Beaches

MBNMS staff will work with local jurisdictions to map infrastructure including sewer and storm drain information as well as the location, cause and receiving waters of sanitary sewer overflows. MBNMS will also work with researchers, SIMoN and others to characterize sensitive habitat or areas of high recreational use that could be impacted by sanitary sewer overflows.

Activity 1.4: Determine Proximity of Problems to Sensitive Areas and Heavily Used Beaches to Develop Priorities and Generate Funding

The information collected in Activity 1.3 will be compared against water quality data and areas of sensitive habitats and high recreational use in order to recruit resources, direct the implementation of management measures, and provide feedback on ongoing activities.

Strategy BC-2: Expand Pathogen and Contamination Research

Laboratory analysis of the three indicator organisms can take up to forty-eight hours during which beachgoers may be exposed to harmful pathogens. In addition, recent studies show that beach water quality can vary greatly on both a temporal and spatial scale. To address these problems, the Sanctuary will seek to assist, encourage, and monitor developments in rapid indicator assessment, explore other potential indicators or methods that detect the pathogens themselves, and perform upstream genetic source analysis studies.

Activity 2.1: Investigate and Implement Rapid Indicator Assessment

Current indicator analysis requires eighteen to twenty-four hour incubation times, and monitoring is geographically and temporally limited. Finding methods that can process samples in less time will reduce the risk to public health by ensuring that water quality is accurately evaluated and posted. The MBNMS will expand the Sanctuary Integrated Monitoring Network (SIMoN), and coordinate with research organizations with expertise in real-time monitoring such as the Monterey Bay Aquarium Research Institute (MBARI), and the Southern California Coastal Water Research Project (SCCWRP). The purpose of these efforts will be to implement methods that will result in quicker turn around times between sample and results (e.g., biosensors, enzymatic assays, Polymerase Chain Reactivity [PCR]) and to investigate and adopt real-time, continuous monitoring techniques.

Activity 2.2: Explore Other Potential Indicators

An ideal indicator organism would be found only when disease-causing agents were present at densities that could cause human health problems. Recognizing that current fecal indicators fall short of this goal, and are neither the most precise nor easily assayed, evaluate alternate indicators such as fecal sterols, caffeine, and long-chain alkylbenzenes (LABs – synthetic surfactant).

Activity 2.3: Explore the Potential to Analyze for Specific Pathogens

The MBNMS will coordinate with partners to facilitate research for techniques that allow for the direct measurement of agents suspected of affecting human and marine health. Indicator

organisms do not directly correspond to human health problems, and only indicate the potential presence of pathogens from untreated or partially treated sewage or contaminated runoff. Alternatively, waterborne pathogens are difficult to detect and quantify, and specific methodology to detect them in samples is only in the development stages.

Activity 2.4: Conduct Genetic Studies at Key Locations to Distinguish Bacteriological Sources

Information on the human or animal origin of fecal pollution gives an indication of the types of pathogens that may be expected, the risk of infection, and the treatment that may be required to control the transmission of disease. MBNMS will coordinate with agencies and scientists on appropriate techniques to distinguish between anthropogenic and animal sources of contamination, which will help to better assess health risks and allocate resources.

Strategy BC-3: Increase Monitoring Network

Resources and staffing among local, state, and federal agencies limit the frequency and number of beaches that can be monitored on a regular basis, which can potentially jeopardize public health. MBNMS staff will seek to develop scientifically justified monitoring protocols to ensure that contact with contaminated waters is reduced to the highest practicable extent. MBNMS will also coordinate and collaborate with existing monitoring programs, and utilize the best available indicators and analysis equipment developed through ongoing research.

Activity 3.1: Increase Number and Frequency of Beach Sampling

MBNMS will work with partners to expand monitoring to locations with reported incidences of illness or where physical features (e.g., proximity to runoff, enclosed waters) suggest high contamination levels.

Activity 3.2: Encourage Increased Upstream Monitoring by Local Agencies

The MBNMS will partner with local public works agencies, and when feasible, enlist volunteers to assist in increased upstream monitoring and assessment through collaboration with the Sanctuary Citizens Watershed Monitoring Network.

Activity 3.3: Incorporate Monitoring Network Data Into SIMoN

MBNMS will incorporate summarized water quality monitoring data, including contamination data, monitoring stations, and warning/closure data into SIMoN.

Figure BC.3 Water Quality Monitoring Stations in Northern MBNMS

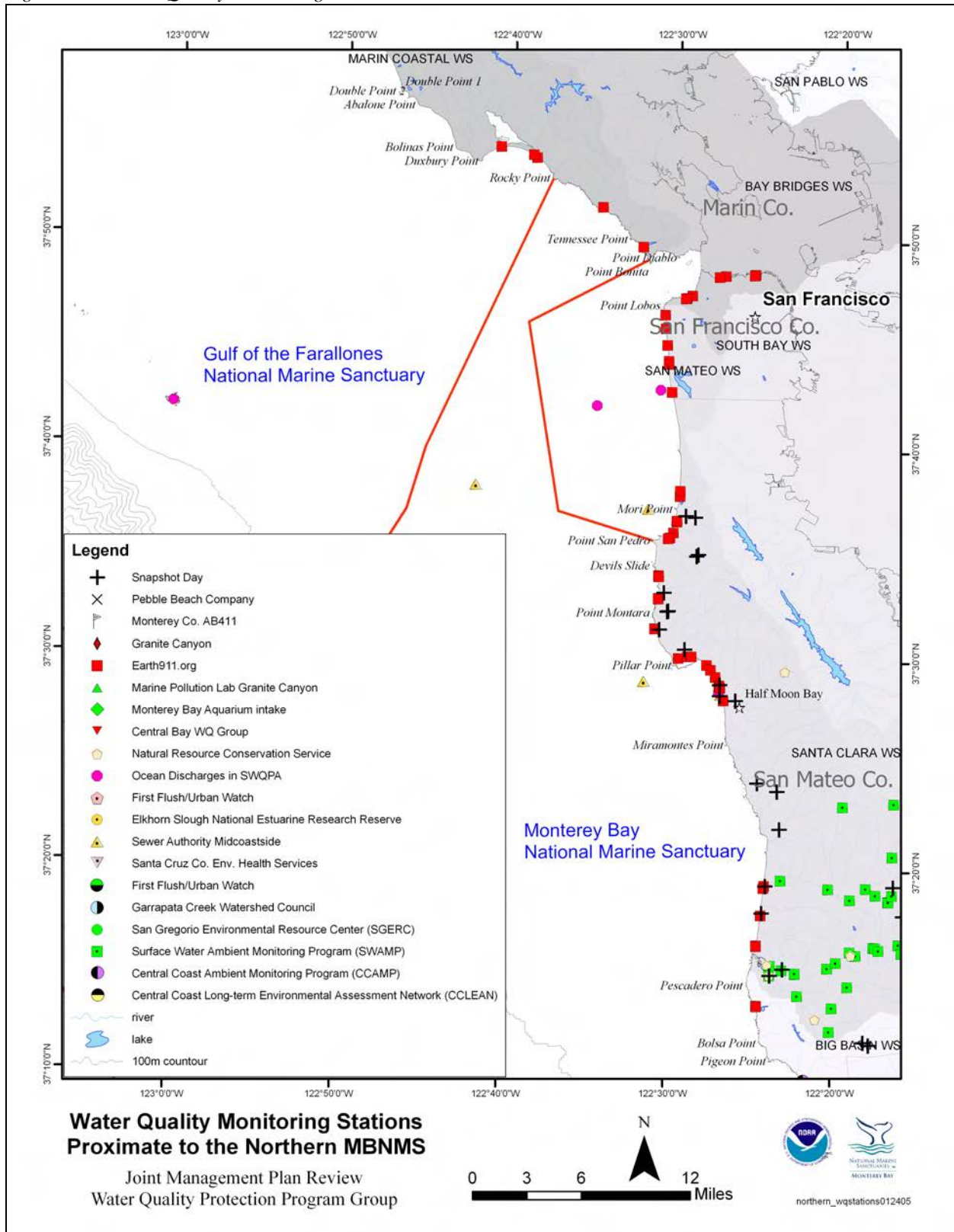


Figure BC.4 Water Quality Monitoring Stations in Central MBNMS

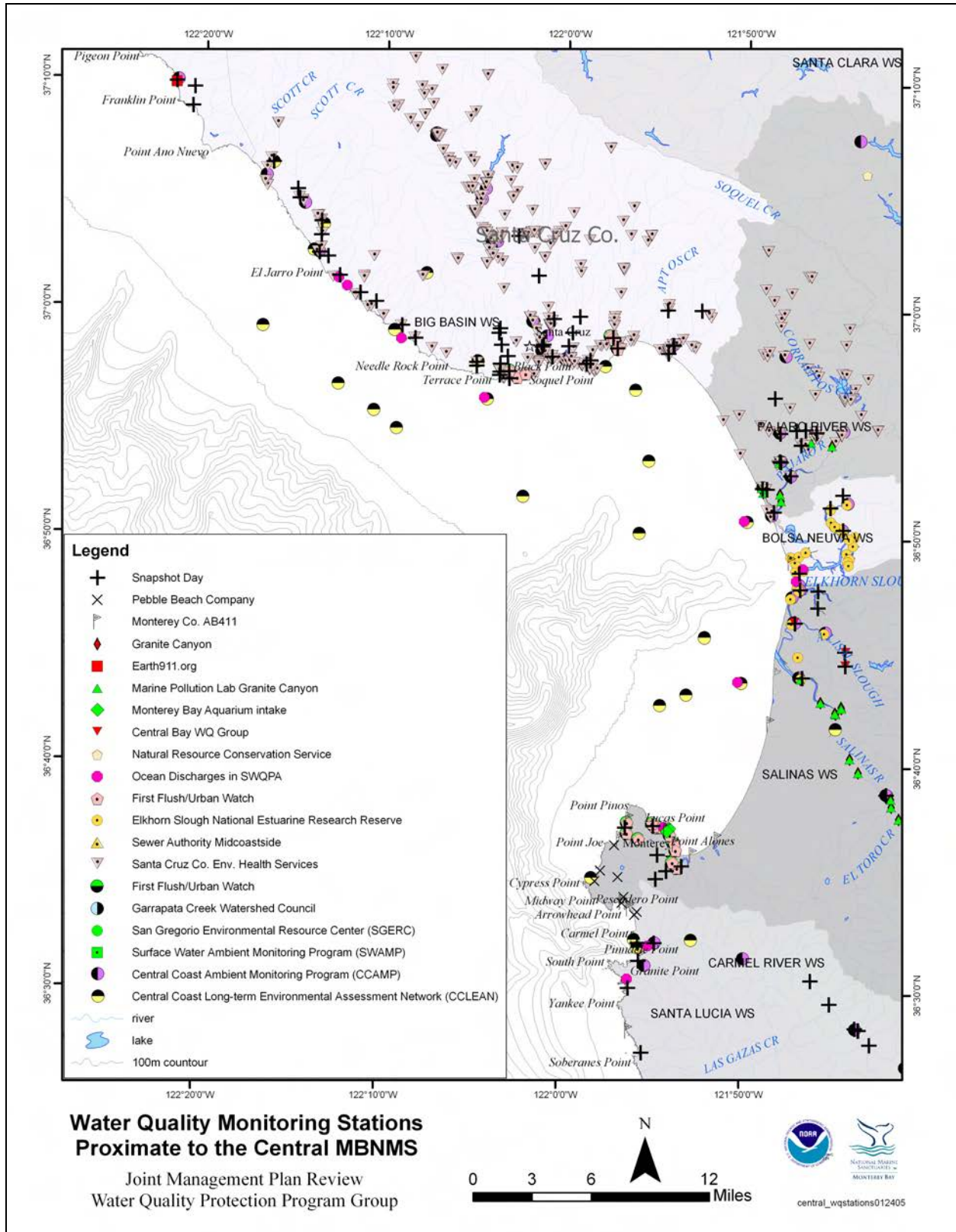
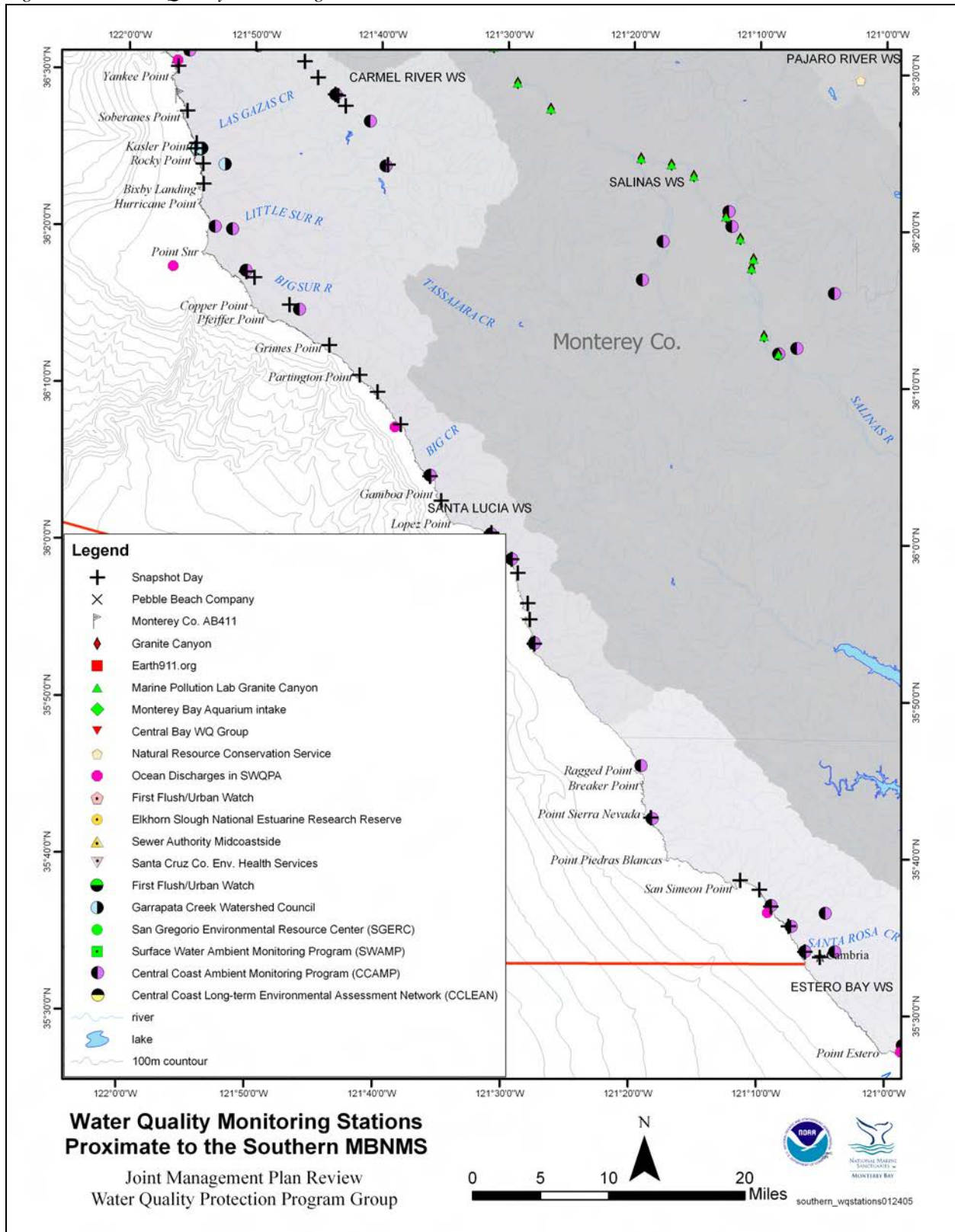


Figure BC.5 Water Quality Monitoring Stations in Southern MBNMS



Strategy BC-4: Enhance Notification Program

The MBNMS will seek to continue and expand upon existing notification systems in an effort to increase public access to water quality information before they depart for the beach.

Activity 4.1: Develop Improved Notification System for User Groups

The MBNMS will work with local agencies to ensure that user groups have the appropriate beach status information before departing for the beach and, if beaches are closed or warnings posted, provide the expected date of “open” status. Each beach closure or warning notification should indicate the cause of the closure or warning. Enhancement opportunities and activities include:

- Continue and expand recorded phone messages
- Continue and expand county websites and links to MBNMS and regional websites
- Evaluate additional links/programs to improve access to information
- Ensure that groups are aware of notification resources through public relations announcements
- Support and Enhance Surfrider Foundation’s fax notification system

Activity 4.2: Coordinate Notification Systems with Education and Outreach Efforts

Enhanced and rapid notification must be coordinated with education and outreach efforts to ensure that the public understands which beaches are closed and why the beach is closed. Increased public understanding of the cause of the spill, the effects of contamination, and which areas are closed will facilitate corrective action.

Strategy BC-5: Increase Source Control Program

Private and public sanitary sewer systems, septic systems, and urban runoff are a significant pathway of anthropogenic bacterial contamination.

Activity 5.1: Work with Local Jurisdictions to Enhance the Repair and Replacement of Sewer Mains

The MBNMS will coordinate with and encourage local agencies to prepare a regional database of main line repair and replacement projects drawing on those developed by local jurisdictions. The MBNMS will work to analyze this data in a GIS database and rank projects based on downstream closures and postings, proximity to sensitive resources, or high-use beaches. This information can then be used to identify the greatest needs for improvements and provide justification for resource expenditures.

Activity 5.2: Reduce Exfiltration and the Number of Sanitary System Overflows

The MBNMS will coordinate with entities developing Sewer System Management Plans required by Waste Discharge Requirements (WDR) to ensure adequate ongoing maintenance and promote community support through outreach and public awareness. The MBNMS will encourage partners to coordinate to:

- A. Utilize GIS and monitoring to improve identification, tracking, management, and follow up of main line obstructions, particularly locations with repeated incidences.

- B. Leverage resources and assist with the development of source control measures and public outreach and education focused on preventing sewer system overflows resulting from the introduction of fats, grease, and other materials that cause blockages. Expand these programs to a regional level.
- C. Ensure proper installation, testing, and inspection of sewers.
- D. Develop a local or regional approved vendor list, franchise, or program similar to the clean business certification program for grease haulers and line clearing vendors.
- E. Investigate alternative main line cleaning technologies.
- F. Assist local jurisdictions in funding line clearing and pump station maintenance/repair activities, and utilize the Sanctuary to develop public support for these activities.
- G. Encourage jurisdictions to require reporting of interceptor/trap cleaning and lateral cleaning.
- H. Conduct technical training/public education and outreach.
- I. Address illicit connections, and continue and expand the detection program under Phase 2 efforts.

Activity 5.3: Work with Local Jurisdictions to Reduce the Number of System Upsets Caused by Private Laterals

The MBNMS will coordinate with partners to create mechanisms that identify and correct chronic problem areas. Public agencies cannot implement lateral maintenance because of the disruption that would occur on private property during rehabilitation, costs involved, and potential liability issues. Homeowners, for their part, are also reluctant to undertake repairs, as costs are typically \$3,000 or more. This strategy encourages cities to implement a method that will reduce the number of overflows from laterals.

- A. *Three-Strikes Ordinance*
If city crews are called to a site three times in a one-year period, encourage local jurisdictions to issue a cease and desist order to the homeowner to repair the problem within ten days. If the problem is classified as a nuisance, city crews can fix it immediately.
- B. *Sale/Transfer Inspection Program*
Work with local jurisdictions to develop an ordinance that requires the inspection of laterals prior to the sale or transfer of a property, which will require maintenance or repair of defective or damaged laterals.
- C. Develop an “approved” vendor list for the Sanctuary cities and counties, modeled after existing program such as the clean business program.
- D. Develop a voluntary lateral inspection and repair program.

Activity 5.4: Work with Local Jurisdictions to Reduce Input from Septic Systems

The MBNMS will encourage jurisdictions to develop a GIS layer of houses on septic systems and correlate this to problem areas based on data from citizens, city, county, and monitoring efforts. The MBNMS can then work with partners to:

- A. Target areas suspected of impacting water quality with educational materials.
- B. Inform citizens on proper use and maintenance.

- C. Ensure that pumpers are reporting system maintenance and require pumpers to submit logs.
- D. Encourage local jurisdictions to implement sale/transfer inspection program.
- E. Encourage local jurisdictions to utilize a clean business-type program for pumpers.
- F. Hold pumpers strictly accountable for improper disposal.

Activity 5.5: Work with Local Jurisdictions to Reduce Microbial Contamination from Urban Runoff/ Storm Drains

The MBNMS will work to coordinate efforts to prepare regional educational, outreach and technical materials that address the issue of beach closures and investigate cost effective measures to treat or divert urban runoff where source control measures prove ineffective. The MBNMS will also coordinate with partners and local jurisdictions to:

- A. Increase the number of RV pump-out stations and provide incentives for their use
- B. Remove sediments in catch basins and other areas prior to the first rains of the season
- C. Develop a mechanism to address waste from homeless camps
- D. Pet Droppings – Utilize existing materials and, as necessary, develop new methods, materials, or devices that will ensure that people clean up after their pets

Strategy BC-6: Increase Technical Training for Industry Professionals

There is a need to raise the level of awareness of professionals in the plumbing, sewer, and restaurant industry as to their potential impact on water quality via the sewer system.

Activity 6.1: Coordinate with Local Jurisdictions to Educate Plumbers, Grease Trap, and Sewer Industry on Proper Cleaning Techniques and Promote Reporting Program

The MBNMS will coordinate with local jurisdictions to raise the level of awareness of each of these industries to their impacts on the overall system and train restaurant personnel in the proper use and maintenance of grease equipment. The MBNMS should work with its partners to let plumbers know that line cleaning can move clogs into city mains, train restaurant personnel in the proper use and maintenance of grease equipment, and promote an interagency reporting program that will alert city staff to potential problems, e.g., problem laterals, behavioral problems, septic system malfunctions, improper grease disposal.

Activity 6.2: Working through Local Jurisdictions, Utilize Existing, or Adapt New Outreach/Training Modules for Targeted Public Servants

Activity 6.3: Develop Spill Response Training Module (See Emergency Response Strategy)

Strategy BC-7: Enhance Public Outreach of Contamination Sources and Solutions

MBNMS will work with partners to develop a comprehensive educational program that increases the public's understanding of the issue, the sources of contamination, and the solutions. Because funding is critical to source control, the education strategy will also seek to develop support for local funding initiatives.

Activity 7.1: Enhance Public’s Understanding of the Importance of Reducing Microbial Contamination, the Sources of Contamination

The MBNMS will work with local agencies, the Regional Water Quality Control Board (RWQCB), and other partners to increase the public’s understanding of beach closures. This includes coordination with the enhanced notification system, so that the public has a real-time understanding of the health of the beaches as well as increasing awareness of the causes of a beach closure when it occurs, the cause of the closure and warning, and work to identify and implement the solution.

Activity 7.2: Develop Coordinated Regional Outreach Program Building and Expanding on Existing Materials and Efforts

The MBNMS will coordinate with regional Phase I and Phase II efforts, existing MBNMS outreach material, including Multicultural Education for Resource Issues Threatening Oceans (MERITO), to ensure consistent messages, facilitate collaboration with various groups, and leverage resources regarding contamination sources and solutions such as proper septic tank maintenance, pet care, and grease disposal.

Strategy BC-8: Increase and Coordinate Enforcement

The MBNMS will seek to collaborate and leverage resources with the RWQCBs to ensure efficient enforcement of sewage spills in line with the authorities and protocols established in the Portor-Cologne Water Quality Act, the State Water Resources Control Board’s (SWRCB’s) enforcement policy, and Sanctuary regulations and enforcement policy.

Activity 8.1: Review Past Oversight and Sanctuary Notification of Spills, and Use this Information to Develop Effective Protocol for Collaboration Between Agencies

The MBNMS will work with partners to review past enforcement efforts by the RWQCBs and National Oceanic and Atmospheric Administration (NOAA) to identify gaps, inconsistencies and opportunities for collaboration. The MBNMS and RWQCBs will develop a system to track spills and communicate on enforcement actions.

Activity 8.2: Coordinate and Strengthen Enforcement Actions with the RWQCBs

Develop adequate means to investigate and pursue necessary enforcement actions and leverage limited enforcement resources through interagency coordination. The MBNMS will develop a suite of legal response options for addressing violations.

Strategy BC-9: Improve Emergency Response Program

The MBNMS, in collaboration with local agencies and the RWQCB, will seek to track spills and ensure that a rapid, 24-hour-a-day spill response is available and that proper containment, disinfection and source control policies are developed and implemented.

Activity 9.1: Improve Reporting and Tracking of Spills

The MBNMS will work with partners to develop a single telephone number that, when called by local governments or sewage districts, business, or the public, will alert all appropriate agencies, including the Sanctuary, to the presence of a spill to ensure rapid containment response. This activity must include a system to adequately log spills and track follow-up actions.

Activity 9.2: Encourage Local Governments to Develop Cross-Departmental, On-Call Systems, that Will Ensure Rapid, 24-Hour-a-Day Spill Response

Activity 9.3: Encourage Local Governments to Develop Model Spill Response Program that Ensures Proper Techniques for Containment and Source Control

Activity 9.4: Provide Sanctuary Enforcement Presence in the Field to address Reported Spills and Assess Injury

Action Plan Partners: Public Works agencies, Coastal Conservancy, Central Coast Joint Data Committee, Southern California Coastal Watershed Research Project, State Water Resources Control Board’s Beach Water Quality Workgroup, Counties, Monterey Bay Aquarium Research Institute, Moss Landing Marine Labs, universities, Sanctuary Integrated Monitoring Network (SIMoN), private sector research laboratories/firms, Water Environmental Research Foundation, UC Davis, County’s Department of Environmental Health, Central Coast Long-term Environmental Assessment Network, Sanctuary Citizens Watershed Monitoring Network, State and County parks, TV and radio news media, Coastal Commission, Surfrider Foundation, regional dive and surf shops, individual haulers, Monterey Regional Water Pollution Control Agency, Local public works agencies, Regional Water Quality Control Boards, Environmental Protection Agency.

Table BC.1: Measuring Performance of the Beach Closures and Microbial Contamination Action Plan

Desired Outcome(s) For This Action Plan:	
Reduce beach closures and postings by reducing anthropogenic microbial contamination in MBNMS waters.	
Performance Measures	Explanation
By 2012, eliminate beach closures and reduce the number of beach postings by 30% due to anthropogenic microbial contamination in the MBNMS.	Beach closures and warnings due to microbial contamination are tracked through postings of the County Environmental Health Departments. Measuring the number of beach closures and warnings in the MBNMS can be calculated by aggregating the monthly or seasonal reports from the county health department’s various reporting mechanisms. These will be reported annually. This performance measure relies on the success of partners yet reflects the importance of not having any beach closures in the MBNMS.

Table BC.2: Estimated Timelines for the Beach Closures and Microbial Contamination Action Plan

Beach Closures and Contamination Action Plan	YR 1	YR 2	YR 3	YR 4	YR 5
Strategy BC-1: Enhance Use of Geographic Information System (GIS)	●————●→			
Strategy BC-2: Expand Pathogen and Contamination Research	●————→				
Strategy BC-3: Increase Monitoring Network	●————●→			
Strategy BC-4: Enhance Notification Program	●————→		●→	
Strategy BC-5: Increase Source Control Program	●————→		●→	
Strategy BC-6: Increase Technical Training for Industry Professionals	●————→		●→	
Strategy BC-7: Enhance Public Outreach of Contamination Sources and Solutions		●————●→		
Strategy BC-8: Increase and Coordinate Enforcement		●————●→		
Strategy BC-9: Improve Emergency Response Program	●.....→				
Legend					
Year Beginning/Ending	: ●————●	Major Level of Implementation: —————			
Ongoing Strategy	: ●————→	Minor Level of Implementation:			

Table BC.3: Estimated Costs for the Beach Closures and Microbial Contamination Action Plan

Strategy	Estimated Annual Cost (in thousands)*				
	YR 1	YR 2	YR 3	YR 4	YR 5
Strategy BC-1: Enhance Use of Geographic Information System (GIS)	\$124	\$32	\$24	\$20	\$20
Strategy BC-2: Expand Pathogen and Contamination Research	\$524	\$24	\$24	\$0	\$24
Strategy BC-3: Increase Monitoring Network	\$191	\$191	\$569	\$219	\$219
Strategy BC-4: Enhance Notification Program	\$29	\$22.5	\$12	\$48	\$48
Strategy BC-5: Increase Source Control Program	\$211	\$211	\$211	\$211	\$211
Strategy BC-6: Increase Technical Training for Industry Professionals	\$51	\$76	\$76	\$76	\$76
Strategy BC-7: Enhance Public Outreach of Contamination Sources and Solutions	\$70	\$60	\$60	\$50	\$50
Strategy BC-8: Increase and Coordinate Enforcement	\$28	\$24	\$24	\$24	\$24
Strategy BC-9: Improve Emergency Response Program	\$28	\$28	\$20	\$12	\$12
Total Estimated Annual Cost	<i>\$1,256</i>	<i>\$668.5</i>	<i>\$1,020</i>	<i>\$660</i>	<i>\$684</i>

* Cost estimates are for both “programmatic” and “base” (salaries and overhead) expenses.

Cruise Ship Discharges Action Plan

Goal

Prevent impacts to Monterey Bay National Marine Sanctuary (MBNMS) resources from cruise ship discharges.

Introduction

Worldwide, cruise ships constitute a large and rapidly growing industry. Although partly constrained by the lack of local docking facilities, cruise ship visits to Monterey are likely to continue to grow as the fleet is shifting from international to more domestic cruises, and due to a new cruise ship docking

facility planned for San Francisco Bay. Due to their sheer size, capacity for passengers and crew (between 1,000 and 5,000 people), and environmental practices, cruise ships can cause serious impacts to the marine environment. The main pollutants generated by a cruise ship are: sewage, also referred to as black water; gray water; oily bilge water; hazardous wastes; and solid wastes. Cruise ship discharges include such harmful matter as sewage, gray water, bilge water, ballast water, solid waste and other hazardous materials.

Figure CS-1: E/V *Sharkcat* and M/V *Crystal Harmony*



- A. Sewage includes vessel sewage and wastewater from medical facilities. Sewage from ships is generally more concentrated than that from land based sources, as it is diluted with less water when flushed (three quarts versus three to five gallons). Sewage discharge can contain bacteria or viruses that cause disease in humans and other wildlife. It can present a public health concern, if discharged in the vicinity of marine life harvested for human consumption, or in or near waters used for recreational activities such as swimming, diving, or boating. Volumes of sewage for a typical cruise ship have been estimated at between five to ten gallons per person per day, or up to 280,000 gallons per week.
- B. Gray water consists of wastewater from sinks, showers, laundry, and galleys. It can contain a number of pollutants including: suspended solids, oil, grease, ammonia, nitrogen, phosphates, copper, lead, mercury, nickel, silver and zinc, detergents, cleaners, oil and grease, metals, and pesticides. A typical cruise ship produces an estimated 1,000,000 gallons of gray water per week.
- C. Bilge water consists of fuel, oil, and wastewater from engines and machinery that collects, along with fresh water and seawater in the area at the bottom of the ship's hull, because of spills, leaks, and routine operations. It may also contain other materials such as rags, cleaning agents, paint, and metal shavings.
- D. Hazardous wastes produced on cruise ships include by-products of dry cleaning and photo processing operations, paints and solvents, batteries, fluorescent light bulbs containing mercury, and wastes from print shops. A typical ship produces an estimated

110 gallons of photo processing chemicals, five gallons of dry-cleaning wastes, and ten gallons of used paints per week. These substances can be toxic to marine life if discharged into the marine environment.

- E. Solid wastes generated by cruise ships include large volumes of food waste, cans, glass, wood, cardboard, paper, and plastic. Plastic debris can be ingested or cause entanglement to marine life including marine mammals, seabirds, and sea turtles. In some cases the wastes are incinerated on the vessel and the ash is discharged at sea; other wastes are disposed of on shore or recycled. A typical cruise ship generates eight tons of solid waste per week.
- F. Cruise ships take in millions of gallons of ballast water, in order to stabilize the vessel for safe and efficient operation. During the process, they take in thousands of species of marine organisms, including various types of larvae, fish eggs, and microorganisms. The water is often drawn in from coastal waters in one area, and discharged at another location. This process has led to the introduction of invasive species, which disrupt marine ecosystems and cost the U.S. billions of dollars per year.

The California Clean Coast Act, which became effective on January 1, 2006, prohibits the release from large passenger vessels (cruise ships) and other oceangoing ships (300 gross tons or more) of hazardous waste, oily bilgewater, other waste, and sewage sludge into the marine waters of the state and marine sanctuaries. The Clean Coast Act also prohibits the release of graywater from cruise ships and oceangoing ships with sufficient holding capacity into the marine waters of the state. Furthermore, the Clean Coast Act requires the State Water Resources Control Board to request the appropriate federal agencies to prohibit the release of wastes from cruise ships and oceangoing ships into state marine waters and the four National Marine Sanctuaries in California.

MBNMS regulations now prohibit discharging or depositing from within or into the Sanctuary any material or other matter from a cruise ship except clean vessel engine cooling water, vessel generator cooling water, or anchor wash..

Strategy CS-1: Increase Outreach and Coordination

MBNMS staff will develop a system to ensure that cruise line industry representatives, cruise ship operators and crew, regulatory agencies, and other relevant parties are cognizant of the Sanctuary's policies regarding cruise ship discharges. Staff will also conduct outreach, aimed at educating cruise ship operators and crew about the MBNMS and its resources, potential impacts from vessel operations, and measures that can be taken to minimize these impacts.

Activity 1.1: Develop and Implement an Outreach Plan About the Sanctuary's Regulation to Address Cruise Line Industry, Regulatory Agencies, and General Public

MBNMS will develop an outreach plan for the public as well as the cruise ship industry to increase understanding and awareness of MBNMS regulations. The Cruise Ship Outreach Plan should address proper stewardship guidelines and use of best management practices (BMPs). MBNMS will also extend its current education and outreach efforts to the Cruise Line Industry.

Activity 1.2: Develop Protocols for MBNMS Communication with Cruise Line Companies

MBNMS will develop a checklist of items to discuss with cruise ship companies to include discharges, anchoring guidelines, adherence to vessel traffic lanes, and sanctuary boundaries. MBNMS will also develop a contact list for cruise line industry representatives and regulatory agencies while ensuring communication of information to cruise lines, ship operators, and all levels of crew.

Activity 1.3: Partner with Cruise Line Industry to Develop MBNMS Outreach Materials and Opportunities

MBNMS will work with the cruise line industry in the production and distribution of customized materials, in both print and video, and develop an onboard presentation about the MBNMS and its resources.

Activity 1.4: Collaborate with Sightseeing Tour Operators to Incorporate Sanctuary Information and Messages to Shore Based Tourists

Strategy CS-2: Develop Enforcement and Monitoring Program

MBNMS staff, in collaboration with partners, will develop and implement enforcement and monitoring programs, and protocols for reporting by cruise ships.

Activity 2.1: Develop and Implement a Tracking Plan for a Cruise Ship Visitation in MBNMS

Activity 2.2: Develop Standard Requirements and Protocols for Reporting

MBNMS will develop a list of emergency contacts for reporting in the event of a discharge. Standard reporting requirements will include standard documents for all cruise ships visiting MBNMS (vessel logs, printouts from holding tanks, etc.).

Activity 2.3: Develop and Implement an Enforcement Program

MBNMS will work with enforcement partners to evaluate and establish effective enforcement practices to ensure compliance. MBNMS and partners should provide sufficient enforcement resources to investigate potential violations and develop collaborative inspection programs with the United States Coast Guard (USCG) to inspect onboard discharge records and ship's systems for compliance. MBNMS will investigate monitoring feasibility and develop and implement monitoring protocols. MBNMS will also identify partners and potential funding sources for monitoring, including industry fees.

Action Plan Partners: State Water Resources Control Board, Regional Water Quality Control Board, State Lands Commission, United States Coast Guard, Ocean Conservancy, City of Monterey, cruise ship industry, City of Monterey, tourism industry, environmental organizations.

Table CS.1: Measuring Performance of the Cruise Ship Discharges Action Plan

Desired Outcome(s) For This Action Plan:	
Prevent impacts to MBNMS resources from cruise ship discharges through enforcement of regulations and outreach to the cruise ship industries.	
Performance Measures	Explanation
No discharges from cruise ships in the MBNMS.	The MBNMS prohibits discharges (with some exceptions for engine cooling water, generator cooling water, and anchor wash) from cruise ships. Performance in implementation of this plan can be evaluated by reviewing the discharge logs and reports submitted by the cruise ships to determine if any discharges have occurred. This will be supplemented by occasional interagency shipboard inspections.

Table CS.2: Estimated Timelines for the Cruise Ship Discharges Action Plan

Cruise Ship Discharges Action Plan	YR 1	YR 2	YR 3	YR 4	YR 5
Strategy CS-1: Increase Outreach and Coordination	●——●	●		▶
Strategy CS-2: Develop Enforcement and Monitoring Program	●——●	●		▶
Legend					
Year Beginning/Ending	: ●——●		Major Level of Implementation: _____		
Ongoing Strategy	: ●——▶		Minor Level of Implementation:		

Table CS.3: Estimated Costs for the Cruise Ship Discharges Action Plan

Strategy	Estimated Annual Cost (in thousands)*				
	YR 1	YR 2	YR 3	YR 4	YR 5
Strategy CS-1: Outreach and Coordination	\$23.5	\$21	\$11.5	\$9	\$9
Strategy CS-2: Enforcement and Monitoring Program	\$160	\$82	\$53	\$42.5	\$42.5
Total Estimated Annual Cost	\$183.5	\$103	\$64.5	\$51.5	\$51.5

* Cost estimates are for both “programmatic” and “base” (salaries and overhead) expenses.

Water Quality Protection Program Implementation Action Plan

Goal

Reduce contamination from nonpoint source pollution in the Monterey Bay National Marine Sanctuary (MBNMS) and its watersheds.

Introduction

The Sanctuary is adjacent to nearly 300 miles of California’s coastline and receives runoff from eleven major watershed areas. The 7,000 square miles of land uses in the adjacent watersheds range from forest and grazing lands to heavily agricultural and urbanized areas. As rainfall or irrigation water passes over the different land uses within the watershed, it can pick up a variety of pollutants, which find their way into streams, rivers, wetlands, harbors, and eventually into the Sanctuary. Offshore areas of the Sanctuary are in relatively good condition, but nearshore coastal areas, harbors, lagoons, estuaries and tributaries show a number of problems, including elevated levels of nitrates, sediments, persistent pesticides, metals, bacteria, pathogens, detergents, and oils. These contaminants can have a variety of biological impacts including bioaccumulation, reduced recruitment of anadromous species, algal blooms, mortality due to toxicity, transfer of pathogens, and interference with recreational uses of the Sanctuary.

During the designation of the Sanctuary in 1992, eight key water quality agencies within the Sanctuary region entered into a Memorandum of Agreement (MOA). This MOA provided an ecosystem-based water quality management process that integrates the mandates and expertise of existing coastal and ocean resource managers and protects the nationally significant resources, qualities and compatible uses of the Sanctuary. The agreement led to the development of the Sanctuary’s Water Quality Protection Program (WQPP). Today, the WQPP is a partnership of twenty-five federal, state and local agencies, public and private groups dedicated to protecting and enhancing water quality in the Sanctuary and its watersheds.

This partnership of MOA signatories, additional public agencies, non-governmental and private organizations are working as members of the WQPP Committee. This committee oversaw the development of four action plans entitled Implementing Solutions to Urban Runoff; Regional Monitoring, Data Access, and Interagency Coordination; Marinas and Boating; and Agriculture and Rural Lands. Many committee members have been partners in initial implementation efforts along with a wide variety of stakeholders in the community including federal, state, and local agencies, businesses, landowners, environmental groups, and the public.

Program Updates

Rather than addressing new topics, this action plan incorporates recommendations of the existing WQPP plans that have been created since the Sanctuary was designated, and recommends ongoing or additional steps for implementation. Existing WQPP plans include:

Implementing Solutions to Urban Runoff

Regional Monitoring, Data Access, and Interagency Coordination

Marinas and Boating

Agriculture and Rural Lands

These original action plans are organized in a format similar to the other Joint Management Plan Review (JMPR) action plans, i.e., by strategy and steps (here called activities), with each activity containing multiple components. Despite limitations on funding dedicated to implementation and staff vacancies during recent years, there has been substantial implementation of a number of strategies, as well as many strategies only partially implemented. In many of these cases of partial implementation, implementation has occurred in some geographic areas or at some times, but has not been widespread or regular throughout the region. A few of the strategies have already been completed or are fully implemented and ongoing, and a few strategies have not been initiated at all.

The program has been successful in leveraging the plans into funding from outside sources, often through grant proposals, and in the case of the Agriculture and Rural Lands plan, through a Congressional allocation to the United States Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS), one of our key partner agencies. Although this outside funding has been essential for program implementation, a disadvantage of this approach has been that it is time consuming to pursue, obtain and administer such outside funding. Grants are generally limited in scope and duration and so can lead to a rather fragmented approach.

A general overview of the number of strategies and activities and the level of implementation is provided in the table below.

Water Quality Protection Program: Action Plan Implementation (as of 2004)

Action Plan	Number of Strategies in Full WQPP Plans	Total Number of Activities in Full WQPP Plans	Number of Strategies Implemented			
			Completed or Ongoing	Substantially Implemented	Partially Implemented	Not Initiated
I. Implementing Solutions to Urban Runoff	7	37	0	3	4	0
II. Regional Monitoring, Data Access, and Interagency Coordination	3	25	0	2	1	0
III. Marinas and Boating	7	50	1	1	2	3
IV. Agriculture and Rural Lands	24	90	1	3	14	6
Total WQPP	41	202	2	9	21	9

The WQPP Committee used the JMPR process to review the WQPP and its individual action plans, to determine what has been implemented, what the barriers to full implementation have been, and what should be priorities as the program moves forward. Following below are each of the four existing action plans broken down into their component strategies. The implementation of the steps in the original plans is briefly summarized here in the table and text under each

strategy. The strategies and activities described here are short summaries of the detailed recommendations in the four original WQPP action plans that total 250 pages.

ACTION PLAN I: IMPLEMENTING SOLUTIONS TO URBAN RUNOFF

Urban runoff is a significant problem in the Sanctuary’s watersheds that can be addressed by a coordinated regional approach towards education, training, and management. The pollutants of concern associated with urban runoff include petroleum hydrocarbons, metals, sediments, detergents, nutrients, pesticides, and organics. The Water Quality Protection Plan (WQPP) Urban Runoff Plan was developed in 1996 in collaboration with the WQPP committee, many of the region’s public works representatives and other stakeholders. It describes seven priority strategies for addressing the problems associated with urban runoff in the region.

Strategy WQPP-1: Increase Public Education and Outreach

The objective of this strategy in the original plan was to review existing educational programs and materials, and to build a framework that would develop a comprehensive regional education and outreach program focused on urban runoff, water quality, and watershed issues. This was to be accomplished by coordinating and building on education efforts that address the causes of urban runoff problems, its effects on habitats and resources, and promotion of measures that reduce pollutants in runoff.

Implementation of WQPP Steps as of 2007

<i>Steps</i>	<i>Implementation Status</i>
Review Existing Programs and Materials to Identify Best Tools	Initial review completed, needs update
Establish a Framework for the Program	Substantial implementation, but intermittent
Develop Supporting Materials	Substantial implementation
Establish Methods for Distributing Information	Partial implementation

The MBNMS developed an initial framework that identified specific target audiences, prioritized geographic areas, and identified the tools, distribution methods, and existing outreach programs to incorporate into the program. Numerous high quality educational materials and programs have been developed or modified to implement this strategy. Many of these materials are available in bilingual formats. They include:

- A. “Dirty Word” TM radio spots – focus on urban runoff, targeting the public
- B. “Dirty Word” TM Public Service Announcements (PSA’s) for television – focus on urban runoff targeting general public
- C. “Storm Drains to Sanctuaries” – PSA for television
- D. Bus ad/movie slide – addressing storm drains
- E. Roving watershed and storm drain models
- F. Storm drain poster
- G. Monterey Bay Begins on Your Street brochure
- H. *Urban Watch* program brochure
- I. *Be Kind to Animals* – Coloring book for children
- J. WQPP Brochure
- K. A Citizen’s Guide to Clean Water

Written materials have been distributed through a variety of venues, including businesses, schools, at public events, and teacher training workshops. Radio ad campaigns have provided multiple exposures in past years, but now lack funding for ongoing presentations. Outreach programs have included a door-to-door campaign in the City of Watsonville, incorporation of water quality lessons into teacher training workshops, and hands-on models, which are used to demonstrate polluted runoff at public events. Outreach has also included water quality presentations to local and state governments, and to various conferences, workshops and classes. Although radio and TV reaches audiences throughout the region, much of the focus of the other types of outreach has been in a few key cities that have been initial partners in the effort, including Monterey, Pacific Grove, and Watsonville.

Although much has been implemented under this strategy, there has not been a consistent program over time or across the cities in the region due to the variable grant-funded nature of activities and staff turnover. Stable implementation of the framework is needed for an educational program that continuously evaluates and expands outreach and addresses the many geographic areas and populations that have not been a focus of the program to date.

Activity 1.1: Update and Reprint Existing Educational Materials

Activity 1.2: Broaden Distribution of Existing Outreach Materials and Programs

Develop outreach distribution mechanisms and programs that are more consistent over time and throughout the region, repeating outreach as needed in existing pilot areas and expanding to coastal cities and constituents not yet reached and inland cities like Salinas.

Activity 1.3: Develop a Stable Funding Source and Infrastructure with Partners to Facilitate Ongoing Distribution and Programs

This should include coordinating and pooling resources with cities required to develop education programs under their National Pollutant Discharge Elimination System (NPDES) Phase II permits.

Activity 1.4: Expand Outreach to the Latino Population in Coordination with Multicultural Education for Resource Issues Threatening Oceans (MERITO)

Strategy WQPP-2: Increase Technical Training

The main objective of this strategy in the original plan was to develop voluntary technical training material and programs for public works and planning staff, small businesses/trades, and construction companies on methods to prevent urban runoff pollution.

Implementation of WQPP Steps as of 2007

<i>Steps</i>	<i>Implementation Status</i>
Evaluate Existing Training Programs, Which Could Be Adopted or Modified	Completed, Needs Updating
Assemble Materials/Enlist Instructors	Completed, Needs Updating

Advertise/Conduct Training in Two Cities	Completed
Conduct Regional Training Program	Substantial Implementation
Evaluate Effectiveness of Training	Partial Implementation
Schedule Ongoing Series of Workshops	Partial Implementation
Establish a Technical Support Network	Not Initiated

Substantial implementation of the technical training strategy occurred in the initial years after plan completion, although activity has reduced in recent years. Implementation on a regional level included co-hosting of five training workshops for public works and planning staff focused on various technical elements of a Model Urban Runoff Program (see below). The Sanctuary also conducted technical training on-site with seven public works departments of individual municipalities via a contractor who addressed specific best management practices (BMPs) related to urban runoff and coliform contamination.

Training for the business community has been partly implemented through development and partial distribution of a variety of technical training materials, including:

- A. Restaurant outreach survey to assess understanding of issue and current practices
- B. Restaurant outreach training video on BMPs called “Make The Connection”
- C. Restaurant “Best Management Practices” poster
- D. Automotive “Best Management Practices” poster

These materials for businesses have been distributed primarily through outreach programs in the cities of Monterey and Pacific Grove, utilizing funding from the cities.

Similar to the education strategy, although substantial implementation has occurred, the trainings have not been consistent in time or covered sufficient geographic areas or target audiences. The training program should be an ongoing one due to staff turnover in target organizations, the need to remind and provide updates to ongoing staff, and to reach new audiences.

Activity 2.1: Update and Expand Training Materials

This should include reviewing past training materials for public works departments to summarize new management measures and regulations. Additional training modules should be included to address planning department staff, supervisors of construction and maintenance crews, businesses, and trades and agency personnel handling hazardous materials.

Activity 2.2: Continue Regional and On-site Urban Training Workshops

This should include contacting municipal and county department heads and trade associations to develop target audiences. The Sanctuary should also continue to perform on-site municipal training sessions and modules to reach those staff who are actually implementing the work and who generally are not reached by regional workshops.

Activity 2.3: Develop and Conduct Training Workshops with Developers

Local planning department staff are often overburdened and do not have the time to thoroughly review development plans for inclusion of stormwater/urban runoff controls. To assist them in

reducing water quality impacts, workshops and trainings should be conducted with the developers and project designers to raise their awareness of stormwater/urban runoff controls that can be included at the onset of the project, rather than relying solely on planners.

Strategy WQPP-3: Collaborate with Regional Urban Runoff Management Efforts

The objective of this strategy in the original plan was to initiate a collaborative effort among municipal, county, and Regional Water Quality Control Board (RWQCB) staff to develop and implement area-wide urban runoff management programs.

Implementation of WQPP Steps as of 2007

Steps	Implementation Status
Develop a Model Municipal Program, Which Provides a Comprehensive Guide to Urban Runoff Management	Completed
Evaluate Existing Regional Urban Runoff Programs for Lessons Learned	Completed
Modify Stormwater Task Force Goals	Not Initiated
Select a Pilot Area For an Urban Runoff Program	Complete
Develop a Formal Program Structure For Regional Effort	Partial Implementation
Develop a Plan For Area-Wide Program	Partial Implementation
Implement the Pilot Program	Completed
Modify Program and Implement in Other Areas	Partial Implementation

Initial implementation of this strategy involved the development of a Model Urban Runoff Program (MURP), in collaboration with the cities of Monterey and Santa Cruz, the Sanctuary, California Coastal Commission (CCC) and the RWQCB. The MURP is a comprehensive guidebook that includes model ordinance revisions, municipal BMPs, illicit discharge detection programs, and recommendations for organizing, funding and monitoring the program. In addition to development of the guidebook, initial implementation of MURP was accomplished in Monterey, Santa Cruz and the City of Watsonville via grant funding. The guidebook has been distributed to all local jurisdictions and numerous trainings have been conducted. Several additional cities have begun adopting the recommendations.

A second key element of this strategy, the development of a formal regional approach to urban runoff, has been partly initiated by local jurisdictions. In Monterey County, the Monterey Regional Water Pollution Control Agency (MRWPCA) is serving as a regional coordinator and permit holder for a coalition of municipalities on the Monterey Peninsula to address urban runoff under NPDES Phase II regulations. A regional approach is also being considered in Santa Cruz County but has not yet been formalized.

The strategies contained in the MURP are directly transferable to jurisdictions developing their stormwater management programs required under their new Phase II permits. Given the fiscal situation of many jurisdictions, there will be a need to reduce development costs and to utilize existing programs and materials. In addition, there is an ongoing need to encourage coordination among jurisdictions to develop regional programs in additional areas.

Activity 3.1: Coordinate with Individual Jurisdictions to Implement Local Stormwater Programs

The Sanctuary should coordinate with individual local jurisdictions in the development and implementation of their stormwater management programs to provide materials developed under the MURP, and assist in implementation of the technical training, monitoring and educational elements of addressing urban runoff management.

Activity 3.2: Facilitate the Development of Regional Stormwater Programs

The Sanctuary should coordinate with additional jurisdictions to encourage their development of coordinated regional approaches to stormwater and pooling of their resources to address urban runoff issues. This should include encouraging the development of multijurisdictional NPDES permit programs such as those developed for the Monterey Peninsula. The Sanctuary should also continue to collaborate with the Stormwater Task Force as a platform for information sharing and coordination of Phase II NPDES programs around Monterey Bay, and with other entities such as the MRWPCA in their regional stormwater programs.

Strategy WQPP-4: Promote Structural/Non-structural Controls

The objective of this strategy in the original plan was to develop demonstration projects and conduct briefings with municipalities, counties and special districts to promote the use of BMPs. Additional activities sought to initiate regional cooperation for prioritizing sites and adopting such practices. By promoting low impact development and more permeable surfaces the efforts will help to recharge groundwater and improve the quality of water flowing to the sanctuary.

Implementation of WQPP Steps as of 2007

Steps	Implementation Status
Select Pilot Project/Solicit Participation	Completed
Plan, Implement, and Evaluate Pilot Project	Completed
Develop/Distribute BMP Guidelines	Partial Implementation
Expand Implementation	Partial Implementation

Direct Sanctuary involvement in implementation of this strategy has been limited to a pilot project and study conducted jointly with the City of Monterey to test the utility of oil and sediment/water separators for treating runoff from parking lots, which uncovered numerous technical challenges in the use of such devices. Identification of alternative types and locations for demonstration projects and briefings to local government has not been conducted. However, the CCC has initiated numerous structural control projects through its permits.

The use of BMPs should be promoted, including structural and nonstructural controls to improve water quality.

Activity 4.1: Promote Structural and Nonstructural Controls via Technical Training

Activity 4.2: Track and Comment on Major Local Projects and Plans to Encourage Inclusion of Structural and Nonstructural Controls

Activity 4.3: Compile and Report Results of Structural/Nonstructural Control Effectiveness

Compile information on previous structural/nonstructural implementation projects that highlight water quality results and identify limitations of the various technologies. Identify additional information or studies needed to better select and design structural/nonstructural BMPs for central coast development projects and initiate research/studies.

Activity 4.4: Pursue Additional Pilot Projects with Local Jurisdictions and Incorporate Monitoring to Establish Benefits

Strategy WQPP-5: Promote Sedimentation/Erosion Controls

The objective of this strategy in the original plan was to initiate a collaborative effort among cities, counties, special districts, and state agencies to develop and implement an erosion/sedimentation source control program for non-agricultural areas, including urban, suburban, and rural residential developments. The strategy sought to identify and evaluate erosion control measures and standards for effectiveness and consistency across counties and municipalities, develop proposed language revisions for “model” ordinances and programs, and implement programs in pilot areas.

Implementation of WQPP Steps as of 2007

Steps	Implementation Status
Identify Measure and Standards	Partial Implementation
Develop Model Programs/Schedule Revisions	Not Initiated
Identify Pilot Area/Conduct Briefings	Not Initiated
Implement in Pilot Area/Evaluate Success	Not Initiated
Implement in Remaining Non-Agricultural Areas	Not Initiated

The CCC compiled an initial listing of standards found in existing ordinances from a number of counties and cities in the Sanctuary region, outlining minimal grading amounts that trigger permits, areas and types of grading where seasonal restrictions may apply, erosion control plan criteria, etc. The WQPP committee has not yet reviewed this data or developed related recommendations on standardization of ordinances or development of model programs and pilot projects.

A regional evaluation of erosion control standards should be conducted to identify and address gaps and inconsistencies.

Activity 5.1: Evaluate Erosion Control Measures and Standards in County and City Ordinances

Activity 5.2: Develop Recommendations for Revisions and Work with Local Jurisdictions to Implement

Strategy WQPP-6: Increase Storm Drain Inspection

The objective of this strategy in the original plan was to work with public works departments to develop a monitoring, mapping, and management system in coastal cities for critical storm drains and outfalls with a history of contaminated flows or that drain to critical habitat.

Implementation of WQPP Steps as of 2007

Steps	Implementation Status
Prepare Monitoring System in Two Priority Cities	Substantial Implementation
Implement System in Two Priority Cities	Substantial Implementation
Conduct Training in Coastal Cities	Partial Implementation
Conduct Evaluation	Not Initiated
Implement Additional Systems	Partial Implementation

Monitoring of the storm drain system has been initiated in several cities via the Urban Watch Program and the First Flush programs coordinated by the Sanctuary Citizen Watershed Monitoring Network (SCWMN). These programs are collaborative efforts between the Sanctuary, the cities, Coastal Watershed Council (CWC), and trained volunteers to take samples at selected locations monthly during the dry season and during the first large rain event of the year. These volunteer programs have been operating in Monterey, Pacific Grove, Capitola and Santa Cruz, and have successfully identified numerous sub-watersheds with high levels of coliform, metals or detergent contamination. Mapping and evaluation of the storm drain system was conducted under MURP grants with the cities of Monterey, Santa Cruz and Watsonville. Training on storm drain mapping and diagnostics, monitoring, and illicit discharge detection has been included in the MURP guidebook and in the regional urban runoff trainings.

Efforts to monitor, map, diagnose and manage storm drains should be continued and expanded in partnership with local jurisdictions.

Activity 6.1: Continue and Expand First Flush and Urban Watch Monitoring Programs

Monitoring efforts for storm drain contaminants should continue and be expanded to additional jurisdictions through the SCWMN's First Flush and Urban Watch programs. This should be coordinated closely with local jurisdictions to select appropriate sampling sites.

Activity 6.2: Conduct Follow-up with Public Works Departments

The Sanctuary should follow up with the city public works departments to evaluate the contaminant hot spots identified by these monitoring programs and encourage them to conduct follow up assessments or targeted source control efforts.

Activity 6.3: Expand Mapping, Diagnostic Capabilities and Illicit Discharge Programs

MBNMS should coordinate with local jurisdictions to promote expansion of their mapping and diagnostic capabilities and illicit discharge detection efforts, as part of their Phase 2 programs. Mapping, illicit detection, and monitoring should also be addressed in new technical training sessions.

Strategy WQPP-7: Produce and Promote CEQA Additions

The objective of this strategy in the original plan was to provide local planners and elected officials with additional analytical tools to assess and reduce the potential changes in the quantity and quality of urban runoff resulting from proposed new development. This tool was to involve the incorporation and use of several questions related to urban runoff in the California Environmental Quality Assessment (CEQA) checklist that local planning departments use to evaluate impacts and target appropriate mitigation recommendations. The checklist was to be accompanied by a training module that would highlight how to conduct the assessment and outline potential BMPs that could be recommended to reduce water quality impacts.

Implementation of WQPP Steps as of 2007

Steps	Implementation Status
Produce and Distribute Training Packet for Local Planners to Accompany Checklist	Completed, Needs Update
Complete Pilot Project of CEQA Checklist Revisions in Monterey County	Completed
Identify and Initiate Project in Remaining Jurisdictions	Partial Implementation
Adoption of CEQA Changes	Partial Implementation
Evaluate Effectiveness of Changes	Not Initiated

A revised CEQA checklist was developed in collaboration with the Monterey County Planning Department, along with a guidebook to assist in training local planners to more thoroughly consider water quality issues related to new developments. The revised CEQA checklist was distributed to all the cities and counties in the Sanctuary region. The checklist was adopted by Monterey County and Santa Cruz County, and it is unknown which cities also adopted it.

There is an ongoing need to work with additional local jurisdictions to revise their checklists and provide accompanying training guidelines on practices that could be included in new redevelopment projects.

Activity 7.1: Encourage the Adoption of the CEQA Checklist Revisions in Additional Jurisdictions

This should include an assessment of which jurisdictions still have not adopted the CEQA checklist, likely to be most cities, and redistributions and outreach to those jurisdictions to encourage its adoption.

Activity 7.2: Provide Accompanying Training Materials and Workshops

The CEQA additions training manual should be updated to incorporate new BMPs and distributed with the checklist. Regional training workshops should be conducted for planners to familiarize them in more detail with the issue. These trainings should include on-the-ground demonstrations to gain an understanding that may be lacking when plan-checking in the office. BMPs are often very simple, both structurally and functionally, and with an improved understanding of them, planners can ensure that they are included in new or redevelopment projects.

Activity 7.3: Conduct Follow Up Evaluations

Follow-ups should be conducted with planning department management to ensure that the checklist revisions are incorporated into their review process. Evaluations should also include an assessment of whether the revisions are leading to the inclusion of additional BMPs in projects.

Activity 7.4: Planning and Policy Working Group

Host a set of working group meetings among those responsible for regulating new development for the protection of water quality. The working group should discuss how their permitting activities can be consistent with Urban Runoff Action Plan strategies and how required updates to various ordinances (Phase II requirements, Local Coastal Program [LCP] updates) can support the implementation of these activities.

ACTION PLAN II: REGIONAL MONITORING, DATA ACCESS, AND INTERAGENCY COORDINATION

The second Water Quality Protection Program (WQPP) plan developed in 1996 addresses the need for a continuous and coordinated strategy for regional monitoring of water quality and compilation of water quality data on a regional level. It also addresses the need for a continuous regional framework for coordinating ways to address water quality, implement and update the WQPP plans and develop new ones where needed.

Strategy WQPP-8: Increase Regional Monitoring

The objective of this strategy in the original plan was to coordinate and strengthen existing monitoring activities within the Sanctuary and its adjacent watersheds, and to develop a cost-effective, comprehensive approach to providing managers, local agencies, and the public with information they need to protect aquatic resources.

Implementation of WQPP Steps as of 2007

Steps	Implementation Status
Conduct Preliminary Assessment of Monitoring Programs in Sanctuary Region	Completed, Update in Progress
Expand Assessment and Conduct Workshop to Develop Initial Recommendations	Completed
Evaluate Other Existing Regional Monitoring Approaches for Lessons Learned	Ongoing
Identify Specific Questions and Parameters To Be Monitored	Completed
Analyze Existing Monitoring Station Locations	Ongoing
Produce Regional Monitoring Plan	Partial Implementation
Develop Program Infrastructure To Sustain Long-Term Effort	Partial Implementation
Implement Monitoring Program	Substantial Implementation
Review, Interpret, and Communicate Results	Partial Implementation

Significant implementation has been initiated on regional coordination and strengthening of government-collected data and volunteer data, and on the development of a regional monitoring program. As recommended in the plan, the Central Coast Regional Water Quality Control Board (CCRWQCB) has led the formation of a regional monitoring program called the Central Coast Ambient Monitoring Program (CCAMP). CCAMP collects long-term data on a rotational basis in several Sanctuary watersheds as well as monitoring of critical river mouths. It has also coordinated a regional monitoring effort, the Central Coast Long-term Environmental Assessment Network (CCLEAN), with the sewage treatment plants within the Sanctuary to develop ambient water quality data in addition to effluent monitoring. The variable nature of state funding and budget cuts has unfortunately led to monitoring program reductions in some of these programs.

For volunteer monitoring, the Sanctuary Citizen Watershed Monitoring Network (SCWMN) has been established to coordinate volunteer monitoring groups in the Sanctuary watersheds. The Network provides standardized training and equipment, a regional website, guidance on data entry, media publicity to inform the public, and coordination and outreach to resource managers on monitoring results. It is also implementing a certification program that can be used to rank the quality of data collected by volunteers. The program also coordinates and sponsors several regional monitoring programs, including an Urban Watch program focused on dry weather storm drain sampling, a First Flush program focused on sampling of the first heavy rain of the season, and a Sanctuary-wide Snapshot Day event that samples urban and rural water quality on the first Saturday of May each year. These volunteer monitoring efforts are a partnership between the Sanctuary Foundation (SF), Coastal Watershed Council (CWC), the Regional Water Quality Control Board (RWQCB), California Coastal Commission (CCC), local cities, and volunteers.

Although considerable progress has been made on development and implementation for both government and volunteer monitoring programs, much work remains to continue and improve the efforts.

Activity 8.1: Develop a Core Set of Data for Long-term Assessments

A core set of data sufficient for long-term assessment and trend analysis should be identified, which can be continuous over many years, and monitoring programs to collect these data should be continued or initiated. This core set of data would be the focus during budget cutbacks.

Activity 8.2: Integrate Regional Monitoring Across Agencies

The Sanctuary should work with the CCRWQCB to integrate monitoring efforts with additional programs throughout the Sanctuary, including the San Francisco Bay Regional Water Quality Control Board (SFBRWQCB)

Activity 8.3: Enhance Training Assistance and Certification of Volunteer Monitoring Groups and Coordination of Annual Events

Year-round coordination, training and assistance should be enhanced for existing and new volunteer groups to improve their effectiveness and longevity. MBNMS should also continue coordination of large annual volunteer events such as Urban Watch, First Flush, and Snapshot Day.

Activity 8.4: Improve Public Awareness of Monitoring Efforts

Additional work is needed to improve public awareness of monitoring efforts, particularly of volunteer groups, including efforts with print, radio and TV media.

Strategy WQPP-9: Increase Access to Monitoring Data

The objective of this strategy in the original plan was to develop a digital data access system to link water quality data and related parameters for the Sanctuary's watersheds and ocean areas. This database was to provide environmental scientists and resources managers with the tools to evaluate problems and make environmental management decisions.

Implementation of WQPP Steps as of 2007

Steps	Implementation Status
Identify Existing Monitoring Data Sets	Substantial Implementation
Form Interagency Data Task Force	Completed
Identify Specific Questions To Be Answered by Data	Substantial Implementation
Identify and Evaluate Existing Database Systems and Networks	Substantial Implementation
Identify Relevant Data, Standard Format and Access System Design	Partial Implementation
Develop Quality Assurance/Quality Control (QA/QC) Protocols and MOAs	Partial Implementation
Develop Metadata and Summary Data for Each Program	Partial Implementation
Conduct Annual Performance Review	Partial Implementation

The Sanctuary and Environmental Protection Agency (EPA) conducted an initial summary of data sets available. The RWQCB has developed a regional database and Geographic Information Systems (GIS) mapping system for CCAMP to display water quality data collected by the RWQCB. The SCWMN has also been working with the RWQCB to allow display of its data in a volunteer version of the CCAMP system. CCAMP and the SCWMN have been working to develop QA/QC protocols and work with watershed groups to adopt these procedures. The Central Coast Joint Data Committee (CCJDC) administered by the Association of Monterey Bay Area Governments (AMBAG) has also made progress in compiling and sharing GIS information on the region's watersheds including topography, land use, parcels, etc. CCAMP and the SCWMN have produced annual or event-related summary data reports (e.g., First Flush, Snapshot Day, and Urban Watch). However, additional work remains to be done by these groups and others to facilitate the display and ready access to water quality data and related information from a variety of sources.

Although significant progress has been made on this strategy, additional work remains to be conducted to integrate information from a number of sources into the Sanctuary Integrated Monitoring Network (SIMoN), and package it in a user-friendly way as a decision-making tool.

Activity 9.1: Integrate Water Quality Data with SIMoN

Water quality monitoring should be integrated with the SIMoN program, and coordinated with biological monitoring efforts. Additional evaluation should be conducted to determine if the CCAMP database can meet Sanctuary needs, and either move to expand this system or develop alternative approaches to link with federal, state, county and university data.

Activity 9.2: Certify Data Quality for Volunteer Groups and Incorporate into Database

The version of the database for volunteer data should be expanded. This will require certification of the data quality of additional watershed groups, including developing QA/QC protocols for their data.

Activity 9.3: Improve Packaging and Distribution of Data to Decision Makers and the Public

Additional focus needs to be directed to packaging and distributing both government and volunteer data to decision makers in an understandable way, and working with them to conduct follow up to track and reduce sources of contamination. This should include an annual report of water quality trends in the Sanctuary that integrates data from a number of programs.

Strategy WQPP-10: Increase Interagency Coordination

The objective of this strategy in the original plan was to develop a continuous regional framework for coordinating ways to address water quality, implement and update the WQPP plans and develop new ones where needed.

Implementation of WQPP Steps as of 2007

Steps	Implementation Status
Establish a WQPP Committee	Completed
Establish Linkages with Other Groups	Substantial Implementation
Coordinate Implementation of WQPP Strategies	Substantial Implementation
Prioritize Funding Goals	Substantial Implementation
Coordinate Permit Review	Substantial Implementation
Coordinate Enforcement Activities	Substantial Implementation
Evaluate New Problems and Develop New Strategies	Ongoing

The WQPP committee served as a coordinated regional framework during the development of the first four plans and assists in coordinating their implementation. Various subgroups and members of the committee work together with Sanctuary staff to pursue specific implementation projects, pursue funding, etc. A charter for a more formal Water Quality Council (WQC) was developed several years ago, but has not been implemented. As part to the Joint Management Plan Review (JMPR) review, the WQPP committee indicated that the basic format of the existing committee meets the needs of the WQPP and can serve to address the major steps in this strategy, and that a more formal WQC is not necessary. Regarding evaluating new problems and issues, many committee members assisted with the development of the Beach Closures Action Plan, and implementation of this plan will eventually be overseen by the committee.

Activity 10.1: Review and Update Committee Membership and Structure

Committee membership should be reviewed and potentially expanded to incorporate new issues and activities. Establishment of ongoing subcommittees that oversee implementation of individual plans should also be considered, as this approach has been very effective in implementing the Agriculture and Rural Lands Plan.

Activity 10.2: Continue Regular Committee Meetings and Coordination to Oversee Implementation and Address New Issues

The committee needs to reestablish a regular quarterly meeting schedule that has been interrupted by a staff vacancy, as well as coordinate between meetings on a regular basis. Committee meetings and other communications should focus on overseeing and enhancing joint implementation of the plans, evaluating progress, and addressing new issues as they arise.

Activity 10.3: Coordinate WQPP Funding

The committee's efforts should include coordinating grant applications with partners, working with MOA signatory agencies to highlight WQPP plans in their grant Request for Proposals (RFPs), and strengthening fundraising efforts through the Sanctuary Foundation (SF).

Activity 10.4: Summarize WQPP Implementation

The MBNMS and its water quality partners will periodically develop reports and host workshops on implementation, and assess next steps, identify partnerships and water quality trends.

ACTION PLAN III: MARINAS AND BOATING

This action plan developed in 1997 describes strategies designed to reduce water pollution from certain activities associated with marinas and boating within the Sanctuary. Boater-generated impacts on water quality generally fall into four categories: toxic metals primarily from anti-fouling paints, hydrocarbons from motor operation and maintenance procedures, solid waste and marine debris from overboard disposal, and bacteria and nutrients from boat sewage. This plan took the approach that much of this pollution can be reduced through education and training programs, application of new technologies and on-site facilities.

Strategy WQPP-11: Increase Public Education, Outreach, and Enforcement

The objective of this strategy in the original plan was to expand and build upon existing efforts conducted by individual harbors to develop a coordinated regional education and outreach program. These programs sought to communicate to boaters the environmental, recreational and economic impacts of pollution.

The recommendations listed under the following activities generally consist of similar actions that can be generalized as:

- A. Compiling existing materials for each topic;
- B. Defining programs and target audiences;
- C. Preparing materials and developing distribution networks and programs; and,
- D. Contacting the targeted audiences with the materials/implementing programs.

Implementation of Water Quality Protection Program (WQPP) Steps as of 2007

Steps	Implementation Status
Review Existing Materials, Define Audience/Topics	Completed
Bilge Wastes and Waste Oil Education	Substantial
Product Information/Toxics Disposal Education	Partial Implementation
Marine Debris Education	Partial Implementation
Vessel Fueling Education	Not Initiated
Sewage Discharge Education	Partial Implementation
Underwater Hull Cleaning Education	Not Initiated
Education on Existing Laws	Substantial Implementation
Develop an Ongoing Distribution Program	Partial Implementation
Encourage Community Use/Stewardship of Harbor	Not Initiated

There are several active partners that have been developing and distributing informational and educational products for over five years, including Save Our Shores' (SOS) Clean Boating Network and the California Coastal Commission's (CCC) Boating Clean and Green Program. Grant funded educational efforts developed by the Sanctuary and/or SOS includes a harbor water-quality poster, water quality signage put in place at all the harbors, signage at bilge pumpout facilities, and a bilge pumpout brochure. SOS also has developed a Dockwalker program that conducts one-on-one outreach and distributes educational materials to boaters at the

harbors. Education and promotional activities have also accompanied the installation of new bilge pumpout facilities at all of the harbors.

This strategy will build upon and expand existing materials and programs and make outreach a regular occurrence.

Activity 11.1: Sustain and Develop One-on-one Boater Outreach Programs

The WQPP should work with various organizations to sustain and develop one-on-one programs with boaters such as Dockwalkers, including recruitment of volunteers and obtaining funding. This should include efforts to distribute materials and discuss with boaters the above list of water quality issues, with special emphasis on use of the bilge water and sewage disposal stations, and on hull cleaning practices that can affect both water quality and introduced species problems.

Activity 11.2: Vessel Fueling Education

Work with the Office of Oil Spill Protection and Response (OSPR) Outreach Program to educate small craft refueling docks as to their responsibility to prevent spills, liability for damage caused by oil spills, and spill notification requirements. Work with the Department of Fish and Game (CDFG) Outreach program to educate small craft refueling docks regarding applying to be registered and certified as “exempt” fuel docks (exempt from Certificates of Financial Responsibility and formal Oil Spill Contingency Plan requirements).

Activity 11.3: Enforcement

As a supplement to educational efforts, MBNMS will conduct general enforcement patrols and follow up on reported violations to address discharges of sewage, oily bilgewater and trash. MBNMS will also inspect MSDs to ensure that they are in compliance with Sanctuary regulations that prohibit the discharge of untreated sewage.

Strategy WQPP-12: Develop and Implement Technical Training Program

The objective of this strategy in the original plan was to develop and implement a regional technical training program for harbor, marina, and boatyard employees within the Sanctuary.

Implementation of WQPP Steps as of 2007

Steps	Implementation Status
Identify Subject Areas	Completed
Compile Training Materials	Completed
Identify Instructors, Trainers, and Funding	Partial Implementation
Solicit Participation and Develop Incentives	Partial Implementation
Conduct Regional and On-Site Workshops	Partial Implementation
Evaluate Workshops and Modify as Needed	Not Initiated

General training modules about water quality were compiled for the harbors, and the package was introduced to several of the harbors as part of their training for the bilge water pumpout facility. Ongoing regional training has not been addressed, except for any staff training efforts already underway by harbormasters.

A review of technical training needs and opportunities should be conducted and programs developed to address gaps.

Activity 12.1: Update Training Materials as Necessary

Activity 12.2: Identify and Pursue Opportunities to Conduct On-site Trainings

Strategy WQPP-13: Promote Bilge Waste Disposal and Waste Oil Recovery

The objective of this strategy was to facilitate the collection of contaminated bilge water through the construction and operation of new bilge water pumpout and waste handling facilities.

Implementation of WQPP Steps as of 2007

Steps	Implementation Status
Initiate Public Education Program	Substantial Implementation
Provide Absorbent Pads	Substantial Implementation
Identify Permits and Memorandum of Agreement (MOAs)	Completed
Identify Funding Sources	Completed
Identify Technology	Completed
Identify Appropriate Sites	Completed
Construct Pumpouts	Substantial Implementation
Publicize Location/Increase Enforcement	Partial Implementation

In 1999, the Sanctuary, in collaboration with Ecology Action and SOS, received a grant from the California Integrated Waste Management Board (CIWMB) to install bilge and crankcase oil pumpouts at Monterey and Moss Landing harbors, and to distribute absorbent pads. SOS installed another system in Santa Cruz harbor in 2002 through a similar grant. These systems, with a significant amount of education and promotion, have been very successful, leading to the recycling of over 8,000 gallons of oil in Monterey and Moss Landing harbors. The systems, however, have proven to be expensive to operate and maintain for the harbors. In addition, the pre-existing pumpout station at Pillar Point harbor has aged significantly and is now of insufficient capacity, and needs to be replaced.

The bilge pumpout system equipment and procedures should be updated as needed, and the use of the facilities promoted.

Activity 13.1: Develop Incentives and Promotions to Encourage Facility Use

Incentives should be developed to encourage boaters to use the pumpouts, along with an ongoing outreach program to promote the facilities.

Activity 13.2: Increase the Economic Viability of the Pumpout Systems

Measures should be developed that will make the region’s systems more economical to maintain, including revisiting the idea of sending the cleaned effluent to the sewer treatment plant or using a low-threat discharge permit.

Activity 13.3: Upgrade the Bilge Pumpout Facility at Pillar Point

The WQPP should work with the harbor to obtain funding for a new system, as well as assist with coordinating an appropriate disposal method.

Strategy WQPP-14: Topside and Haul-out Vessel Maintenance

The objective of this strategy in the original plan was to identify and promote regional guidelines on practices that reduce contaminants from hull wash-water and first flush runoff from boatyards and parking lots. Additionally, it sought to promote continued and expanded use of dust and drip containment methods and paint stripping technologies and products that result in reduced emissions. It recognized the need to review the effectiveness of policies and pollution controls addressing maintenance work at boat slips, parking lots, and unregulated work areas, and to promote boat maintenance methods that generate less pollution through education efforts and/or “Clean Worker Contract” programs.

Implementation of WQPP Steps as of 2007

Steps	Implementation Status
Promote New Stripping/Refinishing Technologies	Not Initiated
Improve Containment and Filtering of Paint	Not Initiated
Ensure Compliance with Existing Regulations	Not Initiated
Improve Control and Filtering of Runoff	Not Initiated
Review Policies Regarding Work in Slips/Parking Lots	Not Initiated

No specific targeted work was conducted by the Sanctuary on this strategy, although various harbors and boatyards may have been addressing parts of the strategy.

Contaminants from hull wash-water and runoff from boatyards and parking lots should be addressed by improved management practices.

Activity 14.1: Promote New Stripping and Refinishing Technologies

Activity 14.2: Improve Containment and Filtering of Paint

Activity 14.3: Ensure Compliance with Existing Regulations

Activity 14.4: Improve Control and Filtering of Runoff

Activity 14.5: Review Policies Regarding Work in Slips/Parking Lots

Strategy WQPP-15: Underwater Hull Maintenance

This strategy in the original plan sought to initiate a program targeted at boat hull maintenance that promotes less toxic paints and improved underwater cleaning practices to reduce discharges to harbor waters. This would be accomplished by distributing information on less toxic paints and results of demonstration projects that evaluate new materials and maintenance methods that reduce discharges. The need to consolidate and promote guidelines for bottom paint preparation and to reduce excessive sloughing of paint was also identified. This strategy sought to initiate a

training and certification program for divers who conduct underwater cleaning to reduce discharges from hull cleaning practices.

Implementation of WQPP Steps as of 2007

Steps	Implementation Status
Promote Safe Marine Products	Partially Implemented
Promote Results of Demonstration Events	Not Initiated
Improve Bottom Paint Preparation	Not Initiated
Initiate Hull Training and Cleaning Certification	Not Initiated

No specific regional work has been conducted on this strategy, although the California Clean Boating Network is considering the issue, and safe products lists have been included in education materials.

Improvements in underwater hull maintenance should be implemented due to the potential to discharge numerous toxic chemicals into harbors and due to the growing concern regarding introduction of exotic species into harbors and coastal areas. Boaters and harbormasters need to be updated on newly developed improved methods and need to have resources available to disseminate to interested boaters. Guidelines should include recommendations on preventing the spread of introduced species in addition to reducing water quality contamination.

Activity 15.1: Promote Safe Marine Products and Procedures for Antifouling Use

Safe products for use as hull paints should be identified and promoted via outreach and demonstration events. Proper techniques for bottom paint preparation to reduce sloughing should also be included in the guidelines and demonstrations.

Activity 15.2: Initiate Guidelines and Trainings for Hull Cleaning

Develop guidelines and training for divers who conduct underwater hull cleaning, including recommendations to reduce water quality contaminations and spread of exotic species. Consider development of a certification program for cleaners who use proper techniques.

ACTION PLAN IV: AGRICULTURE AND RURAL LANDS

The Agriculture and Rural Lands Plan was developed in 1999 to address agricultural runoff in the form of sediments, nutrients and pesticides. The original plan outlines six sections, containing twenty-four strategies and ninety activities intended to protect and enhance the quality of water that drains into the Sanctuary while sustaining the economic viability of agriculture. To more briefly summarize these recommendations for inclusion in the MBNMS Management Plan, each of the six chapters or sections of the original plan is here termed a strategy, and each of the original twenty-four strategies is here termed an activity. This allows for the omission of some of the detailed steps that can be referred to in the original plan. The strategies include organizing agricultural industry networks and watershed groups, increasing technical assistance and education, funding and economic incentives for conservation measures, permit coordination for conservation practices, and improving maintenance practices for rural roadways and public lands.

The many partners that are working together throughout the six-county area on implementation of the Agriculture and Rural Lands Plan are known as the Agriculture Water Quality Alliance (AWQA). AWQA includes agriculture industry groups, federal, state, and local agencies, technical experts, environmental organizations and university researchers. The AWQA Steering Committee, directing the implementation efforts, has representatives from the Sanctuary, Central Coast Agricultural Water Quality Coalition (Coalition of Farm Bureaus), USDA, Natural Resources Conservation Service (NRCS), Resource Conservation Districts (RCDs), and University of California, Cooperative Extension (UCCE).

Because the Agriculture and Rural Lands Plan is relatively new, there has been less time for implementation to proceed and the original recommendations are still relevant. Therefore, we are using a slightly different format to identify future activities for this portion of the WQPP plan, as all current strategies and activities in the original plan will be maintained as future activities in this JMPR action plan. Also, as this is a much longer plan in terms of number of original strategies and activities, both the recommendations and the implementation to date are summarized only at a broad level.

Strategy WQPP-16: Establish Agricultural Industry Networks to Address Water Quality

The three activities in this strategy establish a process for developing industry-led networks of landowners and operators to address agricultural nonpoint pollution issues. Watershed-level agricultural working groups will be established in the Sanctuary's watersheds, under the leadership of existing large agricultural organizations such as Farm Bureaus and related industry groups. These industry networks will take the lead in organizing and working with their own members to establish joint projects for nonpoint source management in priority watershed areas. Activities in this section also include identifying priority target regions for joint projects, conducting outreach on nonpoint issues, assisting growers and ranchers in developing and carrying out voluntary site-specific management plans, obtaining outside technical assistance as needed, and tracking implementation success over time.

Activity 16.1: Establish Regional Industry Networks as a Framework for Addressing Nonpoint Source Management

Activity 16.2: Identify Priority Sites for Landowner Joint Projects

Activity 16.3: Implement Nonpoint Source Management Practices Using Industry-Led Watershed Groups

Implementation of WQPP Steps as of 2007

The Coalition of Central Coast County Farm Bureaus formed in 2000 developed into a non-profit organization known as the Central Coast Agricultural Water Quality Coalition in 2004 and continues to oversee the agricultural industry's regional implementation of this plan. Twenty-three Agricultural Watershed Working Groups have been organized by the Coalition. Over 400 farmers and ranchers participate in these groups by developing water quality plans for their properties and installing conservation practices that reduce erosion and nutrient runoff. Water quality plans have been developed for 97,200 acres of crop and rangeland, and applied on 77,500 acres. A diversity of crops are represented in Watershed Working Groups: cattle, vegetables, vineyards, orchards, field and greenhouse flowers, strawberries, pumpkins, etc. Additional work is needed to ensure that growers who are not part of existing large organizations are also reached. The AWQA Committee has established a template for annual tracking of on-the-ground implementation of practices.

Strategy WQPP-17: Strengthen Technical Information and Outreach to Agriculture

Although extensive technical information exists on agricultural techniques and tools to improve water quality, this information is not always readily available/easily usable for growers and ranchers. This strategy contains seven activities developed to make this information more accessible and useful through increased support for existing technical outreach services, development of networks, cross-training of outreach staff, packaging of easily understood information, and conducting on-site follow-up with workshop participants.

Activity 17.1: Compile, Develop and Distribute User-Friendly Technical Information on Agricultural Conservation Practices

Activity 17.2: Strengthen Referral Network and Cross-Training in Sediments, Nitrates And Pesticides For Technical Field Staff

Activity 17.3: Increase Agency Staff Time to Provide Technical Field Support and Prevention Efforts

Activity 17.4: Strengthen Information Transfer From Industry to Agencies to Keep Up-To-Date On Technical Advances in Conservation Measures

Activity 17.5: Strengthen Grower/Rancher Peer Advisory Networks to Share Conservation Information Among Peers, Including Outreach to Both Landowners And Tenants

Activity 17.6: Evaluate And Distribute Information on Cost-Effectiveness of Water Quality Management Practices

Activity 17.7: Develop And Promote Self-Monitoring Tools for Conservation Management Practices to Assess Problems And Track Success

Implementation of WQPP Steps as of 2007

Using a congressional allocation from the United States Department of Agriculture (USDA) to implement the Sanctuary's agricultural plan, several technical field staff have been hired by the agricultural agencies to assist farmers and ranchers in the six-county area, including an Agronomist, Water Quality Monitoring Specialist, Rural Roads Engineer, Rangeland Specialist, Irrigated Agriculture Specialist, Hydrologist, and an Outreach Coordinator.

Over 500 farmers and ranchers have attended a UCCE training course designed to help farmers develop individual water quality protection plans for their properties. Numerous workshops have been held to train farmers in the benefits and use of specific conservation practices such as cover crops, stream bank protection, irrigation evaluation, and crop row alignment. Training on monitoring practices has also been conducted for the Coalition coordinators.

Research has been completed on the cost effectiveness of fifteen common conservation practices used in the six-county region. This information will be a useful tool for landowners to understand the financial costs and benefits of each practice.

Strategy WQPP-18: Improve Education and Public Relations on Watersheds and Agricultural Conservation Measures

There is a need for improved education of the general public about agricultural conservation issues, and of agricultural groups and the public about watershed issues as a whole. The three activities in this section were developed to enhance public, grower, government agency, and media knowledge about watershed issues, and develop better recognition of the conservation practices that the agricultural community employs.

Activity 18.1: Increase Public Knowledge of and Support for Agriculture and Agricultural Conservation Measures through Media and Outreach

Activity 18.2: Increase Grower and Public Awareness of Watershed-Based Management by Incorporating Watershed Message into Existing Programs and Media Outreach

Activity 18.3: Increase Agency Staff Understanding of Agriculture Through Development of Bulletins and Conducting Tours

Implementation of WQPP Steps as of 2007

Two major press events have been held to highlight AWQA activities and promote conservation practices. A public relations firm was contracted to help develop a media kit explaining watershed management and agricultural conservation practices that protect water quality. A freelance journalist has been contracted to develop stories on conservation practices for both general media and industry trade journals. Resource agency staff have attended many of the

agricultural workshops and field days hosted by AWQA partners. The UCCE Farm Water Quality Short Course, taken by all members of Watershed Working Groups, includes an overview presentation on watershed definition and function. An AWQA website (www.awqa.org) is currently under construction, designed to educate both the public and the agriculture industry about watershed management and agricultural conservation practices. Additional outreach models need to be developed to inform farmers and ranchers who are not involved in the Watershed Working Groups, or who do not speak English as a primary language.

Strategy WQPP 19: Coordinate and Streamline Regulations for Conservation Projects

This strategy stems from comments from both agency staff and landowners on the difficulty of the existing permitting process for conservation practices due to multiple agencies having jurisdiction over projects. A grower or rancher may need multiple permits from each of several agencies at the local, state, and federal levels, with separate fees, different requirements, different timelines, and sometimes contradictory mandates, even for projects that have a beneficial impact on water quality such as sediment basins, vegetative buffers, etc. The three activities in this section were developed to simplify and coordinate the existing permitting process for practices that protect water quality, more effectively apply existing regulations, and strengthen collaborative efforts between the regulatory agencies and the landowners.

Activity 19.1: Develop User-Friendly Permit Guidebooks

Activity 19.2: Develop Regional or Watershed-Based Permits for Conservation Management

Activity 19.3: Improve Collaborative Efforts Between Regulatory Enforcement Agencies and Landowners

Implementation of WQPP Steps as of 2007

A watershed-level permit for water quality improvements has been developed for the Salinas Valley, modeled after the successful Elkhorn Slough permit coordination program. Under a watershed permit, conservation practices are pre-approved by the agencies, and growers can work directly with the NRCS to design and install the conservation practice. This is expected to lead to an increased number of on-the-ground projects that protect water quality. A promotional brochure on the permit streamlining program for the Salinas Valley has been developed and distributed. Work has begun to develop a similar streamlining program in Santa Cruz County.

Strategy WQPP-20: Improve Funding Mechanisms and Incentives for Water Quality Improvements

Growers and ranchers are sometimes discouraged from installing conservation practices due to the initial costs for construction and then ongoing maintenance. The five activities in this section include ways to assist landowners and tenants in developing funding and economic incentives for agricultural conservation measures, and to promote their long-term economic benefits. Also included are strategies to inform growers and ranchers about tax policies that provide tax relief for implementing conservation measures, and to develop new policies that can serve as an additional incentive for voluntarily adopting such measures.

Activity 20.1: Improve Agricultural Community’s Knowledge of and Access to Funding Sources

Activity 20.2: Facilitate Availability of Trained Assistance for Conservation Field Projects

Activity 20.3: Broaden Applicability of Cost-Share Programs for Conservation Measures and Streamline Application Process

Activity 20.4: Increase Understanding of Existing Tax Benefits for Installing Water Quality Conservation Measures

Activity 20.5: Improve Tax Incentives for Implementing Conservation Measures

Implementation of WQPP Steps as of 2007

The Coalition, RCDs, Sanctuary and UCSS have all obtained funding to assist with watershed working groups, conservation practice implementation, research and coordination from state grants and private funding sources. NRCS has also substantially increased its funding under the EQIP cost-share program to growers installing conservation projects in several key Sanctuary watersheds. Additional funding sources are available under the new Farm Bill. However many of the specific recommendations in this section regarding improving funding for conservation measures have not been initiated.

Strategy WQPP-21: Improve Water Quality Management on Public Lands and Rural Roads

This section addresses management issues for public and private rural lands that may include activities other than farming and ranching. Roadways in rural areas can generate significant erosion and sedimentation problems if not properly maintained. The intent of the three strategies in this section is to improve both public and private planning and maintenance practices for rural roadways, in order to reduce erosion and properly dispose of sediment. In addition, this section includes a strategy to address the management and maintenance related to erosion on public trust lands, which is often deficient due to a lack of foresight and funding for long-term maintenance/improvement needs.

Activity 21.1: Provide for Maintenance Practices to Address Sedimentation on Public Roads and Waterways

Activity 21.2: Reduce Sedimentation from Rural Unsurfaced Roads and From Surfaced Roads

Activity 21.3: Improve Conservation Measures on Agency/Public Trust Lands

Implementation of WQPP Steps as of 2007

Training workshops for Public Works staff have been presented in Santa Cruz and San Mateo Counties. Guidelines for road maintenance practices that can prevent sedimentation and erosion are being finalized in Santa Cruz County and will be distributed to other counties for adoption of similar practice standardization. The recently hired Rural Roads Engineer (NRCS) has

undergone training to begin his advisory role in the six-county area. However, this section of the plan has not yet received a strong focus due to attention paid to the agricultural sections of the plan in early years.

FUTURE ACTION PLAN: PROTECTING WATER QUALITY IN WETLANDS AND RIPARIAN CORRIDORS

The original scope of the Water Quality Protection Program (WQPP) as defined by the WQPP Committee was to include an action plan addressing the issue of Wetlands and Riparian Corridors. This was to be the program's sixth action plan (Beach Closures and Microbial Contamination is the fifth), but resource limitations have prevented its development up to this point. The IWRP, Central Coast Wetland Working Groups, Elkhorn Slough Foundation, Watershed Institute, and others have made considerable progress on this issue. The MBNMS will work closely with these entities in the implementation of this plan. The WQPP will develop this action plan in the future as resources permit, and the following is a skeleton outline of the action plan that was developed by the WQPP Committee.

Strategy WQPP-22: Develop Wetlands and Riparian Corridor Action Plan

Activity 22.1: Develop and Implement Wetlands and Riparian Corridors Action Plan

Monterey Bay National Marine Sanctuary (MBNMS) Staff will use the following outline to develop the Wetlands and Riparian Corridors Action Plan

Goals:

- To recognize the relationship between water quality, wetlands and riparian corridors
- To inventory central California coastal wetlands and evaluate potential impacts
- To identify problems with the existing system of wetland/riparian protection and develop policy guidance that addresses these problems
- To integrate land-use planning objectives and resolve conflicts between flood control and wetlands/riparian conservation and restoration
- To implement restoration and protection projects
- To complement existing WQPP action plans and further program goals

Wetland Inventory and Assessment

- Create map of historic central California coastal wetlands
- Compile inventory of existing central California coastal wetlands that identifies location, health, functioning, and projected impacts

Wetland Regulation and Permit Review

- Identify and develop mechanisms to ensure consistent wetland and riparian corridor regulation and protection
- Develop and implement permit streamlining mechanisms for restoration activities
- Design and implement wetlands and riparian corridor education and outreach programs to landowners

Evaluate and design strategies that eliminate or reduce wetlands permitting obstacles, legal liabilities for created wetlands, and vector control concerns

Integrate Land-Use Policy Objectives and Administer Conflict Resolution

Resolve conflicts between flood control agencies and wetland and riparian corridor protection and restoration activities

Wetlands Restoration

Review existing restoration information to establish benefits to water quality from restoring coastal wetlands – identify gaps in knowledge and initiate research recommendations

Establish criteria for future restoration and allowances for appropriate uses of created wetlands for water quality protection purposes

Develop incentives for wetlands/riparian protection (e.g., cost-sharing programs, safe harbor programs, regulatory flexibility and streamlining, reduced/waived fees, etc.)

Develop funding partnerships

Using inventory and assessment information and permit streamlining mechanisms, identify priority areas for restoration, obtain funding, and implement projects

Integrate monitoring to restoration activities for long-term water quality trend analysis

Wetland Policy and Action Plan Implementation

Develop guidance document for local planners for policy integration into general plans, design standards, California Environmental Quality Act (CEQA) review, and local coastal programs

Coordinate and link implementation of plan with existing WQPP action plans

Action Plan Partners: California Coastal Commission, Environmental Protection Agency, California Department of Fish and Game, United States Fish and Wildlife Service, U.S. Army Corps of Engineers, Association of Monterey Bay Area Governments, State Parks, property owners, Academic and Research Institutions, Central Coast Joint Data Committee, Coastal Conservation Corps, California Watershed Network, existing WQPP partners, Regional Water Quality Control Boards, NRCS, RCDs, Local Jurisdictions, Agricultural Watershed Working Groups, Private Foundations, California Coastal Conservancy, NGOs, AWQA, Farm Bureau Coalition, USGG, Local and Regional Flood Control and Planning agencies, Counties, land trusts, Bureau of Land Management, United States Forest Service, local park districts, Monterey Regional Water Pollution Control Agency, schools, business organizations, developers, volunteer monitoring groups, State Water Resources Control Board, Ocean Conservancy, California Department of Fish and Game Office of Spill Prevention and Response, Harbormasters, Memorandum Of Agreement signatories, paint supply companies, boating organizations, California Clean Boating Network, independent hull cleaners, boatyards.

Table WQPP.1: Measuring Performance of the Water Quality Protection Program Implementation Action Plan

Desired Outcome(s) For This Action Plan:	
Prevent impacts to MBNMS resources and qualities from point and nonpoint source pollution resulting from urban, rural and agricultural runoff.	
Performance Measures	Explanation
Increase acreage of agricultural lands with improved water quality management practices from 77,500 acres in 2005 to 150,000 acres by 2012.	Expanding the Agricultural and Rural Lands Water Quality Program will increase the acreage with management plans that address soil erosion, sediment control and subsequent loss of fertilizers and pesticides used in the soil. Performance in implementing this program will be evaluated by tabulating the expansion of the program to new farms on an annual basis
Reduce the concentrations of urban water quality contaminants by 30% in 2012.	MBNMS, in coordination with its partners, will track the contaminants in urban water quality as reported through the First Flush program, Urban Watch, and monthly reporting by the County Environmental Health Departments and RWQCB.

Table WQPP.2: Estimated Timelines for the Water Quality Protection Program Implementation Action Plan I: Urban Runoff

Water Quality Protection Program Action Plan	YR 1	YR 2	YR 3	YR 4	YR 5
Strategy WQPP-1: Increase Public Education and Outreach	●	—	—	—	→
Strategy WQPP-2: Increase Technical Training	●	—	—	—	→
Strategy WQPP-3: Collaborate with Regional Urban Runoff Management Efforts	●	—	—	—	→
Strategy WQPP-4: Promote Structural/Non-structural Controls	●	—	—	—	→
Strategy WQPP-5: Promote Sedimentation/ Erosion Controls		●	—	●	
Strategy WQPP-6: Increase Storm Drain Inspection	●	●			
Strategy WQPP-7: Produce and Promote CEQA Additions	●	●			
Strategy WQPP-8: Increase Regional Monitoring	●	—	—	—	→
Strategy WQPP-9: Increase Access to Monitoring Data	●	●	→
Strategy WQPP-10: Interagency Coordination	●	—	—	—	→
Strategy WQPP-11: Increase Public Education and Outreach	●	—	—	—	●
Strategy WQPP-12: Develop and Implement Technical Training Program	●	—	●		
Strategy WQPP-13: Promote Bilge Waste Disposal and Waste Oil Recovery	●	●			
Strategy WQPP-14: Promote Topside and Haul-out Vessel Maintenance		●	●		
Strategy WQPP-15: Increase Underwater Hull Maintenance	●	—	—	—	●

Monterey Bay National Marine Sanctuary – Final Management Plan
 Section VI – Water Quality: Water Quality Protection Program Implementation Action Plan

Water Quality Protection Program Action Plan	YR 1	YR 2	YR 3	YR 4	YR 5
Strategy WQPP-16: Establish Agricultural Industry Networks to Address Water Quality	●————●▶			
Strategy WQPP-17: Strengthen Technical Information and Outreach to Agriculture	●————●				
Strategy WQPP-18: Improve Education and Public Relations on Watersheds and Agricultural Conservation Measures	●.....▶				
Strategy WQPP-19: Coordinate and Streamline Regulations for Conservation Projects	●.....▶				
Strategy WQPP-20: Improve Funding Mechanisms and Incentives for Water Quality Improvements	●————●				
Strategy WQPP-21: Improve Water Quality Management on Public Lands and Rural Roads	●.....▶	●————●	●		
Strategy WQPP-22: Develop Wetlands and Riparian Corridor Action Plan			●————▶		
Legend					
Year Beginning/Ending	: ●————●	Major Level of Implementation: —————			
Ongoing Strategy	: ●————▶	Minor Level of Implementation:			

Table WQPP.3: Estimated Costs for the Water Quality Protection Program Implementation Action Plan

Strategy	Estimated Annual Cost (in thousands)*				
	YR 1	YR 2	YR 3	YR 4	YR 5
Strategy WQPP-1: Increase Public Education and Outreach	\$151	\$151	\$131	\$131	\$146
Strategy WQPP-2: Increase Technical Training	\$97	\$97	\$92	\$92	\$77
Strategy WQPP-3: Collaborate with Regional Urban Runoff Management	\$16	\$16	\$16	\$16	\$16
Strategy WQPP-4: Promote Structural/Non-structural Controls	\$24	\$24	\$24	\$24	\$24
Strategy WQPP-5: Promote Sedimentation/ Erosion Controls	\$20	\$20	\$12	\$12	\$78
Strategy WQPP-6: Increase Storm Drain Inspection	\$114	\$114	\$114	\$114	\$48
Strategy WQPP-7: Produce and Promote CEQA Additions	\$29	\$29	\$8	\$8	\$8
Strategy WQPP-8: Increase Regional Monitoring	\$480	\$480	\$480	\$480	\$480
Strategy WQPP-9: Increase Access to Monitoring Data	\$175	\$115	\$115	\$115	\$115
Strategy WQPP-10: Increase Interagency Coordination	\$58	\$58	\$58	\$58	\$57
Strategy WQPP-11: Increase Public Education and Outreach	\$75	\$75	\$75	\$75	\$75
Strategy WQPP-12: Develop and Implement Technical Training Program	\$0	\$0	\$13	\$13	\$13
Strategy WQPP-13: Promote Bilge Waste Disposal and Waste Oil Recovery	\$33	\$41	\$16	\$16	\$16
Strategy WQPP-14: Promote Topside and Haul-out Vessel Maintenance	\$60	\$20	\$12	\$12	\$12
Strategy WQPP-15: Increase Underwater Hull Maintenance	\$58	\$28	\$20	\$12	\$12

Monterey Bay National Marine Sanctuary – Final Management Plan
 Section VI – Water Quality: Water Quality Protection Program Implementation Action Plan

Strategy	Estimated Annual Cost (in thousands)*				
	YR 1	YR 2	YR 3	YR 4	YR 5
Strategy WQPP-16: Establish Agricultural Industry Networks to Address Water Quality	\$24	\$24	\$24	\$24	\$129
Strategy WQPP-17: Strengthen Technical Information and Outreach to Agriculture	\$129	\$129	\$129	\$129	\$30
Strategy WQPP-18: Improve Education and Public Relations on Watersheds and Agricultural Conservation Measures	\$34	\$34	\$30	\$30	\$20
Strategy WQPP-19: Coordinate and Streamline Regulations for Conservation Projects	\$20	\$20	\$20	\$20	\$24
Strategy WQPP-20: Improve Funding Mechanisms and Incentives for Water Quality Improvements	\$24	\$24	\$24	\$24	\$48
Strategy WQPP-21: Improve Water Quality Management on Public Lands and Rural Roads	\$148	\$48	\$48	\$48	\$48
Strategy WQPP-22: Develop Wetlands and Riparian Corridor Action Plan	\$0	\$4	\$116	\$56	\$56
Total Estimated Annual Cost	<i>\$1,769</i>	<i>\$1,551</i>	<i>\$1,577</i>	<i>\$1,509</i>	<i>\$1,532</i>

* Cost estimates are for both “programmatic” and “base” (salaries and overhead) expenses.



Section VII

Wildlife Disturbance

- **Marine Mammal, Seabird and Turtle Disturbance Action Plan**
- **Motorized Personal Watercraft Action Plan**
- **Tidepool Protection Action Plan**

Marine Mammal, Seabird, and Turtle Disturbance Action Plan

Goal

Minimize disturbance of marine mammals, seabirds and turtles within the Monterey Bay National Marine Sanctuary (MBNMS).

Introduction

Over the last twenty years, increasing numbers of people have been seeking opportunities to view and experience marine wildlife. For the most part, wildlife viewing has resulted in many positive benefits including new economic opportunities for local communities, and increased public awareness and stewardship for marine resources. However, marine wildlife can be disturbed and/or injured when viewing activities are conducted inappropriately. Disturbance or injury also occurs through commercial harvest activities. Frequent disturbance can adversely affect marine species. The effects of disturbance can be especially critical during sensitive time periods such as feeding, breeding, resting, or nesting. Disturbance is likely to cause avoidance reactions and may result in interruptions of social behavior of animals and is capable of leading to long-term changes in distribution. Public awareness is necessary to effectively address wildlife disturbance issues since most people who choose to view marine wildlife do not intend to place the animals or themselves at risk.

The MBNMS addresses wildlife disturbance through a mix of education, outreach, partnerships with docent programs, regulations and enforcement. The MBNMS regulations explicitly prohibit harassment of marine mammals as defined under the Marine Mammal Protection Act (MMPA), as well as harassment of sea turtles, and birds. Other MBNMS regulations relating to wildlife disturbance include restrictions on flying motorized aircraft below 1,000 feet in three designated sensitive areas, a prohibition on attracting white sharks, and restrictions on the use of motorized personal watercraft (MPWC). Non-regulatory measures are also used by the MBNMS to address wildlife disturbance, and include a variety of education and outreach activities and products.

Wildlife disturbance within the MBNMS is governed by several jurisdictions and law and regulations stemming from the NMSA, the Endangered Species Act (ESA), the California Endangered Species Act (CESA), the Migratory Bird Treaty Act (MBTA), and the Marine Mammal Protection Act (MMPA). The MBNMS coordinates with NOAA Fisheries to evaluate acceptable levels of fishery-related bycatch of marine mammals, seabirds, and turtles under the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA). The following activities related to wildlife disturbance are prohibited within the MBNMS: discharging matter (with certain exceptions); disturbing marine mammals, sea turtles, and birds; attracting white sharks; flying motorized aircraft below 1,000 feet in certain areas; and operation of jet skis outside of the designated zones.

Efforts to minimize the disturbance of wildlife will focus on identifying gaps in the existing system of protection and formulating a plan to jointly develop specific, more detailed

recommendations for those topics that have emerged as priorities. Many species in the MBNMS warrant further protection via outreach, education, enforcement or other strategies designed to inform the public and specific user groups of the need to prevent wildlife disturbance within the MBNMS.

Strategy MMST-1: Mitigate Impacts From Marine Vessels

Motorboats, whale watching vessels, kayaks, and military watercraft can disturb seabird colonies, rookeries, haulout areas, sea otters, or whales, particularly when operating in sensitive areas. The use of motorized or non-motorized vessels (outboard or inboard boats, kayaks, canoes, underwater scooters, or other types of water craft) to interact with marine mammals is increasing nationwide. NOAA Fisheries and the MBNMS receive complaints from members of the public of operators driving through groups of dolphins to elicit bow-riding behavior, whale watching vessels overly encroaching on whales or chasing animals, and kayakers too close to sea otters and harbor seals. Small boats particularly in areas near Elkhorn Slough and harbors may cause fatal blunt trauma injuries to sea otters. These actions can lead to many reactions in marine animals from fatality to avoidance responses and other unnatural behavior.

Activity 1.1: Develop and Distribute Wildlife Viewing Guidelines Addressing Marine Vessels

MBNMS will work to identify existing guidelines such as those generated by Watchable Wildlife, and adapt them to the MBNMS area, where appropriate. MBNMS will work with partners to distribute wildlife viewing guidelines for approaching seabirds, marine mammals, and turtles and helping to identify behavioral stress patterns of the animal. Initial efforts will include identifying target audiences to determine the best ways to package and distribute guidelines and use the MBNMS website to post information pertaining to wildlife observation.

Activity 1.2: Continue and Strengthen MBNMS Team OCEAN Kayak Program

The MBNMS will continue, strengthen, and expand the MBNMS Team Ocean Conservation Education Action Network (Team OCEAN) program, which educates on-the-water kayak users in an effort to prevent disturbance or harassment to sea otters, sea lions, harbor seals, and sea birds.

Activity 1.3: Develop Informational Cards with Guidelines for Viewing Marine Species from Kayaks

The MBNMS will develop partnerships with kayak companies to attach the informational cards to kayaks. MBNMS staff should conduct bi-annual evaluations with kayak companies to ensure that these educational efforts are effective and distribute the informational cards and other signage to boating supply stores, kayak shops, or other commercial venues. MBNMS will also develop additional educational training for local kayak and scuba diving shops, in order to reduce adverse reactions in species of concern. These training sessions should be complemented by outreach workshops outlined in other activities in this strategy.

Activity 1.4: Conduct Outreach and Promotion of Wildlife Viewing Guidelines to Private Boaters

The MBNMS should conduct an assessment of the most effective way to reach boaters with educational materials, including workshops and literature, to educate them on wildlife observation guidelines and vessel operation etiquette. MBNMS will post wildlife viewing

guidelines information at launch ramps, parking areas, public restrooms, or fuel docks. Speed guidelines posted in harbors should be augmented with information about sensitive species in the area, such as sea otters. MBNMS should consider development of a “Dock Walkers” program, in which educators encounter users at the harbor and instruct them about wildlife viewing.

Activity 1.5: Continue Outreach and Promotion of Wildlife Viewing Guidelines to Whale Watching Vessels

MBNMS will conduct workshops and other training to ensure that operators of whale watching vessels are aware of the guidelines for wildlife viewing and operating in a responsible manner.

Activity 1.6: Increase Federal Inter-agency Consultation

The MBNMS should conduct outreach to military environmental liaison to ensure that the military understands MBNMS requirements. In addition to current regulations, the NMSA requires other federal agencies to “consult” with the MBNMS when planning projects likely to injure Sanctuary resources. MBNMS will conduct annual training with federal agencies to ensure that boat operators and pilots are aware of sensitive marine species areas and overflight zones. This annual training is especially important for the US Coast Guard (USCG), which experiences high rotations of staff.

Activity 1.7: Share and Distribute Detailed Geographic Information System (GIS) Data Outlining Areas of Concern

MBNMS will distribute data identifying species distribution, migratory corridors, and seasonal patterns. This information should be included in training and provided as an ongoing tool to better coordinate military training activity to avoid impacts. MBNMS will work with the USCG pilots to facilitate their ability to download this information directly into their electronic flight planners.

Strategy MMST-2: Mitigate Impacts From Low Flying Aircraft

Low flying aircraft are known to cause seabirds, pinnipeds, and whales to exhibit avoidance responses. There are a variety of user groups associated with this activity, which may require different strategies in addressing the problem. The following actions and user groups are of concern: commercial film making flight operations, private non-profit aviation, military and agency (e.g., USCG) aircraft, and other potential activities. Potential impacts from low-flying aircraft are addressed by a specific prohibition on flying under 1,000 feet in designated overflight zones with sensitive wildlife. MBNMS has begun an outreach campaign to pilot associations on the zones and the impacts of low flights, and is working to include notations on Federal Aviation Administration (FAA) aeronautical charts. Additional outreach may be required to reach aviation companies that may be conducting whale-watching trips within the MBNMS Overflight Restriction Zones. In addition, consideration of potential impacts should be weighed for both fixed-wing aircraft and helicopters. There are inherent differences to the operating capabilities of these aircraft, and thus they cause different impacts to species of concern.

Activity 2.1: Identify MBNMS Overflight Restrictions on FAA Charts

Ensuring that correct verbiage and regulations are posted on the aeronautical charts is critical in an effort to inform pilots of the overflight restriction zones. Current aeronautical charts

incorrectly list the MBNMS overflight restriction zones as being a ‘recommendation’ rather than a ‘requirement.’

Activity 2.2: Identify Areas of Concern for Low Overflights and Continue Monitoring of Sensitive Areas

MBNMS will evaluate key geographical areas to understand priority concern locations and levels of disturbance to assist in targeting outreach and enforcement. The MBNMS will work with local film commissions to identify desirable sites for the film industry and monitor for potential impacts. MBNMS will also work with researchers and monitors in the field to compile data, regarding observations of low flying aircraft and associated disturbance. The MBNMS will also work with the Gulf of the Farallones National Marine Sanctuary (GFNMS) and other partners to monitor and evaluate key sensitive areas within the overflight zones as well as sensitive areas, such as Devil’s Slide on the San Mateo Coast, outside of the existing restriction zone.

Activity 2.3: Provide Permit Guidance to Aircraft Operators

The MBNMS will work with partners to coordinate and develop seasonal restrictions with other regulatory agencies to provide a useful guide for filming companies and conduct outreach for the owners of the few private airstrips along the Big Sur coast.

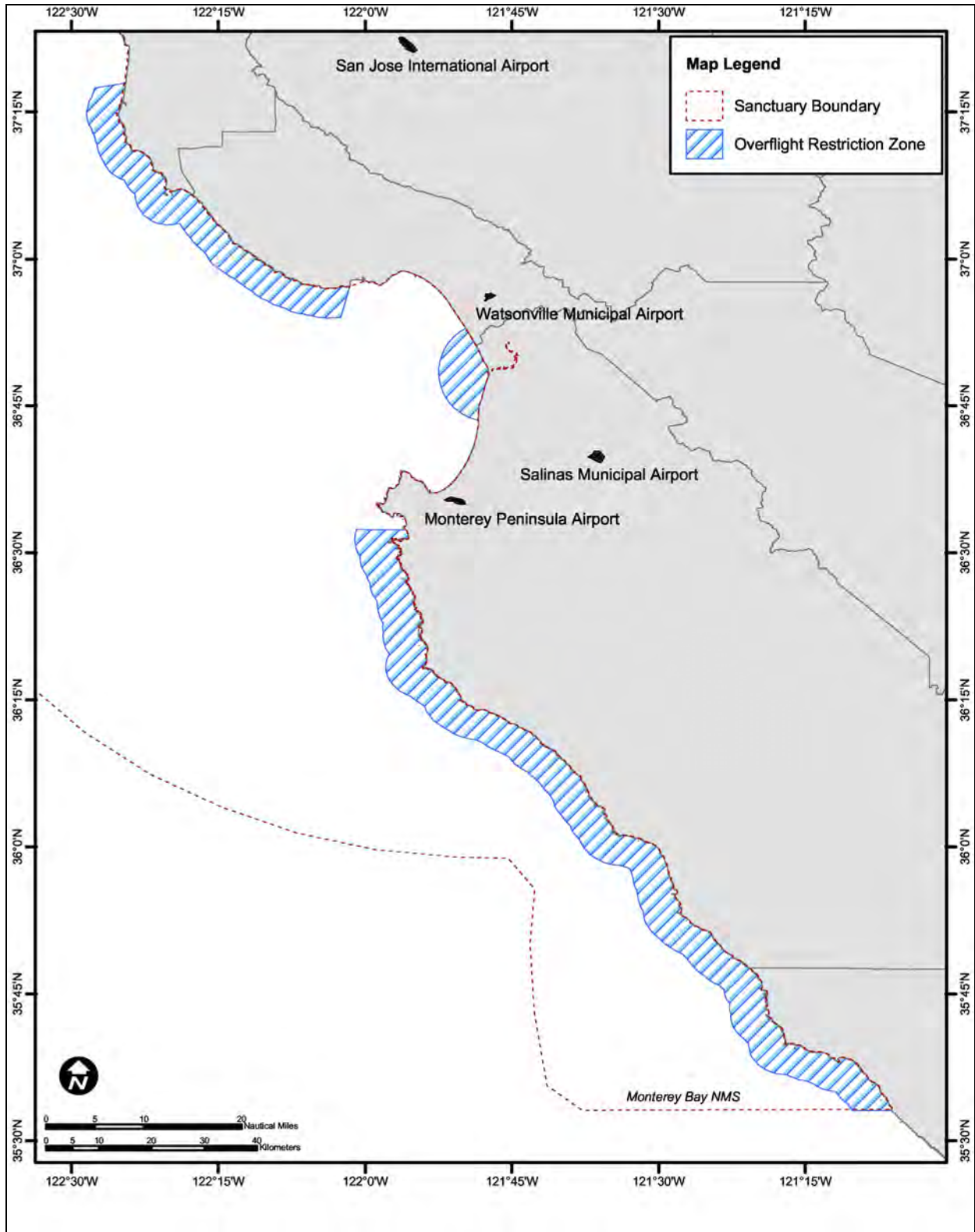
Activity 2.4: Assess Disturbance from Remote Controlled Airplanes

The operation of remote controlled airplanes operating in areas of high seabird and shorebird concentration may cause flushing events. The MBNMS will investigate the frequency and effects of this activity, and where appropriate, work with local municipalities to ensure that the activity is not occurring in highly sensitive habitat areas. Signage and outreach should be in place to educate the hobbyists on potential impacts their actions may cause. Further, the MBNMS regulations apply to remote controlled airplanes.

Activity 2.5: Assess Disturbance from Parasails and Hang Gliders

The MBNMS will work with partners as well as aid and encourage other agencies to evaluate the potential for parasails and hanggliders to disturb snowy plovers.

Figure MMST 1. Existing MBNMS Overflight Restriction Zones



Strategy MMST-3: Mitigate Impacts From Shore-Based Activities

There is a need to evaluate and possibly further address and reduce shore-based disturbance. Disturbance is known to cause seabirds, shorebirds, and pinnipeds to exhibit avoidance responses resultant from the interactions. MBNMS should conduct an assessment of the target audience in order to develop the best tools and materials to reach them.

Activity 3.1: Develop Wildlife Viewing Guidelines Addressing Shore-Based Activities

Identify, modify or draft appropriate guidelines for shore-based interactions with species of concern. This will complement the efforts listed in Strategy MMST-1.

Activity 3.2: Support Partners and Organization Conducting Outreach Activities

The MBNMS will continue to support organizations that conduct activities that reduce harassment to wildlife. The Friends of the Elephant Seal (FES), BayNet, or similar programs should be strengthened to ensure that volunteers continue to be available to interact with the public. The MBNMS will continue to collaborate with state parks and other sites that have intense visitor use to identify strategies to reduce wildlife disturbance, and facilitate increased signage at state parks to complement docent programs. The MBNMS should facilitate a column in a local newspaper that would outline various educational components for the public and offer seasonal information on various species, viewing protocols, pollution reduction tips, or other items of interest.

Activity 3.3: Continue Coordination with US Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) to Address Disturbance from Fireworks

Fireworks displays over the MBNMS have been traditionally conducted as part of national and community celebrations. The MBNMS began consultation with the USFWS and the NMFS in 2003 as required by the ESA, MBTA, and the MMPA. This process will outline permit conditions and maximum number of fireworks allowed at various locations, including areas where fireworks will not be allowed. MBNMS will continue to coordinate with appropriate agencies as permit applications are submitted.

Strategy MMST-4: Mitigate Impacts From Marine Debris

Levels of debris in both the ocean and at the land-sea interface are of growing concern. Various types of debris are known to have adverse effects on marine species. Plastics in the marine environment never fully degrade and recent studies show plastic is consumed by organisms at all levels of the marine food web. Dichlorodiphenyltrichloroethane (DDT) and other hydrophobic compounds are known to adhere to plastics. Ingestion and entanglement are one of the many problems associated with marine debris, which may eventually lead to death for many organisms. Priority types of marine debris include balloons, abandoned/discarded fishing gear, plastics and styrofoam, and consumer goods including 6-pack rings, plastic shopping bags, etc. The MBNMS should conduct an assessment of the target audience in order to develop the best tools and materials to reach them.

Activity 4.1: Coordinate with the California Coastal Commission (CCC) to Conduct Education and Outreach Programs to Illustrate the Impact of Marine Debris

The MBNMS will work with the CCC to determine how to best make information available to the general public for land-based education and all boaters—including the military, cruise ships, large commercial vessels, and fishermen—for ocean-based education. The MBNMS will work with partners to engage the media in wildlife issues adversely affected by debris, such as entangled animals, and identify areas where pelagic plastics accumulate in order to increase awareness of the connection to both land-based and offshore actions. The MBNMS will also work with the CCC to develop public service announcements that educate the public on the concerns and solutions to the issue. This public awareness strategy should fully integrate an educational component about marine debris into the campaign.

Activity 4.2: Expand GIS Database to Monitor Marine Debris in MBNMS

The MBNMS will work with the Ocean Conservancy and the CCC to expand the database to track and characterize the type, location and amounts of marine debris collected through coastal cleanup efforts. Monitoring results will be integrated with other wildlife disturbance monitoring data into the Sanctuary Integrated Monitoring Network (SIMoN).

Activity 4.3: Increase Education Regarding Impacts of Lost Balloons

Balloons are often found at sea and have deleterious effects on various forms of marine species. Develop informational tags to be placed on commercial helium tanks and balloons to illustrate the hazards of releasing balloons into the environment. Information should also be provided to area businesses.

Activity 4.4: Develop Notification and Recovery Program for Abandoned Gear

Work with other appropriate agencies to implement a notification and recovery program to collect fishing gear, similar to the program created in the Northwest Hawaiian Islands where derelict fishing gear is recovered. The USCG will retrieve abandoned fishing gear if it is deemed to be a hazard to navigation. However, gear that is not a navigation hazard is not recovered. The MBNMS should target educational efforts to fishermen and other users regarding the adverse effects of lost gear and debris. This activity will be valuable in combating this form of debris and encourage the USCG to, where possible, recover derelict fishing gear or assist in communication with others who could accomplish recovery. The MBNMS will work with partners to identify and enlist a network of trained partner organizations or individuals who are able to retrieve abandoned gear, after it is determined that the gear is in fact abandoned, while developing a notification system that the USCG, fishermen, researchers and other boaters can use to notify the recovery network of the locations of abandoned gear. The MBNMS will work with partners to develop a criteria list to evaluate whether gear is in fact abandoned. The MBNMS should evaluate the feasibility of developing a shore-side reward program for removal of gear that becomes washed up on beaches. An education component would be necessary to alert beachgoers of the recovery program.

Activity 4.5: Coordinate with Municipalities to Reduce Debris Accumulation

Local consumers, businesses, tourists, and residents should be made aware of the hazards associated with marine debris. Education efforts, in general, have been found to be more effective at the source of the problem than end-based solutions. The MBNMS will identify the

priority debris types to help formulate an educational approach to the issue, and conduct educational efforts with municipalities to install storm shields or catchment basins over storm drains in order to reduce the amount of post consumer garbage that enters the ocean during times of dry weather. The MBNMS will also collaborate with municipalities, cities, and students to paint stencils on storm drains, alerting others to this problem. The MBNMS will also work to support volunteer-based creek cleanups conducted in advance of wet weather in order to reduce the amount of plastic and trash contribution to the MBNMS.

Activity 4.6 Establishing a Large Whale Disentanglement Network

The MBNMS will work with other agencies and organizations to better develop and integrate a large-whale stranding network. During the Fall of 2006 the MBNMS participated in public outreach events and conducted trainings in whale rescue techniques in conjunction with HIHWNMS staff to demonstrate techniques and gear used to disengage large whales from fishing gear and non-fishery equipment and marine debris. Future efforts would likely include additional funding to conduct trainings and dissemination of education materials to address this issue. Future collaborations with partners would also include strengthening the stranding network by procuring necessary gear and expertise to be able to respond appropriately to large-scale stranding events of any kind including those resultant from acoustic impacts.

Strategy MMST-5: Evaluate Impacts From Commercial Harvest

Commercial harvesting of certain fish and kelp resources may result in varied types of disturbance to wildlife. The use of nighttime lighting in the commercial squid fishery may disturb certain seabirds such as pelicans, petrels, and auklets as well as sea otters by disrupting natural behavior. Kelp harvesting may involve potential disturbance of various fauna associated with the kelp ecosystem. Certain species such as sea otters could be prone to harassment by harvesting operations in the kelp beds. Certain methods of aquaculture can result in harm or mortality to seabirds. Pens used for rearing juvenile species can trap seabirds attracted to the contents, thereby resulting in injury or death.

Activity 5.1: Evaluate Levels of Disturbance and Identify Solutions

The MBNMS should conduct research activities to evaluate disturbance from kelp harvesting, lighting from squid fishing vessels, and aquaculture pens and gear entanglement. Potential solutions may include future, further evaluation of shielding or re-directing the light sources in some fashion to ensure current designs are adequate, and modifications to fishing gear and aquaculture pens to reduce bycatch and entanglement. The MBNMS will work with partners to determine if aquaculture pens could be redesigned to reduce entanglement of seabirds. (Note: penned aquaculture, if allowed, requires an authorization from the MBNMS.) The MBNMS will also work with the National Marine Fisheries Service (NMFS) to examine the scope of fishermen unintentionally snagging their gear on whales when both are focused on feeding grounds in the MBNMS. The MBNMS will invite fishermen to participate in training and workshops that will be conducted to reduce unintentional harassment or disturbance to marine species.

Activity 5.2: Coordinate with NOAA Fisheries to Reduce Bycatch of Marine Mammals, Sea Turtles and Birds

The MBNMS will work with NOAA Fisheries to reduce bycatch of marine mammals, turtles and birds associated with fishing activities in the MBNMS. Marine species are known to be prone to hooking and entanglement in fishing lines, gill nets, buoyed anchor lines, discarded fishing gear and other equipment, which can lead to serious injuries or death.

Strategy MMST-6: Assess Impacts From Acoustics

Noise levels in the marine environment have been increasing from increased shipping traffic, sonar technologies, seismic surveys, loudspeakers on boats traveling by or stopping close to nearshore rookeries, and research projects. The effects of noise on marine mammals, seabirds, and turtles is not entirely known, though some active sonars have been conclusively linked to the deaths of whales in other areas. Issues of concern include the effects of acoustics on marine mammals by ships, offshore commercial activities, the military, research, or other influences. NOAA has conducted and continues to conduct research regarding the effects of sound disturbance on marine mammals; however, additional MBNMS-specific research and monitoring may be necessary.

Activity 6.1: Expand Research and Monitoring of Acoustics in MBNMS

Strategies to address the above issue include gathering more information and data on the effects of sound in the marine environment. MBNMS will work with partners to encourage passive acoustic monitoring in order to identify and quantify sources of anthropogenic noise in air and underwater and continue to be apprised of survey and monitoring activities that are evaluating the effects of sound. The NMSP will encourage its research and agency partners to catalogue and analyze anthropogenic noise sources and levels so that staff can better understand the potential impacts and make management decisions based upon this information. NMSP acoustic experts will assist MBNMS staff in developing effective monitoring programs for research and mitigation purposes, and interpreting resulting acoustic data.

Activity 6.2: Continue Evaluation of Individual Projects with Potential Acoustic Disturbance

Potential effects of acoustic disturbance are not entirely known for marine species; however, there is a correlation between some acoustics sources and marine mammal stranding events in other areas of the world. MBNMS will continue evaluating individual proposals on a case-by-case basis through both the permitting and consultation processes to determine impacts of proposed projects, and develop conditions and/or make management recommendations. The MBNMS should work with NOAA Fisheries and other partners to determine acceptable sound levels in the different frequency ranges affecting sanctuary wildlife.

Strategy MMST-7: Reduce Sea Turtle Disturbance

The MBNMS should work with those involved in regional sea turtle research activities to determine primary threats, known disturbance activities, and strategies to reduce disturbance. Sea turtles are difficult to see from the water and are vulnerable to boat collisions and propeller strikes. Other known threats to turtles include the ingestion of garbage and marine debris such as plastic bags, styrofoam, balloons, and other plastics. These items can cause interference in metabolism or gut function as well being responsible for absorption of toxic byproducts. Contact

with discharged oil can harm sea turtles by adversely affecting respiration, blood chemistry, and salt gland function. Ingestion of tar balls is also of concern.

Activity 7.1: Assess Levels of Sea Turtle Disturbance in MBNMS

Strategies to address the disturbance of sea turtles in the MBNMS include working with NOAA Fisheries on further evaluation of sea turtle tracking projects, evaluation of stranding data, and developing a program to identify common sea turtle disturbance or harassment activities.

Activity 7.2: Address Sea Turtle Disturbance in Wildlife Viewing Guidelines.

Strategy MMST-8: Maintain and Enhance Enforcement

The MBNMS has one dedicated NOAA Enforcement Officer to respond to potential violations of MBNMS regulations. The MBNMS relies heavily on collaborations with other cross-deputized partners such as the California Department of Fish and Game (CDFG) and the California Department of Parks and Recreation (CDPR) to assist with MBNMS enforcement. The MBNMS also funds a half-time law enforcement officer working in the Cambria area to assist with enforcement issues in Cambria, San Simeon, and the Big Sur region. Enforcement patrols by the CDFG and the CDPR for the year 2000 - 2001 were tabulated at 2,444 'patrol hours.' Each hour of enforcement patrol effort reflects the presence of an enforcement unit somewhere in the MBNMS.

Activity 8.1: Strengthen Enforcement of MBNMS Regulations

It is critical to strengthen the availability of surveillance and enforcement capabilities, and to increase the visibility of MBNMS enforcement to enhance educational efforts. MBNMS will identify additional enforcement needs and increase MBNMS enforcement staff as necessary to address issues such as disturbance of wildlife by vessels and aircraft and discharge of marine debris. MBNMS enforcement personnel will also assist with development and distribution of wildlife viewing guidelines and interpretive efforts such as the Team OCEAN kayak program. MBNMS will also pursue partnerships with other state and federal agencies to further protect MBNMS resources and improve inter-agency coordination on enforcement to leverage field efforts, including MBNMS, CDFG, State Parks, and local police.

Activity 8.2: Continue Outreach to Increase Knowledge of MBNMS Regulations and Contact Information

There is some confusion among members of the public as to what the MBNMS regulations are and who to contact in the event of a violation. The MBNMS will work with other regulatory agencies to develop and disseminate readily understandable information about complex regulations and multiple jurisdictions to the public and agencies. The MBNMS will develop coordinated training with enforcement personnel and docents on how to effectively report MBNMS violations. The MBNMS will establish and promote a call-in system and infrastructure for the public to report incidents for enforcement follow-up.

Activity 8.3: Increase Use of Summary Settlement Process

NOAA will finalize and use as appropriate a summary settlement process, which would allow tickets or civil penalties to be levied on-scene to offenders.

Activity 8.4: Increase Coordination Between Education and Enforcement Programs

The MBNMS will continue to coordinate the MBNMS education and enforcement programs in order to address wildlife disturbance issues. The MBNMS will design and implement a formal system to facilitate referrals from docents or programs such as Team OCEAN to the enforcement program.

Action Plan Partners: California Department of Fish and Game, Department of Motor Vehicles, Harbors, US Fish and Wildlife, Save Our Shores, Defenders of Wildlife, Friends of the Sea Otter, pilot organizations, training schools, flight clubs, publications (*Inflyer*, *PacFlyer*, *AOPA*), airports, recruiting of volunteer pilots, Point Reyes Bird Observatory, California Coastal National Monument, research institutes, County and State Film Commissions, Visitor and Tourism Bureaus, NOAA Fisheries, State Parks, BayNet, docent outreach, non-profit groups, Ocean Conservancy, Monterey Bay Aquarium, Friends of the Elephant Seal, American Plastics Council, California Coastal Commission, Surfrider Foundation, San Francisco State University, Stanford, Naval Postgraduate School, Military, police, Team OCEAN

Table MMST 1: Measuring Performance of the Marine Mammal, Seabird, and Turtle Disturbance Action Plan

Desired Outcome(s) For This Action Plan:	
Reduce wildlife disturbance by strengthening and expanding the Team OCEAN education and enforcement efforts.	
Performance Measures	Explanation
By 2012, reduce by 50% the number of incidents of disturbance observed by Team OCEAN education program.	The number of contacts and disturbance observations by Team OCEAN will also be tracked seasonally and annually. Variability in the number of contacts should be correlated to the number of personnel in the field since implementation of the action plans will result in expanding the number of docents and volunteers as well as the enforcement staff. Increasing number of contacts may not be an indication of increased instances of wildlife disturbance.

Table MMST 2: Estimated Timelines for the Marine Mammal, Seabird, and Turtle Disturbance Action Plan

Marine Mammal Seabird and Turtle Disturbance Action Plan	YR 1	YR 2	YR 3	YR 4	YR 5
Strategy MMST-1: Mitigate Impacts From Marine Vessels	●		●		▶
Strategy MMST-2: Mitigate Impacts From Low Flying Aircraft	●		●	●	▶
Strategy MMST-3: Mitigate Impacts From Shore Based Activities	●		●		▶
Strategy MMST-4: Mitigate Impacts From Marine Debris	●			●	▶
Strategy MMST-5: Evaluate Impacts From Commercial Harvest			●		▶
Strategy MMST-6: Assess Impacts From Acoustics			●		▶
Strategy MMST-7: Reduce Sea Turtle Disturbance			●	●	▶
Strategy MMST-8: Maintain and Enhance Enforcement	●				▶
Legend					
Year Beginning/ Ending	: ● — ●	Major Level of Implementation: —			
Ongoing Strategy	: ● — ▶	Minor Level of Implementation:			

Table MMST 3: Estimated Costs for the Marine Mammal, Seabird, and Turtle Disturbance Action Plan

Strategy	Estimated Annual Cost (in thousands)*				
	YR 1	YR 2	YR 3	YR 4	YR 5
Strategy MMST-1: Mitigate Impacts From Marine Vessels	\$174	\$123	\$112	\$108	\$108
Strategy MMST-2: Mitigate Impacts From Low Flying Aircraft	\$181	\$95	\$32	\$17	\$17
Strategy MMST-3: Mitigate Impacts From Shore Based Activities	\$29	\$29	\$17	\$17	\$17
Strategy MMST-4: Mitigate Impacts From Marine Debris	\$119	\$61	\$38	\$33	\$33
Strategy MMST-5: Evaluate Impacts From Commercial Harvest	\$93.5	\$93.5	\$93.5	\$93.5	\$93.5
Strategy MMST-6: Assess Impacts From Acoustics	\$550	\$45	\$28	\$24	\$24
Strategy MMST-7: Reduce Sea Turtle Disturbance	\$35	\$35	\$32	\$32	\$32
Strategy MMST-8: Maintain and Enhance Enforcement	\$257	\$257	\$257	\$257	\$293
Total Estimated Annual Cost	<i>\$1,438.5</i>	<i>\$738.5</i>	<i>\$609.5</i>	<i>\$581.5</i>	<i>\$617.5</i>

* Cost estimates are for both “programmatic” and “base” (salaries and overhead) expenses.

Motorized Personal Watercraft Action Plan

Goal

To minimize disturbance of marine wildlife by motorized personal watercraft (MPWC), minimize user conflicts between MPWC operators and other recreationalists, and provide appropriate opportunities for MPWC use within the MBNMS.

Introduction

Motorized Personal Watercraft (MPWC) are small, fast, and highly maneuverable craft that possess unconventionally high thrust capability and horsepower relative to their size and weight. This characteristic enables them to make sharp turns at high speeds and alter direction rapidly, while maintaining controlled stability. Their small size, shallow draft, instant thrust, and “quick reflex” enable them to operate closer to shore and in areas that would commonly pose a hazard to conventional craft operating at comparable speeds. Many can be launched across a beach area, without the need for a launch ramp. Most MPWC are designed to shed water, enabling an operator to roll or swamp the vessel without serious complications or interruption of vessel performance. The ability to shunt water from the load carrying area exempts applicable MPWC from United States Coast Guard (USCG) safety rating standards for small boats. MPWC are often designed to accommodate sudden separation and quick remount by a rider. MPWC are not commonly equipped for night operation and have limited instrumentation and storage space compared to conventional vessels. MPWC propelled by a directional water jet pump do not commonly have a rudder and must attain a minimum speed threshold to achieve optimal maneuverability. Most models have no steerage when the jet is idle.

Independent studies and observations in coastal areas of the United States of MPWC impacts indicate that unrestricted access to all reaches of the MBNMS by such craft would pose an unacceptable threat to wildlife and other ocean users. MPWC commonly accelerate and decelerate repeatedly and unpredictably, and travel at rapid speeds directly toward shore, while motorboats generally slow down as they approach shore. Accordingly, disturbance impacts associated with MPWC tend to be locally concentrated, producing effects that are more geographically limited yet potentially more severe than motorboat use, due to repeated disruptions and an accumulation of impacts in a shorter period of time. To prevent the disturbance of wildlife and other nearshore users, most MPWC have been restricted in protected marine areas adjacent to, or overlapping the MBNMS, e.g., the Gulf of the Farallones National Marine Sanctuary (GFNMS) and nearshore areas of the Golden Gate National Recreation Area (GGNRA), Marin County, California State Parks, and the City of Santa Cruz. Current MBNMS management of MPWC is consistent with actions taken in these jurisdictions.

The majority of MPWC currently operated within the MBNMS are compact water jet-propelled craft that shed water from the passenger spaces. Larger size models are preferred in the high-energy ocean environment for increased power, range, and towing ability. Popular uses are operation within the surf zone, weaving in and out of wave lines, launching off the crest of waves and wakes, and towing surfers into waves. MPWC are often operated in pairs or larger groups for camaraderie and improved safety. Use of MPWC to tow surfers into fifty to eighty-foot waves at Mavericks, a surf break off Pillar Point in San Mateo County, is a relatively new

phenomenon in surfing, allowing surfers to ride waves previously considered too large to catch. Use of MPWC for this purpose has increased dramatically during the past decade at Mavericks. In addition, tow-in surfing activity has been increasing at many traditional surfing locations in the MBNMS, regardless of surf conditions. On days with moderate or low surf, MPWC provide ready access and improved flexibility for positioning surfers on wave breaks. On high surf days, MPWC provide access to areas normally considered too dangerous by paddle surfers. The MBNMS has received complaints by surfers, beachgoers, and coastal residents that the use of MPWC in traditional surfing areas has produced conflicts with other ocean users and caused disturbance of wildlife. During its designation, the MBNMS received a large number of similar complaints from the public, and the operation of MPWC in nearshore areas was identified as an activity that should be prohibited to avoid such impacts.

Strategy MPWC-1: Maintain & Enhance Motorized Personal Watercraft Zones

The MBNMS has employed a zoning approach to MPWC management for sixteen years (since 1992) to prevent disturbance of marine wildlife, nearshore habitats, and other coastal users by MPWC. The four existing zones were initially sited based upon the location of public launch facilities, traditional areas of MPWC use, and local wildlife and marine recreation distribution patterns. Zone boundaries have been marked by a total of twenty-one yellow MBNMS can buoys and four USCG navigation aids. The markers are positioned along the perimeter of each zone; however, they present added navigation hazards to mariners. Overall, the zones have received little use by MPWC operators since many ride three-plus-person-capacity craft that have not been restricted to the zones in the past. With the definition of MPWC changing to include three-plus-person-capacity craft, zone use patterns will likely change, though specific impacts by zone are unknown.

The nearshore area immediately southwest of Pillar Point, California, popularly named “Mavericks,” is known world-wide as a unique surfing venue where waves reaching heights of fifty to eighty feet can occur periodically each year. It is the only site of its kind in the continental United States but is wholly within the MBNMS and immediately adjacent to sensitive habitat areas of the James V. Fitzgerald Marine Reserve. Since the Mavericks area is outside of established MBNMS MPWC operating zones, MPWC access to the area required regulatory modifications. A new seasonal MPWC zone southwest of Pillar Point is created by regulation to provide limited recreational MPWC access to the Mavericks surf break.

Activity 1.1: Improve Buoy Marking System

The visibility of the zone marker buoys will be enhanced by marking buoys to identify their purpose and by adding polyvinyl chloride (PVC) piping to extend buoy height above the waterline. MBNMS will incorporate prominent USCG navigational aids into boundary marking schemes whenever possible.

Activity 1.2: Implement Ongoing Buoy Maintenance Program To Assure Buoys Are On Station

The MBNMS will contract with a private vendor to conduct regular maintenance and any necessary modifications to the buoy system to help assure that buoys remain on station, minimize safety hazards, and correctly mark the prescribed zones.

Activity 1.3: Create a new seasonal MPWC use zone at Mavericks and define boundaries and conditions for use

To address recreational use of MPWC at Mavericks and minimize impacts to wildlife, the National Marine Sanctuary Program is creating a new seasonal MPWC zone and access route that avoids sensitive marine mammal, seabird, and shorebird areas (e.g. Fitzgerald Marine Reserve and reef off Pillar Point), avoids time periods when wildlife are most vulnerable to disturbance, avoids time periods when sensitive wildlife are found in peak concentrations, considers user conflicts, and allows recreational MPWC access to the Mavericks surf break during big wave conditions.

The seasonal MPWC zone at Mavericks will exist only under the following conditions: when a "High Surf Warning" has been issued by the National Weather Service and is in effect for San Mateo County during December, January, or February. Access to this zone will be via a 100 yard-wide corridor along a navigation route that is commonly used by vessels accessing the Sanctuary from Pillar Point Harbor.

Activity 1.4: Evaluate zone use

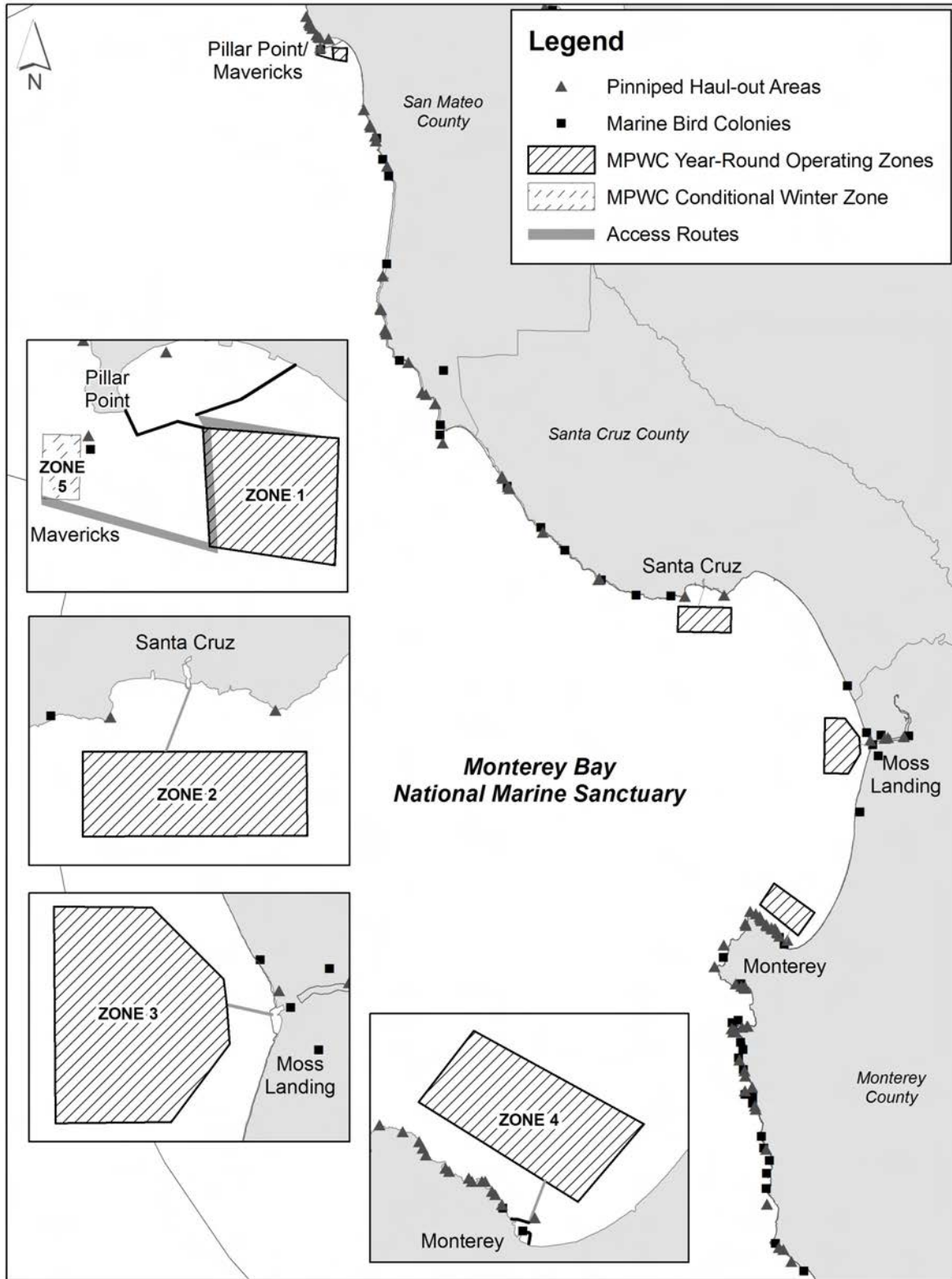
At the end of three years, the MBNMS, in coordination with GFNMS, will evaluate the extent to which the five MPWC use zones are being utilized.

Strategy MPWC-2: Zone Restriction Exceptions

Unless special provisions were made, the new definition of MPWC would significantly limit MPWC training by public safety agencies. Therefore, administrative policies and conditions will be implemented to authorize controlled operation of MPWC by these agencies in areas of the MBNMS outside established operating zones. At least eight state and local public safety agencies currently operate MPWC for purposes of surf zone rescue within the MBNMS. In order to use MPWC during emergencies, these agencies must train their MPWC operators to be familiar with the nearshore areas and ocean dynamics in which they may be called to operate. Since many response areas lie outside of MBNMS MPWC zones, public safety personnel need an administrative mechanism that facilitates familiarization and proficiency training.

The National Marine Sanctuary Program will develop protocols for the permitting of a sponsored big-wave surfing competition at Mavericks that utilize MPWC. In addition, Strategy 1, Activity 1.3 will provide for the creation of a new seasonal zone for limited recreational MPWC access to the Mavericks surf break. The seasonal zone will facilitate both general public access and practice by prospective big-wave surfing competitors.

Figure MPWC 1. MPWC Zones



Activity 2.1: Identify and Implement Official Protocols For Training of Public Safety Personnel

National Marine Sanctuary staff will consult with public safety agencies assigned jurisdictional authority within the MBNMS area to identify MPWC training needs and develop environmental protection protocols that minimize the risk of training impacts upon wildlife and habitats in the Sanctuary. At a minimum, the protocols will limit training to official government public safety personnel assigned to local units exercising jurisdictional authority within the MBNMS. Training shall not occur in sensitive habitat areas, disturb marine wildlife or interfere with other ocean users. Trainees shall use only agency authorized equipment that is marked for ready identification by the public to avoid a misperception of unauthorized use of an MPWC in the MBNMS.

Activity 2.2: Permit or Authorization for Training of Public Safety Personnel

The NOAA will authorize or permit public safety agencies operating MPWC within the MBNMS to conduct MPWC training for locally assigned personnel.

Activity 2.3: Consider Permit Program for one Commercially Sponsored Tow-In Surfing Competition per year at Mavericks (Pillar Point) that uses MPWC

Currently, one commercially sponsored surfing competition using MPWC is organized at Mavericks each year. The GFNMS, in coordination with the MBNMS, will establish guidelines for the limited permitting of MPWC operations at Mavericks as part of one commercially sponsored big-wave competition event per year. If a permit is issued, the activity will be subject to conditions and restrictions that minimize impacts to sanctuary resources.

Strategy MPWC-3: Conduct Educational Outreach to MPWC Community

In order to inform users about use of the zones, eight large enamel interpretive signs were designed, produced, and installed at launch ramps in the four harbors within the MBNMS in 1995. The signs are customized to each harbor location with text of MBNMS MPWC regulations superimposed on a map depicting the nearest operating zone and access route. The MBNMS also designed and published several thousand brochures to provide personal instructions for using the zones and complying with MBNMS regulations. The brochures were distributed to harbor offices and some retail shops. Due to the revised regulations accompanying this action plan, existing outreach materials will need to be modified.

Activity 3.1: Update and Maintain Interpretive Materials (e.g., signs, brochures, videos)

The MBNMS will amend the primary outreach brochure to describe the revised MPWC definition, the zoning system, and how to use the buoy system to remain within the authorized zones. The MBNMS will create new MPWC instructional signs and other media to address revised MPWC regulations and information, and proper riding etiquette.

Activity 3.2: Update Interpretive Methods (e.g., presentations, dock walkers, sign placement, information distribution)

The MBNMS will coordinate with the California Department of Boating and Waterways (CDBW) and conduct a needs assessment survey to determine the most effective method(s) of

contacting MPWC users. The MBNMS will also review locations of instructional signs to ensure they are in prominent locations at launch ramps. Based on the results of the needs assessment, MBNMS will conduct targeted outreach to MPWC user groups, clubs, retailers, renters and repairers, and coordinate with CDBW, volunteer organizations, and harbor masters to provide interpretive information to MPWC operators. The MBNMS will also coordinate with the CDBW to add the MBNMS MPWC regulations link to the department's website.

Activity 3.3: MBNMS Coordination with GFNMS to Maintain the MBNMS NOAA Weather Kiosk at Pillar Point Harbor Launch Ramp for Use By MPWC Operators, Surfers, Boaters, Fishermen, etc.

A weather kiosk is currently located at a prominent location at Pillar Point Harbor to help ocean users determine if appropriate sea conditions exist for authorized MPWC operation at Mavericks. The weather kiosk includes a touch screen computer system linked to real-time weather and oceanographic information from the National Weather Service and National Data Buoy Center. The MBNMS and GFNMS will collaborate to maintain this service for ocean users in the Pillar Point area.

Activity 3.4: Install A Link on the Front Page of the MBNMS and the GFNMS Website for Instant Access to Real-Time Weather and Oceanographic Data from the National Weather Service and National Data Buoy Center

An internet link to oceanographic and weather information will provide ready access by MPWC tow-in operators to information that will help determine if appropriate sea conditions exist for authorized MPWC operation at Mavericks. It will also provide useful information to other MBNMS users and be made available as part of the suite of Sanctuary Integrated Monitoring Network (SIMoN) real-time monitoring tools.

Strategy MPWC-4: Enhance Enforcement Efforts

Oversight and management of MPWC zones requires dedicated enforcement surveillance and rapid response to suspected violations. Harbor patrols and other harbor-based enforcement agencies are uniquely situated to perform this mission, but would require training and financial support. Harbor-based peace officers are familiar with MPWC use patterns in their areas, often receive initial complaint calls from the public, have immediate access to MPWC zones, and are most familiar with harbor areas and adjacent waters.

Activity 4.1: Expanded Deputization of State and Local Peace Officers

The MBNMS will complete a study for utilizing harbor police and other ocean-based law enforcement units to assist the MBNMS in MPWC enforcement. Expanded deputization will be explored to increase surveillance patrols and enforcement personnel to monitor MPWC zones and harbor launch points.

Activity 4.2: Commit Sufficient Enforcement Funding to Support Deputization Agreements

NOAA will seek to provide base funding to support *Activity 4.1* above and will seek augmentation funding from both NOAA and non-NOAA sources.

Activity 4.3: Permit Enforcement at Mavericks Using Permit Fee Funding

Fees may be collected for MPWC use permits at Mavericks and will be used to pay for permit processing, additional monitoring, and/or enforcement of MPWC activity at that location.

Action Plan Partners: United States Coast Guard; California Department of Boating and Waterways; California Department of Parks and Recreation; Cities of Marina, Santa Cruz, Capitola, Half Moon Bay, and Monterey; Pillar Point Harbor; Pacific Grove Ocean Rescue; Surfrider Foundation; Personal Watercraft Industry Association; American Watercraft Association; NOAA Office of Law Enforcement; California Department of Fish and Game; California Highway Patrol; Harbor Police; Sheriff Offices; Police Departments

Table MPWC.1: Measuring Performance of the Motorized Personal Watercraft Action Plan

Desired Outcome(s) For This Action Plan:	
Minimize disturbance of marine wildlife by MPWC, minimize user conflicts, and provide opportunities for MPWC use within the Sanctuary through education and enforcement of MPWC zones.	
Performance Measures	Explanation
By 2012, no observed disturbance of wildlife as a result of MPWC operation.	MBNMS will track the number of reports of wildlife disturbance due to MPWC throughout the MBNMS. This will be obtained from enforcement reports, reports to CDFG, harbor masters, and the USCG. These reports must distinguish MPWC caused disturbance from other types of disturbance discussed in the Marine Mammal, Seabird, and Turtle Disturbance Action Plan. Observed disturbances of wildlife will vary with the level of enforcement, observers, and reporting.

Table MPWC.2: Estimated Timelines for the Motorized Personal Watercraft Action Plan

Marine Personal Watercraft Action Plan	YR 1	YR 2	YR 3	YR 4	YR 5
Strategy MPWC-1: Maintain & Enhance Motorized Personal Watercraft Zones	●				▶
Strategy MPWC-2: Zone Restriction Exceptions	●	●			▶
Strategy MPWC-3: Conduct Educational Outreach to MPWC Community	●	●			▶
Strategy MPWC-4: Enhance Enforcement Efforts	●	●			▶
Legend					
Year Beginning/ Ending	: ● — ●		Major Level of Implementation: —		
Ongoing Strategy	: ● —▶		Minor Level of Implementation:		

Table MPWC.3: Estimated Costs for the Motorized Personal Watercraft Action Plan

Strategy	Estimated Annual Cost (in thousands)*				
	YR 1	YR 2	YR 3	YR 4	YR 5
Strategy MPWC-1: Maintain & Enhance Motorized Personal Watercraft Zones	\$53	\$33	\$33	\$33	\$33
Strategy MPWC-2: Zone Restriction Exceptions	\$35	\$25	\$0	\$0	\$0
Strategy MPWC-3: Conduct Educational Outreach to MPWC Community	\$81	\$46	\$15.5	\$15.5	\$8
Strategy MPWC-4: Enhance Enforcement Efforts	\$161	\$111	\$111	\$111	\$111
Total Estimated Annual Cost	<i>\$330</i>	<i>\$215</i>	<i>\$159.5</i>	<i>\$159.5</i>	<i>\$152</i>

* Cost estimates are for both “programmatic” and “base” (salaries and overhead) expenses.

Tidepool Protection Action Plan

Goal

Protect tidepool habitat and resources from impacts associated with visitation and harvest.

Background

Tidepools and other components of rocky shores represent a species-rich habitat that attracts a wide array of visitors and collectors. In addition to the positive aspects of direct exposure to Monterey Bay National Marine Sanctuary (MBNMS) life, comes the potential for various forms of human disturbance. The MBNMS currently lacks an overall strategy to address impacts to tidepools from human disturbance. Although a comprehensive regional analysis of the locations and extent of tidepool impacts is lacking, public concerns have been raised about disturbance to tidepools in many different areas of the MBNMS, including James V. Fitzgerald State Marine Park, Pigeon Point, Bean Hollow, Santa Cruz, Monterey, Pacific Grove, Pebble Beach, Big Sur and Cambria. Concerns raised in areas of high visitor traffic include trampling of the resources, turnover of rocks, displacement of both living and nonliving resources, and collecting of intertidal species or shells that can provide habitat. Unfortunately, although there is a wealth of knowledge about tidepool life within the MBNMS, there have not previously been studies that focused on evaluating the extent of human impacts at tidepool locations other than James V. Fitzgerald State Marine Park and Natural Bridges State Beach.

Figure TP-1: Students Tidepooling with MBNMS Staff



Trampling is defined as when animals are crushed or dislodged or algae are damaged. Disturbance may also occur if animals or substrates are not returned to the same location. Collecting is defined as picking animals out of the intertidal area, an activity conducted by casual individual visitors, school groups, aquaria, biosupply companies and for consumption. The largest and most common organisms are most often collected since they are most easily found. In the MBNMS region, species selectively harvested for consumption commonly include owl limpets, black turban snails, and others. In addition to direct losses from disturbance and collecting, secondary changes may result from changes in distribution, prey availability, and competition. Under heavy use, patches of habitat become more frequently disturbed, allowing less time for recovery.

Another source of visitor impacts to tidepools is the discarding of trash, which can remain for extended periods of time and become wedged in the substrate. Various types of equipment for research, harvesting or recreational purposes, which are installed or left behind, may also raise public concerns. The level of impact from these sources is unknown. In addition to visitor impacts from trampling, substrate displacement and collecting, which will be addressed in this action plan, there are a variety of other types of human activities that can have negative impacts

on tidepools, and rocky shores, including coastal armoring, polluted runoff, landslide disposal, small boat groundings, and behavioral disturbance of marine mammals.

Most tidepool areas of the MBNMS do not have significant monitoring and enforcement, signage or educational outreach strategies to minimize human impacts. In addition, there has not been a regional effort to assess usage and potential impacts and to prioritize sites that need additional attention. This action plan provides a framework to collaborate with agencies and local communities to more thoroughly evaluate the issue and develop guidelines and programs for comprehensive education, enforcement, monitoring and management of the region's tidepools. Strategies involve recommendations for coordination with actions by a range of players in addition to actions that should be undertaken by the MBNMS.

Strategy TP-1: Assess the Problem

The MBNMS participated in the Point Pinos Tidepool Task Force, a citizen-based group established several years ago in response to public concern about degradation of tidepool habitats in Pacific Grove. This group focused on improving public awareness about tidepool conservation and conducting research about the role of human impacts in changes that occur in rocky intertidal communities. In collaboration with the Point Pinos Tidepool Task Force Research Committee, the Monterey Bay Sanctuary Foundation administered a contract (that concluded in 2003) to evaluate visitor use patterns and resource impacts at Point Pinos. This study is evaluated locations, amounts and types of visitor uses, assessed documents and conducted interviews about historical patterns at the site. It also included field monitoring of intertidal organisms to evaluate species abundance, distribution patterns, size-frequency and other factors at sites that differ in their levels of visitor use, in an attempt to distinguish visitor impacts from other factors that may influence tidepool life such as oceanographic temperature change.

MBNMS staff is also participating in a similar study of tidepool impacts that is beginning at the James V. Fitzgerald State Marine Park under the direction of the San Mateo County Parks and Recreation Division. This study will build on initial work conducted by James V. Fitzgerald State Marine Reserve staff to evaluate impacts of visitor use via use of control sites that limit access. At the southern boundary of the MBNMS, staff are conducting initial efforts on both tidepool monitoring and educational outreach.

The MBNMS has also compiled a detailed survey of the research and monitoring programs focused on rocky intertidal habitat within the MBNMS (DeVogelaere et al., 1998). This provides basic information on tidepool resources, and also may serve as an initial estimate of locations of intertidal habitats that are accessible to visitors. Staff also collaborates with the Partnership for Interdisciplinary Studies of Coastal Oceans (PISCO), a consortium of academic scientists that have been conducting extensive monitoring of rocky intertidal habitats. However, additional information is necessary to fully evaluate the extent of impacts to tidepools.

Activity 1.1: Continue Regional Identification and Prioritization of Tidepool Locations

MBNMS staff will work with partners in continuing the identification of areas subject to existing and potential damage, natural resources, presence of unique species assemblages, and heavily used access points. This activity includes refinement of the Joint Management Plan Review

(JMPPR) workgroup’s geographic matrix characterizing the region’s tidepools, drawing on expert and public input, and adding quantitative data where possible. MBNMS will then conduct a rapid assessment of information in the matrix to provide a ground-truthed survey of identified sites. All information will be integrated into the Sanctuary Integrated Monitoring Network (SIMoN).

Activity 1.2: Identify Types and Extent of Impacts to Tidepools

Assess and prioritize types and extent of impacts including collecting, trampling, and other disturbances from people, drawing primarily on existing studies.

Activity 1.3: Monitor to Understand Natural Versus Human-Caused Changes

Include adequate tidepool sites that are not accessible for use as a control to distinguish impacts; include continuation of PISCO, Long-term Monitoring Program and Experiential Training for Students (LiMPETS), and Fitzgerald projects.

Activity 1.4: Improve Data Collection and Database Coordination Among Tidepool Research and Monitoring Projects

This activity will facilitate data comparisons over time to compare impacted and non-impacted sites.

Activity 1.5: Ensure Researchers Understand Key Priorities and Information Needs of Managers and Improve Packaging and Distribution of Existing Research, and Make It Available to Managers and the Public

Activity 1.6: Compile Historical Knowledge About Key Locations

Include community-based and anecdotal information and analysis of museum specimens. This information can be used to raise public awareness.

Activity 1.7: Conduct an Evaluation of Visitors at Representative Sites

This evaluation should include where they come from, what they are doing at the tidepools, frequency and timing of their visits, and their level of awareness of tidepool etiquette. Include evaluations of pre-visit locations such as the Monterey Bay Aquarium and the Seymour Center.

Activity 1.8: Assess Potential Impacts of Restricted Use Compared to Unrestricted Use

Shifting patterns of use at one site impacts other locations where uses are unrestricted.

Strategy TP-2: Conduct Education and Outreach

MBNMS continues to work with various partners to produce interpretive signage to provide information about tidepools and tidepool etiquette aimed at reducing impacts to heavily visited locations. Completed signs are in place in Pacific Grove, and new ones are underway in San Mateo County and the San Simeon/ Cambria region. To supplement the signage, staff assisted California Department of Parks and Recreation (CDPR) in the production of a new video for school groups and teachers that focuses on tidepool etiquette, and will be working on the local distribution of that product.

Activity 2.1: Develop Appropriate Education and Outreach Materials About Tidepool Protection and Etiquette

MBNMS will work with partners to develop education and outreach materials. These materials will target the public, schools, collectors/researchers and culturally diverse groups and include information about existing regulations and multiple agency jurisdictions, which may be complex and difficult to understand. Visitors should understand it is their responsibility to know these regulations.

Activity 2.2: Consider Potential for Hands-on Exhibits or Live Display Tables

MBNMS will coordinate with other partners and agencies to place exhibits at selected tidepool sites or visitor centers, which could reduce the need for hands-on activities in the tidepools themselves.

Activity 2.3: Develop and Distribute Pre-Visit Education and Outreach Materials about Tidepool Etiquette

MBNMS programs will be established at key visitor locations such as aquaria, which often inspire subsequent field visits.

Strategy TP-3: Strengthen Enforcement

The intertidal zone within the MBNMS is governed by a complex array of multijurisdictional laws and regulations. As of 2003, California Fish and Game Code 8500 restricts the taking of mollusks, crustaceans, or other invertebrates for commercial purposes by any person in any tidal area without a valid tidal invertebrate permit. This restriction covers tide flats or other areas between the high tide mark and 1,000 feet beyond the low tidemark. For non-commercial collection, a more complex set of constraints is outlined in Title 14 §29.05 of the California Code of Regulations (CCR). Enforcement of collecting regulations is an ongoing challenge given the limited number of wardens available. In 2003, four California Department of Fish and Game (CDFG) wardens covered the entire MBNMS coastline, with responsibilities for enforcing a wide range of regulations beyond those covering tidepools. Other enforcement resources include CDPR rangers, city police departments, and the MBNMS's enforcement officer, all of whom are stretched thin by an array of duties and geographic needs unrelated to tidepools.

Activity 3.1: Improve Enforcement of Existing Regulations

MBNMS will work with partner agencies to improve enforcement by, as resources allow, funding more officers/wardens in the field and increasing patrol hours to devote more attention to tidepool issues.

Activity 3.2: Utilize Enforcement to Focus on Significant Violations

Enforcement for significant violations is required at all hours, particularly to provide coverage for off-peak hours when these significant incidences often occur.

Activity 3.3: Improve Interagency Coordination

MBNMS will work with partners to leverage field efforts and increase coordination between MBNMS, CDFG, CDPR and local police. MBNMS will also investigate methods to provide training to municipal enforcement officers.

Activity 3.4: Define a System of Referrals from Docents to Enforcement Officers

MBNMS will work with partners to define a communication infrastructure needed to quickly contact enforcement officers and develop guidance and coordinated training protocols on when to call in enforcement and how to effectively address issues.

Activity 3.5: Integrate Tidepool Incidents and Awareness into Wildlife Disturbance Call-In Systems

MBNMS will work with partners to develop the infrastructure for a system that allows the public to report incidents for enforcement follow-up. This system would be coordinated with the CDFG CalTip system and Save Our Shores (SOS) MBNMS Watch.

Strategy TP-4: Improve Tracking and Evaluation of Collection and Take

Activity 4.1: Develop Information to Estimate Legal and Illegal Recreational and Scientific Take

Activity 4.2: Improve Tracking of Use Under State Collection Permit System and Develop Take Information Using California Department of Fish and Game Citation Data Base

MBNMS will coordinate with CDFG to evaluate the utility of the database as a tracking tool for collection and take from tidepools in MBNMS.

Activity 4.3: Improve Consistency Between Existing Federal, State and Local Data Sources

MBNMS will facilitate integration and comparison of data (e.g., terminology and categories of invertebrate life used on forms).

Activity 4.4: Improve Tracking of Take and Collection from MBNMS Permit Process

MBNMS will assess take and collection and other associated data available at the permit locations. MBNMS staff will also work with existing and potential permittees to increase compliance and use of the permit process, including when permits are required, reporting needed, nontransferability of permits, etc.

Activity 4.5: Include Information on the Permits Needed from Multiple Agencies on Agency Websites

Strategy TP-5: Consider Limitation on Use in Selected Locations

The Sanctuary itself prohibits the alteration of the seabed without a permit <http://montereybay.nos.noaa.gov/resourcepro/prohibitions.html>. However, this regulation has generally been applied to tidepool visitation only if rocks are being removed from the site. MBNMS is a partner with other agencies who directly regulate collecting of intertidal organisms in their efforts to prevent adverse impact to the intertidal zone. In certain locations within the Sanctuary, there is an additional layer of regulation imposed by virtue of its state or local designation as a protected area. There is a panoply of these small protected areas within the MBNMS including state beaches, state marine reserves, state marine conservation areas, and state marine parks. These designations restrict the take and disturbance of the intertidal zone to varying degrees, but generally afford tidepool habitats and organisms greater protection from both commercial and non-commercial impacts. Some allow the take of specified plants and

invertebrates while others may prohibit both take and disturbance. A comprehensive list of these sites and their associated regulations is available at <http://montereybay.nos.noaa.gov/research/techreports/marinezones/>. The MBNMS will evaluate alternative management options at locations where education and enforcement are unlikely to be sufficient.

Activity 5.1: Develop Criteria for Determining Limited Use of Tidepools and Rank Sites

MBNMS will coordinate with partners and use information gathered in the Tidepool Evaluation to determine if limitations are necessary at certain sites.

Activity 5.2: Partner with Agencies with Jurisdictions at Identified Sites

MBNMS will work with partners to assess and develop feasible site-specific management alternatives, including consideration of:

- A. Reservation systems at key sites, including identification of carrying capacity and setting of caps on allowable numbers of visitors for locations with limited access;
- B. Restriction or redirection of coastal access via recommendations to the California Coastal Commission (CCC), CDPR or other agencies, including potential relocation of parking lots and access paths or redirecting visitors or school groups to sites other than tidepools, such as Elkhorn Slough or proximal sandy beaches, and development of education and enforcement at those alternative sites; and
- C. Consideration of tidepool state marine reserves in the Marine Life Protection Act (MLPA) process, building on initial evaluations in the workgroup’s tidepool geographic matrix that may require temporary closures at selected sites, or roping off particularly sensitive areas within a site. California is considering the establishment of an intertidal State Marine Reserve at Natural Bridges in Santa Cruz County.

Strategy TP-6: Identify Implementation Opportunities

Activity 6.1: Increase Multiagency Funding and Joint Staffing to Implement Program

Activity 6.2: Develop Voluntary Contributions

- A. Consider developing an Adopt a Tidepool program
- B. Consider “parking meter” style donation systems at tidepool locations
- C. Generate support from local businesses

Strategy TP-7: Address Other Human Activities

Activity 7.1: Address Other Types of Human Activities

Focus on human activities, which impact tidepools and rocky shores. Consider strategies included in other JMPR action plans.

- A. Evaluate impacts of coastal armoring to ensure that armoring such as rip rap does not harm sensitive tidepool locations.
- B. Reduce polluted runoff from agricultural lands, urban areas and parking lots onto sensitive tidepool locations.

- C. Reduce spills of sewage and oil or discharge of marine debris, which can end up in tidepools.
- D. Review oil spill contingency plans to evaluate adequacy of spill clean-up recommendations for rocky intertidal locations, and ensure that the methodology will not do further damage.
- E. Reduce small boat groundings, which can crush rocky intertidal life, and develop recovery programs or damage fees to be used for tidepool efforts when damage occurs.
- F. Reduce impacts from landslide disposal activities onto sensitive tidepool locations.
- G. Reduce visitor harassment of marine mammals, which haul out on or near rocky intertidal locations.

Action Plan Partners: University of California Santa Cruz, Partnership for Interdisciplinary Studies of Coastal Oceans, Long Marine Lab, Monterey Bay Aquarium, Hopkins Marine Station, California Department of Fish and Game, State Parks, trained volunteers and interns, cities, counties, BayNet, Save Our Shores, Fitzgerald, Seymour Center, schools, science camps, visitor centers, local jurisdictions

Table TP 1: Measuring Performance of the Tidepool Protection Plan

Desired Outcome(s) For This Action Plan:	
Increase understanding of impacts to rocky intertidal areas and protect the habitat and resources from impacts associated with visitation, pollution, harvest, or development.	
Performance Measures	Explanation
Develop and implement education and enforcement programs at five most “at risk” tidepool locations by 2012.	Evaluation of progress toward protection of the rocky intertidal habitat within the Sanctuary can be evaluated by measuring the number of enforcement and education programs implemented. Incremental evaluation will tabulate the number of education and enforcement programs at high priority and high-risk rocky intertidal areas.

Table TP 2: Estimated Timelines for the Tidepool Protection Plan

Tidepool Protection Action Plan	YR 1	YR 2	YR 3	YR 4	YR 5
Strategy TP-1: Assess the Problem	●.....			●.....●	
Strategy TP-2: Conduct Education and Outreach	●.....			●.....▶	
Strategy TP-3: Strengthen Enforcement	●.....		●.....		▶
Strategy TP-4: Improve Tracking and Evaluation of Collection and Take	●.....			●.....●	
Strategy TP-5: Consider Limitation on Use in Selected Locations	●.....			●.....●	
Strategy TP-6: Identify Implementation Opportunities	●.....			●.....●	
Strategy TP-7: Address Other Human Activities	●.....			●.....●	
Legend					
Year Beginning/ Ending	:	●.....●		Major Level of Implementation:
Ongoing Strategy	:	●.....▶		Minor Level of Implementation:

Table TP 3: Estimated Costs for the Tidepool Protection Plan

Strategy	Estimated Annual Cost (in thousands)*				
	YR 1	YR 2	YR 3	YR 4	YR 5
Strategy TP-1: Assess the Problem	\$137	\$49	\$128	\$17	\$112
Strategy TP-2: Conduct Education and Outreach	\$163	\$105	\$67	\$47	\$43.5
Strategy TP-3: Strengthen Enforcement	\$181	\$181	\$185	\$185	\$185
Strategy TP-4: Improve Tracking and Evaluation of Collection and Take	\$28	\$28	\$4	\$4	\$4
Strategy TP-5: Consider Limitation on Use in Selected Locations	\$0	\$16	\$20	\$130	\$130
Strategy TP-6: Address Other Human Activities	\$24	\$12	\$12	\$12	\$12
Total Estimated Annual Cost	\$533	\$391	\$416	\$395	\$486.5

* Cost estimates are for both “programmatic” and “base” (salaries and overhead) expenses.



Section VIII

Cross-Cutting Action Plans

- **Cross-Cutting Introduction**
- **Administration and Operations**
- **Community Outreach**
- **Ecosystem Monitoring**
- **Maritime Heritage**
- **Northern Management Area Transition Plan**

Cross-Cutting Action Plans

Cordell Bank, Gulf of the Farallones and Monterey Bay National Marine Sanctuaries are located adjacent to one another along a 300-mile stretch of the north-central California coast. All three sanctuaries are managed by the National Marine Sanctuary Program (NMSP), share many of the same resources and issues, and have some overlapping interest and user groups. There are many opportunities for these sites to work cooperatively, share assets, and address resource management issues in a coordinated manner.

The three sanctuaries continue to coordinate on many important resource management issues, such as oil spills and volunteer monitoring. However, each site is, for the most part, managed independently of the others. The three sanctuaries have separate administrative staffs, Sanctuary Advisory Councils, and independent education, research and resource protection programs. As a result, opportunities to maximize collaborations and share resources have not fully been realized.

Goals

The goal of the cross-cutting action plans is to build upon existing coordination efforts and identify some activities that should be jointly implemented so that these three sites can operate as integrated and complementary sites to better protect Sanctuary resources. This will ensure that scarce program resources are used more efficiently and result in a more consistent and coordinated delivery of programs, products and services to the public. Cross-cutting actions plans were developed to address: administration and operations; northern management area; community outreach; maritime heritage; and ecosystem monitoring. Though the implementation of other activities contained in the site-specific plans may also be effectively coordinated, the NMSP determined that the cross-cutting action plans would be jointly developed and implemented jointly across the three sites.

Implementation Within the Context of a New Regional Structure

NMSP efforts to address certain priority issues in a cross-cutting framework was a first step in a larger effort to begin looking at sanctuary resource management issues in a regional or ecosystem-based context. Since the cross-cutting plans were developed, the NMSP has been slowly moving toward adopting a new regional management structure. This new regional structure establishes four regions, including a West Coast region, which is led by a Regional Superintendent. The purpose of this new structure is to maximize program integration among the NMSP sites, regions, and national program and to other state and federal programs and partners – across all levels. The regional structure dedicates program leadership and regional staff resources directly towards integrating programs and forging partnerships that supports NOAA's evolving ecosystem-based management approach.

The Regional Superintendent and staff is based in the region and dedicates their efforts toward addressing priority regional issues and capitalizing on regional opportunities and partnerships. In the case of the Jmpr, some of their expertise and responsibilities could include working closely with individual sanctuary staff to coordinate the implementation of certain cross-cutting action plans. For example, regional ecosystem monitoring has emerged as a NOAA priority.

To be effective, this requires the integration of sanctuary monitoring activities not only across the three sites in the joint management plan review, but those at partner state and federal agencies and at other marine sanctuaries such as Channel Islands and Olympic Coast. Regional staff could clearly play an important role in helping coordinate and ensure the linkages as the various site or cross-cutting ecosystem monitoring plans are being implemented. Regional staff and resources may also be involved in helping coordinate or implement the community outreach, maritime heritage action plans. However, it may also be appropriate for individual sanctuaries to either share the lead for implementing the cross-cutting action plans or for one site to take the lead. Ultimately, determining who will take the lead on cross-cutting action plan implementation will be worked out after the regional structure and priorities get established, and after full consideration of the staffing and resources available at each of the three sites.

Administration and Operations Action Plan

Goals

The goals of cross-cutting administration and operations for the Joint Management Plan Review (JMPPR) are to (1) improve coordination and cooperation across the three Sanctuaries to better and more efficiently manage and protect Sanctuary resources, and (2) for the individual sites to start working and functioning as an integrated team. Fulfilling these goals for the three Sanctuaries requires enhancing communication and collaboration among and between managers, program staff and the newly established National Marine Sanctuary Program (NMSP) regions.

Issue Description

During scoping meetings, the NMSP received many comments relating to the need to coordinate various administration and operations across the sites. The three Sanctuary Advisory Councils and Sanctuary staff identified several of these issues as priority items to address in the management plan review. These include:

- Improve resource management consistency and efficiency
- Expand coordination and communication between sites and to the public
- Evaluate emergency response capabilities in the region, and clarify and coordinate the Sanctuary's role in relation to other agencies
- Develop a mechanism to address current and emerging issues between the sites
- Coordinate research/monitoring, education/outreach, and enforcement activities

Addressing the Issue

Each of the three sanctuaries developed site-specific administration and operations action plans to address staffing and infrastructure needs in order to implement their new management plans. In contrast, this cross-cutting administration and operations plan targets some initial activities that will be implemented by all three sites in order to improve communication and maximize their ability to collaborate and cooperate on many important resource management and program areas.

Strategy XAO-1: Improve Internal Communications Among the Three Sanctuaries

Successful collaboration and coordination among sanctuaries is related to the amount and intensity of communication. Though individual sanctuary staff may occasionally communicate by e-mail, telephone or meetings, there is no established mechanism to bring together the managers or staff to proactively discuss issues that may affect multiple sites. This strategy focuses on improving communications between the sites to ensure there are regular opportunities for the managers, staff and the Advisory Councils to learn what is happening at each of the three sites and jointly plan regional programs and activities.

Activity 1.1: Improve communications between the Sanctuary Managers & Superintendents.

Managers and Superintendents will engage in more informal (ad hoc pick-up-the-phone) and formal (regularly scheduled calls or meetings) communications. They will meet at least three times a year with the newly established NMSP regional leadership team to (1) improve communication, (2) conduct Annual Operating Plan (AOP) planning, and/or (3) assess the implementation of AOPs and the JMPR action plans.

Products: List of cross-cutting AOP activities and an assessment of AOP/action plan implementation.

Partners: Managers for Cordell Bank National Marine Sanctuary (CBNMS), Gulf of the Farallones National Marine Sanctuary (GFNMS), and the Monterey Bay National Marine Sanctuary (MBNMS)

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	None	None

Activity 1.2: Sanctuary Managers/Superintendents will plan and schedule one regional Sanctuary update and team building activity per year.

Products: Annual team building/coordination meeting to discuss site-specific and cross-cutting projects, staff roles and responsibilities, and identify how staff can help support and complement the other sites’ programs and staff.

Partners: CBNMS, GFNMS, MBNMS

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	None	None

Activity 1.3: Create a new employee orientation program that includes information from the three Sanctuaries and the NMSP.

The orientation program should include travel to the other sites to meet staff and learn about their programs and activities. These efforts should be coordinated with similar efforts at headquarters.

Products: Employee orientation program that includes a reference binder with information from the other sites and headquarters, publications lists, staff bios.

Partners: MBNMS, CBNMS, GFNMS and NMSP staff

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	None	None

Activity 1.4: The program coordinators will meet separately at least once per year to share information and plan joint activities prior to the development of the annual operating plans.

Products: Site program coordinators (research, education, resource protection) will develop a list of joint or collaborative activities to include in their respective AOPs.

Partners: Program coordinators (research, education, resource protection at CBNMS, GFNMS, MBNMS)

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	None	None

Activity 1.5: Schedule one joint Advisory Council Chair – Sanctuary Manager meeting to determine whether all three Advisory Councils should meet annually.

The MBNMS and GFNMS Advisory Councils currently meet on an annual basis to discuss issues and program activities in the northern management area. This meeting among the Advisory Council chairs and managers would determine the need for expanding this meeting to include all three sites.

Products: Initial Joint Advisory Council Chair Meeting, possible future annual joint meetings.

Partners: CBNMS, GFNMS, MBNMS Advisory Council Chairs and Managers

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	None	None

Activity 1.6: Encourage and provide opportunities for site staff to give presentations at each other’s Sanctuary Advisory Council Meetings.

Products: Briefings at Advisory Council meetings.

Partners: CBNMS, GFNMS, MBNMS

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	None	None

Strategy XAO-2: Improve the Efficiency and Cost-Effectiveness of Program Operations

Each of the three sanctuaries have been designated for over ten years and during this time have accumulated an inventory of equipment, vessels and resources to support its own research/monitoring, education/outreach, and resource protection programs. This strategy recognizes there are instances in which it is more cost-effective to share resources among the sites and some instances when it may be more appropriate for each site to have its own. The sites must first inventory their existing resources and then jointly develop a needs assessment to document what is required to implement the four management plans. This strategy also calls for the sites to coordinate and provide opportunities to conduct joint field operations and to conduct an assessment in order to better cooperate and share facilities, signage and exhibits.

Activity 2.1: Develop a list of existing facilities, exhibits, equipment, vessels and resources based on the revised management plans that could be shared between sites.

Products: List of existing equipment, vessels and resources.

Partners: National Marine Sanctuary Program (NMSP), Cordell Bank National Marine Sanctuary (CBNMS), Gulf of the Farallones National Marine Sanctuary (GFNMS), and the Monterey Bay National Marine Sanctuary (MBNMS)

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	None	None

Activity 2.2: Develop a list of needed facilities, exhibits, equipment, vessels and resources based on the revised management plans that could be shared between sites.

Products: List of needed equipment, vessels and resources.

Partners: NMSP, CBNMS, GFNMS, MBNMS

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	None	None

Activity 2.3: Contact and inform the other sites early in the planning stages of field operations to provide opportunities to plan joint missions and to share information and data.

Products: List of planned field operations. Shared data and reports.

Partners: CBNMS, GFNMS, MBNMS

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	None	None

Strategy XAO-3: Improve the Efficiency and Cost-Effectiveness of Program Administration

Currently each sanctuary office is responsible for managing its own administration and information technology functions, including contracts, procurements, time and attendance, travel orders and vouchers, websites, databases, and geographic information systems. Each site employs a varying number of staff or contractors to perform some or all of these tasks. The goal of this strategy is to evaluate the staffing plans at the sites and maximize opportunities to share personnel and implement methods to make routine administrative functions more efficient. The strategy also highlights the importance of building upon existing efforts to share information technology resources.

Activity 3.1: Review the staffing plans at each sanctuary to determine if collaborations are possible to create efficiencies, fill gaps, share staff resources and complete specific projects.

This review will explore ways to overcome barriers for both contractors and FTEs to participate.

Products: List of opportunities for collaborations between sites.

Partners: Managers for CBNMS, GFNMS, and MBNMS

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	CB	AD-2
	GF	AD-2
	MB	OA-1
	CB (Cordell Bank); GF (Gulf of the Farallones); MB (Monterey Bay)	

Activity 3.2: Based on the review in 3.1, and as opportunities arise, create short-term opportunities for staff exchanges, rotations, details and informal staff loans for specific projects or to fulfill on-going needs across all three sites.

Products: Update list of opportunities. Provide administrative, contract and/or financial options that facilitate such collaborations.
 Partners: Managers for CBNMS, GFNMS, MBNMS, and NMSP

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	None	None

Activity 3.3: Participate in each other’s interview panels to review candidates for new and vacant positions, where possible.

Products: Recommendations on new hires.
 Partners: CBNMS, GFNMS, MBNMS

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	None	None

Strategy XAO-4: Improve the Coordination of Sanctuary Resource Protection Activities and Programs

Each of the three site-specific management plans proposes various strategies to address their own resource protection programs (i.e., regulations/permitting, emerging issues, enforcement, emergency response). This strategy is aimed at improving the communication and coordination of resource protection activities across the three sites. The strategy addresses the need to improve internal understanding and awareness of regulatory and permit processes and activities. Second, it establishes a process to identify and, when appropriate, jointly address emerging issues in a regional capacity. Third, it recommends the development of a regional sanctuary emergency response plan so that the NMSP is better prepared to address emergencies on a regional scale. Finally, it identifies the need to comprehensively evaluate enforcement needs in relation to the new management plans and develop and implement a regional enforcement plan.

Activity 4.1: Improve staff awareness and understanding of each site’s regulations.

Establish a basic and consistent understanding of each site’s regulations and ensure that everyone knows where to direct questions relating to specific regulations and permits.

Products: Fact sheet summarizing each site’s regulatory and permit authority, and identifies the appropriate person to contact at each site.

Partners: NMSP, CBNMS, GFNMS, MBNMS

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	CB	AD-9
	GF	RP-4
	MB	OA-8 and OA-9
CB (Cordell Bank); GF (Gulf of the Farallones); MB (Monterey Bay)		

Activity 4.2: Improve staff awareness and understanding of each site’s permits.

Inform the other sites of any new permit applications or other activities that could affect any of the sanctuaries.

Products: Share existing permit reports and explore whether a new reporting system is needed to improve coordination.

Partners: NMSP, CBNMS, GFNMS, MBNMS

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	CB	AD-9
	GF	RP-5
	MB	OA-8
CB (Cordell Bank); GF (Gulf of the Farallones); MB (Monterey Bay)		

Activity 4.3: Coordinate emerging issues among the three sites.

As the sites identify emerging issues, determine the significance and potential to impact another site, and communicate this to the potentially affected site(s).

Products: Analysis of emerging issue(s).

Partners: NMSP, CBNMS, GFNMS, MBNMS

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	CB	AD-10
	GF	RP-1, RP-2 & RP-3
	MB	EI-1 & EI-2
CB (Cordell Bank); GF (Gulf of the Farallones); MB (Monterey Bay)		

Activity 4.4: Develop coordinated strategies to address emerging issues.

Jointly determine if a new or emerging issue needs action and identify a strategy and activities to address the issue, depending on whether it is an immediate or long-term threat, what is (or is not) known about it, and if there are adequate resources to address it properly.

Products: Recommendation for action, including next steps.

Partners: NMSP, CBNMS, GFNMS, MBNMS

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	CB	AD-10
	GF	RP-1, RP-2 & RP-3
	MB	EI-1 & EI-2

CB (Cordell Bank); GF (Gulf of the Farallones); MB (Monterey Bay)

Activity 4.5: Develop a coordinated sanctuary emergency response plan.

Develop a coordinated sanctuary emergency plan describing how the three sanctuaries will internally coordinate and respond to emergencies including: oil spills, hazardous material spills, vessel groundings, plane crashes, dispersant use, and natural disasters. The plan should address broad emergency response issues that affect the region, identify NMSP staffing responsibilities and expertise, and outline how the NMSP will coordinate with existing federal, state and local emergency response agencies in California. The plan will be developed to utilize the existing Incident Command System (ICS), the U.S. Coast Guard (USCG) Area Contingency Plan (ACP)

Products: Regional Sanctuary Emergency Response Plan.
 Partners: NMSP, CBNMS, GFNMS, MBNMS

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	CB	AD-7
	GF	RP-7 & RP-8
	MB	OA-4

CB (Cordell Bank); GF (Gulf of the Farallones); MB (Monterey Bay)

Activity 4.6: Coordinate with the NMSP Damage Assessment Team on populating and making the Sanctuary Hazardous Incident Emergency Logistics Database System (SHIELDS) functional and operative for the three sanctuaries and integrating it with the existing Sanctuary Integrated Monitoring Network (SIMoN) database.

Products: SHIELDS for CBNMS, GFNMS and MBNMS.
 Partners: NMSP, CBNMS, GFNMS, MBNMS and the National Oceanic and Atmospheric Administration Hazardous Materials (NOAA HAZMAT)

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	CB	AD-7
	GF	RP-7
	MB	OA-4

CB (Cordell Bank); GF (Gulf of the Farallones); MB (Monterey Bay)

Activity 4.7: Develop a comprehensive enforcement plan for the tri-sanctuary area.

This plan will evaluate enforcement needs to implement this management plan and integrate existing formal and informal enforcement networks across this region. The plan should also include a consistent enforcement penalty schedule and an internal communication strategy.

Products: Coordinated enforcement plan for the 3-Sanctuary area.
Partners: CBNMS, GFNMS, MBNMS, GCOS, GCEL, NOAA-Office of Law Enforcement (OLE), the United States Coast Guard (USCG), NPS, CA Parks, California Department of Fish and Game (CDFG), County Sheriff Departments

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	CB	AD-6
	GF	RP-6
	MB	See MB Appendix 6.

CB (Cordell Bank); GF (Gulf of the Farallones); MB (Monterey Bay)

Activity 4.8: Implement a comprehensive enforcement plan for the tri-Sanctuary area.

Products: Enforcement activities that implement the comprehensive enforcement plan, including appropriate development of field officers, improved investigation and follow-up actions, and cooperative enforcement agreements with federal, state and local partners.
Partners: NMSP, CBNMS, GFNMS, MBNMS

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	CB	AD-6
	GF	RP-6
	MB	see MB Appendix 6

CB (Cordell Bank); GF (Gulf of the Farallones); MB (Monterey Bay)

Table XCAO-1: Measuring Performance of the Cross-Cutting Administration & Operations Action Plan

Desired Outcome(s) For This Action Plan:	
Improved communication and coordination among Sanctuary staff resulting in more integrated and coordinated resource protection for Sanctuary resources.	
Performance Measures	Explanation
Increase the number of cross-cutting AOP activities that each site includes in their site-specific AOP by 10% each year.	One of the primary purposes of this action plan is to increase the amount of communication and interaction among the three sites. This action plan identifies specific opportunities for staff to interact, resulting in more coordinated planning and implementation of joint activities that address priority issues. The tangible results of these interactions will be formulated within each site's AOP.

Table XCAO-2: Cross-Cutting Administration & Operations Action Plan Timeline

Administration & Operations Action Plan	Year 1	Year 2	Year 3	Year 4	Year 5
Strategy XAO-1: Improve Internal Communications Among the Three Sanctuaries					
Activity 1.1: Improve communications between the Sanctuary Managers & Superintendents.	→				→
Activity 1.2: Sanctuary Managers/Superintendents will plan and schedule one regional Sanctuary update and team building activity per year.	→				→
Activity 1.3: Create a new employee orientation program that includes information from the three Sanctuaries and the NMSP	→				→
Activity 1.4: The program coordinators will meet separately at least once per year to share information and plan joint activities prior to the development of the annual operating plans.	→				→
Activity 1.5: Schedule one joint Advisory Council Chair – Sanctuary Manager meeting to determine whether all three Advisory Councils should meet annually.	→			
Activity 1.6: Encourage and provide opportunities for site staff to give presentations at each other's Sanctuary Advisory Council Meetings.	→				→
Strategy XAO-2: Improve the Efficiency and Cost-Effectiveness of Program Operations					
Activity 2.1: Develop a list of existing facilities, signage, exhibits, equipment, vessels and resources based on the revised management plans that could be shared between sites.		→			
Activity 2.2: Develop a list of needed facilities, signage, exhibits, equipment, vessels and resources based on the revised management plans that could be shared between sites.		→			

Administration & Operations Action Plan	Year 1	Year 2	Year 3	Year 4	Year 5
Activity 2.3: Contact and inform the other sites early in the planning stages of field operations to provide opportunities to plan joint missions and to share information and data.	—————▶				
Strategy XAO-3: Improve the Efficiency and Cost-Effectiveness of Program Administration					
Activity 3.1: Review the staffing plans at each Sanctuary to determine if collaborations are possible to create efficiencies, fill gaps, share staff resources and complete specific projects.	▶				
Activity 3.2: Based on the review in 3.1, and as opportunities arise, create short-term opportunities for staff exchanges, rotations, details and informal staff loans for specific projects or to fulfill on-going needs across all three sites.	▶			
Activity 3.3: Participate in each other’s interview panels to review candidates for new and vacant positions, where possible.	—————▶				
Strategy XAO-4: Improve the Coordination of Sanctuary Resource Protection Activities and Programs					
Activity 4.1: Improve staff awareness and understanding of each site’s regulations.	—————▶				
Activity 4.2: Improve staff awareness and understanding of each site’s permits.	—————▶				
Activity 4.3: Coordinate emerging issues among the three sites.	—————▶				
Activity 4.4: Develop coordinated strategies to address emerging issues.	—————▶				
Activity 4.5: Develop a coordinated Sanctuary emergency response plan.		▶			
Activity 4.6: Coordinate with the NMSP Damage Assessment Team on populating and making the Sanctuary Hazardous Incident Emergency Logistics Database System (SHIELDS) functional and operative for the three Sanctuaries and integrating it with the existing Sanctuary Integrated Monitoring Network (SIMoN) database.		▶			
Activity 4.7: Develop a comprehensive enforcement plan for the three-Sanctuary area.	▶				
Activity 4.8: Implement a comprehensive enforcement plan for the three-Sanctuary area.	—————▶				

Legend:

- ▶ Planned Activity
-▶ Proposed Activity, based on internal assessment

Table XCAO-3: Estimated Costs to Implement the Administration & Operations Action Plan

Strategy	Estimated Annual Cost (1000's)*					Total Est. 5-Year Cost (1000's)
	YR 1	YR 2	YR 3	YR 4	YR 5	
Strategy XAO-1: Improve Internal Communications Among the Three Sanctuaries	\$54	\$54	\$54	\$54	\$54	\$270
Strategy XAO-2: Improve the Efficiency and Cost-Effectiveness of Program Operations	\$36	\$36	\$36	\$36	\$36	\$180
Strategy XAO-3: Improve the Efficiency and Cost-Effectiveness of Program Administration	\$12	\$12	\$12	\$12	\$12	\$60
Strategy XAO-4: Improve Coordination of Sanctuary Resource Protection Activities and Programs	\$186	\$174	\$162	\$162	\$162	\$846
Total Estimated Annual Cost	\$288	\$276	\$264	\$264	\$264	\$1,356
* Cost estimates are for both “programmatic” and “base” (salaries and overhead) expenses.						
** Contributions from outside funding sources also anticipated.						
For management planning purposes, the individual site cost to implement cross-cutting strategies can be calculated by dividing the estimated annual cost by three (equal cost). The actual cost to each site may vary according to strategy but will be further refined when sites prepare annual operating plans.						

Community Outreach Action Plan

Goal

A coordinated, collaborative regional community outreach strategy will build awareness throughout north-central California, and beyond, about (1) the existence and purpose of the three sanctuaries and the national program; (2) the diverse natural resources and ecosystems of each sanctuary and why they need protection; (3) why their existence is relevant to people; (4) the economic and intrinsic value of the three sanctuaries to coastal and inland communities beyond such direct industries as fishing and ecotourism; (5) how these three sanctuaries are working with constituent groups; and (6) how individuals and groups can be engaged in helping the Sanctuaries accomplish their resource protection, research, and education goals.

Issue Description

Under the National Marine Sanctuary Program (NMSP), each sanctuary in the system conducts education and outreach activities to build broad public awareness about the existence and purpose of our nation’s marine sanctuaries. The NMSP recognizes a well-informed local, regional, and national constituency greatly enhances the ability of the sanctuaries to protect their natural and cultural resources. Therefore, outreach activities should provide local and state governments, businesses, non-governmental organizations, constituent groups, and the general public with the information necessary to be effective partners in the stewardship of sanctuary resources.

Because of limited resources generally, each site has primarily focused on a select number of audiences within a limited geographic area. As a result, there are several areas where a broad-based public understanding needs to be enhanced. For example, there appears to be a lack of understanding and/or confusion about:

The unique situation of having three sanctuaries contiguously located in north-central California,

How these three sanctuaries together can work with other organizations to enhance regional outreach efforts regarding marine ecosystems,

How individuals and groups can engage effectively with the sanctuary Program and best protect sanctuary resources, and

How businesses, constituent groups, agencies, elected officials and others can provide informed input into decisions regarding sanctuary management and further enhance community awareness of the Sanctuaries.

This action plan identifies appropriate regional audiences and topics, regional outreach strategies, and marketing and media exposure efforts that effectively highlight specific program activities across all three sites as well as the national system. It is also designed to complement each site-specific program and to be flexible enough to incorporate new strategies and topics over time.

Effective community outreach is accomplished through a continuous cycle of ocean and coastal outreach, education, and stewardship. Community outreach expands awareness, knowledge and ultimately changes attitudes and behaviors. By providing information on ocean and coastal resources, and providing stewardship opportunities for people to get involved in the Sanctuary, people will begin to have a personal relationship with the Sanctuary and may be more likely to become ambassadors helping to protect Sanctuary resources. Community outreach involves three strategies tailored to the specific needs and interests of a given audience and may be delivered by members of that audience.

Outreach provides audiences with Sanctuary-related information and materials promoting ocean and coastal stewardship.

Education provides fundamental scientific understanding, knowledge, training, or professional development on topics relevant to the world’s atmosphere, climate, oceans and coastal ecosystems, and resource protection.

Stewardship is a personal sense of responsibility to take informed action and make caring choices, at home or work, which promote and protect the health of our coasts and oceans.

Strategy XCO-1: Build Upon and Expand Existing Ocean and Coastal Outreach

This strategy is aimed at raising general awareness of marine ecosystems, individual sanctuaries and the Sanctuary Program, and inspiring stewardship of ocean and coastal resources. Outreach provides audiences with Sanctuary-related information and materials based on NOAA science, products, and services that promote ocean and coastal stewardship. These audiences may be: north-central California coastal residents; people who live and work in inland California communities that regularly visit the ocean, such as divers, kayakers, tidepoolers, etc.; those who make their living within the ocean environment, like fishermen, maritime shipping companies, etc.; or people who live outside California that care about the ocean even though they may never visit. These, and others, are important voices in the protection and stewardship of the oceans. Key target audiences and messages should also be closely coordinated with outreach needs identified in the issue-related action plans.

Activity 1.1: Develop or strengthen coordinated outreach programs and opportunities, such as public service announcements, issue-specific workshops and brochures (e.g., tide pool etiquette), docent programs, signage, learning centers, or exhibits and displays at community events.

Products: Priority list of outreach activities based on the priority issues identified in the management plans. Some of these activities include joint outreach programs, volunteer opportunities, website development, signage and interpretive exhibits.

Partners: Advisory Council members from all three sanctuaries/working groups, Farallones Marine Sanctuary Association, Monterey Bay Sanctuary Foundation, National Marine Sanctuary Foundation, Channel Islands National Marine Sanctuary (CINMS), Channel Islands Sanctuary Foundation/Association, NOAA Enforcement.

Cross-Reference:

None	None
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Activity 1.2: Plan and conduct regional Sanctuary outreach events to promote the importance of monitoring, disseminate monitoring data, and improve understanding of marine conservation and management.

Products: Outreach and education materials/curricula to promote awareness of monitoring activities and disseminate monitoring data.

Partners: Cordell Bank National Marine Sanctuary (CBNMS), Gulf of the Farallones National marine Sanctuary (GFNMS), Monterey Bay National Marine Sanctuary (MBNMS), Sanctuary Integrated Monitoring Program (SIMoN), Community Outreach Working Group, Snapshot Day Water Quality Monitoring Event, Long-term Monitoring Program and Experiential Training for Students (LiMPETS), Beach Watch, Beach Coastal Ocean Mammal/Bird Educational and Research Survey (Beach COMBERS), Farallones Marine Sanctuary Association (FMSA), Global Learning and Observation to Benefit the Environment (GLOBE), JASON Foundation for Education

Cross-Reference:

Sanctuary	Management Plan Strategy Reference
None	None

Activity 1.3: Develop and implement joint media communications plan (print, radio, TV, Internet, etc.).

Products: Joint media communications plan, including site points of contact, and key messages from the management plans.

Partners: Traditional and electronic media, both coastal and inland, including local weekly papers, Community access TV stations

Cross-Reference:

Sanctuary	Management Plan Strategy Reference
None	None

Activity 1.4: Identify and partner with external programs to incorporate Sanctuary-related messages.

Products: External partners’ outreach plan, including priority partners, key messages based on priority issues identified in the management plans, outreach materials.

Partners: United States Coast Guard (USCG), National Park Service (NPS), Environmental Protection Agency (EPA), other federal agencies, California State Parks, other state agencies, cities, local parks/recreation departments, pollution prevention programs, chambers of commerce, trade associations for shipping, fishing, tourism, etc. dive clubs/shops, kayak clubs/shops, spot abalone divers, other recreational groups, natural history museums, institutions with community service requirements/marine sciences (high schools, colleges)

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	None	None

Strategy XCO-2: Enhance and Coordinate Ocean and Coastal Education

This strategy focuses on building community knowledge and fostering caring actions and attitudes targeting priority issues identified in the management plans. The NMSP’s joint ocean and coastal education efforts provide a fundamental scientific understanding, knowledge, training, or professional development to a particular audience on topics identified as important to protect Sanctuary resources. There are many possible audiences, such as students, teachers, state and local agencies, community leaders, and the general public. Sanctuary-related educational activities are based on NOAA science, systematic in design with clear goals, objectives and measurable outcomes; aligned, where appropriate, with state or national education standards; and designed to facilitate evaluation by a third party.

Activity 2.1: Collaborate on existing site-specific education programs and products as a means to enhance and expand educational offerings.

Each year, the education staff will jointly meet to identify collaborative projects for inclusion in their respective AOPs.

- Products: Joint education implementation strategy based on priority education issues identified in the management plans, incorporating priority list of educational programs and materials needed, potential lecture/symposia themes. Joint online teachers’ database.
- Partners: West Coast Education Liaison, state/local volunteer programs, Bay Area Sea Kayakers (BASK), high school/college classes doing coastal monitoring, National Science Foundation, other federal agencies (esp. for funding), Local NGO’s/non-profits, Association of Monterey Bay Area Governments, Association of (SF) Bay Area Governments

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	None	None

Activity 2.2: Following expansion of the MERITO program, increase multicultural/multi-lingual efforts based on needs assessments to determine other multi-cultural, socio-economic, or multi-lingual communities (Vietnamese, Chinese, Portuguese, Italian, etc.) and their interests.

- Products: Needs assessments of various multi-cultural, socio-economic, and multi-lingual communities and possible expansion of education efforts.
- Partners: Multi-cultural community leaders, bilingual school programs, Local NGO’s/non-profits

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	None	None

Activity 2.3: Identify and implement new education programs that can be developed jointly

Products: Teacher workshops, Volunteer Naturalist Corps program, certification training program for professional naturalists, similar to SBNMS (Stellwagen Bank), natural history guides.

Partners: Other National Marine Sanctuaries (esp. Channel Islands, Olympic Coast and Stellwagen Bank), Elkhorn Slough National Estuarine Research Reserve, state/local volunteer naturalist programs, Marine Advanced Technology Education (MATE), Monterey Bay Aquarium Research Institute (MBARI), Moss Landing Marine Lab, universities, and Sea Grant institutions, Eco-tourism businesses such as dive and kayak shops, whale-watching companies, local non-governmental organizations/non-profits

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	None	None

Strategy XCO-3: Enhance Ocean and Coastal Stewardship

Marine Sanctuary stewardship is a personal sense of responsibility to take informed action and make caring choices, at home or work, which promote and protect the health of our coasts and oceans. A steward develops attitudes, motivations, and commitments that are reflected in informed decisions and responsible actions. Stewards can be individuals, members of groups, or entities that influence others’ opinions and actions about the oceans. Stewardship can be demonstrated through a variety of means, including:

- Volunteer for an organized stewardship program,
- Take personal action to protect our ocean sanctuaries,
- Provide informed public input into decisions regarding the sanctuaries, and
- Inform others regarding marine ecosystems and the Sanctuary Program.

Similar to the audiences for outreach, ocean and coastal stewards may be north-central California coastal residents, people who live and work in inland California communities that regularly visit the ocean, those who make their living within the ocean environment, or people who care about the ocean even though they may never visit.

Activity 3.1: Create, maintain and promote Sanctuary and partner volunteer programs to provide opportunities for stewardship as well as expanding resource protection, education, and outreach capabilities of the three Sanctuaries.

Products: Expanded volunteer programs, volunteer opportunities, and trainings.

Partners: NOAA’s Team OCEAN, Elkhorn Slough National Estuarine Research Reserve, Farallones Marine Sanctuary Association, Monterey Bay Sanctuary Foundation, Bay Net, Save Our Shores, other non-governmental organizations, California State Parks, other state/local resource agencies, Friends of Fitzgerald Marine Reserve, high school service learning programs

Activity 3.2: Create new ways to inspire coastal and ocean stewardship in local communities.

The three sites will conduct needs assessments with targeted constituents and audiences to identify innovative and creative methods of engaging people in Sanctuary activities. Some

examples include working with faith-based or cultural organizations, retired citizens or local art groups.

Products: Pilot program or campaign to incorporate non-traditional stewardship activities and partners.

Partners: Faith-based groups, Multi-cultural groups, bilingual school programs, after-school programs, art, dance and music programs, service organizations

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	None	None

Activity 3.3: Identify partners to incorporate stewardship messages.

Products: Collaborative stewardship campaign.

Partners: United States Coast Guard (USCG), National Parks Service (NPS), other federal agencies, California State Parks, other state agencies, cities, local parks/recreation departments, local agencies mandated to have pollution prevention programs (water pollution control, solid waste control), County Sheriffs’ departments, city police, Chambers of commerce, Trade associations for shipping, fishing, tourism, etc., dive clubs, kayak clubs, other recreational groups, natural history museums, institutions that have community service requirements (high schools, colleges), service organizations

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	None	None

Table XCCO-1: Measuring Performance of the Cross-Cutting Community Outreach Action Plan

Desired Outcome(s) For This Action Plan:	
Expand joint education and outreach efforts in a manner enhancing protection for Sanctuary resources and the delivery of programs and services to local communities.	
Performance Measures	Explanation
Increase the number of joint education and outreach efforts directed at communities from 1,000 individuals in Year 1 to 5,000 individuals in Year 5.	One of the main purposes of this action plan is to expand general awareness of the three Sanctuaries, develop joint education products addressing priority issues, and increase involvement of individuals in the stewardship of the resources in the three Sanctuaries. Some of the programs directed at local communities include schools and teachers, volunteers, fairs and festivals, visitor centers, public lecture series, etc.

Table XCCO-2: Cross-Cutting Community Outreach Action Plan Timeline

Community Outreach Plan	Year 1	Year 2	Year 3	Year 4	Year 5
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Cross-cutting Outreach					
Strategy XCO-1: Build Upon and Expand Existing Ocean and Coastal Outreach					
Activity 1.1: Develop or strengthen coordinated outreach programs and opportunities, such as public service announcements, issue-specific workshops and brochures (e.g., tidepool etiquette), docent programs, signage, learning centers, or exhibits and displays at community events.	—————			▶
Activity 1.2: Plan and conduct regional Sanctuary outreach events to promote the importance of monitoring, disseminate monitoring data, and improve understanding of marine conservation and management.	—————			▶
Activity 1.3: Develop and implement joint media communications plan (print, radio, TV, Internet, etc.).		—————			▶
Activity 1.4: Identify and partner with external programs to incorporate Sanctuary-related messages.		—————			▶
Cross-cutting Education					
Strategy XCO-2: Enhance and Coordinate Ocean and Coastal Education					
Activity 2.1: Collaborate on existing site-specific education programs and products as a means to enhance and expand educational offerings.	—————			▶
Activity 2.2: Increase multicultural/multilingual efforts based on needs assessments to determine other multi-cultural, socio-economic, or multi-lingual communities (Vietnamese, Chinese, Portuguese, Italian, etc.) and their interests.			—————		▶
Activity 2.3: Identify and implement new education programs that can be developed jointly.	—————			▶
Cross-cutting Stewardship					
Strategy XCO-3: Enhance Ocean and Coastal Stewardship					
Activity 3.1: Create, maintain, and promote Sanctuary and partner volunteer programs to provide opportunities for stewardship as well as expanding resource protection, education, and outreach capabilities of the three Sanctuaries.		—————			▶
Activity 3.2: Create new ways to inspire coastal and ocean stewardship in local communities.			—————		▶
Activity 3.3: Identify partners to incorporate stewardship messages.		—————			▶

Legend:

- ▶ Planned Activity
-▶ Proposed Activity, based on internal assessment

Table XCCO-2: Estimated Costs to Implement the Cross-Cutting Community Outreach Action Plan

Strategy	Estimated Annual Cost (1000's)*	Total

	YR 1	YR 2	YR 3	YR 4	YR 5	Est. 5-Year Cost (1000's)
Strategy XCO-1: Build Upon and Expand Existing Ocean and Coastal Outreach	\$34.50	\$46.50	\$46.50	\$46.50	\$58.50	\$232.50
Strategy XCO-2: Enhance and Coordinate Ocean and Coastal Education	\$57.00	\$69.00	\$69.00	\$69.00	\$81.00	\$345.00
Strategy XCO-3: Enhance Ocean and Coastal Stewardship	\$52.50	\$64.50	\$64.50	\$64.50	\$76.50	\$322.50
Total Estimated Annual Cost	<i>\$144.00</i>	<i>\$180.00</i>	<i>\$180.00</i>	<i>\$180.00</i>	<i>\$216.00</i>	<i>\$900.00</i>
* Cost estimates are for both “programmatic” and “base” (salaries and overhead) expenses.						
** Contributions from outside funding sources also anticipated.						
For management planning purposes, the individual site cost to implement cross-cutting strategies can be calculated by dividing the estimated annual cost by three (equal cost). The actual cost to each site may vary according to strategy but will be further refined when sites prepare annual operating plans.						

Ecosystem Monitoring Action Plan

Goals

The goals of ecosystem monitoring for the northern-central California sanctuaries are to (1) determine the current and anticipate the future status of Sanctuary resources, (2) understand the limits of variation in resources, (3) detect temporal and spatial changes in resources, (4) identify potential agents of change, and (5) provide scientific information that can guide management decisions on priority issues.

Introduction

The legislation establishing the National Marine Sanctuary System has as a purpose and policy that long-term monitoring of sanctuary resources be supported, promoted, and coordinated (16 U.S.C. 1431). Sanctuaries also promote data collection to assess resource or environmental change with respect to implemented management actions. The suite of monitoring information required by Sanctuary management includes data from within the sanctuary and from areas outside the boundaries that influence sanctuary waters.

For the most part, individual sanctuaries work independently to develop monitoring programs and partnerships to inform their management concerns. These programs typically rely on substantial support from other government, private, and academic institutions at the federal, state, and local levels. The program designs are often only indirectly influenced by sanctuary management responsibilities.

Undertaking ecosystem monitoring requires long-term comprehensive assessments and broad scale integration of data collected in a wide variety of habitats (e.g., coastal interface, subtidal, continental shelf, shelf break, and deep water) and in areas that directly influence them (e.g., watershed, estuaries, coastal currents). Such assessments and integration can only be achieved through coordination with multiple partners focused on a variety of resources and geographic scales. Because the three sanctuaries of Cordell Bank, Gulf of the Farallones, and Monterey Bay have contiguous boundaries, they protect and manage many of the same habitats types and living resources, some of which range throughout the combined area. As such, the sanctuaries should consider each other as primary partners in monitoring efforts to evaluate the status and trends of these shared resources. Coordination among the three sanctuaries to promote, conduct, integrate, and synthesize data from ecosystem monitoring activities is the most effective and efficient means to improve availability of information for resource conservation and management across the region.

The combined areas of the Cordell Bank (CB), Gulf of the Farallones (GF) and Monterey Bay (MB) National Marine Sanctuaries (NMS) also represent a substantial portion of California coastal waters. Regional sanctuary monitoring coordination across this extensive area will help promote sanctuary management concerns as a driver for large-scale monitoring initiatives and partnerships. The data collected from coordinated efforts will be useful at the local and regional scale, with the potential for influencing resource management actions throughout a substantial portion of the West Coast.

Addressing the Issue

With the exception of Cordell Bank, most of the monitoring data that informs sanctuary management are not financed, collected, or analyzed by the sanctuaries. Instead, sanctuaries support and promote these activities indirectly by providing vessel time, staff support, and equipment, and coordinating the interests and information of outside agencies and partners. They also assist to secure outside funding that can be directed toward projects that address sanctuary information needs such as the Sanctuary Integrated Monitoring Network (SIMoN).

Such indirect support is appropriate to the mandate and capacities of the Sanctuary program. Sanctuaries do not have the expertise or the personnel resources to collect and analyze the variety of information required for all of their management needs. Such expertise is accessible through partnerships with various research institutions. However, effective resource management requires a holistic view, which sanctuaries are uniquely positioned to achieve. To meet their resource management mandate, sanctuaries must synthesize and integrate information from disparate research and monitoring projects. They have the further responsibility of interpreting and applying available scientific knowledge for resource managers and the public. Thus, coordination of ecosystem monitoring efforts requires strategic action on various sanctuary-specific programmatic levels.

Recommended strategies focus on coordinating existing activities, identifying opportunities for additional coordination, and establishing the administrative infrastructure, advisory panels, and oversight mechanisms required to support, direct, and evaluate coordinated monitoring across the three Sanctuaries. Because many of the monitoring requirements common to the three Sanctuaries undergoing the Joint Management Plan Review (JMPR) overlap with the interests of Channel Islands and Olympic Coast National Marine Sanctuaries, the strategies recommended in this proposed action plan should serve as a model for expanded coordination of appropriate monitoring activities across all five of the West Coast Sanctuaries. The strategies are also consistent with efforts of the System Wide Monitoring program (SWiM) to improve collection, evaluation, and interpretation of monitoring information throughout the system of sanctuaries. Thus, these activities promote system and regional integration across the program as well as improving ecosystem conservation and management in the combined area of the three sanctuaries.

Strategy XEM-1: Coordinate Existing Targeted Monitoring Activities to Promote Greater Efficiency and Effectiveness

Priority activities for initiation of joint ecosystem monitoring within the region should be focused on the coordination of existing sanctuary-specific monitoring programs that assess similar ecosystems in at least two of the three sanctuaries. This includes coordinating targeted programs that monitor conditions in the coastal interface and the pelagic/offshore systems.

These priorities are based on the need to establish common ecological monitoring efforts throughout the region and the priority issue areas identified in the management plan review that could best be addressed through a coordinated approach among the sanctuaries. Some of the

priority habitats that have been identified for joint monitoring include: rocky intertidal, benthic, and pelagic/open ocean. The coordination channels and activities established to support these targeted efforts could serve as a model for additional monitoring coordination in the future. Other existing or newly emerging monitoring activities, not identified in this action plan, represent potential opportunities for additional coordination. Assessment of such opportunities is addressed in Strategies XEM-2 and XEM-3.

Activity 1.1: Coordinate individual sanctuary rocky intertidal monitoring programs and investigate opportunities to collaborate with other large-scale rocky intertidal monitoring efforts.

Products: Regional Sanctuary rocky intertidal monitoring plan.
 Partners: MBNMS, GFNMS, (PISCO), Multi-Agency Rocky Intertidal Network (MARINE), National Park Service (NPS), Southern California Coastal Water Research Project Authority (SCCWRP), Bodega Marine Laboratory (BML), Tenera Inc., Minerals Management Service (MMS), Kinetic Labs, Inc.

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	None	None

Activity 1.2: Conduct a workshop to coordinate data collection protocols for Beach COMBERS and Beach Watch Programs that indirectly assess the health of the pelagic/offshore ecosystem.

Products: Coordination document for joint reporting; volunteer training, coordination, and enrichment opportunities; data collection, management and metadata standards; coordinated revision and reprinting of the field guide; plan for shared study skin collection.
 Partners: CBNMS, GFNMS, MBNMS, SIMoN, NMSP, Coastal Observation and Seabird Survey Team (COASST)

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	None	None

Activity 1.3: Develop an integrated sanctuary marine mammal, sea turtle, and seabird survey monitoring plan for the three sanctuaries to coordinate and supplement the NOAA Fisheries five-year surveys.

Products: Plan to coordinate and supplement ongoing NOAA Fisheries five-year sanctuary marine mammal/seabird monitoring surveys (per recommendations developed during the Marine Mammal/Seabird Workshop in December 2002). Joint ship-time requests or contracts to ensure consistent availability of appropriate survey platforms. Joint NOAA Ship McArthur II cruises.
 Partners: NOAA Fisheries, CBNMS, GFNMS, MBNMS, CINMS, OCNMS, Center for Integrated Marine Technology (CIMT), NPS, Point Reyes Bird Observatory (PRBO), SIMoN

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	None	None

Activity 1.4: Explore the potential for the expansion of existing fish surveys, such as the CalCOFI transect lines through Gulf of the Farallones and Cordell Bank, and continuation in Monterey Bay.

Products: Assessment for expansion of CalCOFI transects in Cordell Bank and Gulf of the Farallones.

Partners: CBNMS, GFNMS, MBNMS, California Cooperative Oceanic Fisheries Investigations (CalCOFI), California Department of Fish and game (CDFG), Monterey Bay Aquarium Research Institute (MBARI), NOAA Fisheries, Alliance for California Current Ecosystem Observation (ACCEO), NOAA-National Centers for Coastal Ocean Service (NCCOS), SIMoN, University of California-Santa Cruz (UCSC)

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	None	None

Activity 1.5: Jointly develop research cruise plans and standards for sampling and reporting results for benthic habitat survey work.

Products: Research plans such as that developed for the Delta submarine that detail the annual survey work, and a report that summarizes the annual findings and results.

Partners: CBNMS, GFNMS, MBNMS, NOAA Fisheries, California Department of Fish and Game (CDFG), U.S. Geological Service (USGS)

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	None	None

Activity 1.6: Augment the benthic habitat survey work with new technologies such as ROV surveys.

Products: Additional research cruises that use remotely operated vehicles (ROVs) and other technologies. Cruise reports that summarizes the mission’s findings and results.

Partners: CBNMS, MBNMS, NOAA Fisheries, CDFG, USGS

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	None	None

Strategy XEM-2: Coordinate and Implement Existing Regional Ecosystem Monitoring Activities

Over the last decade, many federal and state agencies have actively participated in collaborative efforts to develop and implement integrated coastal and ocean observing and data management systems. To further these efforts, the NMSP, and many individual Sanctuaries, has been working closely with its partners to build upon and integrate existing site monitoring programs into regional ecosystem monitoring programs. The following activities have been identified as pilot programs within the NMSP to test the concept of integrating observation data and making it available to resource managers and the public.

Activity 2.1: Implement the West Coast Observation Project at CBNMS, GFNMS and MBNMS.

The West Coast Observation Project, also known as Sanctuary Ecosystem Assessment Stations, integrates ocean observation data collected at Olympic Coast, Cordell Bank, Gulf of the Farallones, Monterey Bay, and Channel Islands National Marine Sanctuaries. The project will focus on data streams collected at numerous new instrument moorings that will be installed at specific locations within each of the five sanctuaries. Some of these instrument moorings will be maintained and operated by the Partnership for Interdisciplinary Studies of Coastal Oceans (PISCO) in the MBNMS and CINMS. The project intends to make the monitoring data accessible via the Internet in an Integrated Ocean Observing System (IOOS) compatible format. The data from this project will be shared with managers and the public through the Sanctuary Integrated Monitoring Network (SIMoN) website.

Products: Data buoys deployed, data management system, on-line access to data.
 Partners: CBNMS, GFNMS, MBNMS, CINMS, OCNMS, SIMoN, NMSP, PISCO, NCCOS, NOAA-National Coastal Data Development Center (NCDDC), NOAA-National Oceanographic Data Center (NODC), National Data Buoy Center (NDBC), NOAA National Environmental Satellite Data Information Service (NESDIS), NOAA Fisheries, Central California Ocean Observing System (CenCOOS)

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	None	None

Activity 2.2: Develop and implement an integrated NMSP’s System-Wide Monitoring (SWiM) program for CBNMS, GFNMS and MBNMS.

The primary purpose of the System-Wide Monitoring (SWiM) program is to monitor specific ecological parameters of the sanctuary and ensure the timely flow of data and information to those responsible for managing and protecting resources in the ocean and coastal zone, and to those that use, depend on, and study the ecosystems encompassed by the sanctuaries. It does this by enabling marine sanctuaries to develop effective ecosystem-based monitoring programs that address management information needs. SWiM provides a design process to decide what parameters to sample and how to sample them in a way that can be applied consistently at multiple spatial scales and to multiple resource types. It also provides a reporting strategy to enable the evaluation of status and trends in protected resources and activities that affect them.

Finally, SWiM provides a method to share information for broader issues and scales, and contribute to multi-site, regional and national research and monitoring activities. These efforts will be integrated with SIMoN, which implements the monitoring, coordinates with partners, and provides GIS, web and other products that allows for local and regional information sharing.

Products: Integrated and tailored SWiM program developed at CBNMS, GFNMS & MBNMS.
 Partners: CBNMS, GFNMS, MBNMS, SIMoN, NMSP, PISCO, NCCOS, NDBC, NESDIS, NOAA Fisheries, NOAA National Estuarine Research Reserve System (NERRS), U.S. Environmental Protection Agency (EPA), NPS, U.S. Fish and Wildlife Service (USFWS), Mineral Management Service (MMS), USGS, Ocean-US, State of California

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	None	None

Activity 2.3: Conduct a needs assessment and develop a site implementation plan for expanding the Sanctuary Integrated Monitoring Network (SIMoN) to the Gulf of the Farallones and Cordell Bank Sanctuaries.

As part of the process to establish SIMoN, the MBNMS completed a comprehensive assessment of monitoring activities and priorities. Similar assessments have been conducted for CBNMS and GFNMS as part of the management plan review. Collectively, these assessments have identified priority research and monitoring needs for each site based on the issues addressed in the management plan. Some of the common research and monitoring needs include baseline ecosystem characterization and observation; invasive species; water quality; and assessing the various types of human disturbance and impacts from such activities as sound, light, physical disturbance, and fishing. The next step is to compare the assessments, develop a list of shared priorities and data gaps, integrate the existing information into a common database, and implement joint monitoring activities. SIMoN will be the primary mechanism to coordinate data and information among the sites. This network will be expanded from MBNMS to both CBNMS and GFNMS.

Product: CBNMS and GFNMS SIMoN needs assessment and implementation plan(s) that compares research and monitoring needs identified in the management plans.
 Partners: NMSP, SIMoN, MBNMS, GFNMS, and CBNMS

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	None	None

Activity 2.4: Explore Opportunities to Integrate SIMoN with other Regional Monitoring Efforts such as West Coast Observations and other IOOS projects.

Product: Updated SIMoN database consistent with Integrated Ocean Observing Systems (IOOS) protocols and standards.
 Partners: NMSP, SIMoN, MBNMS, GFNMS, CBNMS, NODC, SeaMap, IOOS

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	None	None

Activity 2.5: Evaluate and Identify Ongoing Funding Opportunities to Support Regional and Larger Scale Ongoing Monitoring Activities.

Products: identification of new partnerships and funding mechanisms to support regional monitoring efforts;

Partners: CBNMS, GFNMS, MBNMS, SIMoN, NMSP, NCCOS, NMFS, Farallones Marine Sanctuary Association (FMSA), Monterey Bay Sanctuary Foundation (MBSF)

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	None	None

Strategy XCEM-3: Establish a Joint Internal Monitoring Coordination Team

Coordination of monitoring activities among the sanctuaries requires an administrative infrastructure to identify and act on cross-boundary opportunities, collaborate with large-scale initiatives, and interpret the results for resource managers and public audiences across the region.

Activity 3.1: Establish a Monitoring Coordination Team.

The internal monitoring coordination team could be composed of the entire science staff of the three Sanctuaries, or at a minimum the research coordinators.

Product: Integrated Ecosystem Monitoring Team, biannual meetings to develop integrated monitoring plans and proposals, joint reports.

Partners: CBNMS, GFNMS, MBNMS, NMSP, SIMoN

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	None	None

Activity 3.2: Develop a Research and Monitoring Communication Plan to Improve Coordination Among the Sanctuaries' Research Staffs and Partners.

Products: Research a communication plan, sanctuary list serve, and development of joint projects, research plans and proposals.

Partners: CBNMS, GFNMS, MBNMS, SIMoN

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	None	None

Activity 3.3: Evaluate and Provide Recommendations on the Joint Reporting of Monitoring Activities through Periodic “State of the Sanctuaries” Reports for Cross-cutting Monitoring Activities Among the Three Sanctuaries.

Product: State of the Sanctuaries report.
 Partners: SIMoN, SWiM, NMSP, NODC

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	None	None

Activity 3.4: Develop Annual Ecosystem-based Research and Monitoring Operating Plans in Collaboration with each other to Meet Site, Regional, and National Monitoring Needs.

Product: Development and implementation of site-specific monitoring programs for each site that integrate regional ecosystem monitoring requirements and needs.
 Partners: CBNMS, GFNMS, MBNMS, NMSP, SIMoN

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	None	None

Strategy XEM-4: Consider Establishing a Joint Research Activities Panel to Enhance Research and Monitoring Collaborations

Research staff and interests at all three sites should discuss the need to establish a formal or informal joint research advisory panel (JRAP) consisting of representatives from the site RAPs to assist with ongoing coordination of existing activities and identification of emerging opportunities.

Activity 4.1: Evaluate the Need and Feasibility of Establishing an Ad-hoc or Standing Joint Research Activities Panel (JRAP) to Advise and Identify Opportunities for Coordinated Monitoring Activities.

Products: Evaluation on need to establish a CB RAP, GF RAP and a JRAP.
 Partners: CBNMS, GFNMS, MBNMS, NMSP, Advisory Councils

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	None	None

Activity 4.2: Based Upon the Evaluation in 4.1, Establish a Joint Research Activity Panel (JRAP).

Products: CBNMS RAP; GFNMS RAP, JRAP Formed by Advisory Councils.
 Partners: CBNMS, GFNMS, MBNMS, NMSP, Advisory Councils, MBNMS RAP

Cross-Reference:	Sanctuary	Management Plan Strategy Reference
	None	None

Activity 4.3: Establish Communication Protocols Among the RAPs for Posting Agendas and Minutes for Sanctuary-specific and Joint Meetings.

Product: RAP list serve.

Partners: CBNMS, GFNMS, MBNMS, SIMoN, Advisory Councils, MBNMS RAP

Cross-Reference:	Sanctuary	Management Plan Strategy Reference
	None	None

Activity 4.4: Institute Annual Meetings for a Subgroup of (~10) Representatives from all Three Sanctuary RAPs (or Research Partners if a RAP does not exist) to Coordinate Research and Monitoring Activities in the Region.

This meeting could be conducted in coordination with an existing annual or biennial science symposium or information transfer meeting. The meeting would be planned and organized by the monitoring coordination team members.

Product: Meeting summaries, recommendations, joint proposals and research plans.

Partners: CBNMS, GFNMS, MBNMS, NMSP, Advisory Councils, NCCOS

Cross-Reference:	Sanctuary	Management Plan Strategy Reference
	None	None

Table XEM 1: Measuring Performance of the Cross-Cutting Ecosystem Monitoring Action Plan

Desired Outcome(s) For This Action Plan:	
Increased collaboration among, capacity of, and productivity of the three sanctuary monitoring programs in order to enhance our understanding of the ecosystem(s) in this region and those natural and human factors affecting them.	
Performance Measures	Explanation
<p>1. Increase the number of cooperative research and monitoring activities from two in Year 1 to six in Year 5.</p> <p>2. Extend the geographic range of SIMoN to include Cordell Bank and Gulf of the Farallones and expand its infrastructure so that it can be integrated with other coastal and ocean observation systems along the West Coast by Year 5.</p> <p>3. Design and implement coordinated monitoring programs consistent with the NMSP System Wide Monitoring Program Framework (SWiM) at each site by 2012.</p>	<p>1. Research staff from the three sanctuaries currently engage in limited joint research and monitoring activities. However, to improve our knowledge and understanding about the broader ecosystem in this region, the three sites need to coordinate and systematically plan and implement joint research and monitoring activities with each other and other partners. These new joint research and monitoring activities will be reflected in each sites' Annual Operating Plan (AOP).</p> <p>2. SIMoN is rapidly evolving into a system-wide tool for organizing and displaying research and monitoring related information. SIMoN was developed as a prototype at the MBNMS and could be expanded to include the neighboring CBNMS and GFNMS. In addition, SIMoN should evolve so that other regional coastal and ocean observation systems could be integrated within SIMoN.</p> <p>3. The NMSP has been working for several years to develop a System Wide Monitoring (SWiM) Program Framework. The prototype of the program is underway, and once evaluated, will be ready to implement as other sites, including the three sanctuaries.</p>

Table XEM 2: Cross-Cutting Ecosystem Monitoring Action Plan Timeline

Ecosystem Monitoring Action Plan	Year 1	Year 2	Year 3	Year 4	Year 5
Strategy XEM-1: Coordinate Existing Targeted Monitoring Activities to Promote Greater Efficiency and Effectiveness					
Activity 1.1: Coordinate individual sanctuary rocky intertidal monitoring programs and investigate opportunities to collaborate with other large-scale rocky intertidal monitoring efforts.	→				→
Activity 1.2: Conduct a workshop coordinate data collection protocols for Beach COMBERS and Beach Watch Programs that indirectly assess the health of the pelagic/offshore ecosystem.	→				
Activity 1.3: Develop an integrated sanctuary marine mammal and seabird survey monitoring plan for the three Sanctuaries to coordinate and supplement the NOAA Fisheries 5-year surveys.		→			
Activity 1.4: Explore the potential for the expansion of existing fish surveys, such as the CalCOFI transect lines through Gulf of the Farallones and Cordell Bank, and continuation in Monterey Bay.		→			
Activity 1.5: Jointly developed research cruise plans and standards for sampling and reporting results for benthic habitat survey work.	→				→
Activity 1.6: Augment the benthic habitat survey work with new technologies such as ROV surveys.	→				→
Strategy XEM-2: Coordinate and Implement Existing Regional Ecosystem Monitoring Activities					
Activity 2.1: Implement the West Coast Observation Project at CBNMS, GFNMS and MBNMS.	→				→
Activity 2.2: Develop and implement an integrated NMSP's System-Wide Monitoring (SWiM) program for CBNMS, GFNMS and MBNMS.		→			→
Activity 2.3: Conduct a needs assessment and develop a site implementation plan for expanding SIMoN to the Gulf of the Farallones and Cordell Bank Sanctuaries.	→				
Activity 2.4: Explore opportunities to integrate SIMoN with other regional monitoring efforts such as West Coast Observations and other IOOS projects.	→				→
Activity 2.5: Evaluate and identify ongoing funding opportunities to support regional and larger scale ongoing monitoring activities.	→				→
Strategy XEM-3: Establish a Joint Internal Monitoring Coordination Team					
Activity 3.1: Establish a Monitoring Coordination Team.	→				

Ecosystem Monitoring Action Plan	Year 1	Year 2	Year 3	Year 4	Year 5
Activity 3.2: Develop a research and monitoring communication plan to improve coordination among the Sanctuaries’ research staffs and partners.	→				
Activity 3.3: Evaluate and Provide Recommendations on the joint reporting of monitoring activities through periodic “state of the Sanctuaries” reports for cross-cutting monitoring activities among the three Sanctuaries.			→	→	→
Activity 3.4: Develop annual ecosystem-based research and monitoring operating plans in collaboration with each other to meet site, regional, and national monitoring needs.	→	→	→	→	→
Strategy XEM-4: Consider Establishing a Joint Research Activities Panel to Enhance Research and Monitoring Collaborations					
Activity 4.1: Evaluate the need and feasibility of establishing an ad-hoc or standing joint research activities panel (JRAP) to advise and identify opportunities for coordinated monitoring activities.		→→		
Activity 4.2: Based upon the evaluation in 5.1, establish a Joint RAP.			→		
Activity 4.3: Establish communication protocols among the RAPs for posting agendas and minutes for Sanctuary-specific and joint meetings.			→		
Activity 4.4: Institute annual meetings for a subgroup of (~10) representatives from all three Sanctuary RAPs (or research partners if a RAP does not exist) to coordinate research and monitoring activities in the region.				→	→

Legend:

- Planned Activity
-→ Proposed Activity, based on internal assessment

Table XEM 3: Estimated Costs to Implement the Ecosystem Monitoring Action Plan

Strategy	Estimated Annual Cost (1000's)*					Total Est. 5-Year Cost (1000's)
	YR 1	YR 2	YR 3	YR 4	YR 5	
Strategy XEM-1: Coordinate Existing Targeted Monitoring Activities to Promote Greater Efficiency and Effectiveness	\$183	\$183	\$183	\$183	\$183	\$915.00
Strategy XEM-2: Coordinate and Implement Existing Regional Ecosystem Monitoring Activities	\$174	\$258	\$294	\$282	\$246	\$1254.00
Strategy XCEM-3: Establish a Joint Internal Monitoring Coordination Team	\$24	\$72	\$78	\$51	\$27	\$252.00
Strategy XEM-4: Consider Establishing a Joint Research Activities Panel to Enhance Research and Monitoring Collaborations	\$0	\$12	\$12	\$15	\$15	\$54.00
Total Estimated Annual Cost	\$381	\$525	\$567	\$531	\$471	\$2475.00
* Cost estimates are for both “programmatic” and “base” (salaries and overhead) expenses.						
** Contributions from outside funding sources also anticipated.						
For management planning purposes, the individual site cost to implement cross-cutting strategies can be calculated by dividing the estimated annual cost by three (equal cost). The actual cost to each site may vary according to strategy but will be further refined when sites prepare annual operating plans.						

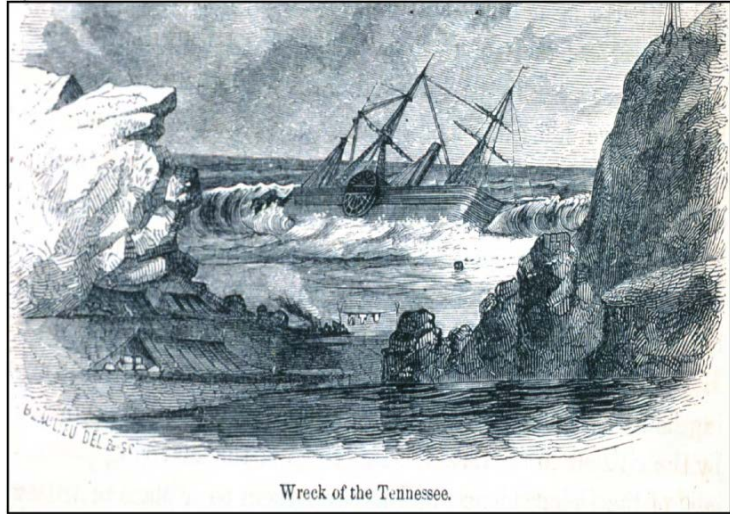
Maritime Heritage Action Plan

Goals

The National Marine Sanctuary Program (NMSP) is developing a new program aimed to identify, protect and raise awareness of the cultural and historical resources in the three sanctuaries. Program efforts include conducting paleo-ecological and archaeological studies; inventorying, locating, and monitoring both historic shipwrecks and those that pose an environmental threat to sanctuary marine resources; and characterizing and protecting maritime heritage resources.

This plan provides the framework for a Maritime Heritage Resources Program that addresses historic and cultural underwater sites, as well as traditional heritage resources such as Native American and fishing communities, commercial marine transport of passengers and cargo, and recreational activities like diving, surfing, and boating. Although the NMSP only has authority to protect Sanctuary cultural and historic resources, the program recognizes that traditional user and ocean-dependent groups are interconnected with the Sanctuaries and are an integral part of their history.

Figure MH-1: The passenger-cargo steamer *Tennessee* runs aground near Point Bonita



Issue Description

The NMSA and site regulations mandate the management and protection of Sanctuary cultural and historical resources. Cultural resources are defined as any historical or cultural feature, including archaeological sites, historic structures, shipwrecks, and artifacts. *Historical resources* are defined as any resources possessing historical, cultural, archaeological or paleontological significance, including sites, contextual information, structures, districts, and objects significantly associated with or representative of earlier people, cultures, maritime heritage, and human activities and events. Historical resources include “submerged cultural resources,” and also include “historical properties,” as defined in the National Historic Preservation Act (NHPA), as amended, and its implementing regulations, as amended.

The area encompassed by the Cordell Bank National Marine Sanctuary (CBNMS), the Gulf of the Farallones National Marine Sanctuary (GFNMS), and the Monterey Bay National Marine Sanctuary (MBNMS) is rich in cultural and historical resources, and has a long and interesting maritime history. The sea floor preserves remnants of the sites where people lived and of the vessels in which they conducted trade and fought wars. Ships, boats, wharves, lighthouses,

lifesaving stations, whaling stations, prehistoric sites, and a myriad of other heritage treasures lie covered by water, sand, and time.

The history of California's Central Coast is predominantly a maritime one. From the days of the early Ohlone inhabitants to the exploration and settlement of California to the present, coastal waterways remain a main route of travel, subsistence, and supply. Ocean-based commerce and industries (e.g., fisheries, shipping, military, recreation, tourism, extractive industries, exploration, research, and aesthetics) are important to the maritime history, the modern economy, and the social character of this region. These constantly changing human uses define the maritime heritage of these Sanctuaries and help interpret our evolving relationship with the Sanctuary resources. Ports such as San Francisco and Monterey, and smaller coastal harbor towns, developed through fishing, shipping, and economic exchange. Today these have become major urban areas, bringing millions of people in proximity to National Marine Sanctuaries. Many of these people are connected to the Sanctuaries through commercial and recreational activities such as surfing, boating, and diving.

Records indicate that 430 vessel and aircraft losses were documented between 1595 and 1950 along California's Central Coast from Cambria north to Bodega Head, including the Farallones Islands. Specifically, 173 in the GFNMS, 257 in the MBNMS, and none documented within the CBNMS. Some sites have been located and inventoried by the NOAA and the National Park Service (NPS) in the GFNMS region. The GFNMS and MBNMS have also collaborated with state and federal agencies, and the private sector to gather resource documentation and to create opportunities to locate and record submerged archaeological resources. MBNMS recently completed a shipwreck inventory from established shipwreck databases, and review of primary and secondary source documentation. These studies provide a foundation for an inventory of the historic resources in the Sanctuaries.

The GFNMS and MBNMS, and possibly CBNMS, are also faced with the challenge of identifying and monitoring historic and non-historic shipwrecks posing environmental threats to sanctuary marine resources. Lurking in the deep are the hazardous cargoes, abandoned fuel, and unexploded ordnance inside sunken vessels that are slowly deteriorating in a corrosive marine environment. Shipwrecks already identified as a concern are the oil tanker USS *Montebello* (near the MBNMS) that may retain over three million gallons of unrefined crude oil and the C-3 freighter *Jacob Luckenbach* (GFNMS), containing Bunker-C fuel oil. In 2002, the U.S. Coast Guard contracted the removal of 85,000 gallons of Bunker-C fuel from the *Jacob Luckenbach*.

Submerged Site Inventory and Assessment Initiative

NMSP regulations mandate that archaeological resources be managed consistent with the Federal Archaeological Program. The NMSP's Marine Heritage Program (MHP) and NOAA Maritime Archeological Center (MAC) were established in 2002 and 2004 respectively to emphasize the need for research, education, outreach, and protection of maritime heritage resources. Issues to be addressed regarding the protection of submerged archaeological resources include site protection, permitting, and shipwrecks as environmental threats. GFNMS and MBNMS will partner with the Channel Island National Marine Sanctuary (CINMS) on its Shipwreck Reconnaissance Program (SRP) in California waters to record submerged sites using vocational

archaeologists, remotely operated vehicles (ROV), and manned submersibles. The SRP develops underwater site maps and archaeological reports, conducts annual site monitoring, and recommends appropriate sites for inclusion in the National Register of Historic Places.

Shipwrecks as Environmental Threats

GFNMS and MBNMS both coordinate with the Damage Assessment Restoration Fund and other relevant agencies. GFNMS and MBNMS will work with CINMS to expand their efforts to identify shipwrecks that may pose environmental threats and will provide pertinent information to NOAA's Hazardous Materials (HAZMAT) division and the NMSP for development of the Sanctuaries Hazardous Incident Emergency Logistics Database System (SHIELDS) and the Resources and Under Sea Threats (RUST) Geographic Information System (GIS) database systems.

Site Protection

As submerged shipwreck sites are inventoried in CBNMS, GFNMS, and MBNMS and become more visible to the public, they are also more at risk from divers wishing to remove artifacts. CBNMS, GFNMS, and MBNMS will consider enhancing visitor use while mitigating damage to heritage resources by providing the sport and commercial diving communities and visitors to shoreline sites with interpretive information about archaeological sites and their protection. Sanctuary and California state regulations prohibit the un-permitted disturbance of submerged archaeological and historical resources. The NMSP and California State Lands Commission (CSLC) have an archaeological resource recovery permit system in place. Protection and monitoring of these sites will become a more pronounced responsibility in the Sanctuaries' heritage resources management program. Partnerships will be established with local law enforcement agencies for site monitoring and compliance of public access to submerged sites. The sanctuaries will designate a contact person(s) to coordinate with the California State Historic Preservation Office (SHPO) to ensure that permit guidelines, under the Archaeological Resources Protection Act, are followed.

Traditional User and Ocean-Dependent Groups

There is the potential to cultivate partnerships with local, state, and federal programs (e.g., American Folk Life Center, universities, Department of the Interior) and the identified communities. These partnerships could aid in the design and implementation of studies of living maritime heritage and folk life to help educate the public about traditional cultures and practices including Native Americans, other ethnic residents, fishermen and economic activities reflecting historic human interaction with the ocean.

Education and Outreach

CBNMS, GFNMS, and MBNMS have partnered with CINMS in the development of the West Coast Shipwreck Database online curriculum. The database serves to inform the public about the historical significance of shipwrecks, including those posing environmental threats to Sanctuary marine resources, e.g., the *Jacob Luckenbach* story. The database is being expanded to include living journals assisting families searching for information about shipwrecked vessels their relatives may once have served on as crewmembers or passengers. Family members are

encouraged to share with the public their living journals associated with the shipwreck histories for dissemination. CBNMS, GFNMS, and MBNMS will identify partners to explore exhibit development at maritime or regional museums and learning centers that focus on the areas’ maritime heritage history; shipwrecks, exploration, fishing, and fisheries; vessel trades, routes and nationalities; and shoreline structures such as lighthouses, lifesaving stations, canneries, whaling facilities, surfing, and boating.

Strategy XMHR-1: Establish Maritime Heritage Resources Program

The NMSP is placing increasing emphasis on the development of maritime heritage resources programs to identify and protect submerged archaeological sites, and to increase public awareness about the maritime history associated with individual Sanctuaries. A well-coordinated program will be required to identify and assess documented shipwrecks, some of which may pose significant environmental hazards; to protect sites from unauthorized disturbance; and to develop heritage partnerships and education programs.

Activity 1.1: Develop the foundation and infrastructure of a MHR Program.

Products: Maritime Heritage Resource (MHR) program plan and infrastructure to implement it.
 Partners: CBNMS, GFNMS, MBNMS, NMSP-MHP, CINMS, SCRG

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	None	None

Activity 1.2: Identify and assist partners doing maritime heritage related work to obtain funding and resources.

Products: Database of partners and funding sources.
 Partners: CBNMS, GFNMS, MBNMS, CINMS

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	None	None

Strategy XMHR-2: Inventory and Assess Submerged Sites

The CBNMS, GFNMS, and MBNMS, in conjunction with the West Coast Cultural Resources Coordinator, will collaborate with state and federal agencies and the private sector to gather resource documentation and to create opportunities to locate and record submerged archaeological resources. MBNMS recently completed such an inventory; GFNMS will pursue funding to update its previous inventory, done jointly with the NPS. This effort will also be coordinated with NOAA’s MHP.

Activity 2.1: Establish external partnerships to inventory potential shipwreck sites with other federal, state, and local agencies as well as vocational archaeologists, commercial divers and fishermen, and recreational divers.

Products: Updated inventory of potential shipwreck sites in the three sanctuaries that includes site characterizations and shipwreck assessments.

Partners: CBNMS, GFNMS, MBNMS, CINMS, MHP, National Park Service (NPS), California State Historic Preservation Office (SHPO)

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	None	None

Activity 2.2: Conduct systematic research and survey for archaeological sites, including the remains of prehistoric, as well as historic sites, representing ship and aircraft losses.

This effort would be based upon geographic regions with a high probability of cultural and historic remains established by conducting remote sensing surveys and/or diver investigations of target sites as part of larger research cruises across the three sanctuaries. Such surveys would include the development of education materials and curriculum, a project website, a site assessment report, corrosion study, and a comparison with previous surveys.

Products: MBNMS survey of the USS *Macon* and continuing efforts to survey the *Lukenbach* and *Montebello*.

Partners: CBNMS, GFNMS, MBNMS, CINMS, MHP, National Park Service (NPS), California State Historic Preservation Office (SHPO)

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	None	None

Activity 2.3: Establish a Shipwreck Reconnaissance and Site Monitoring Program.

Use a model similar to CINMS to record and monitor submerged sites and to document new artifact discoveries and evaluation of human site disturbance. Record site positions in NOAA's ARCH GIS database.

Products: Expanded site information in NOAA's ARCH.

Partners: CBNMS, GFNMS, MBNMS, CINMS, MHP

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	None	None

Activity 2.4: Assess and Nominate Appropriate Submerged Archaeological Sites for Inclusion in the National Register of Historic Places.

Products: Applications for site inclusion in the National Register of Historic Places.

Partners: CBNMS, GFNMS, MBNMS, CINMS, MHP, NPS, SHPO

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	None	None

Strategy XMHR-3: Assess Shipwrecks and Submerged Structures for Hazards

The GFNMS, MBNMS, and possibly CBNMS, are faced with the challenge of identifying and monitoring historic and non-historic shipwrecks that may pose environmental threats to Sanctuary marine resources. Information pertaining to shipwrecks as environmental threats is provided to NOAA’s HAZMAT division and the Office of National Marine Sanctuaries for the development of the SHIELDS and RUST database systems. The sanctuaries will develop a plan to address this issue since there are many shipwrecks that pose threats in the near future.

Activity 3.1: Establish an inventory of shipwrecks, inside and outside of sanctuary boundaries, posing environmental threats to sanctuary marine resources.

This inventory is based upon primary and secondary source documentation from established shipwreck databases, interviews with commercial divers and fishermen, and recreational divers who frequently visit submerged shipwrecks. The Sanctuaries will also collaborate with other organizations doing similar research. As the Sanctuaries compile information regarding sites that may pose environmental threats, this information will be coordinated with NOAA’s HAZMAT division and the Office of National Marine Sanctuaries for the development of the SHIELDS and RUST database systems.

- Products: Inventory of sites that may pose environmental threats, including a priority listing of shipwreck sites to be located via reconnaissance dives. Evaluation reports on sites submitted to federal and state trustee agencies for potential remediation.
- Partners: CBNMS, GFNMS, MBNMS, CINMS, MHP, NOAA HAZMAT, NOAA ORR, NPS, SHPO

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	None	None

Activity 3.2: Establish a monitoring program for shipwreck sites.

Develop protocols for site evaluation, including timelines for long-term monitoring. Direct efforts to monitor sites that have been located and are considered a threat to Sanctuary marine resources based on the monitoring work at such sites as the *Jacob Luckenbach* and the *Montebello*.

- Products: A shipwreck monitoring plan.
- Partners: CBNMS, GFNMS, MBNMS, CINMS, MHP, NPS, SHPO

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	None	None

Activity 3.3: Coordinate with partners to reduce threats.

GFNMS and MBNMS will work with NMSP to expand efforts to identify shipwrecks that may pose environmental threats and will provide pertinent information to NOAA’s HAZMAT division and the NMSP for the development of the SHIELDS and RUST GIS database systems. Shipwrecks identified as a potential threat to leak or spill hazardous waste will be regularly monitored, and NMSP will work with other trustee agencies to develop a plan to prevent, reduce, and respond to environmental threats from these vessels.

Products: A threat mitigation plan.
 Partners: CBNMS, GFNMS, MBNMS, CINMS, MHP, NOAA HAZMAT, NOAA ORR, NPS, SHPO

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	None	None

Activity 3.4: For historic shipwrecks, ensure compliance under Section 106 of the National Historic Preservation Act (NHPA) and the National Marine Sanctuary Act (NMSA).

Products: Final Reports of Post Site Disturbance Documentation and/or Archaeological Site Reports submitted to the SHPO.
 Partners: CBNMS, GFNMS, MBNMS, CINMS, MHP, NOAA HAZMAT, NOAA ORR, NPS, SHPO

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	None	None

Strategy XMHR-4: Protect and Manage Submerged Archaeological Resources

The NMSP regulations mandate that archaeological resources be managed consistent with the Federal Archaeological Program. The NMSP’s Maritime Heritage Program (MHP) and Maritime Archeology Center (MAC) were established in 2002 and 2004 respectively to emphasize the need for research, education, outreach, and protection of heritage resources. Issues to be addressed by GFNMS, MBNMS, and possibly CBNMS, regarding the protection of submerged archaeological resources include:

- Permitting
- Site protection through enforcement and education
- Shipwrecks as environmental threats

Activity 4.1: Jointly develop uniform protocol to manage, monitor, and protect submerged sites within the three sanctuaries in partnership with appropriate local law enforcement agencies.

Products: Monitoring and permitting protocols, enforcement surveillance and inspection program as appropriate, mooring system plan if needed at dive sites.

Partners: CBNMS, GFNMS, MBNMS, CINMS, MHP, NPS, SHPO, NOAA Office of Law Enforcement (OLE)

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	None	None

Activity 4.2: Provide training to Sanctuary staff and facilitate training for partners.

The training will focus on the importance of submerged archaeological resources and the need and tools to manage and protect them.

Products: A comprehensive training program.

Partners: CBNMS, GFNMS, MBNMS, CINMS, MHP, NPS, SHPO, NOAA Office of Law Enforcement (OLE)

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	None	None

Activity 4.3: Identify archaeological and historic resources currently outside sanctuary boundaries that may be of significant historic interest or may pose a threat to sanctuary resources.

Explore the appropriateness, feasibility and need to (1) consider expanding existing boundaries to protect site(s) as maritime heritage resources or (2) work with the state to establish a state marine cultural preservation area (e.g., the USS *Montebello*, 1.6nm south of the MBNMS near Cambria, others to be determined).

Products: Site assessments and recommendations for preservation and/or protection.

Partners: CBNMS, GFNMS, MBNMS, MHP, NPS, SHPO

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	None	None

Strategy XMHR-5: Conduct Public Outreach with Traditional User and Ocean-Dependent Groups and Communities

A key aspect of the CBNMS, GFNMS, and MBNMS maritime heritage program will be to educate the public about traditional maritime cultures and practices including Native Americans; exploration; settlement; ethnic groups; whalers; historic and present-day fishermen; recreational uses; and traditional shipping, shipbuilding, canneries, and other economic activities reflecting historic human interaction with the ocean. Although sanctuary protection status is given only to cultural and historical resources, the program recognizes that traditional user and ocean-dependent groups are interconnected with the sanctuaries and are an integral part of their history. Therefore, this program will also acknowledge those traditional maritime heritage activities and practices consistent with the NMSA’s primary goal of resource protection.

Activity 5.1: Identify traditional user and ocean-dependent groups.

Solicit and document the range of traditional user and ocean-dependent groups’ ideas, values, etc. Conduct a literature search to gather resource documentation on traditional users and ocean-dependent groups and communities. Use this information to prioritize appropriate aspects of their maritime heritage.

Product: Sanctuary user groups and community historic analysis.

Partners: CBNMS, GFNMS, MBNMS, CINMS, MHP

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	None	None

Activity 5.2: Develop collaborative programs and initiatives.

GFNMS will initiate a partnership with the fishing community at Pillar Point Harbor to enhance relationships and jointly develop ways to educate the public on the interconnections with the three Sanctuaries.

Products: Pillar Point maritime heritage community demonstration initiative. Collaborative programs, such as sustainable seafood events, adopt-a boat classroom programs (e.g., SEA Grant-Marine program), historic re-enactments at harbors, Native American village sites.

Partners: CBNMS, GFNMS, MBNMS, San Mateo County Harbor District – Pillar Point, Half Moon Bay Fishermen’s Association, CA Sea Grant

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	None	None

Activity 5.3: Create an inventory of historic and present maritime heritage communities.

Focus on traditionally associated people to support mapping and interpretive programs. Assess and nominate appropriate sites for the National Register of Historic Places.

Products: Database inventory of maritime heritage communities and sites; nominations for the National Register of Historic Places.

Partners: CBNMS, GFNMS, MBNMS, MHP, NPS, SHPO

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	None	None

Activity 5.4: Map and document traditional communities and sites.

These communities and sites may include fishing and whaling sites; shipping/commercial marine transport of passengers and cargo; lighthouses and life-saving stations; tribes (coastal); and recreational uses such as surfing and diving.

Products: Tri-sanctuary map of traditional communities and sites.

Partners: CBNMS, GFNMS, MBNMS, MHP, NPS, SHPO

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	None	None

Strategy XMHR-6: Establish Maritime Heritage Focused Education and Outreach Programs

Maritime Heritage provides a unifying theme to educate and inform people along the California coast and throughout the country about the historic human interaction with the ocean. Through websites, museum exhibits, and other tools, the Sanctuaries will provide information on:

Programs by and about traditional cultures and practices including Native Americans, ethnic groups, fishermen, and economic activities

Shipwrecks, exploration, fishing and fisheries; trade vessels, routes and nationalities

Shoreline structures such as lighthouses, life-saving stations, canneries, whaling facilities

Traditional recreational activities such as diving, surfing, and boating

Stewardship of our cultural and historic maritime resources

Activity 6.1: Improve information sharing and dialogue.

Hold periodic maritime heritage event to highlight specific cultural and historic resources that the sites are mandated to protect, such as archeological sites, shipwrecks, etc., and link to adjacent communities and human uses.

Product: Annual community event focusing on maritime heritage resources.

Partners: CBNMS, GFNMS, MBNMS, MHP, NPS, SHPO, local maritime museums and historic parks

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	None	None

Activity 6.2.

The websites should include specific information about maritime heritage resources, such as living journals of traditional users and ocean-dependent groups as well as shipwreck survivors, archaeological project updates, potential environmental threats, and maps.

Products: Expanded maritime heritage Web-based information.

Partners: CBNMS, GFNMS, MBNMS

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	None	None

Activity 6.3: Develop and implement education and outreach programs and materials for the Maritime Heritage Program.

Incorporate traditional users/ocean-dependent groups and submerged archaeological resources into existing and new education/outreach programs.

Products: Maritime heritage programs, brochures, posters, etc.

Partners: CBNMS, GFNMS, MBNMS, MHP, NPS, SHPO, local maritime museums and historic parks.

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	None	None

Activity 6.4: Collaborate on maritime heritage resource exhibits and signage.

GFNMS and MBNMS are currently collaborating on a joint interpretive exhibit at Pigeon Point Lighthouse in San Mateo County. The three sites will incorporate maritime heritage themes and messages as part of the California Statewide Signage, Exhibits, and Facilities plan.

Products: Joint interpretive exhibits at Pigeon Point Lighthouse and other locations, joint signage, and joint public lecture series.

Partners: CBNMS, GFNMS, MBNMS, MHP, NPS, SHPO, local maritime museums and historic parks

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	None	None

Table XCMHR 1: Measuring Performance of the Maritime Heritage Resources Action Plan

Desired Outcome(s) For This Action Plan:	
Establish a joint maritime heritage program that identifies and assesses known shipwrecks; protects sites from unauthorized disturbance; develops heritage partnerships and education programs.	
Performance Measures	Explanation
By Year 5, the Maritime Heritage program will identify and list all known heritage resources in these three Sanctuaries in a digital resource database and identify shipwrecks that could pose environmental threats. When appropriate, develop plans to protect these resources from threats and provide public outreach and education.	The specific maritime heritage activities identified in this plan build upon existing site efforts and collectively establish a new joint maritime heritage program for this region. The program will allow these sites to be responsive to the NMSA purpose and policy to identify and protect cultural and historic resources. Implementation of these strategies will better streamline and coordinate overall NMSP efforts to protect maritime heritage resources and expand awareness of the importance of these resources to the public.

Table XCMHR 2: Estimated Costs to Implement the Cross-Cutting Maritime Heritage Resources Action Plan

Strategy	Estimated Annual Cost (1000's)*					Total Est. 5-Year Cost (1000's)
	YR 1	YR 2	YR 3	YR 4	YR 5	
Strategy XMHR-1: Establish Maritime Heritage Resources Program	\$55.5	\$55.5	\$0	\$0	\$0	\$111
Strategy XMHR-2: Inventory and Assess Submerged Sites	\$81	\$81	\$72	\$72	\$72	\$378
Strategy XMHR-3: Assess Shipwrecks and Submerged Structures for Hazards	\$0	\$0	\$51	\$51	\$51	\$153
Strategy XMHR-4: Protect and Manage Submerged Archaeological Resources	\$0	\$0	\$0	\$24	\$24	\$48
Strategy XMHR-5: Conduct Public Outreach with Traditional User and Ocean-Dependent Groups and Communities	\$39	\$39	\$58.5	\$58.5	\$58.5	\$253.5
Strategy XMHR-6: Establish Maritime Heritage Focused Education and Outreach Programs	\$61.5	\$61.5	\$64.5	\$64.5	\$64.5	\$316.5
Total Estimated Annual Cost	\$237	\$237	\$246	\$270	\$270	\$1,260

* Cost estimates are for both “programmatic” and “base” (salaries and overhead) expenses.

** Contributions from outside funding sources also anticipated.

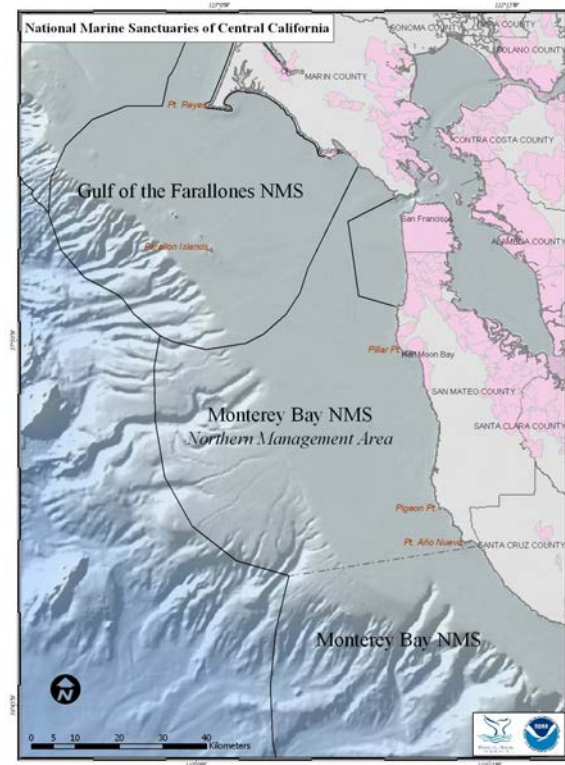
For management planning purposes, the individual site cost to implement cross-cutting strategies can be calculated by dividing the estimated annual cost by three (equal cost). The actual cost to each site may vary according to strategy but will be further refined when sites prepare annual operating plans.

Northern Management Area Transition Action Plan

Goal

The goal of the Northern Management Area (NMA) Transition Plan is to identify specific strategies and activities that would implement a National Marine Sanctuary Program (NMSP) decision to transfer administrative and management authority in the northern management area of the Monterey Bay National marine Sanctuary (MBNMS) to the Gulf of the Farallones National Marine Sanctuary (GFNMS).

Figure 1: Northern Management Area



Issue Description

The Northern Management Area Transition Plan is the outcome of a process to resolve the “MBNMS-GFNMS boundary” issue. Resolution of this shared boundary issue was identified as a priority within the Joint Management Plan Review (JMPR) public scoping meetings and the Sanctuary Advisory Council prioritization process. The NMSP established an internal working group to develop recommendations on how to address this issue. The NMSP solicited public comments and held a joint Advisory Council meeting to discuss the recommendation. At the conclusion, the NMSP determined that the Gulf of the Farallones would assume full administrative and management responsibilities of the area extending from the San Mateo/Santa Cruz County line northward to the existing boundary between the Monterey Bay and Gulf of the Farallones Sanctuaries, though the existing legal Sanctuary boundaries remain the same. For convenience, this area is informally referred to as the Northern Management Area (NMA) (see Figure 1).

Northern Management Area (NMA) Administration & Operations

Administration and operations are the specific staffing, facilities, vessels, and procedural elements that are needed to effectively manage a site or area. Most of the specific activities associated with transferring the office administration, expanding the existing office, and hiring new staff have already been completed and are not included here.

Strategy XNAO-1: Create a Multi-Functional HMB Regional Office.

Activity 1.1: Expand the existing the Half Moon Bay (HMB) office, or relocate to a new location.

Products: New multi-purpose office, ideally along Pillar Point Harbor to provide a multi-purpose facility (district staff office, space for volunteers/interns, accessible and visible visitor center, public meeting space).

Partners: Gulf of the Farallones National Marine Sanctuary (GFNMS), Monterey Bay National Marine Sanctuary (MBNMS), San Mateo Harbor District

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	None	None

Strategy XNAO-2: Evaluate the Delivery and Success of NMSP Programs and Services in the NMA

Activity 2.1: Conduct an evaluation of the delivery and success of NMSP programs and services to local communities in the NMA.

Products: Analysis of success using performance measures that have been established to measure the delivery and effectiveness of NMSP programs and services to local communities in the NMA.

Partners: Transition Team, GFNMS, MBNMS & HQ staff

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	GF	AD-6.2 & AD-6.3
	CB (Cordell Bank); GF (Gulf of the Farallones); MB (Monterey Bay)	

Northern Management Area (NMA) Resource Protection

Resource protection encompasses several program areas and includes a diverse range of management issues. The overall goal for resource protection in the NMA is to maintain a high level of protection for Sanctuary resources in this area by creating a resource protection team that works collaboratively and capitalizes on the strengths and expertise of individual staff, regardless of which site they are located in. GFNMS staff will take the lead on most resource protection issues originating in the NMA, except for water quality issues, which will continue to be overseen by MBNMS. However, the MBNMS regulations will continue to apply in this area and any policy development, permits, authorizations or other significant actions must be closely coordinated with appropriate MBNMS staff. Though the actual issue and expertise of staff will factor into who ultimately works on an issue, the following protocol provides a general guideline:

Issue primarily located in MB and straddles NMA (e.g., Shoreline Armoring): MBNMS staff takes the lead and coordinates with GFNMS staff.

Issue primarily located in GF and straddles NMA (e.g., *Lukenbach* Spill/Clean-up): GFNMS staff takes the lead and coordinates with MBNMS staff.

Issue only located in NMA (e.g., Mavericks Tow-in Surfing): GFNMS staff takes the lead and coordinates with MBNMS staff.

When addressing specific resource protection issues, sanctuary managers often seek advice and recommendations from their respective Advisory Councils. The following protocols provide general guidance as to how the Advisory Councils will be involved on issues affecting the NMA.

Primarily in the MBNMS and straddles the NMA: Issue first goes to the MBNMS Advisory Council for action. Their recommendations are forwarded to the GFNMS Advisory Council for comment and action.

Primarily in the GFNMS and straddles the NMA: Issue first goes to the GFNMS Advisory Council for action. Their recommendations are forwarded to the MBNMS Advisory Council for comment and action.

Only in the NMA: Issue first goes to the GFNMS Advisory Council for action. Their recommendations are forwarded to the MBNMS Advisory Council for comment and action.

If there are fundamental differences in the recommendations between the Advisory Councils, a joint working group will be formed to resolve the differences. If no resolution can be reached, the separate recommendations from the Advisory Councils will be forwarded to the sanctuary managers, who will consider both recommendations before making a decision.

Strategy XNRP-1: GFNMS Will Be Responsible for Permit Activities in the NMA

Activity 1.1: GFNMS will process permits within the NMA, except for water quality permits, which will continue to be overseen by MBNMS.

Products: Permit review, processing and issuance in the NMA.

Partners: GFNMS and MBNMS resource protection staff

Cross-Reference:	Sanctuary	Management Plan Strategy Reference
	GF	RP-5

CB (Cordell Bank); GF (Gulf of the Farallones); MB (Monterey Bay)

Strategy XNRP-2: GFNMS Will Be Responsible for Regulatory Activities in the NMA While Maintaining Maximum Consistency and Protection to Sanctuary Resources

Activity 2.1: GFNMS staff will take the lead in evaluating a potential new dredge disposal site for Pillar Point Harbor should a detailed site proposal be developed by the San Mateo County Harbor District for submission to federal and state agencies.

Such an action would require changing the MBNMS regulations and designation document and require coordination with the MBNMS staff, and approval from the MBNMS Superintendent.

Products: Assessment and recommendation regarding any new dredge disposal site proposal; possible change to the MBNMS regulations and designation document.

Partners: GFNMS & MBNMS resource protection staff

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	MB	HDD-2.3 & OA-11.1(c)
	CB (Cordell Bank); GF (Gulf of the Farallones); MB (Monterey Bay)	

Activity 2.2: GFNMS staff will facilitate a public process in the next five years to consider whether the San Francisco Exemption Area (a.k.a. “the donut hole”) should be incorporated into the MBNMS.

Such an action would require changing the MBNMS regulations and designation document and require coordination with MBNMS staff, and approval from the MBNMS Superintendent.

Products: Assessment and recommendation on whether to include this area in the MBNMS. This could result in a change to the MBNMS regulations and designation document.

Partners: GFNMS and MBNMS resource protection staff

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	None	None

Activity 2.3: The GFNMS and MBNMS Resource Protection Teams will closely coordinate on any future proposed regulatory changes that could impact the NMA or the other Sanctuaries.

Products: Potential regulatory modifications.

Partners: GFNMS and MBNMS resource protection staff

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	MB	OA-12
	GF	RP-4
	CB (Cordell Bank); GF (Gulf of the Farallones); MB (Monterey Bay)	

Strategy XNRP-3: GFNMS Staff will Coordinate Existing and Emerging Resource Protection Issues in the NMA

Activity 3.1: GFNMS staff will lead efforts to coordinate and implement JMPR site-specific activities to support resource protection and stewardship in the NMA and the delivery of services and programs to local communities.

Products: Implement JMPR resource protection strategies and activities.

Partners: GFNMS and MBNMS resource protection staff

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	MB	OA-12, HDD-1, 3-5; DESAL-1-5; CA-1-4; SC-1, 2; BH-1-7; FER-1-7; Ei-1-3; IS-1-5; MPA-1-11; MMST-1-4; MPWC-1-4; TP-1-7

GF	RP-1-5; FA-1-6; GF-7; IS-1-9; EP-1-3; WD-1-6
CB (Cordell Bank); GF (Gulf of the Farallones); MB (Monterey Bay)	

Activity 3.2: GFNMS staff will lead efforts to consult and coordinate on resource protection issues with other local, state and federal resource management agencies in the NMA.

Staff will also work with these agencies and other partners to implement specific resource protection strategies and activities identified in the JMPR.

- Products: Implemented JMPR resource protection strategies and activities.
 Partners: GFNMS and MBNMS resource protection staff

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	MB	OA-12
	GF	AD-5, RP-4, RP-5
CB (Cordell Bank); GF (Gulf of the Farallones); MB (Monterey Bay)		

Strategy XNRP-4: GFNMS Staff will Coordinate Enforcement Activities in the NMA

Activity 4.1: GFNMS staff will provide assistance as appropriate in the planning and implementation of all NMA enforcement activities in the NMA and will coordinate with MBNMS to ensure consistency across the sites.

- Products: Enforcement cases investigated. Surveillance activities. Updated Enforcement plan.
 Partners: GFNMS & MBNMS resource protection staff, MBNMS Enforcement Officer and the National Oceanic and Atmospheric Administration-Office of Law Enforcement (NOAA-OLE).

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	GF	PR-6 and scattered throughout GFNMS Management Plan (MP)
CB (Cordell Bank); GF (Gulf of the Farallones); MB (Monterey Bay)		

Strategy XNRP-5: GFNMS Staff will Coordinate NMA Emergency Response Activities in the NMA

Activity 5.1: GFNMS staff will lead and closely coordinate efforts to respond to emergencies in the NMA to ensure maximum resource protection to Sanctuary resources.

- Products: Communication strategy that recognizes site-specific and regional emergency response plans.
 Partners: GFNMS and MBNMS resource protection staff

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	GF	RP-7, RP-8, VS-7, VS-8
	MB	OA-5 & XAO-4.3 (scattered throughout JMPR)
CB (Cordell Bank); GF (Gulf of the Farallones); MB (Monterey Bay)		

Strategy XNRP-6: MBNMS Water Quality Protection Program Staff Will Continue to Coordinate Water Quality Activities in the NMA

Activity 6.1: Implement existing Water Quality Protection Program (WQPP) activities.

- MBNMS WQPP staff will continue to implement water quality activities (planning, implementation of management measures, partnership and stakeholder coordination, monitoring and outreach) in the NMA and regularly communicate with GFNMS staff to enhance understanding of the activities underway.

Products: WQPP Plans implemented in the NMA. New GFNMS WQPP assessment completed.
 Partners: MBNMS WQPP staff and GFNMS resource protection staff

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	GF	RP-7, RP-8, VS-1-13; WQ-2, 3, 5, 6, 9
	MB	BC-1-10; CS-1-4; MOA-1-3; WQPP-1-23OA-5 & XAO-4.3 (scattered throughout JMPR)
CB (Cordell Bank); GF (Gulf of the Farallones); MB (Monterey Bay)		

Activity 6.2: Conduct site water quality needs assessment.

MBNMS has hired a new regional WQPP specialist who will be assigned to work with GFNMS staff, and other West Coast Sanctuary staff, on their specific needs and threats, and assess how existing MBNMS water quality programs or processes could be translated or modified to meet those needs, or whether new programs should be developed. Once these assessments are done, the new WQPP regional specialist will assist the sites in designing the appropriate plans and building site capacity for implementation, drawing on individual MBNMS subject matter staff where possible. Note that this new water quality position is not focused on the NMA specifically, but on providing assistance to all West Coast Sanctuaries, including the GFNMS. However, opportunities for regional approaches that could benefit the NMA will also be pursued.

Products: New Regional WQPP staff member. Site-by-site needs assessment.
 Partners: MBNMS WQPP staff and GFNMS resource protection staff

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	GF	RP-7, RP-8, VS-1-13; WQ-2, 3, 5, 6, 9
	MB	BC-1-10; CS-1-4; MOA-1-3; WQPP-1-23OA-5 & XAO-4.3 (scattered throughout JMPR)
CB (Cordell Bank); GF (Gulf of the Farallones); MB (Monterey Bay)		

Activity 6.3: Review and issue water quality authorizations.

MBNMS staff will continue to review water quality permits in the NMA, and issue authorizations with appropriate conditions to minimize impacts as outlined in the MBNMS water

quality MOA. MBNMS staff will coordinate with and seek input from GFNMS staff in reviewing these permits.

Products: Permit and authorization review and issuance

Partners: MBNMS WQPP staff and GFNMS resource protection staff

Cross-Reference:	Sanctuary	Management Plan Strategy Reference
	MB	MOA-1 to MOA-3, XNRP-1

CB (Cordell Bank); GF (Gulf of the Farallones); MB (Monterey Bay)

Northern Management Area (NMA) Research and Monitoring

The GFNMS Research Coordinator will be the lead on most research and monitoring projects and programs in the NMA. The Research Coordinator will work closely with the MBNMS and CBNMS Research Coordinators to ensure that the projects are integrated and coordinated. One of the overall goals for research and monitoring in the NMA, and more broadly across the region is to capitalize on the strengths and expertise of individual staff regardless of their site location. As such, staff from either site may be requested to consult or work on research and monitoring projects in the NMA based on their area of expertise. For example, if a proposed research project in the NMA involves rocky intertidal issues, then those MBNMS staff with expertise and experience on these issues would be involved. Likewise, if there were an issue where GFNMS staff had more experience (e.g., seabirds or marine mammals) then they would be involved. There are many research and monitoring projects already being implemented by both sites in the NMA and many more issue-based projects that could be jointly or separately implemented. The research staff from the two sites will continue to discuss opportunities for collaborative implementation of these programs and activities.

Though the actual issue and expertise of staff will factor into who ultimately works on a research and monitoring issue, the following protocol provides a general guideline:

Issue primarily located in the MBNMS and straddles the NMA (e.g., SIMoN): the MBNMS staff takes the lead and coordinates with the GFNMS staff.

Issue primarily located in the GFNMS and straddles the NMA (e.g., seabird monitoring): the GFNMS staff takes the lead and coordinates with the MBNMS staff.

Issue only located in the NMA (e.g., Wildlife Disturbance monitoring near Pillar Point): the GFNMS staff takes the lead and coordinates with the MBNMS staff.

When addressing some research and monitoring issues, Sanctuary managers may seek advice and recommendations from their respective Advisory Councils. The following protocols provide general guidance as to how the Advisory Councils will be involved on research and monitoring issues affecting the NMA.

Primarily in the MBNMS and straddles the NMA: Issue first goes to the MBNMS Advisory Council for action. Their recommendations are forwarded to the GFNMS Advisory Council for comment and action.

Primarily in the GFNMS and straddles the NMA: Issue first goes to the GFNMS Advisory Council for action. Their recommendations are forwarded to the MBNMS Advisory Council for comment and action.

Only in the NMA: Issue first goes to the GFNMS Advisory Council for action. Their recommendations are forwarded to the MBNMS Advisory Council for comment and action.

If there are fundamental differences in the recommendations between the Advisory Councils, a joint working group will be formed to resolve the differences. If no resolution can be reached, the separate recommendations from the Advisory Councils will be forwarded to the Sanctuary managers, who will consider both recommendations before making a decision.

Strategy XNRM-1: Share Information

Activity 1.1: Develop and implement procedures for sharing information on existing research and monitoring projects and coordinate on future projects.

Products:

- Briefings on select existing projects, for example:
 - Rocky intertidal monitoring
 - Beached bird survey
 - SIMoN
 - Ecosystem dynamics study/pelagic monitoring
 - Trustee restoration projects (Rhinoceros Auklet)
 - Black abalone withering foot study
 - Elephant seal database
- Conduct an annual Coordinators’ meeting to identify and plan joint research projects among the sites. These should be included in each site’s Annual Operating Plan (AOP).
- Develop a Research & Monitoring Communication Plan.

Partners: Cordell Bank National Marine Sanctuary (CBNMS), GFNMS, MBNMS, & Sanctuary Integrated Monitoring Network (SIMoN) Research Personnel

Sanctuary	Management Plan Strategy Reference
Cross-Reference:	XEM-1 to XEM-3, XAO-1.2, XAO-2.1, XAO-2.2
	CB (Cordell Bank); GF (Gulf of the Farallones); MB (Monterey Bay)

Strategy XNRM-2: Coordinate Research and Monitoring Information Dissemination

Activity 2.1: Update, cross-link, and develop Web products for GFNMS, MBNMS and SIMoN websites.

Products: Update site characterization, research and monitoring content on website, cross-link existing studies, maps, and data that apply to the NMA.

Partners: GFNMS & MBNMS Research and IT Personnel

Cross-Reference:	Sanctuary	Management Plan Strategy Reference
		XEM-1 to XEM-3, XNEO-3
	CB (Cordell Bank); GF (Gulf of the Farallones); MB (Monterey Bay)	

Strategy XNRM-3: Collaborate on Sanctuary Advisory Committees and Working Groups on Research and Monitoring Issues Related to the NMA

Activity 3.1: Assess current and future NMSP participation on technical advisory committees or working groups in the NMA (such as Fitzgerald Marine Reserve, MBNMS RAP).

Based upon the technical needs of the group, determine who is the most appropriate staff person to participate in the group. There may be instances when it is appropriate to have more than one NMSP research staff on the committee, depending upon the needed expertise.

Products: Inventory of staff participation in external research and monitoring technical advisory panels. As necessary, update staff expertise and assignment inventory.

Partners: CBNMS, GFNMS & MBNMS Research Personnel

Cross-Reference:	Sanctuary	Management Plan Strategy Reference
		XEM-1
	CB (Cordell Bank); GF (Gulf of the Farallones); MB (Monterey Bay)	

Strategy XNRM-4: Collaborate on Volunteer Monitoring Efforts Related to the NMA

Activity 4.1: Continue efforts to coordinate and collaborate Beach Watch and Beach COMBERS volunteer monitoring programs.

Products: Continue to share annual reports. Continue to communicate unusual mortality and oil/HAZMAT incidences.

Partners: CBNMS, GFNMS & MBNMS Research Personnel and volunteer coordinators

Cross-Reference:	Sanctuary	Management Plan Strategy Reference
	MB	OA-4
	GF	RE-1, WD-2, IS-5
	CB (Cordell Bank); GF (Gulf of the Farallones); MB (Monterey Bay)	

Strategy XNRM-5: Implement Jmpr Site-Specific Research and Monitoring Activities in the NMA

Activity 5.1: The GFNMS and MBNMS Research Teams will coordinate on the implementation of Jmpr site-specific and cross-cutting ecosystem research and monitoring activities in the NMA.

Products: Coordinate efforts to implement specific research and monitoring projects based on a Joint Research and Monitoring Annual Operating Plan.

Partners: GFNMS and MBNMS research staff

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	CB	RE-7-9, 10
	GF	RP-7, RP-8, VS-7, VS-8; FA-1-6; IS-1-5; VS-5; RE-1, 2; WD-1-3; WQ-8
	MB	BC-1-4; CA-1, 2; BH-2-5; DESAL-2, 4; EI-1,2; FER-2, 3, 5, 7; HDD-2, 3, 5; IS-1-3; MMST-2,4-7; SC-1-3, 5, 6; OA-2, 5; TP-1; WQPP-8, 9, 19; & XAO-4.3 (scattered throughout Jmpr)

CB (Cordell Bank); GF (Gulf of the Farallones); MB (Monterey Bay)

Northern Management Area (NMA) Education and Outreach

GFNMS education staff will be the lead on education programs in the NMA and will ensure that the MBNMS Education Coordinator is informed about all education activities taking place in the NMA. One of the overall goals for education and outreach in the NMA, and more broadly across the region, is to capitalize on the strengths and expertise of individual staff regardless of their site location. As such, staff from either site may be requested to consult on projects in the NMA based on their area of expertise. There are many education, outreach and volunteer programs already being implemented by both sites in the NMA and many more issue-based programs that could be jointly or separately implemented. The education staff from the two sites will continue to discuss opportunities for collaborative implementation of these programs and activities.

Though the actual issue and expertise of staff will factor into who ultimately works on an education or outreach issue, the following protocol provides a general guideline:

Issue primarily located in the MBNMS and straddles the NMA (e.g., MERITO multi-cultural education): the MBNMS staff takes the lead and coordinates with the GFNMS staff.

Issue primarily located in the GFNMS and straddles the NMA (e.g., Sanctuary Explorers Summer Camp): the GFNMS staff takes the lead and coordinates with the MBNMS staff.

Issue only located in the NMA (e.g., Pillar Point outreach): the GFNMS staff takes the lead and coordinates with the MBNMS staff.

When addressing some education and outreach issues, Sanctuary managers may seek advice and recommendations from their respective Advisory Councils. The following protocols provide general guidance as to how the Advisory Councils will be involved on education and outreach issues affecting the NMA.

Primarily in the MBNMS and straddles the NMA: Issue first goes to the MBNMS Advisory Council for action. Their recommendations are forwarded to the GFNMS Advisory Council for comment and action.

Primarily in the GFNMS and straddles the NMA: Issue first goes to the GFNMS Advisory Council for action. Their recommendations are forwarded to the MBNMS Advisory Council for comment and action.

Only in the NMA: Issue first goes to GFNMS Advisory Council for action. Their recommendations are forwarded to the MBNMS Advisory Council for comment and action.

If there are fundamental differences in the recommendations between the Advisory Councils, a joint working group will be formed to resolve the differences. If no resolution can be reached, the separate recommendations from the Advisory Councils will be forwarded to the Sanctuary managers, who will consider both recommendations before making a decision.

Strategy XNEO-1: Transfer, Establish and Implement School Programs in the NMA

Activity 1.1: Coordinate and implement both GFNMS and MBNMS classroom activities (i.e., Oceans Week, etc.) to promote a greater awareness of the Sanctuaries in schools.

Products: Six classroom presentations per year.
 Partners: GFNMS, MBNMS, Farallones Marine Sanctuary Association (FMSA) education staff, Cabrillo School District, Pescadero School District, other San Mateo County schools

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	MB	OA-5, MERITO-1 to MERITO-3, others within various issues
	GF	ED-1 to ED-6 & XCO-3
CB (Cordell Bank); GF (Gulf of the Farallones); MB (Monterey Bay)		

Activity 1.2: Establish a Sanctuary education group composed of teachers and other marine educators/communicators to share information and ideas.

Products: A periodic compilation of suggestions for new/expanded school programming.
 Partners: GFNMS, MBNMS, CBNMS education staff, San Mateo, San Francisco, Marin, and Sonoma County schools, Advisory Council members, informal marine educators

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	MB	MB OA-3.2, MERITO-2
	GF	ED-1 & ED-4
CB (Cordell Bank); GF (Gulf of the Farallones); MB (Monterey Bay)		

Activity 1.3: Expand the LiMPETS student monitoring program by identifying more potential locations along the NMA coastline and providing training to teachers and students.

Products: Student monitoring data – rocky intertidal, sand crab.

Partners: GFNMS, MBNMS, FMSA education staff, Cabrillo School District, Pescadero School District, other San Mateo County Schools

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	MB	OA-4 and TP-2
	GF	ED-1 to ED-6, WD-2
	CB (Cordell Bank); GF (Gulf of the Farallones); MB (Monterey Bay)	

Activity 1.4: Identify and pursue partnerships and funding opportunities to expand the MBNMS MERITO Program to the NMA.

Products: Watershed Activity Guide, Marine Conservation Kits, train-the-trainers workshops, weekly outings for after-school programs, kayak days, tidepool days, hiking days, PSA (Spanish/English), webpage updates.

Partners: GFNMS, FMSA education staff, MBNMS Multicultural Education for Resource Issues Threatening Oceans (MERITO) staff, Cabrillo School District, Pescadero School District, other San Mateo County schools, Pescadero Conservation Alliance, Boys & Girls Club, California State Parks

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	MB	MERITO-1 to MERITO-6
	CB (Cordell Bank); GF (Gulf of the Farallones); MB (Monterey Bay)	

Strategy XNEO-2: Develop and Implement Community Outreach and Stewardship Programs

Activity 2.1: Represent the NMSP at local fairs and community events.

Products: Joint traveling displays at such events as the Half Moon Bay Dream Machines (Fly-In) Bay Area Paddle Fest, Toast to the Coast, and the Pigeon Point Lighthouse annual lighting celebration for GFNMS, MBNMS, and CBNMS.

Partners: NMSP, GFNMS, MBNMS and CBNMS education staff

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	GF	ED-7
	CB (Cordell Bank); GF (Gulf of the Farallones); MB (Monterey Bay)	

Activity 2.2: Develop and implement a lecture series for the NMA, consistent with lecture offerings in GFNMS and MBNMS.

The initial series may focus on lighthouses of the sanctuaries and historic maritime commerce of the coast.

Products: Six lectures per year.
 Partners: GFNMS/MBNMS/CBNMS education staff, FMSA, and other resource agencies

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	GF	ED-8
	CB (Cordell Bank); GF (Gulf of the Farallones); MB (Monterey Bay)	

Activity 2.3: Coordinate and enhance citizen volunteer opportunities, including Beach Watch and Snapshot Day/First Flush to support resource protection objectives.

Products: Volunteer cross-trainings; expansion of NMA volunteer opportunities.
 Partners: GFNMS, MBNMS, CBNMS education staff, FMSA, other resource agencies

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	MB	OA-4
	GF	ED-7, IS-5, WD-2, WD-4
	CB (Cordell Bank); GF (Gulf of the Farallones); MB (Monterey Bay)	

Strategy XNEO-3: Develop and Disseminate Outreach Materials in the NMA

Activity 3.1: Disseminate existing GFNMS and MBNMS materials throughout the NMA.

Products: Distribution of existing education and outreach materials at select locations throughout the NMA.
 Partners: GFNMS, MBNMS education staff

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	MB	varies by issue
	GF	ED-10 to ED-14
	CB (Cordell Bank); GF (Gulf of the Farallones); MB (Monterey Bay)	

Activity 3.2: Prepare and submit periodic articles on NMA issues for local and regional newsletters and other sanctuary publications.

Products: Four-six articles/year.
 Partners: GFNMS, MBNMS education staff

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	MB	OA-5.11
	GF	WD-6 and ED-11
CB (Cordell Bank); GF (Gulf of the Farallones); MB (Monterey Bay)		

Activity 3.3: Coordinate the development of maps for use by GFNMS, MBNMS and CBNMS, including a bathymetric map of the north-central California Sanctuaries and a GIS map of the three with all sanctuary offices, anchorages/safe harbors and wildlife viewing.

Products: Bathymetric map and GIS map of CBNMS/GFNMS/MBNMS.
 Partners: GFNMS, MBNMS, CBNMS staff, FMSA, MBNMSF

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	MB	OA-5.10
	GF	ED-11
CB (Cordell Bank); GF (Gulf of the Farallones); MB (Monterey Bay)		

Activity 3.4: Engage the community and user groups on how best to involve and inform them about issue-specific resource management issues (i.e., Mavericks, water quality, San Francisco exemption area).

Products: Community workshops, brochures, displays, website content.
 Partners: GFNMS, MBNMS subject matter staff
 Cross-Reference: Varies by issue and site

Activity 3.5: Develop NMA-related links between GFNMS and MBNMS websites. Explore options for Internet collaboration beyond the NMA to strengthen relationships with the Internet-savvy San Francisco Bay Area population.

Products: GFNMS and MBNMS websites that contain information and links to the NMA; expanded joint Web products.
 Partners: GFNMS, NMSP, MBNMS Web staff

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	MB	OA5.10
	GF	ED-11), XNRM-2, & NMA Decision Document
CB (Cordell Bank); GF (Gulf of the Farallones); MB (Monterey Bay)		

Strategy XNEO-4: Implement Jmpr Site-Specific Education and Outreach Activities in the NMA

Activity 4.1: The GFNMS and MBNMS Education Teams will coordinate on the implementation of Jmpr site-specific education and outreach activities in the NMA.

This will be accomplished by exploring opportunities to work proactively with local communities and tapping into existing education and outreach networks (e.g. civic groups,

environmental organizations, etc.). The teams will link the NMA with efforts to increase awareness of the sanctuaries to communities throughout the greater San Francisco Bay region.

Products: Implementation of JMPR education and outreach strategies and activities within the NMA, the greater SF Bay area, and beyond.

Partners: GFNMS and MBNMS education staff

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	CB	ED-1-10, 12, 13; VS-9; PC-3
	MB	CA-3; HDD-5; OA-6, 10, 11; BH-7; IS-2, MPA-8, FER-1-5; IF-1,3,4; MERITO-1-7; BC-3,4,6,7; CS-2,4; WQPP-1-3,6-11,13,15,16,18-21; MMST-1-8’
	GF	MPWC-3; TP-1,2,5; OA-2 ED-1-8, 11; IS-5, 9; WD-2, 4-6; FA-5; WQ-2,9; ED-14; VS-9

CB (Cordell Bank); GF (Gulf of the Farallones); MB (Monterey Bay)

Strategy XNEO-5: Pursue Collaborative Opportunities for Interpretive Signage and Facilities in the NMA

Activity 5.1: Develop collaborative partnerships to create and install interpretive signage in the NMA as part of the long-range California-wide Sanctuaries Interpretive Signage Plan.

Products: 12 trailside signs, 6-8 rail/post mounted signs, 2 large kiosks.

Partners: GFNMS, MBNMS education staff, California State Parks, San Mateo Coast Natural History Association, San Mateo County Harbor District, San Mateo County Parks, Half Moon Bay Parks and Recreation

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	MB	IF-1 to IF-3
	GF	ED-9, ED-12, ED-13

CB (Cordell Bank); GF (Gulf of the Farallones); MB (Monterey Bay)

Activity 5.2: Complete development, fabrication, and installation of collaborative interpretive exhibit at Pigeon Point Light Station in partnership with California State Parks, MBNMS, and the San Mateo Coast Natural History Association.

Key themes for interpretation include the maritime history of the area, the establishment of the lighthouse, life and commerce along the coast, and the natural history of sanctuary waters and resources.

Products: Interpretive exhibits on the lighthouse, sanctuaries, and natural history of the area.

Partners: GFNMS/MBNMS/CBNMS education staff, California State Parks, San Mateo Coast Natural History Association, Pigeon Point Hostel, Pigeon Point Environmental Education Program

	Sanctuary	Management Plan Strategy Reference
Cross-Reference:	MB	IF-1.6
	GF	ED-13

CB (Cordell Bank); GF (Gulf of the Farallones); MB (Monterey Bay)

Table XCN 1: Measuring Performance of the Cross-Cutting Northern Management Area Transition Plan

Desired Outcome(s) For This Action Plan:	
Transfer management responsibilities in the NMA from MBNMS to GFNMS in a manner that enhances protection for sanctuary resources and the delivery of programs and services to local communities.	
Performance Measures	Explanation
<p>By Year 5, 100% of the resource protection, education and research activities identified in this plan are fully implemented.</p> <p>Increase the number of education and outreach programming efforts directed at communities in the NMA from 1,000 individuals in Year 1 to 5,000 individuals in Year 5.</p>	<p>1. The transfer of management responsibilities from MBNMS to GFNMS in the NMA will be accomplished in a manner that builds upon existing resource protection efforts in this area. Implementation of the strategies in this action plan will clarify each of the sites roles and responsibilities, increase coordination, resource and expertise sharing, and ultimately enhance resource protection and outreach efforts to local communities.</p> <p>2. One of the main purposes of this action plan is to ensure that the delivery of products, services and programs to communities in the NMA is increased. Implementation of this action plans targets outreach to local communities in the NMA. Some of the activities include schools and teachers, volunteers, fairs and festivals, visitor centers, public lecture series, etc.</p>

Table XCN-2: Cross-Cutting Northern Management Transition Plan Timeline

Northern Management Area Transition Plan	Year 1	Year 2	Year 3	Year 4	Year 5
NMA Administration and Operations					
Strategy XNAO-1: Create a Multi-Functional HMB Regional Office					
Activity 1.1: Expand the existing Half Moon Bay (HMB) office, or relocate to a new location.			→		
Strategy XNAO-2: Evaluate the Delivery and Success of NMSP Programs and Services in the NMA					
Activity 2.1: Conduct an evaluation of the delivery and success of NMSP programs and services to local communities in the NMA.	→	→	→	→	→
NMA Resource Protection					
Strategy XNRP-1: GFNMS will be Responsible for Permit Activities in the NMA					
Activity 1.1: GFNMS will process permits within the NMA, except for water quality permits, which will continue to be overseen by MBNMS.	→	→	→	→	→

Northern Management Area Transition Plan	Year 1	Year 2	Year 3	Year 4	Year 5
Activity 1.2: GFNMS staff will take the lead in considering the development of protocols for a Special Use Permit for tow-in surfing at Mavericks as envisioned in the MBNMS revised management plan and coordinate such proposed actions with MBNMS staff.		→			
Strategy XNRP-2: GFNMS will be Responsible for Regulatory Activities in the NMA While Maintaining Maximum Consistency and Protection to Sanctuary Resources					
Activity 2.1: GFNMS staff will take the lead in evaluating a potential new dredge disposal site for Pillar Point Harbor should a detailed site proposal be developed by the San Mateo County Harbor District for submission to federal and state agencies.		→			
Activity 2.2: GFNMS staff will facilitate a public process in the next five years to consider whether the San Francisco Exemption Area (“the donut hole”) should be included in the MBNMS.			→		
Activity 2.3: The GFNMS and MBNMS Resource Protection Teams will closely coordinate on any future proposed regulatory changes that could impact the NMA or the other sanctuaries.	→				→
Strategy XNRP-3: GFNMS Staff Will Coordinate Existing and Emerging Resource Protection Issues in the NMA					
Activity 3.1: GFNMS staff will lead efforts to coordinate and implement JMPR site-specific activities to support resource protection and stewardship in the NMA and the delivery of services and programs to local communities.	→				→
Activity 3.2: GFNMS staff will lead efforts to consult and coordinate on resource protection issues with other local, state and federal resource management agencies in the NMA.	→				→
Strategy XNRP-4: GFNMS Staff Will Coordinate Enforcement Activities in the NMA					
Activity 4.1: GFNMS staff will oversee the planning and implementation of all NMA enforcement activities in the NMA and will coordinate with MBNMS to ensure consistency across the sites.	→				→
Strategy XNRP-5: GFNMS Staff Will Coordinate NMA Emergency Response Activities in the NMA					
Activity 5.1: GFNMS staff will lead and closely coordinate efforts to respond to emergencies in the NMA to ensure maximum resource protection to Sanctuary resources.	→				→
Strategy XNRP-6: MBNMS Water Quality Protection Program Staff Will Continue to Coordinate Water Quality Activities in the NMA					
Activity 6.1: Implement existing WQPP Activities.	→				→
Activity 6.2: Conduct Site Water Quality Needs Assessment.	→				
Activity 6.3: Review and issue water quality authorizations.	→				→
NMA Research & Monitoring					

Northern Management Area Transition Plan	Year 1	Year 2	Year 3	Year 4	Year 5
Strategy XNRM-1: Share Information					
Activity 1.1: Develop and implement procedures for sharing information on existing research and monitoring projects and coordinate on future projects.	—————▶				
Strategy XNRM-2: Coordinate Research and Monitoring Information Dissemination					
Activity 2.1: Update, cross-link, and develop Web products for GFNMS, MBNMS and SIMoN websites.	—————▶				
Strategy XNRM-3: Collaborate on Sanctuary Advisory Committees and Working Groups on Research and Monitoring Issues Related to the NMA					
Activity 3.1: Assess current and future NMSP participation on technical advisory committees or working groups in the NMA (such as Fitzgerald Marine Reserve, MBNMS RAP).	—————▶				
Strategy XNRM-4: Collaborate on Volunteer Monitoring Efforts Related to the NMA					
Activity 4.1: Continue efforts to coordinate and collaborate Beach Watch and Beach COMBERS volunteer monitoring programs.	—————▶				
Strategy XNRM-5: Implement JMPR Site-Specific Research and Monitoring Activities in the NMA					
Activity 5.1: The GFNMS and MBNMS Research Teams will coordinate on the implementation of JMPR site-specific and cross-cutting ecosystem research and monitoring activities in the NMA.	—————▶				
NMA Education & Outreach					
Strategy XNEO-1: Transfer, Establish and Implement School Programs for the NMA					
Activity 1.1: Coordinate and implement both GFNMS and MBNMS classroom activities (i.e., Oceans Week, etc.) to promote a greater awareness of the Sanctuaries in schools.	—————▶				
Activity 1.2: Establish a Sanctuary education group comprised of teachers and other marine educators/communicators to share information and ideas.	→				
Activity 1.3: Expand the LiMPETS student monitoring program by identifying more potential locations along the NMA coastline and providing training to teachers and students.	→		→	
Activity 1.4: Identify and pursue partnerships and funding opportunities to expand the MBNMS MERITO Program to the NMA.			—————▶		
Strategy XNEO-2: Develop and Implement Community Outreach and Stewardship Programs					
Activity 2.1: Represent the NMSP at local fairs and community events.	—————▶				
Activity 2.2: Develop and implement a lecture series for the NMA, consistent with lecture offerings in GFNMS and MBNMS.	—————▶				

Northern Management Area Transition Plan	Year 1	Year 2	Year 3	Year 4	Year 5
Activity 2.3: Coordinate and enhance citizen volunteer opportunities, including Beach Watch and Snapshot Day/First Flush to support resource protection objectives.	—————▶				
Strategy XNEO-3: Develop and Disseminate Outreach Materials in the NMA					
Activity 3.1: Disseminate existing GFNMS and MBNMS materials throughout the NMA.	—————▶				
Activity 3.2: Prepare and submit periodic articles on NMA issues for local and regional newsletters and other sanctuary publications.	—————▶				
Activity 3.3: Coordinate the development of maps for use by GFNMS, MBNMS and CBNMS, including a bathymetric map of the north-central California Sanctuaries and a GIS map of the three with all Sanctuary offices, anchorages/safe harbors and wildlife viewing.	————▶				
Activity 3.4: Engage the community and user groups on how best to inform them about issue-specific resource management issues (i.e., Mavericks, water quality, SF exemption area).	—————▶				
Activity 3.5: Develop NMA-related links between GFNMS and MBNMS websites. Explore options for Web collaboration beyond the NMA to strengthen relationships with the Internet-savvy San Francisco Bay Area population.	—————▶				
Strategy XNEO-4: Implement Jmpr Site-Specific Education and Outreach Activities in the NMA					
Activity 4.1: The GFNMS and MBNMS Education Teams will coordinate on the implementation of Jmpr site-specific education and outreach activities in the NMA.	—————▶				
Strategy XNEO-5: Pursue Collaborative Opportunities for Interpretive Signage and Facilities in the NMA					
Activity 5.1: Develop collaborative partnerships to create and install interpretive signage in the NMA as part of the long-range California-wide Sanctuaries Interpretive Signage Plan.	—————▶				
Activity 5.2: Complete development, fabrication, and installation of collaborative interpretive exhibit at Pigeon Point Light Station in partnership with California State Parks, MBNMS, and the San Mateo Coast Natural History Association.	————▶				

Legend:

- ▶ Planned Activity
-▶ Proposed Activity, based on internal assessment

Table XCN-3: Estimated Costs to Implement the Cross-Cutting Northern Management Area Transition Plan

Strategy	Estimated Annual Cost (1000's)*					Total Est. 5-Year Cost (1000's)
	YR 1	YR 2	YR 3	YR 4	YR 5	
NMA Administration & Operations						
Strategy XNAO-1: Create a Multi-Functional HMB Regional Office	(\$33)	(\$33)	(\$48)	(\$48)	(\$33)	(\$195)
Strategy XNAO-2: Evaluate the Delivery and Success of the NMSP Programs and Services to the NMA	(\$8)	(\$8)	(\$8)	(\$8)	(\$8)	(\$40)
NMA Resource Protection						
Strategy XNRP-1: GFNMS Will Be Responsible for Permit Activities in the NMA	(\$23)	(\$52)	(\$52)	(\$18)	(\$18)	(\$163)
Strategy XNRP-2: GFNMS Will Be Responsible for Regulatory Activities in the NMA While Maintaining Maximum Consistency and Protection to Sanctuary Resources	(\$18)	(\$18)	(\$18)	(\$109.5)	(\$112)	(\$275.5)
Strategy XNRP-3: GFNMS Staff Will Coordinate Existing and Emerging Resource Protection Issues in the NMA	(\$16)	(\$16)	(\$16)	(\$16)	(\$16)	(\$80)
Strategy XNRP-4: GFNMS Staff Will Coordinate Enforcement Activities in the NMA	(\$16)	(\$61)	(\$61)	(\$61)	(\$61)	(\$260)
Strategy XNRP-5: GFNMS Staff Will Coordinate NMA Emergency Response Activities in the NMA	(\$16)	(\$61)	(\$61)	(\$61)	(\$61)	(\$260)
Strategy XNRP-6: MBNMS Water Quality Protection Program Staff Will continue to coordinate Water Quality Activities in the NMA	\$50	\$50	\$50	\$50	\$50	\$250
NMA Research & Monitoring						
Strategy XNRM-1: Share Information	(\$16)	(\$16)	(\$16)	(\$16)	(\$16)	(\$80)
Strategy XNRM-2: Coordinate Research and Monitoring Information Dissemination	(\$20)	(\$20)	(\$20)	(\$20)	(\$20)	(\$100)
Strategy XNRM-3: Collaborate on Sanctuary Advisory Committees and Working Groups on Research and Monitoring Issues Related to the NMA	(\$9)	(\$9)	(\$9)	(\$9)	(\$9)	(\$45)

Monterey Bay National Marine Sanctuary – Final Management Plan
 Section VIII – Cross-Cutting: Northern Management Area Transition 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 XNRM-4: Collaborate on Volunteer Monitoring Efforts Related to the NMA	(\$8)	(\$8)	(\$8)	(\$8)	(\$8)	(\$40)
Strategy XNRM-5: Implement JMPR Site-Specific Research and Monitoring Activities in the NMA	(\$9)	(\$9)	(\$9)	(\$9)	(\$9)	(\$45)
NMA Education & Outreach						
Strategy XNEO-1: Transfer, Establish and Implement School programs for the NMA	(\$30)	(\$30)	(\$130)	(\$130)	(\$130)	(\$450)
Strategy XNEO-2: Develop and Implement Community Outreach and Stewardship Programs	(\$20)	(\$20)	(\$20)	(\$20)	(\$20)	(\$100)
Strategy XNEO-3: Develop and Disseminate Outreach Materials in the NMA	(\$30)	(\$30)	(\$30)	(\$30)	(\$30)	(\$150)
Strategy XNEO-4: Implement JMPR Site-Specific Education and Outreach Activities in the NMA	(\$20)	(\$20)	(\$20)	(\$20)	(\$20)	(\$100)
Strategy XNEO-5: Pursue Collaborative Opportunities for Interpretive Signage and Facilities in the NMA	(\$40)	(\$40)	(\$20)	(\$20)	(\$20)	(\$140)
Total Estimated Annual Cost for MBNMS Only	\$50	\$50	\$50	\$50	\$50	\$250
* Cost estimates are for both “programmatic” and “base” (salaries and overhead) expenses.						
** Contributions from outside funding sources also anticipated.						
**All costs for this action plan are for GFNMS only except where noted for MBNMS						



Section IX

Appendices

- **Ecosystem Management Strategies**
- **Education and Outreach Related Activities**
- **Research and Monitoring Related Activities**
- **Enforcement Related Activities**
- **List of Acronyms**

Table of Contents

Appendix A – Ecosystem Management Strategies.....	1
Appendix B – Education and Outreach Related Activities.....	10
Appendix C – Research and Monitoring Related Activities.....	21
Appendix D – Enforcement Related Activities.....	33
Appendix E – List of Acronyms.....	37

Appendix A – Ecosystem Management Strategies

Ecosystem Management	
Habitat: Beaches	
Action Plan	Management Strategy
Coastal Development	Coastal Armoring CA-1: Conduct Issue Characterization and Needs Assessment CA-2: Develop and Implement Regional Approach to Coastal Armoring
	Desalination DESAL-2: Develop Facility Siting Guidelines DESAL-3: Identify Environmental Standards for Desalination Facilities
	Harbors & Dredge Disposal HDD-5: Alternative Disposal Sites
	Submerged Cables SC-1: Identify Routing and Zones for Submerged Cable Projects
Ecosystem Protection	Big Sur Coastal Ecosystem Protection BSP-2: Develop an Interagency Coordination Program
	Introduced Species IS-1: Address Known Pathways of Introduction IS-3: Develop Baseline Information, Research & Monitoring Program
	SIMoN SI-4: Integrate, Synthesize, and Analyze New and Existing Data
	Marine Protected Areas MPA-2: Define Conservation Goals/Objectives/Habitats & Resources to be MPA-5: Develop Integrated Management System
Partnerships & Opportunities	Fishing Related Education and Research FER-5: Collect and Distribute Fisheries and Habitat Related Data FER-7: Conduct Public Outreach on Links Between Healthy Ecosystems
	Interpretive Facilities IF-3: Increase Sanctuary-wide Interpretive Signage
Water Quality	Beach Closures and Microbial Contamination BC-1: Enhance Use of Geographic Information Systems (GIS) BC-2: Expand Pathogen and Contamination Research BC-3: Increase Monitoring Network BC-4: Enhance Notification Program BC-5: Increase Source Control Program BC-6: Increase Technical Training for Industry Professionals BC-7: Enhance Public Outreach of Contaminations Sources and Solutions BC-8: Increase and Coordinate Enforcement BC-9: Improve Emergency Response Program
	Water Quality Protection Program Implementation WQPP-3: Collaborate with Regional Urban Runoff Management Efforts WQPP-6: Increase Storm Drain Inspections WQPP-9: Increase Access to Monitoring Data
Wildlife Disturbance	Marine Mammal, Seabird and Turtle Disturbance MMST-3: Mitigate Impacts From Shore-Based Activities MMST-4: Mitigate Impacts From Marine Debris

Ecosystem Management	
Habitat: Deep Sea	
Action Plan	Management Strategy
Coastal Development	Harbors & Dredge Disposal HDD-2 Review Offshore Dredge Disposal Activities
	Submerged Cables SC-1 Identify Routing and Zones for Submerged Cable Projects
Ecosystem Protection	Big Sur Coastal Ecosystem Protection BSP-2 Interagency Coordination Program
	Bottom Trawling Effects on Benthic Habitats BH-2 Assess Trawl Activity BH-6 Identify and Implement Potential Ecosystem Protection
	Davidson Seamount DS-1 Conduct Site Characterization DS-2 Conduct Ecological Processes Investigations DS-3 Develop Resource Protection Program DS-4 Conduct Seamount Education and Outreach Initiatives
	Introduced Species IS-3 Develop Baseline Information, Research & Monitoring Program
	SIMoN SI-4 Integrate, Synthesize, and Analyze New and Existing Data
	Marine Protected Areas MPA-2 Define Conservation Goals and Objectives and Habitats and Resources to be Protected MPA-5 Develop Integrated Management System
	Interpretive Facilities IF-1 Construct and Operate Visitor Center
Partnerships & Opportunities	MERITO-2 Community-Based Bilingual Outreach Program
Water Quality	Cruise Ship Discharges CS-1 Increase Outreach and Coordination CS-2 Develop Enforcement and Monitoring Program
Wildlife Disturbance	Marine Mammal, Seabird and Turtle Disturbance MMST-1 Mitigate Impacts From Marine Vessels MMST-4 Mitigate Impacts From Marine Debris MMST-6 Assess Impacts From Acoustics MMST-7 Reduce Sea Turtle Disturbance MMST-8 Maintain and Enhance Enforcement

Ecosystem Management	
Habitat: Estuaries	
Action Plan	Management Strategy
Coastal Development	Coastal Armoring CA-2: Develop and Implement Regional Approach to Coastal Armoring
	Desalination DESAL-2: Develop Facility Siting Guidelines
	Harbors & Dredge Disposal HDD-3: Coordinate with Sediment Monitoring and Reduction Programs
	Submerged Cables SC-1: Identify Routing and Zones for Submerged Cable Projects
Ecosystem Protection	Big Sur Coastal Ecosystem Protection BSP-2: Interagency Coordination Program
	Introduced Species IS-1: Address Known Pathways of Introduction IS-2: Develop Prevention Program for Known Pathways of Introduction IS-3: Develop Baseline Information, Research & Monitoring Program
	SIMoN SI-1: Implement Monitoring Programs Needed to Support Management SI-4: Integrate, Synthesize, and Analyze New and Existing Data
	Marine Protected Areas MPA-2: Define Conservation Goals and Objectives and Habitats and Resources to be Protected MPA-5: Develop Integrated Management System
Partnerships & Opportunities	Interpretive Facilities IF-2: Develop Smaller Regional Interpretive Facilities
	Ocean Literacy Strategy OLCB-5: Implement the MBNMS Multicultural Education for Resource Issues Threatening Oceans (MERITO) Program
Water Quality	Beach Closures and Microbial Contamination BC-1: Research BC-2: Monitoring BC-4: Geographic Information System (GIS)
	Water Quality Protection Program Implementation WQPP-16: Establish Agricultural Industry Networks to Address Water WQPP-17: Strengthen Technical Information and Outreach to WQPP-18: Improve Education and Public Relations on Watersheds and WQPP-21: Improve Water Quality Management on Public Lands and WQPP-22: Develop Wetlands and Riparian Corridor Action Plan
Wildlife Disturbance	Marine Mammal, Seabird and Turtle Disturbance MMST-1: Mitigate Impacts From Marine Vessels MMST-2: Mitigate Impacts From Low Flying Aircraft MMST-3: Mitigate Impacts From Shore-Based Activities MMST-4: Mitigate Impacts From Marine Debris MMST-8: Maintain and Enhance Enforcement

Ecosystem Management	
Habitat: Kelp Forests	
Action Plan	Management Strategy
Coastal Development	Desalination DESAL-2: Develop Facility Siting Guidelines
	Submerged Cables SC-1: Identify Routing and Zones for Submerged Cable Projects
Ecosystem Protection	Big Sur Coastal Ecosystem Protection BSP-1: Provide Integrated Data and Information to the Public BSP-2: Interagency Coordination Program
	Introduced Species IS-1: Address Known Pathways of Introduction IS-3: Develop Baseline Information, Research & Monitoring Program
	SIMoN SI-3: Integrate Regional Monitoring Efforts SI-4: Integrate, Synthesize, and Analyze New and Existing Data
	Marine Protected Areas MPA-2: Define Conservation Goals and Objectives and Habitats and Resources to be Protected MPA-5: Develop Integrated Management System
Partnerships & Opportunities	Fishing Related Education and Research FER-5: Fisheries Related Data Collection and Distribution
	Interpretive Facilities IF-1: Construct and Operate Visitor Center
	Ocean Literacy Strategy OLCB-5: Implement the MBNMS Multicultural Education For Resource Issues Threatening Oceans (MERITO) Program
Wildlife Disturbance	Marine Mammal, Seabird and Turtle Disturbance MMST-1: Mitigate Impacts From Marine Vessels MMST-4: Mitigate Impacts From Marine Debris MMST-5: Evaluate Impacts From Commercial Harvest MMST-8: Maintain and Enhance Enforcement
	Motorized Personal Watercraft MPWC-1: Maintain Motorized Personal Watercraft Zones

Ecosystem Management		
Habitat: Open Ocean		
	Action Plan	Management Strategy
Ecosystem Protection	Introduced Species	IS-3 Develop Baseline Information, Research & Monitoring Program
	SIMoN	SI-4 Integrate, Synthesize, and Analyze New and Existing Data
	Marine Protected Areas	MPA-2 Define Conservation Goals and Objectives and Habitats and Resources to be Protected MPA-5 Develop Integrated Management System
Partnerships & Opportunities	Fishing Related Education and Research	FER-5 Fisheries Related Data Collection and Distribution
	Interpretive Facilities	IF-1 Construct and Operate Visitor Center
Water Quality	Cruise Ship Discharges	CS-2 Develop Enforcement and Monitoring Program
Wildlife Disturbance	Marine Mammal, Seabird and Turtle Disturbance	MMST-1 Mitigate Impacts From Marine Vessels MMST-4 Mitigate Impacts From Marine Debris

Ecosystem Management	
Habitat: Rocky Shores	
Action Plan	Management Strategy
Coastal Development	Coastal Armoring CA-1 Conduct Issue Characterization and Needs Assessment CA-2 Develop and Implement Regional Approach to Coastal Armoring
	Desalination DESAL-1 Develop and Implement Regional Desalination Program DESAL-2 Develop Facility Siting Guidelines DESAL-3 Identify Environmental Standards for Desalination Facilities DESAL-4 Develop Modeling and Monitoring Program
	Harbors and Dredge Disposal HDD-2 Review Offshore Dredge Disposal Activities
	Submerged Cables SC-1 Identify Routing and Zones for Submerged Cable Projects
Ecosystem Protection	Big Sur Coastal Ecosystem Protection BSP-1 Provide Integrated Data and Information to the Public BSP-2 Interagency Coordination Program
	Introduced Species IS-1 Address Known Pathways of Introduction IS-2 Develop Prevention Program for Known Pathways of Introduction IS-3 Develop Baseline Information, Research & Monitoring Program
	SIMoN SI-4 Integrate, Synthesize, and Analyze New and Existing Data
	Marine Protected Areas MPA-2 Define Conservation Goals and Objectives and Habitats and Resources to be Protected MPA-5 Develop Integrated Management System
Partnerships & Opportunities	Interpretive Facilities IF-3 Increase Sanctuary-Wide Interpretive Signage
	Ocean Literacy Strategy OLCB-5: Implement the MBNMS Multicultural Education for For Resource Issues Threatening Oceans (MERITO) Program
Water Quality	Water Quality Protection Program Implementation WQPP-3 Collaborate with Regional Urban Runoff Management Efforts WQPP-8 Increase Regional Monitoring
Wildlife Disturbance	Marine Mammal, Seabird and Turtle Disturbance MMST-4 Mitigate Impacts From Marine Debris MMST-5 Evaluate Impacts From Commercial Harvest MMST-8 Maintain and Enhance Enforcement
	Motorized Personal Watercraft MPWC-1 Maintain Motorized Personal Watercraft Zones
	Tidepool Protection TP-1 Assess the Problem TP-2 Conduct Education and Outreach TP-3 Strengthen Enforcement TP-4 Improve Tracking and Evaluation of Collection and Take TP-5 Consider Limitation on Use in Selected Locations TP-6 Identify Implementation Opportunities TP-7 Address Other Human Activities

Ecosystem Management	
Habitat: Sandy Floor	
Action Plan	Management Strategy
Coastal Development	Harbors and Dredge Disposal HDD-2 Review Offshore Dredge Disposal Activities HDD-3 Coordinate with Sediment Monitoring and Reduction Programs HDD-4 Disposal of Fine-Grained Material
	Submerged Cables SC-1 Identify Routing and Zones for Submerged Cable Projects
Ecosystem Protection	Big Sur Coastal Ecosystem Protection BSP-2 Interagency Coordination Program
	Bottom Trawling Effects on Benthic Habitats BH-1 Develop Partnerships with Fishermen BH-2 Assess Trawl Activity BH-3 Identify Habitats Vulnerable to Trawling BH-4 Develop a Management Tracking Program BH-5 Develop an Impact Identification and Research Program BH-6 Identify and Implement Potential Ecosystem Protection Measures BH-7 Develop Education and Outreach Program
	Davidson Seamount DS-1 Conduct Site Characterization
	SIMoN SI-4 Integrate, Synthesize, and Analyze New and Existing Data
	Marine Protected Areas MPA-2 Define Conservation Goals and Objectives and Habitats and Resources to be Protected MPA-5 Develop Integrated Management System
Partnerships & Opportunities	Fishing Related Education and Research FER-1 Educate About Fisheries Management FER-5 Fisheries Related Data Collection and Distribution FER-6 Collect and Distribute Socioeconomic, Cultural, and Historical Data
	Interpretive Facilities IF-1 Construct and Operate Visitor Center

Ecosystem Management		
Habitat: Seamounts		
	Action Plan	Management Strategy
Coastal Development	Submerged Cables	SC-1: Identify Routing and Zones for Submerged Cable Projects
Ecosystem Protection	Bottom Trawling Effects on Benthic Habitats	BH-2: Assess Trawl Activity BH-6: Identify and Implement Potential Ecosystem Protection Measures
	Davidson Seamount	DS-1: Conduct Site Characterization DS-2: Conduct Ecological Processes Investigations DS-3: Develop Resource Protection Program DS-4: Conduct Seamount Education and Outreach Initiatives
	SIMoN	SI-4: Integrate, Synthesize, and Analyze New and Existing Data
	Marine Protected Areas	MPA-2: Define Conservation Goals and Objectives and Habitats and Resources to be Protected MPA-3: Develop General Design Criteria MPA-4: Determine Types of Use MPA-5: Develop Integrated Management System
Partnerships & Opportunities	Fishing Related Education and Research	FER-2: Enhance Stakeholder and Public Communication
	Interpretive Facilities	IF-2: Develop Smaller Regional Interpretive Facilities
Wildlife Disturbance	Marine Mammal, Seabird and Turtle Disturbance	MMST-4: Mitigate Impacts From Marine Debris

Ecosystem Management		
Habitat: Submarine Canyons		
	Action Plan	Management Strategy
Coastal Development	Harbors and Dredge Disposal	HDD-2: Review Offshore Dredge Disposal Activities HDD-4: Disposal of Fine-Grained Material
	Submerged Cables	SC-1: Identify Routing and Zones for Submerged Cable Projects
Ecosystem Protection	Big Sur Coastal Ecosystem Protection	BSP-2: Interagency Coordination Program
	Bottom Trawling Effects on Benthic Habitats	BH-2: Assess Trawl Activity
	Davidson Seamount	DS-2: Conduct Ecological Processes Investigations
	Introduced Species	IS-3: Develop Baseline Information, Research & Monitoring Program
	SIMoN	SI-4: Integrate, Synthesize, and Analyze New and Existing Data
	Marine Protected Areas	MPA-2: Define Conservation Goals and Objectives and Habitats and Resources to be Protected MPA-5: Develop Integrated Management System
Partnerships & Opportunities	Fishing Related Education and Research	FER-5: Fisheries Related Data Collection and Distribution
	Interpretive Facilities	IF-1: Construct and Operate Visitor Center

Appendix B – Education and Outreach Related Activities

Action Plan	Strategy	Activity	Implementation Timing
Coastal Development Issues			
Coastal Armoring	CA-3: Permit Program Improvements	3.5: Share Information with Other Agencies	Years 1-2
Harbors and Dredge Disposal	HDD-5: Alternative Disposal Methods	5.1: Evaluate Potential Beneficial Usage of Dredged Materials	Years 3-4
Ecosystem Protection Issues			
Big Sur Coastal Ecosystem Coordination	BSP-1: Provide Integrated Data and Information to the Public	1.5: Develop and Implement Process to Keep Public Informed About Website	Years 3-4
	BSP-2: Develop an Interagency Coordination Program	2.2: Facilitate Priority Issue Coordination Task Forces	Years 3-5
Bottom Trawling Effects on Benthic Habitats	BH-1: Develop Partnerships with Fisherman	1.1: Engage Fishermen to Work with the Sanctuary to Address Impacts from Bottom Trawling	Years 1-2
	BH-6: Potential Ecosystem Protection Measures	6.1: Generate Socio-economic profile of Local Trawl Fishery	Years 4-5
	BH-7: Develop Education and Outreach Program	7.1: Define Educational Needs and Develop Outreach Program	Years 2-5
Davidson Seamount	DS-4: Conduct Seamount Education and Outreach Initiatives	4.1: Conduct an Educational Needs Assessment	Years 3-5
		4.2: Develop and Implement Davidson Seamount Education and Outreach Program	Years 3-5
Introduced Species	IS-2: Develop Prevention Program for Known Pathways of Introductions	2.1: Develop and Implement Introduced Species Outreach and Prevention Program	Years 3-5
Marine Protected Areas	MPA-8: Develop Education and Outreach Program	Activity 8.1: Identify Target Audiences and Develop Components of an Effective Education and Outreach Program	Years 3-5
		Activity 8.2: Conduct Regional Workshops to Share Information and Gather Input From Fishing Leaders and the Community After MPA Design Criteria are Determined by Multi-stakeholder Groups	Years 3-5
		Activity 8.3: Consider Ongoing Education potential of individual reserve locations	Years 3-5

Action Plan	Strategy	Activity	Implementation Timing
Operations and Administration			
Operations and Administration	OA-1: Assess Staffing Needs	1.3: Develop a Structured Intern Program	Years 1-2
	OA-2: Develop Volunteer Program	2.3: Provide Volunteer Orientation and Training	Years 2-3
	OA-3: Coordinate and Support Sanctuary Advisory Council	3.11: Assist Working Groups in Defining Each Group's Membership Protocols and Decision-making Protocols	Years 1-5
	OA-5: Conduct Administrative Initiatives	5.13: The MBNMS Education Coordinator Will Continue to Manage the Education Team and Participate in NMSP-wide Activities Relating to Education Including General Outreach Products and Events	Years 1-5
	OA-6: Coordinate and Conduct Boat Operations	6.1: Review and Adopt Boat Operations Guidelines	Years 1-5
	OA-7: Oversee and Conduct Dive Operations	7.3: Improve Outreach Efforts to the Local Dive Community in Order to Foster Collaborative Working Relationships	Years 1-5
	OA-8: Oversee and Conduct Aircraft Operations	8.1: Assess Aircraft Needs Based on the Management Plan Priorities	Years 2-5
	OA-9: Maintain and Enhance Permit Program	9.4: Conduct Outreach to Inform the Public About the Permit Process	Years 1-5
		9.5: Improve Website Information	Years 1-5
	OA-10: Interagency Program Review	10.1: Conduct Outreach to Agencies and Stakeholders	Years 1-5
Partnerships and Opportunities			
Fishing Related Education and Research	FER-1: Educate About Fisheries Management	1.1: Develop Information Identifying MBNMS's Role in Fisheries Issues	Years 2-4
	FER-2: Enhance Stakeholder and Public Communication	2.3: Develop a Communication Plan Between Parties Interested in Education and Research Issues Related to Fishing in the MBNMS	Years 2-4
		2.6: Facilitate Public Forums and Development of Educational Materials for the General Public and Interested Parties to Understand Local Fisheries, Fish Populations and Habitats and the Role of the MBNMS in Protecting the Ecosystem	Years 2-4
	FER-3: Facilitate Sustainable Fisheries Definition and Promotion	3.1: Promote Biological and Socioeconomic Research on Sustainability	Years 2-3
		3.2: Work with Partners to Identify, Promote, and Certify Healthy Fisheries in the MBNMS	Years 2-3
		3.3: Increase Outreach and Awareness of How Sustainability is Assessed	Years 2-3

Action Plan	Strategy	Activity	Implementation Timing
<i>Fishing Related Education and Research cont.</i>	FER-4: Involve Fishermen in Education and Outreach Programs	4.1: Evaluate Existing Outreach Efforts at a Sanctuary Education Panel (SEP) Meeting and Include Input from Fishermen and Other Interested Parties	Years 1-5
		4.2: Develop and Implement Interpretive Signage of Local Fishing Activities at Harbors	Years 1-5
		4.3: Create Fishing Related Exhibits at MBNMS Visitor Center	Years 1-5
		4.4: Develop and Implement Education Program for K-12, “Mariners in the Classroom”	Years 1-5
Interpretive Facilities Action Plan	IF-1: Construct and Operate Visitor Center	1.2: Develop Visitor Center Facilities and Operations Plan	Years 1-3
	IF-3: Sanctuary-Wide Interpretive Signage	3.3: Support Sanctuary-Related Interpretive Trail Projects	Years 1-3
	IF-4: Virtual Experiences	4.1: Expand Virtual Interpretive Opportunities on MBNMS Website	Years 2-3
		4.2: Expand Interpretive Opportunities Using Telepresence Technology	Years 2-3
		4.3: Expand Interpretive Opportunities Using Virtual Education Products	Years 2-3
Ocean Literacy and Constituent Building	OCLB-1: Develop and Implement Constituent Outreach Programs to increase Ocean Literacy	1.1: Offer general ocean awareness programs and sanctuary information	Years 1-5
		1.2: Partner with local and national partners to develop coordinated ocean literacy messages	Years 1-5
		1.3: Increase public awareness of the sanctuary and ocean literacy issues through media exposure and marketing	Years 1-5
	OLCB-2: Develop and Implement a Comprehensive Volunteer Program	2.1: Assessment of volunteer needs within the Sanctuary’s programming	Years 1-5
		2.2: Identify funds and hire a Volunteer Coordinator	Years 1-5
		2.3: Evaluate volunteer recruitment, retention and effectiveness of roles	Years 1-5
	OLCB-3: Create Partnerships with Local Businesses	3.1: Implement partnership opportunities with the restaurant and lodging industries	Years 1-2
		3.2: Explore partnership opportunities with “on-the-water” businesses	Years 1-3
		3.3: Explore additional partnership opportunities with businesses participating in the Water Quality Protection Program or identified in MBNMS Action Plans	Years 1-5

Action Plan	Strategy	Activity	Implementation Timing
<i>Ocean Literacy Action Plan cont.</i>	OLCB-4: Develop and Implement K-12 Education Programs to increase Ocean Literacy	4.1: Develop educational programs and supporting materials for school groups including those visiting MBNMS visitor centers	
		4.2: Provide teacher professional development programs utilizing sanctuary educational materials and promoting ocean literacy	
		4.3: Develop and make available sanctuary educational tools for use in schools	
		4.4: Develop ocean stewardship programming for K-12 students in conjunction with education partners	
	OLCB-5: Implement the MBNMS Multicultural Education for Resources Threatening Oceans (MERITO) Program	5.1: Community-Based Bilingual Outreach Program (After-school program, adult ed, field experiences)	
		5.2: Site-Based Bilingual Outreach Program (Demographic surveys, develop bilingual materials w/partners, support partner events)	
		5.3: Teacher Training and Internship Program	
		5.4: Comprehensive Communications Plan	
		5.5: Integration of Multicultural Elements To Existing MBNMS Programs And Materials	
		5.6: Intra-Sanctuary Expansion of MERITO (CINMS expansion, regional website, expansion to other sanctuaries)	
5.7: Evaluation of MERITO Programs			
Water Quality Issues			
Beach Closures and Contamination Action Plan	BC-3: Increase Monitoring Network	3.1: Increase Number and Frequency of Beach Sampling	Years 1-2
	BC-4: Enhance Notification Program	4.1: Develop Improved Notification System for User Groups	Years 1-3
	BC-6: Increase Technical Training for Industry Professionals	6.1: Coordinate with Local Jurisdictions to Educate Plumbers, Grease Trap, and Sewer Industry on Proper Cleaning Techniques and Promote Reporting Program	Years 1-3
		6.2: Working through Local Jurisdictions, Utilize Existing, or Adapt New Outreach/Training Modules for Targeted Public Servants	Years 1-3

Action Plan	Strategy	Activity	Implementation Timing
<i>Beach Closures</i> <i>Action Plan cont.</i>		6.3: Develop Spill Response Training Module (See Emergency Response Strategy)	Years 1-3
	BC-7: Enhance Public Outreach of Contamination Sources and Solutions	7.1: Enhance Public’s Understanding of the Importance of Reducing Microbial Contamination, the Sources of Contamination	Years 2-3
		7.2: Develop Coordinated Regional Education Program Building and Expanding on Existing Materials and Efforts	Years 2-3
Cruise Ship Discharges	CS-1: Outreach and Coordination	1.1: Develop and Implement an Outreach Plan to Address Cruise Line Industry, Regulatory Agencies, and General Public	Years 1-2
		1.4: Partner to Cruise Line Industry to Develop MBNMS Outreach Materials and Supplies	Years 1-2
		1.5: Collaborate with Sightseeing Tour Operators, to Incorporate Sanctuary Information and Messages to Shore Based Tourists	Years 1-2
Water Quality Protection Program Implementation	WQPP-1: Public Education and Outreach	1.1: Update and Reprint Existing Educational Materials	Years 1-5
		1.2: Broaden Distribution of Existing Outreach Materials and Programs	Years 1-5
		1.4: Expand Outreach to the Hispanic Population in Coordination with MERITO	Years 1-5
	WQPP-2: Technical Training	2.1: Update and Expand Training Materials	Years 1-5
		2.2: Continue Regional and On-site Urban Training Workshops	Years 1-5
		2.3: Develop and Conduct Training Workshops with Developers	Years 1-5
	WQPP-3: Regional Urban Runoff Management	3.2: Facilitate the Development of Regional Stormwater Programs	Years 1-5
	WQPP-6: Storm Drain Inspection	6.1: Continue and Expand First Flush and Urban Watch Monitoring Programs	Years 1-2
	WQPP-7: CEQA Additions	7.2: Provide Accompanying Training Materials and Workshops	Years 1-2
	WQPP-8: Regional Monitoring	8.4: Improve Public Awareness of Monitoring Efforts	Years 1-5
	WQPP-9: Data Access	9.3: Improve Packaging and Distribution of Data to Decision-makers and the Public	Years 1-2
WQPP-10: Interagency Coordination	10.4: Summarize WQPP Implementation	Years 1-5	
WQPP-11: Public Education and Outreach	11.1: Sustain and Develop One-on-One Boater Outreach Programs	Years 1-5	

Action Plan	Strategy	Activity	Implementation Timing
<i>Water Quality cont'd.</i>	WQPP-13: Bilge Waste Disposal and Waste Oil Recovery	13.1: Develop Incentives and Promotions to Encourage Facility Use	Years 1-2
	WQPP-14: Topside and Haul-out Vessel Maintenance	14.5: Review Policies Regarding Work in Slips/ Parking Lots	Years 2-3
	WQPP-15: Underwater Hull Maintenance	15.2: Initiate Guidelines and Trainings for Hull Cleaning	Years 1-5
	WQPP-16: Establish Agricultural Industry Networks to Address Water Quality	16.3: Implement Nonpoint Source Management Practices Using Industry-led Watershed Groups	Years 1-2
	WQPP-17: Strengthen Technical Information and Outreach to Agriculture	17.5: Strengthen Grower/Rancher Peer Advisory Networks to Share Conservation Information Among Peers, Including Outreach to Both Landowners And Tenants	Years 1-2
	WQPP-18: Improve Education and Public Relations on Watersheds and Agricultural Conservation Measures	18.1: Increase Public Knowledge of and Support for Agriculture and Agricultural Conservation Measures through Media and Outreach	Years 1-2
		18.2: Increase Grower and Public Awareness of Watershed-Based Management by Incorporating Watershed Message into Existing Programs and Conducting Media and Outreach	Years 1-2
	WQPP 19: Coordinate and Streamline Regulations for Conservation Projects	19.1: Develop User-Friendly Permit Guidebooks	Years 2-3
	19.3: Improve Collaborative Efforts Between Regulatory Enforcement Agencies and Landowners	Years 2-3	
Wildlife Disturbance Issues			
Marine Mammal, Seabird and Turtle Disturbance	MMST-1: Mitigate Impacts From Marine Vessels	1.1: Find, Modify, and Develop Wildlife Viewing Guidelines	Years 3-5
		1.2: Continue and Strengthen MBNMS Team Ocean Kayak Program	Years 3-5
		1.3: Develop Informational Cards with Guidelines for Viewing Marine Species from Kayaks	Years 3-5
		1.4: Conduct Outreach and Promotion of Wildlife Viewing Guidelines to Private Boaters	Years 3-5
		1.5: Continue Outreach and Promotion of Wildlife Viewing Guidelines to Whale Watching Vessels	Years 3-5

Action Plan	Strategy	Activity	Implementation Timing
<i>Marine Mammal Seabird and Turtle Disturbance cont'd.</i>	MMST-2: Mitigate Impacts from Low Flying Aircraft	2.3: Continue Outreach to Pilots	Years 3-4
		2.4: Conduct Outreach with Film Commission	Years 3-4
	MMST-3: Mitigate Impacts From Shore Based Activities	3.2: Support Outreach Activities	Years 3-5
	MMST-4: Mitigate Impacts from Marine Debris	4.1: Coordinate with the Work Done by the California Coastal Commission, Conduct Education and Outreach Programs to Illustrate the Impact of Marine Debris	Years 4-5
		4.3: Increase Education Regarding Impacts of Lost Balloons	Years 4-5
	MMST-5: Consider Impacts Commercial Harvest	5.1: Evaluate Levels of Disturbance and Identify Solutions	Years 3-5
	MMST-6: Assess Impacts from Acoustics	6.1: Expand Research and Monitoring of Acoustics in Marine Environment	Years 3-5
	MMST-7: Reduce Sea Turtle Disturbance	7.2: Address Sea Turtle Disturbance in wildlife viewing guidelines	Years 3-4
MMST-8: Maintain and Enhance Enforcement	8.2: Conduct Outreach to Increase Knowledge of MBNMS Regulations and Contact Information	Years 1-5	
Motorized Personal Watercraft Action Plan	MPWC-3: Conduct Educational Outreach to MPWC Community	3.1: Update and Maintain Interpretive Materials (e.g. signs, brochures, videos)	Years 1-2
		3.2: Update Interpretive Methods (e.g. presentations, dock walkers, sign placement, information distribution)	Years 1-2
		3.3: Coordinate with GFNMS to Maintain the MBNMS NOAA Weather Kiosk at Pillar Point Harbor Launch Ramp for Use By MPWC Operators, Surfers, Boaters, Fishermen, etc.	Years 1-2
		3.4: Install A Link on the Front Page of the MBNMS and the GFNMS Website for Instant Access to Real-Time Weather and Oceanographic Data from the National Weather Service and National Data Buoy Center (Contingent on MPWC Permitting Program)	Years 1-2
Tidepool Protection Action Plan	TP-1: Assess the Problem	1.5: Ensure Researchers Understand Key Priorities and Information Needs of Managers	Years 4-5
		1.7: Conduct an Evaluation of Visitors at Representative Sites	Years 4-5
	TP-2: Conduct Education and Outreach	2.1: Develop Appropriate Education and Outreach	Years 4-5

Action Plan	Strategy	Activity	Implementation Timing
<i>Tidepool Protection cont'd.</i>		2.2: Consider Potential for Hands-on Exhibits or Live Display Tables	Years 4-5
		2.3: Develop Pre-Visit Education about Tidepool Etiquette	Years 4-5
Cross Cutting Issues			
Administration and Operations Plan	XAO-1: Improve Internal Communications Among the Three Sanctuaries	1.4: Program Coordinators will Meet Separately at Least Once Per year to Share Information and Plan Joint Activities Prior to the Development of the Annual Operating Plan	Years 1-5
	XAO-2: Improve the Efficiency and Cost-effectiveness of Program Operations	2.1: Develop a List of Existing Facilities, Signage, Exhibits, Equipment, Vessels, and Resources Based on the Revised Management plans that could be Shared Between Sites	Years 1-2
		2.2: Develop a List of Needed facilities, Signage, Exhibits, Equipment, Vessels and Resources Based on the Revised Management Plans that could be Shared Between Sites	Years 1-2
	XAO-3: Program Administration Improvements	3.3: Build Upon Existing Efforts to Share Information Technology (IT) Resources	Years 1-2
Community Outreach	XCO-1: Build Upon and Expand Ocean and Coastal Outreach	1.1: Develop or strengthen coordinated outreach programs and opportunities, such as Public Service Announcements, Issue-specific Workshops and Brochures (e.g. Tidepool Etiquette), Docent Programs, Signage, Learning Centers, or Exhibits and Displays at Community Events	Years 2-3
		1.2: Plan and Conduct Regional Sanctuary Outreach Events to Promote the Importance of Monitoring, Disseminate Monitoring Data, and Improve Understanding of Marine Conservation and Management	Years 2-3
		1.3: Develop and implement joint media communications plan (print, radio, TV, Internet, etc.)	Years 2-3
		1.4: Identify and Partner with External Programs to Incorporate Sanctuary-related Messages	Years 2-4
	XCO-2: Enhance and Coordinate Ocean and Coastal Education	2.1: Collaborate on Existing Site-specific Education Programs and Products as a Means to Enhance and Expand Educational Offerings	Years 2-4

Action Plan	Strategy	Activity	Implementation Timing
<i>Community Outreach cont'd.</i>		2.2: Following expansion of the MERITO program, increase Multicultural/ Multilingual Efforts Based on Needs Assessments to Determine other Multicultural, Socio-economic, or Multilingual Communities (Vietnamese, Chinese, Portuguese, Italian, etc.) and their Interests	Years 3-5
		2.3: Identify and Implement New Education Programs that can be Developed Jointly	Years 1-2
	XCO-3: Ocean/ Coastal Stewardship	3.1: Create, maintain and promote Sanctuary and partner volunteer programs to provide opportunities for stewardship as well as expanding resource protection, education, and outreach capabilities of the three Sanctuaries	Years 1-5
		3.2: Create Alternative Ways to Inspire Coastal and Ocean Stewardship	Years 1-5
		3.3: Identify partners to incorporate stewardship messages	Years 1-5
Maritime Heritage	XHMR-2: Inventory and Assess Submerged Sites	2.4: Assess and Nominate Appropriate Submerged Archaeological Sites for Inclusion to the National Register of Historic Places	Years 4-5
	XHMR-4: Protect and Manage Submerged Archaeological Resources	4.2: Provide Training to Sanctuary Staff and Facilitate Training for Partners	Years 4-5
	XMHR-5: Conduct Public Outreach with Traditional User and Ocean Dependent	5.1: Identify Traditional User and Ocean Dependent Groups	Years 3-4
		5.2: Develop Collaborative Programs and Initiatives	Years 4-5
		5.3: Create an Inventory of Historic and Present Maritime Heritage Communities	Years 4-5
	XMHR-6: Establish Maritime Heritage Focused Education and Outreach Programs	6.1: Improve Information Sharing and Dialogue	Years 3-5
		6.2: Create, expand and populate individual Sanctuary websites and/or the West Coast Shipwreck Database	
		6.3: Develop and Implement Education and Outreach Programs and Materials for the Maritime Heritage Program	Years 1-5
		6.4: Collaborate on Maritime Heritage Resource Exhibits and Signage	Years 1-5

Appendix C – Research and Monitoring Related Activities

Action Plan	Strategy	Activity	Implementation Timing
Coastal Development Issues			
Coastal Armoring	CA-1: Conduct Issue Characterization and Needs Assessment	1.1: Produce MBNMS-wide Maps and Database for use as Planning and Permit Review Tools	Years 1-5
		1.2: Compile and Analyze Ecological and Socioeconomic Data	Years 1-5
		1.4: Develop and Implement a Long-term Monitoring Program	Years 1-5
	CA-2: Develop and Implement Regional Approach to Coastal Armoring	2.8: Pursue Pilot Program for Alternatives to Coastal Armoring	Years 2-4
Desalination	DESAL-2: Facility Siting Guidelines	2.1: Identify Preferred Conditions and Habitats	Years 2-3
	DESAL-4: Modeling and Monitoring Program	4.2: Identify Minimum Information Required for Project Application	Years 3-4
		4.4: Determine Cumulative Impacts from Multiple Facilities	Years 3-4
Harbors and Dredge Disposal	HDD-2: Review Offshore Dredge Disposal Activities	2.3: Review Dredge Disposal Activities and Evaluate Redefinition of SF-12 (Moss Landing)	Years 1-2
		2.4: Coordinate with GFNMS in Evaluation of Dredge Disposal Site for Pillar Point Harbor	Years 1-2
	HDD-3: Sediment Monitoring and Reduction Program	3.1: Assess Changes in Aquatic Disposal Volumes	Years 3-5
		3.4: Monitor Coastal and Estuarine and Sediment Flow	Years 3-5
	HDD-5: Alternative Disposal Methods	5.1: Evaluate Potential Beneficial Usage of Dredged Materials	Years 3-4
Submerged Cables	SC-1: Routing and Zones for Submerged Cable Projects	1.1: Identify Environmentally Sensitive Areas	Years 1-2
	SC-2: Submerged Cable Project Permit Guidelines	2.1: Refine and Implement Permit Pathway and Applicant Guidelines	Years 1-2
		2.2: Identify Development Standards	Years 1-2
Ecosystem Protection Issues			

Action Plan	Strategy	Activity	Implementation Timing
Big Sur Coastal Ecosystem Coordination	BSP-1: Provide Integrated Data and Information to the Public	1.1: Create Multi Agency Website for Big Sur Region	Years 3-4
		1.2: Provide Online Access for Planning Documents	Years 3-4
		1.3: Develop Integrated GIS Database for Big Sur Coastal and Marine Resource Management	Years 3-4
		1.4: Update Website as Agencies Update Plans and Programs	Years 3-4
		1.5: Develop and Implement Process to Keep Public Informed About Website	Years 3-4
		1.6 Attend and Participate in the Big Sur Multi-Agency Advisory Council (MAAC)	Years 3-4
	BSP-2: Develop Interagency Coordination Program	2.2: Facilitate Priority Issue Coordination Task Forces	Years 3-5
Bottom Trawling Effects on Benthic Habitats	BH-2: Assess Trawl Activity	2.1: Compile Fishing Data	Years 1-3
		2.3: Improve Data Gathering	Years 1-3
	BH-3: Identify Habitats Vulnerable to Trawling	3.1: Consult Literature and Scientists to Develop Criteria for Selecting and Prioritizing Habitats Vulnerable to Effects of Bottom Trawling	Years 1-3
		3.2: Consult with Local Scientists, Fishermen, and Primary Literature to Determine What and Where Vulnerable Habitats are Located	Years 1-3
		3.3: Gather Existing Data on Habitat Distribution and Incorporate into GIS Format	Years 1-3
		3.4: Evaluate the Need for and Develop Strategy to Obtain Additional Habitat Distribution Data if Necessary	Years 1-3
	BH-4: Develop Management Tracking Program	4.1: Compile Database of Regulations and Restrictions	Years 1-3
	BH-5: Develop an Impact Identification and Research Program	5.1: Identify Impacts from Bottom Trawling in MBNMS	Years 2-3
		5.2: Identify and Conduct Necessary Research on Trawling Impacts	Years 2-3
	Davidson Seamount	DS-1: Conduct Site Characterization	1.1: Complete Geologic and Biological Characterization of Seamount
1.3: Conduct Zoological Survey of Surface and Midwater Areas Above the Seamount			Years 3-5
1.4: Initiate Oceanographic Surveys of Seamount Region			Years 3-5

Action Plan	Strategy	Activity	Implementation Timing
<i>Davidson Seamount cont'd</i>		1.5 Complete Thorough Socioeconomic (Commercial, Recreational, Research Uses) Analysis	Years 3-5
		1.6: Characterize Cultural History of Davidson Seamount	Years 3-5
		1.7: Incorporate Site Characterization Document in MBNMS Websites	Years 3-5
	DS-2: Conduct Ecological Processes Investigations	2.1: Conduct Regular Benthic Surveys of the Davidson Seamount	Years 3-5
		2.2: Conduct Deepwater Coral Ageing and Restoration Studies	Years 3-5
		2.3: Perform Research on Seamount to Expand Understanding Distribution and Abundance of Species	Years 3-5
		2.4: Understand Links with Coastal Sanctuary	Years 3-5
DS-3: Develop Resource Protection Program	3.1 Continuously Characterize the Potential Threats to the Davidson Seamount	Years 2-5	
Emerging Issues	EI-1: Identify and Track Emerging Issues	1.3: Consider Development of an “Early Warning” System to Assist MBNMS in Receiving Early Information on New and Unforeseen Issues, Including Efficient Pathways and Processes for Receiving this Information	Years 1-5
	EI – 2: Develop Process to Address Emerging Issues	2.1: Identify and Define Criteria for Assessing the Importance of Emerging Issues	Years 1-5
		2.2: Outline Alternative Categories and Processes to Address Emerging Issues	Year 1-5
Introduced Species Action Plan	IS-1: Address Known Pathways of Introduction	1.1: Develop and Implement Action Plans to Address Pathways, Threats, and Effective Prevention/Management	Years 3-5
	IS-2: Develop Prevention Program for Known Pathways of Introductions	2.1: Develop and Implement Introduced Species Outreach and Prevention Program	Years 3-5
	IS-3: Develop Baseline Information, Research & Monitoring Program	3.1: Increase Baseline Research	Years 3-4
		3.2: Develop Monitoring Plan for New Invasions	Years 3-4
		3.3: Synthesize Research Results and Make Results Publicly Available	Years 3-4
		3.4: Assess Ecological and Economic Impacts of Introduced Species in the MBNMS	Years 3-4

Action Plan	Strategy	Activity	Implementation Timing
Marine Protected Areas Action Plan	MPA-2: Define Conservation Goals and Objectives and Habitats and Resources to be Protected	2.2: Consider Range of Representative Habitat Type- e.g. Hard Bottom, Soft Bottom, Kelp Forest, Pelagic, Rocky Intertidal, Estuarine, etc.	Years 1-2
		2.3: Identify Key Ecological Interactions, Including Predator-Prey Relationships, Migratory Patterns, Life History Stages, and the Role of Biogenic Habitat (e.g. kelp)	Years 1-2
		2.4: Identify Emerging or Existing Threats to These Habitats, Resources or Interactions	Years 1-2
		2.5: Identify Resource or Habitat-specific Objectives for MPAs and/or Network/Collection of MPAs	Years 1-2
		2.6: Include Mix of Degrees of Habitat Health Ranging from Areas that are Minimally Disturbed and Set Aside for Protection, to Historically Productive, Currently Underused Habitats Set Aside to Allow Recovery	Years 1-2
		MPA-3: Develop General Design Criteria	3.1: Consider Biological and Physical Factors
	3.2: Consider Human Use Patterns		Years 2-3
	3.3: Address Considerations of MPA Size and Scale		Years 2-3
	3.4: Consider Design Issues Specific to Federal Waters		Years 2-3
	MPA-5: Develop Integrated Management System	5.1: Identify and Evaluate Other Existing or Planned Ecosystem, Fishery, or Land-based Management Tools, as Feasible Within Staff Limitations	Years 2-3
	MPA-6: Conduct Socioeconomic Impact Analysis and Mitigation	6.1: Identify Types of Socioeconomic Analyses to Assist in the Design and Evaluation of Biologically Effective MPAs That Will Allow Continuation of Sustainable Fishing Practices and Sustainable Communities	Years 1-3
	MPA-9: Build Research and Monitoring Program	9.1: Design and Conduct Biological Effectiveness Evaluations Linked to Specific Goals of MPAs	Years 2-5
		9.3: Coordinate Monitoring and Data Distribution	Years 2-5
Operations and Administration			
Operations and Administration	OA-1: Assess Staffing Needs	1.3: Develop a Structured Intern Program	Years 1-2
	OA-2: Develop Volunteer Program	2.1: Coordinate and Incorporate MBNMS Volunteer Efforts on Specific Projects into a Single Team OCEAN Program	Years 2-3

Action Plan	Strategy	Activity	Implementation Timing
<i>Ops and Admin cont'd.</i>	OA-5: Conduct Administrative Initiatives	2.2: Continue Volunteer Recruitment and Placement	Years 2-3
		2.4: Recognize the Efforts and Services of Volunteers	Years 2-3
		2.5: Create a Mechanism to Retain Volunteers	Years 2-3
		5.8: MBNMS Will Continue to Partner with the Monterey Bay Sanctuary Foundation, a Nonprofit Organization Whose Mission is to Advance the Understanding and Protection of MBNMS and Other National Marine Sanctuaries in California, and with Other Nongovernmental Partners	Years 1-5
		5.12: The MBNMS Research Coordinator Will Continue to Manage the Research Team and Participate in NMSP-wide Activities Relating to Research	Years 1-5
	OA-6: Coordinate and Conduct Boat Operations	6.2: Develop Boat Operator and Crew Member Qualification Plan	Years 1-5
		6.4: Fund and Construct 65FT <u>FULMAR</u> Vessel	Years 1-5
	OA-7: Oversee and Conduct Dive Operations	7.1: Identify Needs for Diving Operations from Other Action Plans	Years 1-5
		7.2: Establish a Staff Qualification Plan	Years 1-5
		7.4: Develop Reciprocity Agreements with Other Research Diving Programs to Facilitate Collaborative Research	Years 1-5
	OA-8: Aircraft Operations	8.2: Based on Needs Assessment, Develop and Implement Aircraft Operations Plan	Years 2-5
	OA-9: Maintain and Enhance Permit Program	9.3: Review Permit Process to Improve Efficiency and Effectiveness	Years 1-5
	OA-10: Interagency Program Review	10.1: Conduct Outreach to Agencies and Stakeholders	Years 1-5
		10.3: Review and Comment on Local Coastal Program Updates	Years 1-5
Partnerships and Opportunities			
Fishing Related Research and Education	FER-2: Enhance Stakeholder Communication Enhancement	2.1: Continue to Meet with Fishermen, Incorporate them into Relevant Committees and Obtain Fishermen's Perspective for the Sanctuary Advisory Council	Years 2-4
		2.3: Develop a Communication Plan Between Parties Interested in Education and Research Issues Related to Fishing in the MBNMS	Years 2-4

Action Plan	Strategy	Activity	Implementation Timing
<i>Fishing Related Research and Education cont'd.</i>		2.4: Investigate Partnership with the Pacific Marine Conservation Council's (PMCC) West Coast-Wide Collaborative Research Program	Years 2-4
		2.4: Develop a Series of Meetings Outlining Projects with Science Needs Using Fishermen's Skills and Assets	Years 2-4
	FER-3: Facilitate Sustainable Fisheries Definition and Promotion	3.1: Promote Biological and Socioeconomic Research on Sustainability	Years 2-3
		3.2: Work with Partners to Identify, Promote, and Certify Healthy Fisheries in the MBNMS	Years 2-3
		3.3: Increase Outreach and Awareness of How Sustainability is Assessed	Years 2-3
	FER-5: Collect and Distribute Fisheries and Habitat Related Data	5.1: Coordinate with Fishery Management Agencies in Developing a Recurring Workshop Series with Interested Parties to Determine Existing Data, Efforts, Gaps, Overlap, and Develop a Coordinated Plan for Collection and Distribution of Marine Ecosystem and Fisheries Relevant Data	Years 3-5
		5.2: Consider Input from Fishermen and Other Stakeholders in the Development, Synthesis, Collection, and Analyses of Data When Participating in Cooperative Fisheries Research	Years 3-5
		5.3: Include Fisheries Relevant Data in the Sanctuary Integrated Monitoring Network (SIMoN) Metadata Files And Website	Years 3-5
	FER-7: Conduct Public Outreach on Links Between Healthy Ecosystems and Fish Stocks	7.2: Facilitate an Assessment of What Is Known about the Links Between Ecosystems and Fisheries	Years 2-3
		7.4: Conduct Outreach to Target Audiences	Years 2-3
Interpretive Facilities	IF-1: Construct and Operate Visitor Center	1.2: Develop Visitor Center Facilities and Operations Plan	Years 1-3
	IF-4: Virtual Experiences	4.1: Expand Virtual Interpretive Opportunities on MBNMS Website	Years 2-3
Sanctuary Integrated Monitoring Network	SI-2: New Monitoring Efforts for Basic MBNMS Characterization and Understanding of Changes in Natural Resources	2.1: Initiate New and Continue Existing Monitoring Efforts to Address Needs Identified as Priorities in MBNMS Management Plan	Years 1-5
		2.3: Continue Rapid Response Programs	Years 1-5
		2.4: Continue Revue of Internal MBNMS Proposals	Years 1-5

Action Plan	Strategy	Activity	Implementation Timing	
<i>Sanctuary Integrated Monitoring Network cont.</i>		2.5: Continue Review of Unsolicited Proposals	Years 1-5	
	SI-3: Integrate Regional Monitoring Efforts	3.1: Coordinate and Synthesize Historic Data Sets with Information from the Various Regional Research Institutions Working within the MBNMS	Years 1-5	
		3.2: Integrate Existing Data Sets into the SIMoN Database	Years 1-5	
		3.3: Create and Disseminate Synthetic Products Based on Data from Various Monitoring and Research Efforts	Years 1-5	
		3.4: Expand the Metadata Database to Include All Ongoing Monitoring Projects, Add New Projects, and Periodically Update and Review All Projects in the Database	Years 1-5	
		3.5: Expand the SIMoN Database (i.e. PDERM) to Include Research (non-monitoring) Projects that Complement Historic and Current Monitoring Efforts	Years 1-5	
		3.6: Participate in the Development of Regional Ocean Observatory Programs	Years 1-5	
		SI-5: Outreach and Information Dissemination	5.1: Continue Development and Maintenance of Monitoring Database and Mapping Tools on SIMoN Website	Years 1-5
	5.2: Produce State of the Sanctuary Report and Other Technical Reports		Years 1-5	
	5.3: Conduct Annual Monitoring Symposia and Workshop		Years 1-5	
	5.4: Provide Timely Information for Management Decisions		Years 1-5	
	5.5: Continue to Create GIS Products to Support Monitoring Efforts		Years 1-5	
	SI-6: Expand SIMoN as a Model for the National Marine Sanctuary System	6.1: Establish SIMoN Programs at All Sites	Years 1-2	
		6.2: Involve Local Researchers Along with Agency Staff to Share Existing Monitoring and Identify and Collect New, Critical Monitoring Data	Years 1-2	
		6.3: Identify “Sentinel” Locations for Long-Term Monitoring Locations at All Sanctuaries in the Development of Ocean Observatories	Years 1-2	
		6.4: Develop Indicators, or Metrics, for each Site to Assess, to the Extent Possible, the Health of a MBNMS’s Ecosystem	Years 1-2	
	Water Quality Issues			

Action Plan	Strategy	Activity	Implementation Timing
Beach Closures and Contamination	BC-1: Enhance Use of Geographic Information System (GIS)	1.2: Expand and Continue to Encourage Local Jurisdictions to Map Septic Sewer and Storm Drain Lines, and to Record Data on Reported Spills, Blockages, and Lateral Line Cleaning Work	Years 1-2
	BC-2: Expand Pathogen and Contamination Research	2.1: Investigate and Implement Rapid Indicator Assessment	Years 1-5
		2.2: Explore Other Potential Indicators	Years 1-5
	BC-3: Increase Monitoring Network	3.1: Increase Number and Frequency of Beach Sampling	Years 1-2
	BC-4: Enhance Notification Program	4.1: Develop Improved Notification System for User Groups	Years 1-3
Water Quality Protection Program Implementation	WQPP-9: Data Access	9.1: Integrate Water Quality Data with SIMoN	Years 1-2
		9.2: Certify Data Quality for Volunteer Groups and Incorporate into Database	Years 1-2
		9.3: Improve Packaging and Distribution of Data to Decision-makers and the Public	Years 1-2
	WQPP-17: Strengthen Technical Information and Outreach to Agriculture	17.7: Develop And Promote Self-Monitoring Tools for Conservation Management Practices to Assess Problems And Track Success	Years 1-2
Wildlife Disturbance Issues			
Marine Mammal, Seabird and Turtle Disturbance	MMST-2: Mitigate Impacts from Low Flying Aircraft	2.2: Identify Research and Monitoring Activities	Years 3-4
	MMST-4: Mitigate Impacts from Marine Debris	4.2: Develop a Database to Monitor Marine Debris	Years 4-5
	MMST-5: Consider Impacts from Commercial Harvest	5.1: Evaluate Levels of Disturbance and Identify Solutions	Years 3-5
	MMST-6: Assess Impacts From Acoustics	6.1: Expand Research and Monitoring of Acoustics in Marine Environment	Years 3-5
	MMST-7: Reduce Sea Turtle Disturbance	7.1: Assess Levels of Sea Turtle Disturbance in MBNMS	Years 3-4
Tidepool Protection	TP-1: Assess the Problem	1.1: Continue Regional Identification and Prioritization of Tidepool Locations	Years 4-5
		1.2: Identify Types and Extent of Impacts to Tidepools	Years 4-5
		1.3: Monitor to Understand Natural Versus Human-Caused Changes	Years 4-5
		1.4: Improve Data Collection and Database Coordination Among Tidepool Research and Monitoring Projects	Years 4-5

Action Plan	Strategy	Activity	Implementation Timing
<i>Tidepool Protection cont'd.</i>		1.5: Ensure Researchers Understand Key Priorities and Information Needs of Managers	Years 4-5
		1.6: Compile Historical Knowledge About Key Locations	Years 4-5
Cross Cutting Issues			
Administration and Operations	XAO-1: Improve Internal Communications Among the Three Sanctuaries	1.4: The Program Coordinators will Meet Separately at Least Once per year to Share Information and Plan Joint Activities Prior to the Development of the Annual Operating Plan	Years 1-5
	XAO-2: Improve the Efficiency and Cost-effectiveness of Program Operations	2.2: Develop a List of Needed Facilities, Signage, Exhibits, Equipment, Vessels, and Resources Based on the Revised Management Plans that could be Shared Between Sites	Years 1-2
		2.3: Contact and Inform the other Sites Early in the Planning Stages of Field Operations to Provide Opportunities to Plan Joint Missions and to Share Information and Data	Years 1-2
Ecosystem Monitoring	XEM-1: Coordinate Existing Targeted Monitoring Activities to Promote Greater Efficiency and Effectiveness	1.1: Coordinate individual sanctuary rocky intertidal monitoring programs and investigate opportunities to collaborate with other large-scale rocky intertidal monitoring efforts	Years 1-5
		1.2: Conduct a workshop to coordinate data collection protocols for Beach COMBERS and Beach Watch Programs that indirectly assess the health of the pelagic/offshore ecosystem	Years 2-3
		1.3: Develop an integrated sanctuary marine mammal and seabird survey monitoring plan for the 3 sanctuaries to coordinate and supplement the NOAA Fisheries 5-year surveys	Years 3-5
		1.4: Explore the potential for the expansion of existing fish surveys, such as the CalCOFI transect lines through Gulf of the Farallones and Cordell Bank, and continuation in Monterey Bay	Year 2
		1.5: Jointly developed research cruise plans and standards for sampling and reporting results for benthic habitat survey work	Years 1-5
		1.6: Augment the benthic habitat survey work with new technologies such as ROV surveys.	Years 1-5

Action Plan	Strategy	Activity	Implementation Timing
<i>Ecosystem Monitoring cont'd.</i>	XEM-2: Coordinate and Implement Existing Regional Ecosystem Monitoring Activities	2.1: Implement the West Coast Observation Project at CBNMS, GFNMS and MBNMS	Years 1-5
		2.2: Develop and implement an integrated NMSP's System-Wide Monitoring (SWiM) program for CBNMS, GFNMS and MBNMS	Years 2-3
	XEM-3: Identify Shared Monitoring Needs With Respect to Management Concerns and Responsibilities at Each of the Sanctuaries	3.1: Conduct a needs assessment and develop a site implementation plan for expanding SIMoN to the Gulf of the Farallones and Cordell Bank sanctuaries	Years 1-2
		3.2: Explore opportunities to integrate SIMoN with other regional monitoring efforts such as West Coast Observations and other IOOS projects	Years 1-2
		3.3: Evaluate and identify ongoing funding opportunities to support regional and larger scale ongoing monitoring activities	Years 1-2
	XEM-4: Establish a Joint Internal Monitoring Coordination Team	4.1: Establish a Monitoring Coordination Team	Years 2-3
		4.2: Review the monitoring recommendations set forth by the sanctuary specific issue-based working groups during the joint management plan review process	Year 1
		4.3: Develop a research and monitoring communication plan to improve coordination among the sanctuary's research staff and partners	Year 2
		4.4: Investigate the opportunity for joint reporting of monitoring activities through periodic "state of the sanctuaries" reports for cross-cutting monitoring activities among the three sanctuaries	Year 2

Action Plan	Strategy	Activity	Implementation Timing
<i>Ecosystem Monitoring cont'd.</i>	XEM-5: Consider Establishing Additional Site-Specific or a Joint Research Activities Panel to Enhance Research and Monitoring Collaborations	5.1: Evaluate the need and feasibility of establishing a CBNMS Research Activity Panel (RAP) or a GFNMS RAP as a permanent SAC working group and the need to create an ad-hoc or standing joint research activities panel (JRAP) to advise and identify opportunities for coordinated monitoring activities	Year 2
		5.4: Institute annual meetings for a subgroup of (~10) representatives from all three sanctuary RAPs (or research partners if a RAP does not exist) to coordinate research and monitoring activities in the region	Year 4
Maritime Heritage	XMHR-1: Establish Maritime Heritage Resources Program	1.1: Develop the foundation and infrastructure of a MHR Program	Years 1-2
		1.2: Identify and assist partners doing maritime heritage related work to obtain funding and resources	Years 2-3
	XMHR-2: Inventory and Assess Submerged Sites	2.1: Establish external partnerships to inventory potential shipwreck sites with other federal, state, and local agencies as well as vocational archaeologists, commercial divers and fishermen, and recreational divers	Years 3-4
		2.2: Conduct systematic research and survey for archaeological sites, including the remains of prehistoric, as well as historic sites, that represent ship and aircraft losses	Years 3-4
		2.3: Establish a Shipwreck Reconnaissance and Site Monitoring Program	Years 3-5
		2.4: Assess and Nominate Appropriate Submerged Archaeological Sites for Inclusion to the National Register of Historic Places	Years 3-5
	XMHR-3: Assess Shipwrecks and Submerged Structures for Hazards	3.1: Establish an inventory of shipwrecks, inside and outside of Sanctuary boundaries, that may pose environmental threats to Sanctuary marine resources	Years 3-5
		3.2: Establish a monitoring program for shipwreck sites that may pose environmental threats	Years 3-5
		3.3: Coordinate with partners to reduce threats	Years 1-5
		3.4: For historic shipwrecks, ensure compliance under Section 106 of the National Historic Preservation Act (NHPA) and the National Marine Sanctuary Act (NMSA)	Years 3-5

Action Plan	Strategy	Activity	Implementation Timing
<i>Maritime Heritage cont'd.</i>	XMHR-4: Protect and Manage Submerged Archaeological Resources	4.1: Jointly develop uniform protocol to manage, monitor, and protect submerged sites within the three sanctuaries in partnership with appropriate local law enforcement agencies	Years 2-4
		4.2: Provide training to sanctuary staff and facilitate training for partners	Years 3-4
		4.3: Identify archaeological and historic resources currently outside sanctuary boundaries that may either be of significant historic interest or may pose a threat to sanctuary resources	Years 4-5

Appendix D – Enforcement Related Activities

Action Plan	Strategy	Activity	Implementation Timing
Coastal Development Issues			
Coastal Armoring	CA-2: Develop and Implement Regional Approach to Coastal Armoring	2.6: Broaden the Multi-Agency Enforcement Program	Years 2-4
	CA-3: Improve Permit Program	3.6: Permit Enforcement	Years 2-4
Desalination	DESAL-4: Develop Modeling and Monitoring Program	4.4: Enforcement and Permit Compliance	
Harbors and Dredge Disposal	HDD-1: Improve Agency Coordination	1.3: Enforcement and Permit Compliance	
Submerged Cables	SC-2: Develop Submerged Cable Project Permit Guidelines	2.5: Enforcement and Permit Compliance	
Ecosystem Protection Issues			
Davidson Seamount	DS-3 Develop Resource Protection	3.3 Develop and Implement Enforcement Plan for DSMZ	Years 1-2
Introduced Species	IS-2: Prevention Program for Known Pathways of Introduction	2.3: Coordinate Use of Regulations/ Permits/ Enforcement and Inspect Discharge Logs	Years 3-5
Marine Protected Areas	MPA-7: Develop Enforcement and Compliance Program	7.1: Identify Components of an Effective Enforcement Program and Implementation Mechanisms to Provide Adequate Surveillance on the Water and in the Air	Years 4-5
		7.2: Develop Partnerships and Cooperative Interagency Enforcement Plans	Years 4-5
		7.3: Ensure Adequate Training of Enforcement Officers in MPA Management and Regulations	Years 4-5
		7.4: Utilize Technology such as GPS and Remote Sensing to facilitate Compliance	
		7.5: Enlist Community Participation in MPA Management and Enforcement to Maximize Cost-effectiveness of Enforcement Program and Enhance Compliance	Years 4-5
	MPA-8: Develop Education and Outreach Program	8.5: Integrate Education with Enforcement and Research	Years 4-5
Operations and Administration			
Operations and Administration	OA-6: Coordinate and Conduct Boat Operations	6.5 Implement Boat Operations to Support Sanctuary Enforcement	Year 1-2
	OA-10: Permit Program	10.1: Conduct Outreach to Agencies and Stakeholders	

Action Plan	Strategy	Activity	Implementation Timing
<i>Ops and Admin cont'd.</i>		10.2: Review and Comment on Local Land Use Decisions	
		10.3: Review and Comment on Local Coastal Program Updates	
		10.4: Review and Comment on Fishery Management Plan Updates	
		10.5: Testify at Local Hearings on Issues Affecting the MBNMS	
Water Quality Issues			
Beach Closures and Contamination	BC-8: Increase and Coordinate Enforcement	8.1: Review Past Oversight and Sanctuary Notification of Spills, and Use this Information to Develop Effective Protocol for Collaboration Between Agencies	Years 1-2
		8.2: Coordinate and Strengthen Enforcement Actions with the RWQCBs	Years 1-2
	BC-9: Emergency Response	9.4: Provide Sanctuary Enforcement Presence Where Necessary in the Field to Follow Up on Reported Spills and Assess Potential Injury to the Sanctuary	Years 1-2
Cruise Ship Discharges	CS-2: Enforcement and Monitoring Program	2.4: Develop and Implement an Enforcement Program, in Collaboration with Partners	Years 1-2
Water Quality Protection Plan	WQPP-11: Public Education and Outreach	11.3:	
Wildlife Disturbance Issues			
Marine Mammal, Seabird and Turtle Disturbance	MMST-8: Enforcement Activity Disturbance	8.1: Strengthen Enforcement	Years 1-3
		8.2: Continue Outreach to Increase Knowledge of MBNMS Regulations and Contact Information	
		8.3: Increase Use of Summary Settlement Process	
		8.4: Increase Coordination Between Education and Enforcement Programs	
Motorized Personal Watercraft	MPWC-4: Enhance Enforcement Efforts	4.1: Expanded Deputization of Local Peace Officers to Increase Surveillance	Years 2-3
		4.2: Commit Sufficient Enforcement Funding to Support Deputization Agreements with Harbors	Years 2-3
		4.3: Permit Enforcement at Mavericks Using Permit Fee Funding	Years 2-3
Tidepool Protection	TP-3: Strengthen Enforcement	3.1: Improve Enforcement of Existing Regulations	Years 1-3
		3.2: Utilize Enforcement to Focus on Significant Violations	Years 1-3
		3.3: Improve Interagency Coordination	Years 2-4
		3.4: Define a System of Referrals from Docents to Enforcement Officers	Years 3-4
		3.5: Promote a Public Call-in Reporting System	Years 4-5
Cross Cutting Issues			
Administration and Operations	XAO-4: Resource Protection Program Coordination	4.1: Improve staff awareness and understanding of each site's regulations	Years 1-3

Action Plan	Strategy	Activity	Implementation Timing
		4.5: Develop a coordinated sanctuary emergency response plan	Years 2-3
		4.6: Coordinate with the NMSP Damage Assessment Team on populating and making SHIELDS functional and operative for the three sanctuaries and integrating it with the SIMoN database.	Years 1 -5
		4.7 / 4.8: Develop and implement a comprehensive enforcement plan for the tri-sanctuary area.	Years 3-5
Maritime Heritage	XMHR-4: Submerged Archaeological Resources Protection and Management	4.1: Jointly develop protocol to manage, monitor, and protect submerged site within the three sanctuaries in partnership with appropriate local law enforcement agencies.	Year 3-4
Northern Management Area	XNRP-2: GFNMS will be responsible for regulatory activities in the NMA while maintaining maximum consistency and protection to sanctuary resources	2.3: Resource Protection Teams Coordinate on Proposed Regulatory Changes	Years 1-2
	XNRP -4: GFNMS staff will coordinate enforcement activities in the NMA	4.1: GFNMS staff will oversee planning and implementation of all NMA enforcement activities in the NMA and will coordinate with MBNMS to ensure consistency across the sites.	Years 1-5

Appendix E – List of Acronyms

ACCEO.....	Alliance for California Current Ecosystem Observation
ACP.....	Area Contingency Plan (USCG)
ACT.....	Alliance for Coastal Technologies
ADA.....	Americans with Disabilities Act
Alliance.....	Alliance of Communities for Sustainable Fisheries
AMBAG.....	Association of Monterey Bay Area Governments
AOP.....	Annual Operating Plan
APPS.....	U.S. Act to Prevent Pollution from Ships
ATOC.....	Acoustic Thermometry of Ocean Climate
AWA.....	American Watercraft Association
AWQA.....	Agricultural Water Quality Alliance
BAH.....	Booz Allen Hamilton
BASK.....	Bay Area Sea Kayakers
BBC.....	British Broadcasting Corporation
BC.....	British Columbia
Beach COMBERS.....	Beach Coastal Ocean/Marine Bird Education Research Surveys
BLM.....	Bureau of Land Management
BML.....	Bodega Marine Laboratory
BMP(s).....	Best Management Practices
BTAP.....	MBNMS Business and Tourism Activity Panel
BWQW.....	Beach Water Quality Workgroup (SWRQCB)
Cal EPA.....	California Environmental Protection Agency
CalCOFI.....	California Cooperative Oceanic Fisheries Investigations
CalTrans.....	California Department of Transportation
CAMP.....	Campaign Against Marijuana Planting
CBNMS.....	Cordell Bank National Marine Sanctuary
CBSOA.....	California Boating Safety Officers Association
CCAMLR.....	Commission for the Conservation of Antarctic Marine Living Resources
CCAMP.....	Central Coast Ambient Monitoring Program
CCC.....	California Coastal Commission
CCJDC.....	Central Coast Joint Data Committee
CCLEAN.....	Central Coast Long-term Environmental Assessment Network
CCR.....	California Code of Regulations
CCRWQBC.....	Central Coast Regional Water Quality Control Board
CDBW.....	California Department of Boating and Waterways
CDF.....	California Department of Forestry
CDFG.....	California Department of Fish and Game
CDPR.....	California Department of Parks and Recreation
CeNCOOS.....	Central California Ocean Observing System

CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
CHP	California Highway Patrol
CIMT	Center for Integrated Marine Technology
CINMS	Channel Islands National Marine Sanctuary
CMAR	Coastal Maritime Archaeology Resources
COASST	Coastal Observation And Seabird Survey Team
CODAR	Coastal Ocean Dynamics Applications Radar
COE	U.S. Army Corps. Of Engineers
CSLC	California State Lands Commission
CSUMB	California State University, Monterey Bay
CWA	U.S. Clean Water Act
CWC	Coastal Watershed Council
CWG	Conservation Working Group
CWG	MBNMS Conservation Working Group
CZMA	Coastal Zone Management Act
DDT	Dichlorodiphenyltrichloroethane
DDT	Dichlorodiphenyltrichloroethane
DEIS	Draft Environmental Impact Statement
DOC	United States Department of Commerce
DOI	United States Department of the Interior
DPR	California Department of Parks and Recreation
EEZ	U.S. Exclusive Economic Zone
EFH	Essential Fish Habitat
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ERP	External Monitoring Review Panel
ESA	Endangered Species Act
ESNERR	Elkhorn Slough National Estuarine Research Reserve
FAA	Federal Aviation Administration
FCC	Federal Communications Commission
FEIS/MP	Final Environmental Impact Statement and Management Plan
FES	Friends of the Elephant Seal
FKNMS	Florida Keys National Marine Sanctuary
FMA	Fishermen’s Marketing Association
FMSA	Farallones Marine Sanctuary Association
FSO	Friends of the Sea Otter
FWCPA	Federal Water Pollution Control Act
GFNMS	Gulf of the Farallones National Marine Sanctuary
GGNRA	Golden Gate National Recreation Area

GIS	Geographic Information Systems
GLOBE	Global Learning and Observation to Benefit the Environment
GPS	Global Positioning System
GS	Government Service
GSA	General Services Administration
HAZMAT	Hazardous Materials (NOAA)
HDD	Horizontal Directional Drilling
HIHWNMS	Hawaiian Islands Humpback Whale National Marine Sanctuary
HMBFMA	Half Moon Bay Fisherman’s Marketing Association
HSI	Hispanic Serving Institution
ICCL	The International Council of Cruise Lines
ICS	Incident Command System
IFQ	Individual Fishing Quota
IOOS	Integrated Ocean Observing Systems
ITQ	Individual Transferable Quota
JASON	JASON Foundation for Education
JMPR	Joint Management Plan Review
JRAP	Joint Research Advisory Panel
JRB	Joint Review Board
LABs	Long-chain Alkylbenzenes
LCP	Local Coastal Program
LiMPETS	Long-term Monitoring Program and Experiential Training for Students
LML	Long Marine Lab
LPNF	Los Padres National Forest
MAC	Maritime Archaeology Center (NOAA)
MAR	Multiple Antibiotic Resistance
MARINE	Multi-Agency Rocky Intertidal Network
MARPOL	The International Convention for the Prevention of Pollution from Ships
MATE	Marine Advanced Technology Education (Center)
MBA	Monterey Bay Aquarium
MBARI	Monterey Bay Aquarium Research Institute
MBNMS	Monterey Bay National Marine Sanctuary
MBSF	Monterey Bay Sanctuary Foundation
MBTA	Migratory Bird Treaty Act
MERITO	Multicultural Education for Resource Issues Threatening Oceans
MGD	Million Gallons per Day
MHR	Maritime Heritage Resources
MHW	Mean High Water
MHWL	Mean High Water Line
MIIS	Monterey Institute of International Studies
MISO	Monterey Inter-Shelf Observatory
MLML	Moss Landing Marine Laboratories

MLPA	Marine Life Protection Act
MMPA	Marine Mammal Protection Act
MMS	Minerals Management Service
MMUG	Marine Mapping User Group
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
MPA.....	Marine Protected Area
MPN	Most Probable Number
MPWC	Motorized Personal Watercraft
MRWPCA	Monterey Regional Water Pollution Control Agency
MS4.....	Municipal Separate Storm Sewer Systems
MSD.....	Marine Sanitation Device
MSFCMA.....	Magnuson Stevens Fishery Conservation and Management Act
MSI	Environmental Entrepreneurship Program/Minority Serving Institution (NOAA)
MURP	Model Urban Runoff Program
NANPCA.....	Nonindigenous Aquatic Nuisance Prevention and Control Act
NAS	Nautical Archaeology Society
NASA	National Aeronautics and Space Administration
NAUI	National Association of Underwater Instructors
NCCOS.....	The National Centers for Coastal Ocean Science
NCDDC	National Coastal Data Development Center (NOAA)
NDBC	National Data Buoy Center
NEPA.....	National Environmental Policy Act
NERRS	National Estuarine Research Reserve System (NOAA)
NESDIS	National Environmental Satellite Data Information Service (NOAA)
NGO.....	Non-governmental organization
NHPA	National Historic Preservation Act
NHU.....	National Hispanic University
NISA	National Invasive Species Act of 1996
NM.....	Nautical Mile
NMA	Northern Management Area
NMFS	National Marine Fisheries Service
NMSA.....	National Marine Sanctuaries Act
NMSF	National Marine Sanctuary Foundation
NMSP	National Marine Sanctuary Program
NOAA OLE.....	NOAA’s Office of Law Enforcement
NOAA.....	National Oceanic and Atmospheric Administration
NODC	National Oceanographic Data Center
NOS	National Ocean Service
NPDES.....	National Pollutant Discharge Elimination System
NPS	National Park Service
NPS	Naval Postgraduate School

NPS	Naval Postgraduate School
NPS	Non Point Source Pollution
NRCS	National Resources Conservation Service
NTIA	National Telecommunications and Information Administration
NURP	National Undersea Research Program (NOAA)
NWHICRER	Northwest Hawaiian Islands Coral Reef Ecosystem Reserve
OCNMS	Olympic Coast National Marine Sanctuary
OCRM.....	Office of Coastal Resource Management (NOAA)
OES	Office of Emergency Services
OSPR	(Office of) Oil Spill Prevention and Response (CDFG)
OT	Ocean Thunder
PADI	Professional Association of Diving Instructors
PCB	Polychlorinated biphenyls
PCFFA	Pacific Coast Federation of Fishermen’s Associations
PCR	Polymerase Chain Reactivity
PFEL	Pacific Fisheries Environmental Laboratory
PFMC.....	Pacific Fishery Management Council
PISCO	Partnership for Interdisciplinary Studies of Coastal Oceans
PMCC	Pacific Marine Conservation Council
PPT.....	Parts Per Thousand
PRBO	Point Reyes Bird Observatory
PSA	Public Service Announcement
PSMFC	Pacific States Marine Fisheries Commission
PVC.....	Polyvinyl Chloride
PWIA	Personal Watercraft Industry Association
QA.....	Quality Assurance
QC	Quality Control
RAP.....	Research Activity Panel
RBOC	Recreational Boaters of California
RCRA	U.S. Resource Conservation and Recovery Act
RFP	Request for Proposal
RO	Reverse Osmosis
ROV	Remotely Operated Vehicle
RUST	Resources and Under Sea Threats (NMSP database system)
RWQCB.....	Regional Water Quality Control Board
SAC.....	Sanctuary Advisory Council
SAFE.....	Stock Assessment and Fishery Evaluation
SBNMS	Stellwagen Bank National Marine Sanctuary
SCCWRP	Southern California Coastal Water Research Project
SCRP.....	Submerged Cultures Resource Program (NMSP)
SCWMN	Sanctuary Citizen Watershed Monitoring Network
Sea Grant	University of California Sea Grant

SEA	Surfer's Environmental Alliance
SEALS	Sanctuary Education Awareness and Long-term Stewardship
SEP.....	MBNMS Sanctuary Education Panel
SF	Sanctuary Foundation
SFBRWQCB	San Francisco Bay Regional Water Quality Control Board
SFSU	San Francisco State University
SHIELDS.....	Sanctuaries Hazardous Incident Emergency Logistics Database System
SHPO	California State Historic Preservation Office
SIMoN	Sanctuary Integrated Monitoring Network
SLUGS.....	Santa Lucia Gradient Studies
SMCNHA.....	San Mateo Coast Natural History Association
SNAPSHOT	Snapshot Water Quality Monitoring Event
SOS	Save Our Shores
SRP	Shipwreck Reconnaissance Program (CINMS)
SST.....	Sea Surface Temperature
SWiM.....	System Wide Monitoring Program (NMSP)
SWRCB	State Water Resources Control Board
TAMC.....	Transportation Agency for Monterey County
Team OCEAN.....	Team Ocean Conservation Education Action Network
TMDL	Total Maximum Daily Loads
UCCE.....	University of California Cooperative Extension
UCSB.....	University of California Santa Barbara
UCSC	University of California Santa Cruz
USACE	U.S. Army Corps of Engineers
USCG.....	United States Coast Guard
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WASC.....	Western Administrative Support Center (NOAA)
WDR	Waste Discharge Requirements
WERF	Water Environmental Research Foundation
WQC	Water Quality Council
WQPP	Water Quality Protection Program (MBNMS)
WRP.....	Western Regional Panel on Aquatic Nuisance Species
WWF.....	World Wildlife Fund