

# MONTEREY BAY NATIONAL MARINE SANCTUARY







# **Monterey Bay National Marine Sanctuary Draft Management Plan**

June 2020

In accordance with the National Marine Sanctuaries Act (NMSA; 16 U.S.C. §§ 1431 et seq.), the management plan for Monterey Bay National Marine Sanctuary (MBNMS) has been updated. The updated plan applies to the entire area encompassed by the sanctuary. The issue areas and programs addressed in this document were built with guidance from the general public, sanctuary staff, agency representatives, experts in the field, and the Sanctuary Advisory Council.

For readers wanting to learn more about the management plan, MBNMS policies and community-based management processes, we encourage you to visit the sanctuary's website at <https://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.

The National Oceanic and Atmospheric Administration's (NOAA) Office of National Marine Sanctuaries (ONMS) serves as the trustee for a network of underwater parks encompassing more than 600,000 square miles of marine and Great Lakes waters from Washington state to the Florida Keys, and from Lake Huron to American Samoa. The network includes a system of 14 national marine sanctuaries and Papahānaumokuākea and Rose Atoll marine national monuments.

NOAA's National Ocean Service (NOS) is the umbrella organization for ONMS and is dedicated to exploring, understanding, conserving, and restoring the nation's coasts and oceans. NOS works to balance environmental protection with economic prosperity, promoting safe navigation, supporting coastal communities, sustaining coastal habitats, and mitigating coastal hazards.

NOAA, an agency of the U.S. Department of Commerce, 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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Cover images, top to bottom, left to right:

Northern elephant seal (*Mirounga angustirostris*). Photo: Robert Schwemmer/NOAA

Horned aeolid (*Hermisenda crassicornis*). Photo: Steve Lonhart/NOAA

Juvenile copper rockfish (*Sebastes caurinus*). Photo: Steve Lonhart/NOAA

Bixby Bridge and Big Sur coastline. Photo: Robert Schwemmer/NOAA

California hydrocoral (*Stylaster californicus*) and purple sea urchin (*Strongylocentrotus purpuratus*). Photo: Steve Lonhart/NOAA

Scouler's surf grass (*Phyllospadix scouleri*). Photo: Chad King/NOAA

Small rock with colorful creatures and giant kelp (*Macrocystis pyrifera*). Photo: Chad King/NOAA



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## Executive Summary

### **Background**

Monterey Bay National Marine Sanctuary (MBNMS) is one of 14 national marine sanctuaries administered by NOAA. MBNMS extends from Marin County to Cambria, encompassing approximately 276 miles (444 kilometers) of shoreline and 6,094 square miles (15,783 square kilometers) of ocean extending an average distance of 25 miles (40 kilometers) from shore (see Figure ES-1). At its deepest point, MBNMS reaches 12,743 feet (3,884 meters). The sanctuary is home to numerous species of mammals, seabirds, fishes, invertebrates, and algae in a 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 and an extinct underwater volcano. These habitats abound with life, from tiny microscopic plants to enormous blue whales. Approximately 8 million people live within 50 miles (80 kilometers) of its shoreline, many of whom rely on sanctuary resources for pleasure or work. With its great diversity of habitats and life, and its importance to the human communities along its shoreline, MBNMS is a national focus for recreation, research, and education.

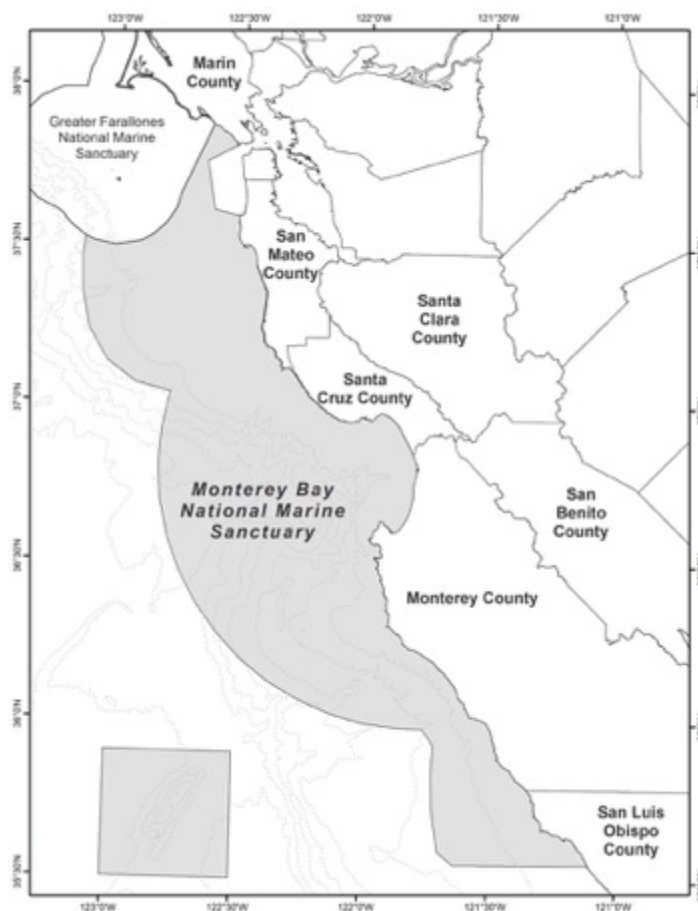


Figure ES-1. MBNMS boundaries and adjacent coastal counties. Image: NOAA

### **Management Plan Review**

This management plan for MBNMS was developed as part of a process known as a management plan review. NOAA's Office of National Marine Sanctuaries (ONMS) reviewed MBNMS's 2008 management plan using a community-based process promoting numerous opportunities for public input. The review process examined current issues and threats to sanctuary resources and the extent to which the 2008 management plan provided adequate resource protections.

## ***The Management Plan***

This management plan revises the 2008 management plan, and focuses on how best to understand and protect the sanctuary's resources. The management plan includes 14 action plans grouped into issue- and program-based themes guiding MBNMS staff over the coming decade.

### ***Issue-Based Action Plans***

*Climate Change:* Sanctuary waters, as well as surrounding coastal areas and communities, are experiencing climate-related stressors (e.g., sea level rise, extreme storms), and these are expected to worsen over the coming decades. This action plan proposes to address coastal resilience, climate adaptation, and ocean acidification through capacity building and collaborative partnerships.

*Coastal Erosion and Sediment Management:* The natural shoreline of the sanctuary has been altered by human activities such as coastal armoring, mining operations, coastal construction, and altering streams and rivers. This plan would reduce human-caused coastal erosion through collaboration with local, state, and federal agencies to address and restore sediment balance in nearshore habitats throughout the sanctuary.

*Davidson Seamount Management Zone (DSMZ) and Sur Ridge:* New scientific information is needed to support resource protection decisions and education related to seamount and deep ridge areas. This plan proposes to increase our understanding of the DSMZ and Sur Ridge through characterization and ecological process studies, and the development of education programs on these unique features of the sanctuary.

*Emerging Issues:* Although a wide range of current issues have been outlined in depth in the existing management plan, emerging issues are not addressed similarly. This action plan focuses on developing a framework to identify and address future resource protection issues.

*Introduced Species:* Introduced species are an increasingly common global threat, and the rate of invasion of introduced species continues to accelerate. The strategies outline efforts to prevent the introduction, spread, and establishment of introduced species, and to control and eradicate populations of introduced species already established in the sanctuary.

*Marine Debris:* We need a better understanding of types of marine debris impacting MBNMS resources and how those impacts can be reduced or eliminated. This plan will assess and seek to reduce the amount of marine debris in or entering the sanctuary.

*Water Quality:* The sanctuary's proximity to the coastline makes it vulnerable to pollution originating from [watershed areas](#) draining into it, including contaminants such as sediments, nutrients, bacteria, pesticides, metals, and detergents. Implementation of this action plan will raise awareness of water quality issues and improve the quality of water entering the sanctuary.

*Wildlife Disturbance:* Disturbance of marine wildlife is increasing in frequency and severity as an expanding urbanized society and increased tourism interacts with wild animals. This plan aims to maintain and improve protection of sanctuary wildlife by evaluating and remediating adverse impacts from human activities.

## ***Program-Based Action Plans***

*Education, Outreach, and Communication:* The NMSA envisions sanctuary management conducting extensive education, outreach, and communication strategies to engage public constituents and fulfill the MBNMS mission. This plan seeks to increase protection and appreciation of sanctuary resources by building greater public understanding, engagement, and stewardship throughout our highly diverse coastal communities.

*Marine Spatial Planning:* ONMS addresses a wide range of resource protection and management issues, varying in complexity and geographic scope. This action plan focuses on issues requiring marine spatial planning approaches and strategies, seeking to balance uses and protections of sanctuary resources, and improve scientific understanding.

*Maritime Heritage:* Constantly changing human uses define the maritime heritage of the central coast and interpret our evolving relationship with sanctuary resources. Activities include inventorying, locating, surveying, and monitoring historic shipwrecks and those posing potential threats to sanctuary resources; and characterizing and protecting maritime heritage resources.

*Operations and Administration:* This action plan addresses the necessary operational and administrative activities required for implementing an effective program, including staffing, infrastructure needs, and operational improvements.

*Research and Monitoring:* One of the stated purposes of the National Marine Sanctuaries Act is “to support, promote, and coordinate scientific research on, and long-term monitoring of, the resources of areas designated as sanctuaries.” This action plan proposes to assess the condition of and changes in species, habitats, and ecosystem processes, to better characterize and understand the sanctuary ecosystem, and support ecosystem-based management, resource protection, and education.

*Resource Protection:* The resource protection program identifies and reduces impacts to wildlife and other sanctuary resources through collaborative management with local stakeholders. The resource protection plan seeks to protect and restore the biological, historical, and cultural resources in the sanctuary.

## ***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 MBNMS and ONMS. Implementation of some action plans depend on a variety of funding scenarios such as grant awards, funding priorities of outside parties, or reliance on partner participation, in addition to federal appropriations. 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.



## SECTION 1: INTRODUCTION



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

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## Background

The sanctuary encompasses a range of habitats from sandy beaches to rocky intertidal areas to open ocean, one of the nation's largest kelp forests, a submarine canyon, and Davidson Seamount. The highly productive biological communities in MBNMS are host to one of the highest levels of marine biodiversity in the world, including 30 threatened and endangered species. MBNMS is adjacent to one of the largest urban concentrations in North America with approximately 8 million people living within 50 miles (80 kilometers) of its shoreline. The designation of this area as a national marine sanctuary indicates its value to the American people, and the need for long-term protection.

This management plan revises the 2008 plan and continues to focus on understanding and protecting the resources of MBNMS. This update was developed with public input from public scoping meetings, written comments, and Sanctuary Advisory Council and working group meetings, all providing input and recommendations regarding which issues MBNMS should address and how to address them.

Many marine resource management issues confront MBNMS. The action plans making up this management plan provide strategies to understand the issues and protect the coastal and marine environments comprising the sanctuary. The action plans address these issues through education and outreach, research and monitoring, collaborative planning and management efforts, regulation, and enforcement. The majority of actions described within this management plan are addressed in partnership with local, state, and other federal agencies, as well as many stakeholders with an interest in MBNMS.

This management plan is composed of 14 action plans guiding MBNMS staff for the next 10 years, beginning in 2020. The action plans are grouped into two main management themes: issue- and program-based. Each section contains several action plans

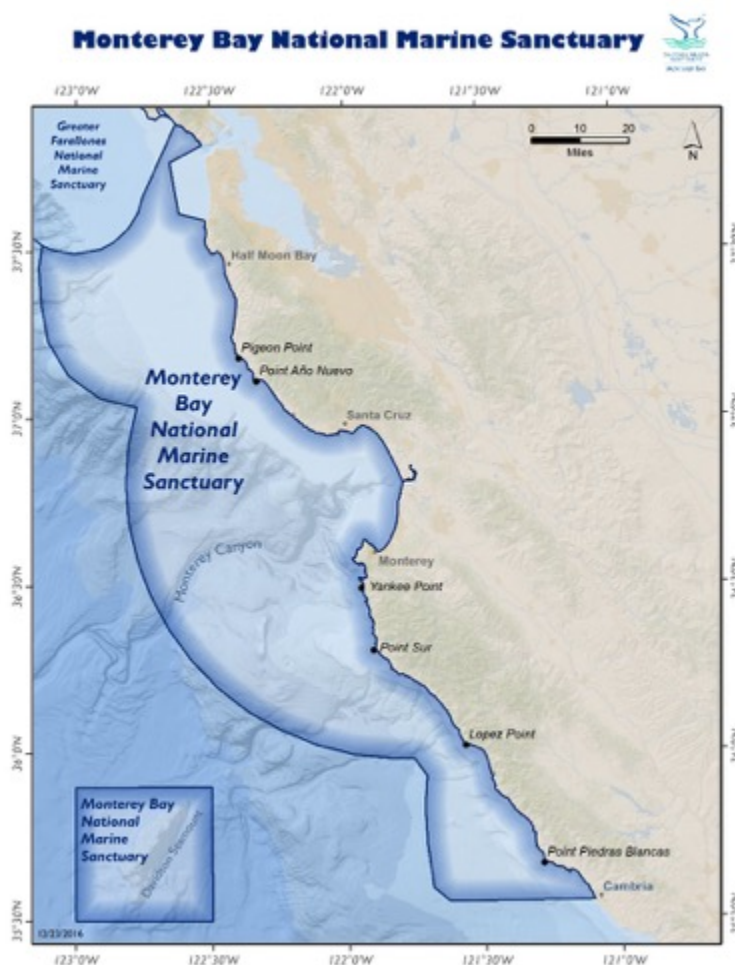


Figure I-2. MBNMS boundary. Image: NOAA

addressing issues identified through the public scoping process and prioritized by the Sanctuary Advisory Council. MBNMS staff often collaborate with partners to provide the services and activities necessary to implement the mandates outlined in the NMSA as well as addressing priority marine management issues of the sanctuary.

The programmatic action plans address the procedural requirements needed to implement the management plan and meet the NMSA mandates of resource protection, research, and education. Each action plan details the management action and describes mechanisms to evaluate the progress of the plan.

This introductory section provides background on ONMS, MBNMS, and the management plan review process. The section describes the administrative hierarchy and the organic act establishing ONMS. Next, it references the terms of designation, and details the history, mission, goals, and program foci of MBNMS. Finally, this section introduces the fundamental steps of the management plan review process, concluding with development of the new management plan.

### **Overview of ONMS**

ONMS resides within the Department of Commerce, managed by the National Ocean Service (NOS) in the National Oceanic and Atmospheric Administration (NOAA). ONMS manages a national system of marine protected areas (MPAs). Since 1972, ONMS has worked cooperatively with the public and federal, state, tribal, and local officials to promote conservation while allowing compatible commercial and recreational activities. Increasing public awareness and protection of our marine environment and the natural and cultural resources within it are accomplished through site management, scientific research, monitoring, exploration, and educational programs.

The National Marine Sanctuary System consists of 14 national marine sanctuaries and Papahānaumokuākea and Rose Atoll marine national monuments. The system encompasses more than 600,000 square miles (1,554,000 square kilometers) of marine and Great Lakes waters from Washington state to the Florida Keys and from Lake Huron to American Samoa (Figure I-3). ONMS has recently designated one new sanctuary, Malloes Bay-Potomac River National Marine Sanctuary and two other designations, Wisconsin-Lake Michigan and Lake Ontario, are in progress. ONMS provides oversight and coordination among the National Marine Sanctuary System by setting priorities for addressing resource management issues and directing program and policy development. ONMS is responsible for ensuring each sanctuary has an updated management plan consistent with the NMSA. The plans include management strategies to address current and emerging threats.

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

## The National Marine Sanctuaries Act

The NMSA, as amended (16 U.S.C. §1431 et seq.), is the law creating and guiding management of the National Marine Sanctuary System. The NMSA authorizes the Secretary of Commerce to designate 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 as national marine sanctuaries. The primary objective of the NMSA is to protect sanctuary resources. The NMSA also directs facilitation of all public and private uses of those resources compatible with the primary objective of resource protection.

The purposes and policies of the NMSA are:

- A. To identify and designate national marine sanctuaries as areas of the marine environment which are of special national significance and to manage these areas as the National Marine Sanctuary System;
- B. 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;
- C. To maintain the natural biological communities in the national marine sanctuaries, protect where appropriate, restore and enhance natural habitats, populations, and ecological processes;
- D. To enhance public awareness, understanding, appreciation, and sustainable use of the marine environment and the natural, historical, cultural, and archeological resources of the National Marine Sanctuary System;
- E. To support, promote, and coordinate scientific research on and long-term monitoring of the resources of these marine areas;
- F. 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;
- G. 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;
- H. To create models of and incentives for ways to conserve and manage these areas, including the application of innovative management techniques; and
- I. To cooperate with global programs encouraging conservation of marine resources.

A complete version of the NMSA is available from the ONMS website at [sanctuaries.noaa.gov/](https://sanctuaries.noaa.gov/).



# NATIONAL MARINE SANCTUARY SYSTEM



Figure I-3. National Marine Sanctuary System. Image: NOAA

## Ecosystem-Based Management in ONMS

The 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(a)(4)(C)) noting “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 (a)(3)). As such, the units of the National Marine Sanctuary System subscribe to a broad and comprehensive management approach in keeping with the NMSA’s primary objective of resource protection. This approach differs from the various 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 within the sanctuary that are deemed compatible with resource protection. These ecosystems managed by ONMS span diverse geographic, administrative, political, and economic boundaries. Strong partnerships among resource agencies, non-governmental interests, members of the public and scientific community, user groups, and conservationists are essential.

## MBNMS Designation

MBNMS was established for the purpose of resource protection, research, education, and public use. Designated in 1992, MBNMS stretches from Rocky Point in Marin County to Cambria, encompassing a shoreline length of 276 miles (444 kilometers) and 6,094 square miles (15,783 square kilometers) of ocean, extending an average distance of 25 miles (40 kilometers) from shore. At its deepest point, MBNMS reaches down 12,743 feet (3,884 meters).

The natural resources of MBNMS include one of our nation's largest contiguous kelp forests, an underwater extinct volcano, one of North America's largest underwater canyons, and the closest-to-shore deep ocean environment off the continental United States. MBNMS is home to some of the most diverse and productive marine ecosystems in the world, including a vast diversity of marine life, with 36 species of marine mammals (MBNMS is one of the best places in the world to view elephant seals, sea otters, and a huge variety of whales and dolphins), 180 species of seabirds, 525 species of fish, four species of sea turtles, 31 phyla of invertebrates, and more than 450 species of marine algae. This highly productive and biodiverse area is often referred to as the "Serengeti of the Sea." MBNMS is also home to 30 species receiving special protection under the Endangered Species Act (ESA). Federally-listed threatened or endangered species include seven species of large whales, the southern sea otter, Steller sea lion, Guadalupe fur seal, California condor, California clapper rail, western snowy plover, marbled murrelet, four species of sea turtles, six species of salmon or steelhead, two species of sturgeon, eulachon (a smelt), and the tidewater goby. MBNMS is also a meeting place for the geographic ranges of many species. MBNMS lies at the southern end of the range for some species, like the Steller sea lion, which occur from central California north to Alaska and Japan. The sanctuary lies at the northern end of the range for others, like giant kelp, occurring from San Francisco to Baja California, Mexico.

MBNMS resides within one of four eastern boundary current upwelling centers 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. Shallow, relatively warm waters are replaced by deep, cold, and nutrient-rich water. The cold water increases primary productivity, allowing phytoplankton to bloom, which in turn supports zooplankton. This process provides 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% of the annual global production of marine biomass, despite only representing 0.1% of the ocean's total surface area.

A variety of potential resource threats and opportunities exist within MBNMS due to the sensitivity of habitats and species in the region, the long stretch of adjacent populated coastline with several urban centers, 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 are critical elements in enhancing understanding and stewardship of this national treasure, using tools ranging from visitor centers and public events, to interactive teacher workshops and extensive written materials.

Cultural resources abound and are protected by MBNMS regulations. Archaeologists estimate 450 reported historical vessel (shipwreck or aircraft) losses within the waters

of MBNMS and approximately 718 historic sites (former village sites, customs houses, and submerged cultural sites) within the sanctuary and adjacent coastal zone.

## History

MBNMS was established in 1992 by authority of the Secretary of Commerce under the NMSA as directed congressionally by the Oceans Act of 1992. This designation was achieved 15 years after the sanctuary 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:

- A. The area is of special national significance due to its resource or human-use values.
- B. 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.
- C. Designation of the area will ensure comprehensive conservation and management, including resource protection, scientific research, and public education.
- D. The area is of a size and nature that will permit comprehensive and coordinated conservation and management.

NOAA was directed to designate Monterey Bay as a national marine sanctuary under the 1988 reauthorization of the NMSA. On August 3, 1990, NOAA released the draft environmental impact statement/management plan for the proposed MBNMS and published proposed regulations. NOAA held public hearings and published the final management plan and environmental impact statement in June 1992. MBNMS final regulations were published in the Federal Register on September 18, 1992.

In 2008, MBNMS expanded to include Davidson Seamount. The final rule, which includes the boundary expansion, is available at <http://montereybay.noaa.gov/intro/mp/welcome.html>. Davidson Seamount is a pristine undersea mountain habitat off the coast of Central California, 80 miles (128.75 kilometers) southwest of Monterey and 75 miles (120.7 km) west of San Simeon. At 26 miles (41.8 kilometers) long and 8 miles (12.8 kilometers) wide, it is one of the largest known seamounts in U.S. waters. From base to crest, the seamount is 7,480 ft tall (2,188.5 m.), yet its summit is still 4,101 ft (1,250 meter) below the sea surface. ONMS determined Davidson Seamount required protection from the take of or other injury to benthic organisms or those organisms living near the seafloor because of the seamount's special ecological and fragile qualities. The boundary change added a 775 square mile (2,007 square kilometer) area to MBNMS, increasing its area to 6,094 square miles (15,783 square kilometers).

## Mission and Goals

The mission of MBNMS staff is to understand and protect the coastal ecosystem and cultural resources of Monterey Bay National Marine Sanctuary.

MBNMS program goals per the NMSA are to:

- A. Enhance resource protection through comprehensive and coordinated conservation and management tailored to the specific resources that complements existing regulatory authorities.
- B. Support, promote, and coordinate scientific research on and monitoring of the site-specific marine resources to improve management decision-making.
- C. Enhance public awareness, understanding, and wise use of the marine environment through public interpretive and recreational programs.
- D. Facilitate, to the extent compatible with the primary objective of resource protection, multiple uses of these marine areas not prohibited pursuant to other authorities.
- E. Maintain four program areas making up the administration of MBNMS: research and monitoring, resource protection, education and outreach, and program operations.

## Focus and Accomplishments of the Research and Monitoring Program

The research and monitoring program's focus is on science-based activities to support resource management by: determining information gaps; developing studies to improve understanding of distinct management issues and long-term sanctuary health; and interpreting research for decision makers. MBNMS is part of the world-renowned and collaborative research community in coastal central California. Twenty research institutions are represented on the MBNMS Research Activity Panel (RAP). Members of the RAP and other scientists from regional institutions (Figure I-4) share their expert knowledge, facilities, equipment, and academic programs to help address issues identified in the MBNMS management plan. The research and monitoring program, in collaboration with regional partners, has achieved notable regional and international success through advisory committees, organizing symposia, developing websites with monitoring information, developing sanctuary condition reports with associated data sharing portals, obtaining research grants, gaining access to national research assets, conducting research expeditions, publishing scientific papers, and integrating science into education, research, and resource management endeavors. Examples of research program accomplishments over the past decade include:

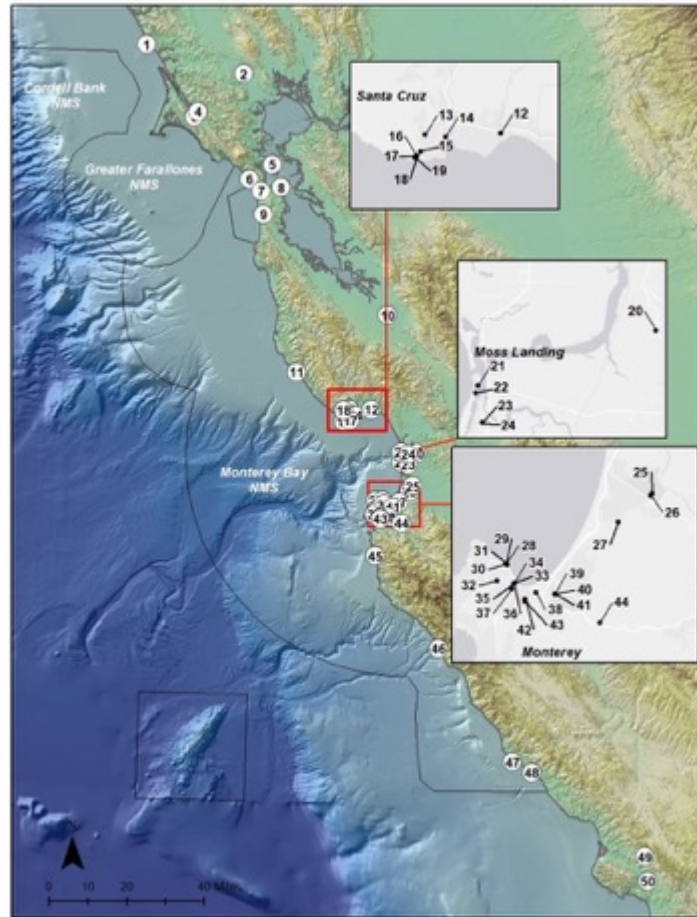


Figure I-4: Regional Institutions. Image: NOAA

- Facilitating more than 50 research institution collaboration meetings of the MBNMS Research Activity Panel.
- Maintaining the longstanding Ricketts Memorial Award (33 years) and associated symposia.
- Maintaining a citizen science program to assess stranded marine birds and mammals, detecting an average of 2.5 natural and/or human-caused significant mortality events per year.
- Assessing long-term changes to help communities, in association with marine reserves, climate change, disease, and other factors.



- Expanding and maintaining the Sanctuary Integrated Monitoring Network website and data submission processes for four national marine sanctuaries along the West Coast.
- Conducting the only long-term monitoring program of a lost shipping container that sank to 4,200 feet, and becoming an international expert on the issue.
- Characterizing the extensive sand and mud habitats of the MBNMS continental shelf.
- Developing a regional soundscape monitoring program and linking it to national efforts.
- Developing a marine biodiversity observation network that integrates existing monitoring programs to share data through innovative web portals, and receiving an “Excellence in Partnering Award” for the effort from the National Oceanographic Partnership Program.
- Discovering unique areas such as the dense deep-sea coral gardens of Sur Ridge and the largest deep-sea octopus brooding area ever seen.
- Developing deep-sea coral restoration methods.
- Serving on advisory panels for a 61-acre wetland restoration project in Elkhorn Slough.
- Conducting oceanographic, water quality, and biological surveys on and above Davidson Seamount, making this seamount one of the best studied in the world since this area was added to MBNMS in 2008.
- Advising resource managers on permit applications on topics ranging from beach nourishment to deep-sea cable laying.
- Participating in numerous damage assessments associated with shipwrecks and water quality issues.
- Assessing black abalone and their habitats for sensitive species designations, and developing methods for minimizing impacts to these species. Participating in the first translocation of black abalone for habitat restoration.
- Participating in activities to characterize and protect maritime heritage resources, including visitor center docent training and exhibit development, survey to determine if oil was present aboard the sunken SS *Montebello*, and listing of USS *Macon* in the National Register of Historic Places.
- Publishing more than 40 scientific papers on topics ranging from deep-sea taxonomic guides to estuarine species invasions.

### **Focus and Accomplishments of the Resource Protection Program**

One of the primary mandates of the NMSA is to protect and restore the biological, historical, and cultural resources in the sanctuary. A key objective of the management plan is to ensure human activities in MBNMS do not adversely affect natural resources, including habitats. This objective 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 impacts. The resource protection program also supports the Sanctuary Advisory Council’s Conservation Working Group (CWG), which serves as a forum for conservation issues, identifying resource protection needs and providing advice, views,

and factual information on resource protection, sanctuary management, and other issues.

The sanctuary's long coastline, including four harbors and several urban areas, creates multiple complex threats to the coastal ecosystem. In addition, changes to the climate are causing sea level rise, extreme storms, and ocean acidification. ONMS will need to focus on collaborative solutions at the local/regional and national level to adapt to these changes.

The resource protection program has accomplished many important objectives over the past decade such as:

- Full implementation of the Water Quality Protection Program, developed to improve and/or protect water quality (related to urban runoff, harbors, marinas, agriculture, and rural lands), as well as strengthen coordinated regional water quality monitoring by government agencies and citizen groups.
- 20 years of implementing the Citizen Watershed Monitoring Network, a consortium of citizen (community?) monitoring groups that monitor the health of the eleven watersheds flowing into the Sanctuary. This includes Snapshot Day, First Flush and Urban Watch programs
- Effective coordination with the National Marine Fisheries Service (NMFS) and the Pacific Fishery Management Council (PFMC) to protect sensitive habitat through modifications to groundfish Essential Fish Habitat (EFH).
- Identification of sanctuary ecologically significant areas in order to characterize and map biogenic hot spots, including sensitive habitats that may require additional research and protection.
- Publication of desalination guidelines in 2010, in coordination with NMFS and California Coastal Commission, which guide the design and planning for proposed desalination projects along the shoreline of MBNMS, as well as agency environmental review and permitting. Proposed technologies such as sub-surface and open water intake/outfall pipes are addressed, which would require coordination and permit oversight to identify potentially significant impacts to marine resources.
- Participation in research and a long-range management plan for Highway 1 to reduce impacts from landslide repair and disposal activities into the sanctuary.
- Continued coordination with NOAA Office of Law Enforcement (OLE) and an officer assigned to focus on MBNMS enforcement issues.
- Facilitated ongoing communication among law enforcement entities through coordination of the Law Enforcement Technical Advisory Committee (LETAC).
- Increased field surveillance by MBNMS staff to detect prohibited activities in an effort to ensure greater protection of sanctuary resources. Field surveys have included on-the-water presence and shoreline surveys.
- Implementation of action plans addressing submerged cables, coastal erosion, and cruise ship discharges. Strategies for these issues are now incorporated into new action plans.
- Conducted socioeconomic surveys of targeted user groups (e.g., wildlife viewing operators) to gather data on the non-consumptive market value of marine wildlife and other sanctuary resources.

- Implementation of a hazardous material/emergency response program for events such as spills and vessel groundings.
- Continued collaboration with the U.S. Coast Guard (USCG) to conduct random joint inspections of cruise ships visiting Monterey to verify their adherence with sanctuary and USCG regulations.
- Implementation of a permit program to review proposed activities that could otherwise harm MBNMS resources and issue permits or other authorizations with conditions to minimize or negate impacts.
- Coordinated review of projects, plans, and permits of other agencies to minimize impacts.

### **Focus and Accomplishments of the Education and Outreach Program**

MBNMS education and outreach efforts help connect people to the marine environment and support resource protection and conservation science. With the goal to promote public awareness and understanding of our national marine sanctuaries, programs strive to empower citizens with the knowledge necessary to make informed decisions, ultimately leading to the responsible stewardship of marine ecosystems. Since the creation of two sanctuary interpretative centers, the Coastal Discovery Center in 2006 and the Sanctuary Exploration Center in 2012, hundreds of thousands of visitors have experienced education programs and interpretative exhibits focused on sanctuary research and conservation. Partnerships and collaboration have also played a key role in the development and implementation of the MBNMS educational and outreach efforts, with the sanctuary's visitor center facilities hosting numerous community partner programs, special events, film festivals, and conferences.

Overall, education and outreach programs have accomplished many important objectives of the sanctuary management plan over the past decade, increasing public awareness and providing issue-based education and programming for students and teachers. Some of the activities include:

- Hosting film festivals, science lectures, ocean fairs, and docent-led tours at our two sanctuary interpretive centers.
- Installing interpretive signs and displays at numerous state parks and along trails, beaches, and partner facilities adjacent to the sanctuary.
- Developing educational products and materials including curricula, books, brochures, posters, maps, newsletters, annual reports, videos, and an extensive website.
- Participating in public community events.
- Producing media and public relations stories, web stories, and social media content.
- Developing the SeaPhoto app for mobile devices to serve as a digital field guide to organisms seen in the sanctuary.
- Engaging with recreation, business, and hospitality sectors to expand and enhance public awareness and promoting sustainable recreation and tourism in the sanctuary.
- Producing episodes of *Your Sanctuary*, a public television series highlighting sanctuary resources, research, education, and community partnerships in ocean

protection that was broadcasted on Access Monterey Peninsula TV channel and YouTube.

- Hosting the annual Sanctuary Currents Symposium event for researchers, educators, students, and the public to learn about current research being conducted in the sanctuary to better understand sanctuary habitats and resources.
- Developing water quality products to address urban runoff and illegal pollution discharges.
- Promoting protection of endangered species, fragile habitats, and protected species through public presentations, special events, and video products.
- Developing and distributing outreach materials on important resource protection issues, such as reducing wildlife disturbances, tide pool etiquette, and addressing marine debris.
- Coordinating the volunteer interpretative programs Team OCEAN (Ocean Conservation Education Action Network) and Bay Net to educate the public about safe wildlife viewing and help prevent wildlife disturbances.
- Developing school curricula to support field trip programming, including the Multicultural Education for Resource Issues Threatening Oceans (MERITO) program and Voices of the Bay.
- Using sanctuary interpretive centers to host school field trip programs, such as beach explorations, wharf oceanography, marine debris, and plankton studies.
- Conducting in school classroom education programs, such as “Fisherman in the Classroom.”
- Supporting exposure to careers through ocean exploration and research expeditions including Nautilus Live telepresence programs with Ocean Exploration Trust and Immersion Presents with the Mystic Aquarium and Institute for Exploration.
- Engaging with academic institutions, such as Cal Poly, UC Santa Cruz, and CSUMB, to support college student internships and professional development.

### **Focus and Accomplishments of Program Operations**

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

Program operations accomplishments include:

- Developing and tracking of the MBNMS annual operating plan, and management plan to better assess milestones and needs.
- Complying with DOC/NOAA security requirements for computers, telephone systems, and associated networks to maintain a secure digital workplace.
- Facilitating geographic information systems (GIS) to enhance research and monitoring, resource protection, policy development, and education and outreach needs.
- Supporting a robust, safe dive and field operations program to better facilitate enforcement, emergency response, and research and monitoring of sanctuary resources.

- Supporting MBNMS's Sanctuary Advisory Council, working groups, and subcommittees (recruitment, meeting support, logistics, newsletters) to enhance public input into sanctuary management.
- Revising the Sanctuary Advisory Council charter to enhance meeting flow, streamline procedures, and enhance member selection processes.
- Completing the management plan review process (draft management plan, proposed regulations, and environmental assessment) as part of the sanctuary system's adaptive management model.
- Tracking and reporting management plan performance measures to aid in measuring progress to management goals.
- Supporting the development of the MBNMS Foundation to enhance sanctuary programs across education, resource protection, and research focus areas.
- Managing three staffed offices (Monterey, Santa Cruz, and San Simeon) to increase public interface with sanctuary staff and programming.
- Managing and maintaining two visitor centers and exhibits (the Sanctuary Exploration Center in Santa Cruz and the Coastal Discovery Center in San Simeon) to better engage the public, schools, and teachers.
- Supporting the human resource needs for 25 federal staff and affiliates and hundreds of volunteers required to accomplish the resource protection, education, outreach, monitoring, and citizen science activities outlined in MBNMS's management plan.

### **Public Participation and the Sanctuary Advisory Council**

The citizens of central California are politically and socially engaged on issues affecting their communities and surrounding environment, including the coast and ocean. MBNMS owes its existence largely to the dedication and determination of thousands of local citizens and elected officials who strongly advocated for its designation. Public participation permeates nearly every aspect of sanctuary management and operation, including support and management of the Sanctuary Advisory Council and its working groups, volunteering for the many programs that help MBNMS achieve its education and research missions, and participating in community festivals and symposia.

The [Sanctuary Advisory Council](#) advises the superintendent on policy issues affecting the sanctuary, and is composed of 20 voting members with alternates and eight non-voting members representing various stakeholders. The council has played a vital role in many decisions affecting the central California coast. The Sanctuary Advisory Council has three standing working groups:

**[Conservation Working Group](#):** Coordinates the efforts of existing conservation-focused organizations and helps promote and achieve comprehensive and long-lasting stewardship of MBNMS through continued advice, input, and advocacy.

**[Research Activity Panel](#):** Provides scientific advice and objective information, assists in the implementation of programs to increase our scientific understanding of the sanctuary, promotes a comprehensive understanding of existing research activities and institutions, reviews research proposals, and advises on research priorities.



**Sanctuary Tourism and Recreation Working Group:** strengthens economic partnerships with MBNMS and local businesses, and provides a forum for local businesses and MBNMS to coordinate and promote recreation and tourism opportunities in the sanctuary.

## Monterey Bay National Marine Sanctuary Setting

### *Human Environment*

#### **Regional Context**

Five counties border MBNMS: Marin, San Mateo, Santa Cruz, Monterey, and San Luis Obispo. Three additional counties, San Francisco, Santa Clara and San Benito, have watersheds draining directly into MBNMS. Each is diverse in terms of population and economic base.

The northern region borders Marin County and the San Francisco Peninsula, which 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. Coastal development 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 west toward the coast. Monterey County, in the southern region, also faces significant growth challenges. Based on 2017 census data, the largest industries in Monterey County are agriculture, forestry, fishing and hunting, health care and social assistance, and hospitality and food services. San Luis Obispo County's economy focuses on agriculture, tourism, and education. These counties face significant challenges addressing population needs and impacts to the environment. Limited infrastructure and resources (e.g., transportation, affordable housing, water, workforce, municipal budgets) to accommodate coastal communities and protect natural resources necessitate cooperation and coordination among local, state and federal government. Having a national marine sanctuary (and other state and federal protected lands and waters) in this region helps make environmental protection a priority.

The central California coastal region is a mosaic of federal, state, county, and private lands with varying protections. The management of this region is highly collaborative and often involves overlapping jurisdictions. Federal partners in the region include the United States Forest Service (USFS) and the Bureau of Land Management (BLM), both of which manage federal lands adjacent to the sanctuary. California State Parks (CSP) manages state parks and beaches adjacent to the sanctuary; California Department of Fish and Wildlife (CDFW) manages 23 state marine protected areas within sanctuary boundaries; and the California Department of Transportation (Caltrans) works closely with MBNMS staff on slide and erosion issues along the Highway 1 corridor. The aforementioned counties and cities have small parks and beaches dotting the coast. Various non-governmental organizations (NGOs) like the Elkhorn Slough Foundation, Big Sur Land Trust, The Nature Conservancy, and other private conservation groups contribute to the protections of coastal lands, the ocean, and their associated watersheds.

## Socio-Economic Environment

A rich history of human use of this region's marine resources begins with Native Americans and continues to the present. Today the sanctuary's spectacular scenery, moderate climate, abundance of marine life and relatively clean ocean waters all draw large numbers of divers, kayakers, boaters, fishers, surfers, tide poolers, and bird and mammal watchers. Coastal tourism, agriculture, education, and commercial fisheries are all pillars of the regional economy with direct links to MBNMS.

Travel and tourism is one of the most significant industries, with a total travel-spending revenue in 2017 of \$10.3 billion for the five counties adjacent to MBNMS. San Mateo leads in total spending at \$3.9 billion, followed by Monterey at \$2.8 billion and San Luis Obispo at \$1.7 billion (Dean Runyan Associates 2019). Two of the main reasons given for travel to the coastal region include natural and scenic beauty and recreational opportunities.

Agriculture is also an important industry in the region, which is a national leader in the production of artichokes, strawberries, and salad greens. In 2016, agriculture was valued at \$6 billion for the five counties adjacent to MBNMS (California Department of Food and Agriculture 2017). Monterey County, valued at \$4.25 billion (Monterey County 2016), is by far the most significant agricultural producer in the region and ranks fourth highest statewide.

The fishing industry constitutes a relatively small portion of the overall economy, both regionally and statewide. However, this industry reflects an important component to the historical, economic, and cultural fabric of the region. Most fish caught within MBNMS are landed at one of six main ports: Princeton/Half Moon Bay, Santa Cruz, Moss Landing, Monterey, Morro Bay, or Avila/Port San Luis. In 2017, more than 750 commercial vessels fished within MBNMS annually and more than 95% of the commercial landings by weight were comprised of market squid, anchovy, Dungeness crab, sablefish, hagfish, salmon, California halibut, spot prawn, thornyheads, and rockfish. In 2017, ex-vessel revenues for all species within MBNMS totaled almost \$33.3 million dollars paid to commercial fishermen in California. Additional revenue is also generated from the businesses associated with fishing operations, including food processing, marinas, maintenance operations, and equipment. In a 20-year period from 1992 (when the sanctuary was designated) to 2012, over 1.4 billion pounds of fish were landed in the ports adjacent to MBNMS (and Morro Bay-adjacent) at a value of over \$515 million.

The rich biodiversity and close proximity of the deep sea also provide unparalleled research opportunities for approximately 25 marine science institutions that, in 2014, employed more than 2,300 staff and researchers with combined annual budgets of more than \$315 million. 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.

Other MBNMS-related industries include research, aquaculture, kelp harvesting, and commercial shipping (including cruise ships). The adjacent San Francisco/Oakland

ports and harbor complex is one of the largest on the U.S. Pacific Coast with millions of tons of cargo passing under the Golden Gate Bridge annually.

### **Human History and Resource Use**

Humans settled in the vicinity of MBNMS as long as 10,000 years ago. At the time of Spanish arrival in the early 1700s, about 40 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 indigenous peoples "Costanoans," meaning "coast dwellers." Today they are known as the Ohlone, meaning "people of the west." Shell midden piles left by the Ohlone have been found at most substantial waterways and shorelines between Morro Bay and Monterey Bay, composed primarily of remains of abalone, mussels, clams, snails, chitons, limpets, and other invertebrate groups. The quantity of shells suggests that the Ohlone were "a principal control of animal population sizes" in the intertidal zone in some areas. (MBNMS 1996) The Ohlone used fire to manage terrestrial vegetation for purposes such as enhancing growth and preparing plants for harvest.

Spanish settlements arose in the late 1700s and they began to exploit both natural resources and the Ohlone. These settlers established a pastoral lifestyle and an extensive network of missions that relied heavily on livestock and servant labor. Many European traders and explorers of the late 1700s 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." (MBNMS 1996)

Ohlone populations plummeted after establishment of the missions due to introduced diseases, cultural dissolution, and exploitation by the Spanish and later Mexicans and Americans. Sweeping changes in the resulting landscape included greatly enlarged pasturelands throughout fertile drainages of MBNMS and incidental importation of many non-native grasses and other plants. The Spanish also hired imported Russian or local Ohlone hunters to hunt sea otters. These valuable pelts were exported to Asia, Europe, and elsewhere in the Americas. Sea otters became scarce around Monterey Bay by the late 1800s. The Spanish also harvested abalone for trade with northwest coast Indians.

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

In the 1850s, 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 1860s allowed for rapid transport of fresh fish. Genovese Italian immigrants established fishing settlements around Monterey Bay in the 1870s, 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 to 1930, collapsed in the 1930s, and has not yet recovered to its former size.

Several other ethnic groups harvested natural resources from the sanctuary 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 use the resources of this biologically rich region. (MBNMS 1996)

## ***Physical Environment***

### **Regional Geography**

MBNMS contains one of the world's most geologically diverse and complex seafloors and continental margins. The sanctuary is located on a plate boundary separating the North American Plate from the Pacific Plate and is marked by the San Andreas Fault system. The active tectonic region frequently experiences earthquakes, submarine landslides, turbidity currents, flood discharges, and coastal erosion.

Coastal topography of the sanctuary 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 in the sanctuary's mid-region; and predominantly 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) and Scott Creek enter Monterey Bay from these highlands through well-defined valleys as a major drainage system. Elkhorn Slough, an old river estuary occupied today only by tidal salt marshes, extends inland from Moss Landing for more than six miles (9.7 square kilometers). The broad, extensive Salinas Valley, the Gabilan Range, and the northern Santa Lucia Range are the dominant topographic features in the southern area 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 and drainage systems. From Point Sur to Morro Bay, many streams and creeks drain the southern Santa Lucia Mountains 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 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 and the Sierra Nevada and Cascade ranges into San Francisco Bay, which is the largest estuary on the west coast of North America.

## **Geology**

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 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. The San Gregorio-Palo Colorado and Monterey Bay fault zone is considered active with a 10% 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 (9.7 to 14.5 kilometers) wide. It consists of a number of relatively short fault segments potentially affecting local submarine physiography.

Sediment of the continental shelf (less than 400 feet, 121.9 meters water depth) from the northern area of MBNMS varies 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. Sediment accumulation patterns determine biological habitats. Organisms that are adapted to shifting substrate are found in dynamic areas with high sediment deposition. Organisms that depend on shelter and steady algal growth are found on rocky substrate that does not experience regular major changes.

Bluff erosion, dune erosion, and sediment input from rivers and streams are the most significant sediment sources to the continental shelf in MBNMS. The greatest concentrations of coarse sand deposits are found on the southern Monterey Bay shelf and on the shelf off the Big Sur coast. Submarine canyons, common to 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 annually, 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 MBNMS are influenced largely by the California Current and upwelling. The California Current is an eastern boundary current that is generally characterized as a broad, shallow, and slow-moving current, exhibiting high spatial and temporal variability. It is usually located several miles offshore, flowing north to south, beginning in Alaska and terminating off Baja California. 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. Several agencies and research groups are studying the physical, chemical, and biological properties of this current system and how atmospheric conditions influence oceanic conditions, which in turn affect productivity of pelagic (i.e., open water) ecosystems.

The California Current has many semi-stationary jets and eddies. Satellite imagery has shown cold filaments approximately 30 miles (48.3 kilometers) wide, extending approximately 150 miles (241.4 kilometers) 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 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 practical salinity units (psu) when upwelling is strong to 33.2 psu at non-upwelling times.

Three oceanic periods exist in the Monterey Bay area: the upwelling period from early spring to late summer; the oceanic period from late summer to early fall; and the Davidson Current period from late fall to late winter. The descriptions may be useful to describe the changing hydrographic conditions along 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 flow towards the equator is coupled with the intensification of northwesterly winds that generally parallel the central California coastline. The sudden strengthening of the northwesterly winds, usually March through 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 (50.3 meters) 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, 997.8 kilometers). Surface waters that moved seaward are replaced by deeper upwelled waters that flow shoreward and upward.

Although the seasonal changes in 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, through an eastward propagating pulse or Kelvin wave taking 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 Earth's rotation and the gravitational pull of the moon, sun and other celestial bodies. 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 (119.8 meters) were recorded within three miles (4.8 kilometers) of the Monterey Canyon head. Internal waves lose energy when they break and again at the head of the canyon. This promotes a net upward canyon flow, similar to the effects of wind-driven upwelling. Internal waves may contribute up to 30% of the nutrients assimilated by phytoplankton during periods when upwelling is absent and perhaps 10% of the required nutrients during periods of upwelling. The Monterey Bay Submarine Canyon acts as a deep-water conduit bringing offshore waters and organisms directly into the Monterey Bay and at the same time acts as a sediment basin.

## ***Natural Habitats of the Sanctuary***

### **Rocky Shores**

Rocky shores are one of the sanctuary's most accessible habitats, where at low tide, a wide diversity of organisms is exposed. The accessibility of organisms attracted early marine ecologists to develop experimental studies influencing our understanding of ecology beyond the marine realm. For example, Ed Ricketts and Jack Calvin conducted their foundational studies in intertidal ecology along the sanctuary shoreline for *Between Pacific Tides* (Ricketts 1988). Approximately 56% of MBNMS coast is rocky shore habitat. Particularly in central California, rocky shores are one of the most diverse, studied, and understood biological habitats of the world.

MBNMS has four zones of rocky intertidal organisms associated with different tidal heights. Starting from the top, the splash zone is usually exposed to air and has relatively few species. The periwinkle snail, *Littorina keenae*, is indicative of the splash zone. Microscopic algae are common in winter, 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 acorn barnacle, *Balanus glandula*, and red algae, *Endocladia muricata* and *Mastocarpus papillatus*, are indicative of this zone. The mid intertidal zone is dominated more by water and is exposed to air briefly once or twice per day and has many well-known organisms, including several species of sea stars, *Pisaster ochraceus* and *Patiria miniata*, and sea anemones, *Anthopleura xanthogrammica* and *Anthopleura elegantissima*. At wave-exposed sites, the California mussel, *Mytilus californianus*, can dominate this zone. The low intertidal zone is exposed to air only during the lowest tides and the presence of the seagrass

*Phyllospadix* is a good indicator of the mean lower low water tide level. The low intertidal zone is also where sponges and tunicates are most common.

Intertidal zonation can vary based on slope, wave exposure, orientation, and local geology. In addition to physical factors that influence patterns of intertidal zonation, biological interactions, such as predation and competition, alter zonation patterns. 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. Disturbances that open up space for colonization are caused by waves, predation, substratum weathering, exfoliation, human collection, and trampling. Disturbances are common enough that some species persist, dispersing from one patch to another as the dominant competitors crowd them out.

### Kelp Forests

Kelp provides a highly productive and diverse habitat used by numerous species, including marine mammals, fishes, other algae, and vast numbers of invertebrates. Adjacent to the rocky coastline but beyond the shore break, 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 age-structure of a kelp forest is very dynamic.

Kelp canopy cover varies seasonally. The canopy is thickest in late summer and thins or disappears in winter when large swells and old age combine to remove weakened adult algae. 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 12 inches per day. The measured productivity (per square foot of seafloor) of a kelp forest is among the highest of any natural community in the world.

Kelp forests consist of canopy layers similar to terrestrial forests. In central California, the two primary canopy forming species in kelp forests are giant kelp, *Macrocystis pyrifera* and bull kelp, *Nereocystis luetkeana*, both of which are brown seaweeds. 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 in patches along the Big Sur coastline. The understory is the layer three to six feet (1.8 meters) above the bottom of the seafloor 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 diversity 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 and free divers are attracted to kelp forests and their rich invertebrate fauna, which make dive sites in Monterey Bay and along the Big Sur coast among the most scenic in the world.

Kelp forests and their associated flora and fauna are important resources for 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, cosmetics, and other products.

### **Sandy and Mud Seafloor**

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 size groups. The lack of hard substrate and the shifting sand prevents algae from settling and therefore, these vast sandy plains appear to be lifeless deserts. However, many organisms live in the sand and mud. There are two broad zones, including a shallow region dominated by crustaceans and a deeper area dominated by sedentary polychaete worms. The crustacean zone continues through the surf zone and intertidal beach zone, areas where sediment is constantly moving around. The main crustacean groups include organisms like sand crabs (*Emerita analoga*) that burrow into the sand or are active on the surface of the sandy floor. All organisms burrow into the seafloor and flourish in wave-disturbed sandy floor. Only a few species live in relatively permanent burrows or tubes, like tube dwelling anemones (*Pachycerianthus fimbriatus*). Most species live close to the seafloor surface and do not burrow deep.

### **Estuaries**

The waters of MBNMS include the main channel of California's second largest coastal wetland, Elkhorn Slough. A slough, or estuary, is a coastal body of water connecting a watershed to the open ocean. The resulting mix of land, freshwater, and saltwater creates a mosaic of habitats and communities, changing from terrestrial to marine over small distances.

Estuaries are highly variable and are 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 with 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 live in the estuary. As the tide flows in, fresh and saltwater 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 freshwater enters the system, salinity is very low, tidal influence is minimal, and the currents are dominated by watershed input and flow downstream. In the upper region of an estuary, there is a slight 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 fine mud, and water is generally brackish (salinity 18 to 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.

Elkhorn Slough is located partially within MBNMS boundaries. It serves an important role in sustaining both resident and migratory birds, which use the resources generated by this highly productive ecosystem. In 2000, the American Bird Conservancy designated Elkhorn Slough as a Globally Important Bird Area, and it is a must-see site for avid bird watchers and visitors to Monterey Bay. Elkhorn Slough serves also as a nursery area for a number of commercially targeted flatfish species such as English sole and speckled sanddabs, and is also a popular hangout spot and haul out for a keystone species, the sea otter. Meeting all nine criteria set forth by the Ramsar Convention on Wetlands, the Elkhorn Slough was officially designated a “Wetland of International Importance” in October 2018. In addition, Elkhorn Slough National Estuarine Research Reserve is one of 29 National Estuarine Research Reserves established nationwide as field laboratories for scientific research and estuarine education. The reserve is administered by NOAA and managed by the California Department of Fish and Wildlife and is the only National Estuarine Research Reserve contiguous with a national marine sanctuary.

## **Open Ocean**

The ocean covers 70% of Earth’s surface. Of that 70%, 65% makes up the open ocean ecosystem, which typically lies well offshore where the water depth is greater than 330 feet (101 meters). Only the remaining 5% consists of the highly productive marine ecosystems we generally see highlighted in the media, such as coral reefs or kelp forests.

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, and are cooler and more nutrient rich than the western Pacific waters found along the coast of Asia. In the eastern Pacific, recirculation of nutrients from deeper waters drives phytoplankton to bloom in the upper 330 feet (101 meters) of the photic zone (also known as the epipelagic zone). Phytoplankton in turn feed zooplankton and their predators. The open ocean, or pelagic zone, is further divided into different zones based on depth: mesopelagic zone, bathypelagic zone, and abyssopelagic zone.

The deep sea is a dark and cold environment, which includes a variety of habitats from the midwater (i.e., mesopelagic zone) to the abyss (i.e., abyssopelagic zone) that are populated by a wide array of animals. The mesopelagic zone starts at 656 feet (200 meters) below the surface and extends to about 3,300 feet (1,006 meters). Available light, nutrients, and dissolved oxygen decreases and water pressure increases with depth. Mesopelagic fish and some macroinvertebrates have large and elaborate eyes allowing them to see under low-light conditions. The bathypelagic zone starts below 3,300 feet (1,006 meters) and extends to the abyss, which starts at 13,100 feet (4,000 meters). The abyss ranges to approximately 19,700 feet (6,000 meters). 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, the fishes developed other senses to attract mates, find food, and escape predators.

Bioluminescence is the production of visible light by living organisms. Most of the species living in the deep sea are bioluminescent and possess organs called photophores, which produce light from chemical reactions. Elaborate adaptation may provide many advantages in the deep sea. Deep-sea inhabitants may use bioluminescence to attract and capture prey, escape predators by scaring them or creating a diversion, or to communicate.

Plant life, including phytoplankton, needs light to thrive. However, light is absent or very low in the deep sea. After sunset, many small mesopelagic fishes and zooplanktons feed on phytoplankton by migrating from the deep sea to the surface layer. At dawn, these organisms return to the deep sea. The 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.

## Deep Sea

The continental shelf is the gradually sloping submerged margin of the continent that extends from the nearshore to the shelf break. The deep sea begins at the continental shelf break (at a depth of approximately 650 feet, or 200 meters). Beyond the shelf break, the continental slope descends more steeply to the ocean floor. In MBNMS, the outer continental shelf is relatively broad from the northern boundary to southern Monterey Bay. The shelf narrows considerably south of Monterey Bay and remains narrow throughout most of the southern portion of the sanctuary, except around Point Sur and near the southern boundary. A large portion of the shelf in the sanctuary is composed of soft-bottom habitats, which cover approximately 1,384 square miles (3,584 square kilometers) from depths of 100 – 650 feet (30 to 200 meters). Sandy bottom is generally found in shallow waters of the shelf, less than 130 feet (40 meters). The percentage of mud, silt, and clay increases as depth increases on the shelf and beyond the shelf break. The lack of hard substratum for attachment prevents algae and some invertebrates from colonizing soft-bottom habitats.

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 6,500 feet (1,981 meters) deep are not as well-known as the sedimentary invertebrate communities of the continental shelf. The most abundant

large invertebrates are sea cucumbers. The dominant invertebrates in terms of abundance are infaunal and all are 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 (3,200 meters) below the ocean surface. Cold seeps are sites where sulfide- or methane-rich fluids release from the seafloor. Specialized chemosynthetic communities are often associated with cold seeps. Unlike the other deep-sea communities that depend on food sinking from the above water column, chemosynthetic communities rely on chemical energy produced by fluid released from the seafloor. On Earth, most of the food web starts with plants dependent 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 various chemical constituents, the mechanism regulating fluid flow and the biological communities differ among the cold seeps within MBNMS.

The ecology of cold seep communities is poorly understood. Cold seep communities are composed of species found only in cold seep areas and include vesicomyid clams and vestimentiferan worms basing all or most of their nutrition on chemosynthetic production by bacteria. Seep communities can be viewed as isolated oases in a relatively energy-poor deep seafloor landscape. A variety 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 ecological processes have been addressed.

### **Submarine Canyons**

Within MBNMS, submarine canyons are prominent geomorphic features. These 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. These submarine features can have sinuous channel axes and may also have a number of branching channels, which may coincide with geologic faults. The positions of some channels of the Monterey Canyon coincide with geologic faults such as Carmel Canyon.

The deepest and largest submarine canyon on the coast of North America is the Monterey Submarine Canyon in the center of Monterey Bay. The canyon is 292 miles (469.9 kilometers) long, approximately seven miles (11.3 kilometers) wide at its widest point and has a maximum and rim to floor relief of 5,577 feet (1,699.9 meters). Numerous smaller canyons also exist in MBNMS and incise the continental shelf and slope. Canyons terminating at the shoreline are thought to be active and are 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 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 (399,975 cubic meters) of sand as well as large volumes of fine grain 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 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. Repeat bathymetric mapping using high-resolution tools and installing instruments in the canyons enables scientists to determine locations where deposition and erosion take place. These advances allow scientists 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 rockfishes 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 rockfishes in submarine canyons and other deepwater habitats. These programs typically use crewed and remotely operated (ROV) submersibles to map the substrate type and quantify the amount of rock habitat available to fish.

### **Seamounts**

Seamounts are defined as steep geologic features rising from the seafloor with a minimal elevation of 3,300 feet (1,006 meters) and a limited extent across the summit. However, 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 elongate base. Seamounts usually have volcanic origins. Estimates show more than 30,000 seamounts over 3,281 feet (1,000 meters) tall exist in the Pacific Ocean, compared to approximately 800 in the Atlantic Ocean. 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 called Taylor columns, internal wave reflection, tidally induced currents and eddies, trapped waves, and eddies shed downstream. Currents over seamounts measure up to 19 inches per second, or 0.9 knots. Evidence for concentrations of fish and zooplankton over seamounts due to enhanced primary productivity is sparse and some suggest 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 sea surface is likely an important variable that could influence water column productivity but has not yet been definitively addressed.

Davidson Seamount is reported to be relatively pristine though it is relatively close to shore and one of the largest seamounts on the West Coast. Davidson Seamount has large assemblages of corals and sponges adjacent to each other, which has not been observed at other seamounts. Many of these species are rare or newly discovered. More than 1,500 brooding female octopuses were discovered within MBNMS near Davidson Seamount using ROVs in 2018. In March 2019, the human-occupied vehicle *Alvin* discovered additional populations of brooding octopuses in the area and confirmed that warm water (up to 9.9 degrees C) is diffusing out of the seafloor. Additional research in the area is planned for 2020 and 2021.

## ***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), 29 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.

The marine mammal population likely to have grown the fastest 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 occurred at beaches near Point Piedras Blancas, from 400 individuals in 1991 to over 24,000 in 2017.

The gray whale, a common cetacean in the sanctuary, has overall increased in number over the years (approximately 3.3% 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 1999-2000, 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 resulting in reduced calf production. The cause of this 1999-2000 mortality event is not understood but it is likely environmental conditions and food availability played a role. It was suspected the gray whale population had neared or reached its carrying capacity. Coincident with this hypothesis, scientists found the amphipod prey base of gray whales in the Arctic feeding grounds had decreased in the northern Bering Sea in the previous 10 years. At the time this draft management plan was being written, another mortality event of gray whales was unfolding.

Recent raw counts data of the California sea otter have made population trends difficult to interpret. Surveys from 2010 reported a 3.6% decrease in adults from the previous year and pup production was down 11%. Between 2012 and 2013, however, otter count increased by 3.2% and pup production increased by 29%. Surveys from 2018 showed



over 2,900 sea otters from Pigeon Point to Gaviota State Park, a 14% increase from 2017 surveys. On a longer time scale, the sea otter population has increased by approximately 40% since sanctuary designation in 1992.

Cetacean research, citizen monitoring and tourist whale watching has increased in Monterey Bay since sanctuary designation. However, relatively little is known about marine mammal ecology at the northern and southern borders of the sanctuary, although MBNMS anticipates expansion of research outward from the ports and research institutes bordering Monterey Bay. One of the most important ecological questions that needs more study is the relationship between the prey resources and the marine mammal populations, as well as a better understanding of threats due to whale ship strikes and fishing gear entanglements. Monterey Bay is an active feeding area for many large cetaceans, most of which are protected, and there continues to be interaction between whales and maritime and fishing industries.

Ship-based and aerial marine mammal surveys have occurred at Davidson Seamount since 2010, most recently in 2018. Additional projects conducted at Davidson include seabird observations, plankton tows, midwater fish trawls, conductivity, temperature, and depth readings, echo-sounder data collection, sea surface collection of microplastics, and water sampling for persistent organic pollutants and harmful algal blooms (HABs). Data will be used to relate the spatial patterns of bird and mammal distribution with prey and oceanographic patterns and identify resources at risk from human threats.

### **Seabirds and Shorebirds**

The abundance and richness of birds in MBNMS reflect the diversity of habitats and productive environment that provides feeding grounds rich in plankton and fish. The sanctuary's seabird and shorebird community in the sanctuary is a mix of permanent and seasonal residents. Seabirds are those birds whose normal habitat and food source is the marine environment, whether coastal, offshore or pelagic. The majority of seabirds in this region are seasonal visitors. They can be divided into four groups by their feeding strategies, which are reflected in their anatomy, physiology, and habitat niche: (1) surface feeders, e.g., albatrosses, frigatebirds and pelicans; (2) surface swimmers/pursuit divers, e.g., alcids, cormorants, loons and grebes; (3) plunge-divers, e.g., terns, gulls, shearwaters, and pelicans; and (4) scavengers and pirates (those who steal from other birds), e.g., gulls, fulmars, and jaegers.

The term shorebird refers to any bird that relies on beaches or wetlands for feeding and nesting habitat. Shorebirds are classified by their feeding strategies. "Probers" use their long beaks to probe down into the sand for buried clams, worms, and other animals. Probers include dowitchers and sandpipers. "Gleaners" scurry back and forth along the beach, feeding on invertebrates they find on the sandy surface. Examples of gleaners include sanderlings and plovers. Elkhorn Slough attracts the third largest concentration of shorebirds in California, surpassed only by the much larger Humboldt and San Francisco bays. Shorebirds reach their greatest densities from October through March in Elkhorn Slough. This reflects the presence of individuals moving to and from northern breeding grounds as well as large numbers of over-wintering birds.

A number of ongoing multi-year studies are monitoring the distribution, abundance, and movement patterns of large pelagic animals, and seabirds. Beach COMBERS (Coastal Ocean Mammal/Bird Education and Research Surveys), Applied California Current Ecosystem Studies (ACCESS), California Cooperative Oceanic Fisheries Investigations (CalFOFI), Cornell's Lab of Ornithology's eBird, are some examples of existing monitoring programs.

## **Fishes**

The fish fauna in MBNMS constitute a diverse and significant ecological resource. At least 525 fish species are distributed across a wide variety of habitats, with each habitat having its own characteristic fish assemblage. The rockfish assemblage (*Sebastes* spp.) is iconic to this region, comprising 50+ species off California that are found in nearly all rocky habitats of the sanctuary's marine habitat, and can also be found midwater. The sanctuary is located at the southern end of the range of many species that are part of the very diverse, cold-temperate fauna that make up the Oregonian Province. Occasionally, southern species from the California Province (south of Point Conception) extend their ranges to central and northern California during warm oceanographic events, such as El Niño and the Pacific Decadal Oscillation. Biological effects from an El Niño include decreased primary productivity, which often cascades to recruitment failures of ecologically important fish species, particularly rockfishes. In addition, fish species with tropical affinities that are naturally associated with warm water (e.g., billfishes) appear further north.

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. 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 (Starr et al. 2002). 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.

## **Invertebrates**

Tens of thousands of invertebrate species occur within MBNMS, including squids, sponges, anemones, jellies, worms, corals, tunicates, snails, octopuses, clams, and arthropods such as barnacles, crabs, and spot prawns. Most invertebrate species are not harvested commercially, with the exception of squid, spot prawn, Dungeness crab, rock crab, and octopus. Structure-forming invertebrates can provide habitat for others and are generally slow growing, patchily distributed, and sensitive to disturbance.

## **Algae and Surf Grass**

Algae forms one of the primary components in the marine food web by converting solar energy using chlorophyll. The marine algae found in MBNMS are some of the most diverse in the world, from microscopic phytoplankton to surfgrasses and giant kelp, which can be found over 60 feet (18 meters) deep and can grow up to 10 inches a day (see Natural Habitats of the Sanctuary, Kelp Forests).

## Species of Special Concern

Within the sanctuary reside 30 ESA-listed endangered or threatened species. Thirteen of these have been placed on the federal list of endangered and threatened wildlife since sanctuary designation in 1992. These new listed species include green sea turtle (threatened), winter run Chinook salmon (endangered), spring run and central California Chinook salmon (threatened), central California coho salmon (endangered), central and south/central California steelhead (threatened), southern green sturgeon (threatened), longfin smelt (consideration), tidewater goby (endangered), eulachon (threatened), black abalone (endangered), California condor (endangered), marbled murrelet (threatened), short-tailed albatross (endangered), and western snowy plover (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 (slowly), California condor (slowly), and tidewater goby.

Table I-1: Special status species that may occur in MBNMS

| Common Name                   | Scientific Name                   | Listing Status   |
|-------------------------------|-----------------------------------|--|
| <b>Marine Mammals</b>         |                                   |  |
| Southern sea otter            | <i>Enhydra lutris nereis</i>      | ESA Threatened; Marine Mammal Protection Act (MMPA) Listed |
| California sea lion           | <i>Zalophus californianus</i>     | MMPA Listed  |
| Steller sea lion              | <i>Eumetopias jubatus</i>         | MMPA Listed  |
| Harbor seal                   | <i>Phoca vitulina richardii</i>   | MMPA Listed  |
| Northern fur seal             | <i>Callorhinus ursinus</i>        | MMPA Depleted  |
| Northern elephant seal        | <i>Mirounga angustirostris</i>    | MMPA Listed  |
| Guadalupe fur seal            | <i>Arctocephalus townsendi</i>    | ESA Threatened; MMPA Depleted                              |
| Harbor porpoise               | <i>Phocoena phocoena</i>          | MMPA Listed  |
| Risso's dolphin               | <i>Grampus griseus</i>            | MMPA Listed  |
| Common dolphin – long-beaked  | <i>Delphinus capensis</i>         | MMPA Listed  |
| Common dolphin – short-beaked | <i>Delphinus delphis</i>          | MMPA Listed  |
| Dall's porpoise               | <i>Phocoenoides dalli</i>         | MMPA Listed  |
| Bottlenose dolphin            | <i>Tursiops truncatus</i>         | MMPA Depleted  |
| Pacific white-sided dolphin   | <i>Lagenorhynchus obliquidens</i> | MMPA Listed  |
| Northern right whale dolphin  | <i>Lissodelphis borealis</i>      | MMPA Listed  |

|  |                                   |                               |
|--|-----------------------------------|-------------------------------|
| Minke whale  | <i>Balaenoptera acutorostrata</i> | MMPA Listed                   |
| Blue whale   | <i>Balaenoptera musculus</i>      | ESA Endangered; MMPA Depleted |
| Humpback whale   | <i>Megaptera novaeangliae</i>     | ESA Endangered; MMPA Depleted |
| Fin whale  | <i>Balaenoptera physalus</i>      | ESA Endangered; MMPA Depleted |
| Sperm whale  | <i>Physeter macrocephalus</i>     | ESA Endangered; MMPA Depleted |
| Gray whale   | <i>Eschrichtius robustus</i>      | MMPA Depleted                 |
| Killer whale   | <i>Orcinus orca</i>               | ESA Endangered; MMPA Listed   |
| North Pacific right whale  | <i>Eubalaena glacialis</i>        | ESA Endangered; MMPA Depleted |
| Sei whale  | <i>Balaenoptera borealis</i>      | ESA Endangered; MMPA Depleted |
| <b>Common Name</b>   | <b>Scientific Name</b>            | <b>Listing Status</b>         |
| Short-finned pilot whale   | <i>Globicephala macrorhynchus</i> | MMPA Listed                   |
| Baird's beaked whale   | <i>Berardius bairdii</i>          | MMPA Listed                   |
| Cuvier's beaked whale  | <i>Ziphius cavirostris</i>        | MMPA Listed                   |
| <b>Reptiles</b>  |                                   |                               |
| Leatherback sea turtle   | <i>Dermochelys coriacea</i>       | ESA Endangered                |
| Green sea turtle   | <i>Chelonia mydas</i>             | ESA Threatened                |
| Loggerhead sea turtle  | <i>Caretta caretta</i>            | ESA Endangered                |
| Olive ridley turtle  | <i>Lepidochelys olivacea</i>      | ESA Threatened                |
| <b>Fish</b>  |                                   |                               |
| Chinook salmon (Winter-Run Evolutionary Signification Unit [ESU])      | <i>Oncorhynchus tshawytscha</i>   | ESA Endangered                |
| Chinook salmon (Spring-Run ESU)  | <i>Oncorhynchus tshawytscha</i>   | ESA Threatened                |
| Chinook salmon (Central California Coast ESU)                          | <i>Oncorhynchus tshawytscha</i>   | ESA Threatened                |
| Coho salmon (Central California ESU)                                   | <i>Oncorhynchus kisutch</i>       | ESA Endangered                |
| Steelhead (Central California Coast Distinct Population Segment [DPS]) | <i>Oncorhynchus mykiss</i>        | ESA Threatened                |
| Steelhead (South Central California Coast DPS)                         | <i>Oncorhynchus mykiss</i>        | ESA Threatened                |
| North American green sturgeon (Southern DPS)                           | <i>Acipenser medirostris</i>      | ESA Threatened                |
| Longfin smelt  | <i>Spirinchus thaleichthys</i>    | ESA Consideration             |

|   |   |                       |
|---|---|-----------------------|
| Tidewater goby  | <i>Eucyclogobius newberryi</i>          | ESA Endangered        |
| Eulachon  | <i>Thaleichthys pacificus</i>           | ESA Threatened        |
| Green sturgeon  | <i>Acipenser medirostris</i>            | ESA Threatened        |
| <b>Marine Invertebrates</b>   |   |                       |
| Black abalone   | <i>Haliotis cracherodii</i>             | ESA Endangered        |
| <b>Birds</b>  |   |                       |
| California condor   | <i>Gymnogyps californianus</i>          | ESA Endangered        |
| <b>Common Name</b>  | <b>Scientific Name</b>                  | <b>Listing Status</b> |
| California least tern   | <i>Sterna antillarum browni</i>         | ESA Endangered        |
| Short-tailed albatross  | <i>Phoebastria (=Diomedea) albatrus</i> | ESA Endangered        |
| California clapper rail   | <i>Rallus longirostris obsoletus</i>    | ESA Endangered        |
| <b>Birds That Have Critical Habitat Adjacent to MBNMS and Feed in the Sanctuary</b> |   |                       |
| Marbled murrelet  | <i>Brachyramphus marmoratus</i>         | ESA Threatened        |
| Western snowy plover  | <i>Charadrius nivosus nivosus</i>       | ESA Threatened        |

## Monterey Bay National Marine Sanctuary Condition Report

The preceding sections describe the sanctuary as 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 microscopic plants to enormous blue whales. The sanctuary is home to a diversity of species including marine mammals, seabirds and shorebirds, sea turtles, fishes, invertebrates, and marine algae.

Diverse human activities put significant pressure on sanctuary resources. Some of the most prominent pressures include vessel traffic, commercial and recreational fishing, agricultural and urban runoff, harmful algal blooms, coastal development, marine debris, the introduction of non-indigenous species (i.e., introduced species), and disturbances to wildlife. In addition, larger, more global issues, such as climate change and ocean acidification, are significant areas of concern where some impacts are being detected, but long-term effects are not well understood.

NOAA uses a socioecological approach to assess, protect, and improve resources and societal well-being in national marine sanctuaries. MBNMS staff and partners in academia, the nonprofit sector, and business, as well as private citizens, use a host of observing technologies and approaches to measure and estimate the condition of natural and archaeological resources and the economic benefits of sanctuaries. Sanctuary condition reports combine the latest environmental and socioeconomic data with extensive expert input to provide the public, particularly stakeholders, with periodic updates of the status and trends for driving forces, pressures, natural and



archaeological resource conditions, and ecosystem services in national marine sanctuaries. The reports go on to describe the links between current management activities and issues of concern and the benefits of actions to resources and the public. With that information, not only is sanctuary management better prepared to respond to changing conditions with proactive management and sensible regulations, but the public is better equipped to make practical recommendations as participants in the management plan review process for their national marine sanctuaries.

Condition reports use the best available science and most recent data to assess the status of various parts of the sanctuary's ecosystem. Because of the considerable differences within the sanctuary among the estuarine, nearshore, offshore, and seamount environments, each question to determine resource status and trends is answered separately for each environment. Though many estuaries occur along the central California coastline, they are not within the sanctuary's boundaries. Elkhorn Slough is the only estuary located inside sanctuary boundaries and thus, is the focus of the estuarine environment section in the report. For condition report purposes, the nearshore environment is defined as extending from the shoreline boundary of the sanctuary (mean high water) to the 30-meter isobaths and includes the seafloor and water column. The offshore environment is defined as extending from the 30-meter isobath out to the offshore boundary of the sanctuary and includes the seafloor and water column. The seamount environment includes the seamount and surrounding seafloor and water column within the Davidson Seamount Management Zone (DSMZ). The DSMZ was added to MBNMS in November 2008 and was assessed for the first time in the [2015 condition report update](#).

The 2015 assessment of the estuarine environment of Elkhorn Slough reinforces the [2009 assessment](#) that this is an area of concern within the sanctuary. Elkhorn Slough has a history of extensive alteration of habitat structures by humans. Natural processes strongly impact water quality, habitat quality, and abundance, and the structure and health of the faunal assemblage. Continued inputs of nutrients and contaminants, especially in areas of muted tidal influence, contribute to events such as frequent hypoxia, algal blooms, and impacts to sensitive species. Historical human modifications to this system have led to substantial changes in hydrology, erosion, and sedimentation that continue to impact the abundance and quality of habitats and living resources. There is a high percentage of non-native species competing with native species and impacting ecosystem health. Some key species, such as eelgrass, native oysters, and sea otters, are showing signs of improvement. The slough is the focus of new and ongoing conservation and restoration efforts. In the coming years, restoration projects and improvements in land management practices should result in some measurable improvements in water and habitat quality in portions of the slough.

The nearshore environment is the main zone of interaction between humans and the sanctuary. This is the zone where most residents and visitors interact with sanctuary resources and where most human activities have the strongest influence. As such, this environment receives significant research and resource management attention. Habitats in less impacted areas are in good condition (e.g., off of Big Sur), but overall there are concerns about localized ongoing activities, including sand mining, coastal armoring, inputs of contaminants, and marine debris. A high percentage of the sanctuary's beaches

regularly monitored for safety of swimming received good grades in the last five years, likely due to improvements in sanitary sewer infrastructure in coastal cities. On the other hand, the nearshore waters continue to receive nutrient enrichments from land-based activity, which can intensify the effects of harmful algal blooms (HABs) on sensitive species. Decreases in persistent organic pollutants (dieldrin, dichlorodiphenyltrichloroethane [DDT], and polybrominated diphenyl ethers [PBDEs]) were observed in mussels at five locations, but there is limited information available on new pollutants, such as current-use pesticides and pharmaceuticals. Recent drastic declines in sea stars, a key species in nearshore habitats, are a concern, but causes and potential impacts on ecological function and biodiversity will take time to understand.

In the offshore environment, which extends from 30 meters depth to the seaward boundary, most of the regularly monitored key species and species assemblages appear to be stable. Pollutants (e.g., polychlorinated biphenyls [PCBs]), marine debris, and toxins from HABs were detected in some key species. There are concerns about impacts to sensitive species from human-caused noise, vessel traffic, and entanglement in lines from buoys and lost and active fishing gear. Bottom trawl fishing has decreased in intensity and spatial extent, and has changed to less damaging gear and moved to less sensitive habitats. Recovery of formerly impacted habitats and structure-forming species is expected. The recent prevalence of unusually warm water along the U.S. West Coast has altered the distribution and abundance of some temperature-sensitive species and led to stranding events for some key species; however, more time is needed to determine if this phenomenon will have any persistent impacts on key species or the structure and function of the offshore ecosystem. Impacts from climate change, including acidification, warming, and shoaling of the oxygen minimum zone, are starting to be detected, but much more research and monitoring is required to better understand and predict current and future impacts.

This first assessment of the seamount environment found benthic habitats and living resources on or near Davidson Seamount to be in good condition. Due to its depth, distance from shore, and regulatory protections, the seamount area has not been impacted by human activities to the extent of other sanctuary offshore areas. Corals, sponges, and other benthic fauna appear to be in pristine or near-pristine condition. Some threats exist, such as vessel traffic and impacts from climate change, especially ocean acidification. More research and monitoring of water quality, habitat, and living resources associated with the seamount are needed to better understand the current status and predict potential impacts of human activities and changing climate.

Overall, the updated assessment of the state of sanctuary resources indicates the sanctuary is doing quite well in comparison to other parts of the world's ocean. As of the 2015 publication of the MBNMS condition report, the abundance and diversity of wildlife seen in Monterey Bay is remarkable compared to many parts of the world and many sanctuary resources are showing relative stability or improvement. Long-term monitoring along rocky shores and in kelp forests shows that biogenic habitat, including canopy-forming kelp, understory algae, and many structure-forming invertebrates, have been generally abundant and stable. The number of native species in sanctuary habitats, one measure of biodiversity, appears to be stable with no known losses of native species. Though some non-native species are present in the sanctuary, no new introductions are

known to have occurred in any of the sanctuary's environments. Most of the sanctuary's regularly monitored key species and species assemblages appear to be stable or slightly improving in status.

Nonetheless, a main purpose of the 2015 condition assessment was to identify problems with sanctuary health so management can focus on finding opportunities to improve conditions. The findings in the 2015 update, along with information from the 2009 MBNMS condition report, were used as a tool to support the process to review and update the MBNMS management plan. This new management plan builds on the 2008 management plan, which contained a number of management actions to address issues and concerns. The plan stressed an ecosystem-based approach to management, which requires consideration of ecological interrelationships not only within the sanctuary, but also within the larger context of the California Current ecosystem.

A summary of linkages between activities from this management plan and the 2015 condition report update can be found in Appendix C.

## **Sanctuary Regulations**

All activities (e.g., fishing, boating, diving, research, and education) may be conducted in MBNMS unless prohibited or otherwise regulated by MBNMS. All activities are subject to liability for destruction, loss, or injury to MBNMS resources under Section 312 of the NMSA, as amended.

### **Scope of Regulations**

The terms of designation of MBNMS identify the following activities as subject to regulation, including prohibition, to the extent necessary and reasonable to ensure the protection and management of sanctuary resources and qualities. Complete text of the revised MBNMS terms of designation can be found in published and on-line versions of the Federal Register, 73 FR 70488.

As described in the sanctuary terms of designation, the following activities are subject to regulation:

- 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 dredged material deposited at disposal sites authorized prior to the effective date of sanctuary designation, as described in Appendix C to the regulations, 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; and
- L. Introducing or otherwise releasing from within or into the sanctuary an introduced species.

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 temporary regulation, including prohibition. A summary of prohibitions is included in Appendix D

### **Marine Zones**

Certain human activities can pose significant negative impacts to special habitats and key physical and biological resources within the sanctuary. As a result, federal, state, and local agencies have attempted to protect resources present within MBNMS by designating discrete areas (e.g., marine life protection areas, dredged material disposal sites) where human activities are controlled through special regulatory zoning and seasonal/spatial restrictions. The 6,094 square-mile sanctuary contains over 75 such marine zones which are designated by numerous agencies and may be overlapping. Approximately 82% of these zones encompass nearshore waters and are managed by NOAA, Department of Defense (DOD), CDFW, California Department of Parks and Recreation (CDPR), State and Regional Water Control Boards (SRWCB) and National Park Service (NPS). The remaining 18% of zones encompass offshore marine habitats and are managed by NOAA, USACE, USCG, DOD, and EPA. While most special zones within MBNMS are restrictive in nature, some allow uses or activities otherwise prohibited (e.g., MPWC operations, dredge spoil disposal, and jade collection).

The following identify and describe the marine regulatory zones directly managed by ONMS or incorporated by reference within sanctuary regulations (see Figure I-5):

*Jade Collection Zone:* A 2-mile stretch of coastal waters along the Big Sur coast where traditional small-scale collection of loose jade is allowed within MBNMS below mean high water. Zone regulations allow small-scale collection to support local collectors,

geologists, and artisans while protecting the mineral resources and benthic habitat of the sanctuary from systematic mining and exploitation.

*Dredged Material Disposal Zones (four zones):* Areas designated by USACE as disposal sites for dredged material free of harmful contaminants. Periodic seafloor dredging is necessary to maintain multiple channels and basins of the four small-craft harbors adjacent to the sanctuary. Without such dredging, marine sediment transport processes would fill channels and basins, effectively closing harbors to vessel traffic. Disposal of dredge spoils is highly monitored and regulated by the EPA, USACE, MBNMS, and the state of California to prevent contaminated sediments from being discharged into the sanctuary.

*Restricted Overflight Zones (four zones):* Nearshore areas over which motorized aircraft are restricted from flying below 1,000 feet (305 meters) to protect sensitive marine wildlife from visual, physical, and audible disturbance. These zones often encompass areas with high densities of marine mammals or seabirds, including key reproductive, foraging, and resting sites.

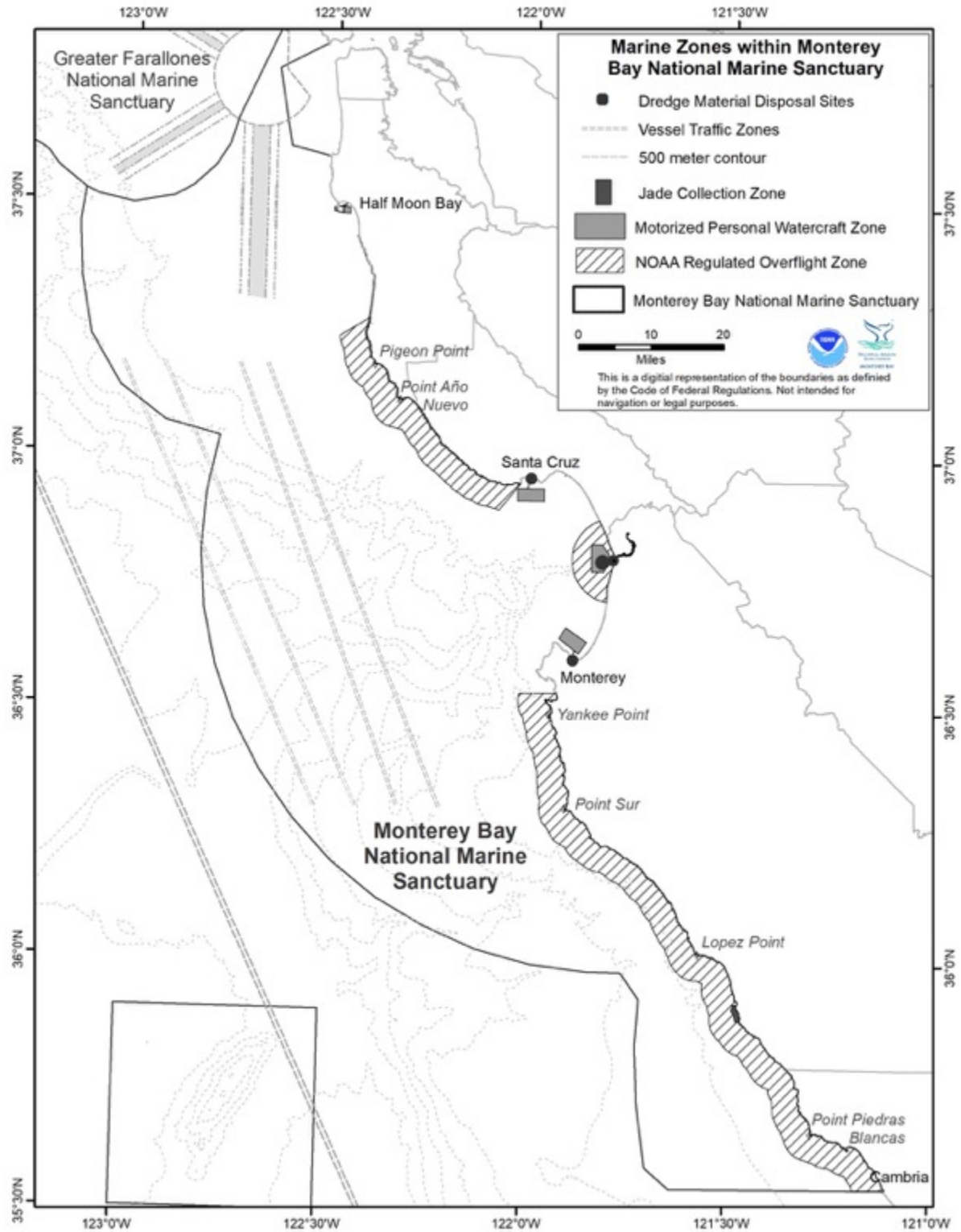
*Motorized Personal Watercraft Zones (five zones):* Areas designated for the use of MPWC. These zones allow this water-sport recreation while protecting nearshore marine life from disturbance or other injury and minimizing conflicts with other users, such as surfers and kayakers.

*Davidson Seamount Management Zone:* The DSMZ is a special zone prohibiting take or disturbance of any sanctuary resources below a depth of 3,000 feet (914 meters) of seawater. Though sanctuary regulations do not apply to fishery resources at the DSMZ, NMFS regulations prohibit fishing below 3,000 feet (914 meters) at the seamount. Thus, the two regulatory authorities establish a comprehensive prohibition against disturbance of resources on and around the underwater dormant volcano. The DSMZ was designated to protect the fragile and pristine seamount environment including rare corals and sponge communities. The DSMZ is an internationally significant study site for improving scientific understanding of deep-sea ecological communities.

*Vessel Traffic Zones:* Vessel traffic within the sanctuary was a major concern raised during the sanctuary designation process. The historical record of spills from transiting vessels is relatively small, but potential impacts could be enormous. Congress directed the Secretaries of Commerce and Transportation to evaluate potential threats from spills of oil or other hazardous materials to sanctuary resources and possible ways to reduce those threats. USCG and NOAA established a working group of [key stakeholders](#) with the goal to suggest a vessel traffic management system maximizing protection of sanctuary resources while allowing for the continuation of safe, efficient, and environmentally sound transportation. The resulting traffic separation schemes are based on an analysis of the anticipated response time for existing rescue vessels. Distances offshore of Point Sur and Pigeon Point strengthen informal patterns of current practices, and where necessary, shift certain types of vessels further offshore to reduce the level of threats to resources. Implementation is through Recommended Tracks approved by the United Nation's International Maritime Organization (IMO), an organization of the world's key shipping nations.



IR-5: MBNMS Marine Zones. Image: NOAA



## ***Regulatory Changes Proposed as Part of Management Plan Review***

As part of this management plan review process, NOAA identified proposed regulatory changes to address resource protection concerns in the sanctuary. The proposed rule, published concurrently with this draft management plan, proposes to:

1. Add a definition for the “beneficial use of dredged material” and a regulatory clarification that the existing prohibition against disposal of dredged material in Monterey Bay National Marine Sanctuary at locations other than pre-1992 disposal sites does not apply to authorization of habitat restoration projects using clean dredged sediment material because such beneficial use of dredged material would not be considered “disposal.”
2. Reduce the sea state condition required for motorized personal watercraft access to the Mavericks seasonal-conditional zone.
3. Correct an administrative error to properly document the list of exempted Department of Defense activities within the Davidson Seamount Management Zone.
4. Modify the boundaries of four existing year-round motorized personal watercraft zones.

A detailed description of these proposed regulatory changes and their anticipated environmental impacts is provided in the draft environmental assessment and notice of proposed rulemaking published concurrently with this draft management plan.

## **Implementing the Management Plan**

### **Management Plan Review**

The NMSA requires management plan review to be conducted by all national marine sanctuaries (16 U.S.C. §1434(e)) to ensure each site properly conserves and protects its living and cultural resources. Management plans describe regulations and boundaries, outline staffing and budget needs, present management actions and performance measures, and guide the development of future budgets and management activities. MBNMS last reviewed its management plan in 2008.

This management plan review fulfills the requirements of 16 U.S.C §1434(e) to (1) evaluate the substantive progress toward implementing the management plan and goals for the sanctuary, especially the effectiveness of site-specific management techniques and strategies; (2) revise the management plan and regulations as necessary to fulfill the purposes and policies of this chapter; and (3) include a prioritization of management objectives. Through the current process of reviewing the 2008 management plan, it was clear recent scientific discoveries, advancements in managing marine resources, and new resource management issues needed to be addressed/updated since 2008. Public meetings and formal public hearings on the draft management plan will help staff revise this document into a final management plan outlining the MBNMS priorities for the next several years.

The ONMS management plan review process is based on four fundamental steps:

1. Completion of the site’s condition report;
2. Public scoping meetings;

3. The prioritization of issues and development of action plans;
4. The preparation of draft and final management plans and the relevant NEPA documentation, such as an environmental impact statement or environmental assessment.

### **Condition Report**

Condition reports use the best available science and most recent data to assess the status of various parts of the sanctuary ecosystem. The [condition report](#) helps inform MBNMS staff, partners, and the public of current and emerging issues that may require additional focus in the revised management plan. See [z](#)

### **Public Scoping**

Using community-based processes and providing numerous opportunities for public input, ONMS examined current issues and threats to the resources and determined if the current management plan is adequately protecting MBNMS resources. Four scoping meetings were held between September 2015 and October 2015 and over 220 comments were received. A report summarizing the scoping results (December 11, 2015) was used by the Sanctuary Advisory Council to help them provide advice on the highest priority issues (MBNMS 2015).

### **Identification and Prioritization of Issues**

Following the public process of scoping, issues to be addressed were selected through a prioritization process. Through a binning exercise, the Sanctuary Advisory Council members provided feedback and recommendations on the resource issues and narrowed the number of issues to be addressed. The [results from this exercise](#) were published on the MBNMS website (MBNMS 2016). The resulting focused set of priority issues was presented at an April 2016 meeting of the Sanctuary Advisory Council. Following selection of the priority issues, ONMS staff developed a series of workshops and presentations for the Sanctuary Advisory Council in order to receive feedback on the scope and appropriate activities to address the issues. For three of the priority issues, working groups composed of staff, Sanctuary Advisory Council members, stakeholders, and subject experts were established to further characterize the issues and develop strategies to address them. Internal teams comprised of ONMS staff addressed other issues and developed proposed action plans and presented them to the Sanctuary Advisory Council for review.

### **Action Plan Development**

The management plan is composed of action plans developed by staff, using input from the Sanctuary Advisory Council and external experts. Within the plans are the recommended strategies and activities addressing specific priority issues identified during the scoping and prioritization phases of the management plan review.

The action plans were then brought to the Sanctuary Advisory Council in February and April of 2018 for review. The council reviewed and made recommendations on action plans and generally recommended the strategies and activities as proposed by the staff and working groups.

### **Action Plan Components**

Action plans are the means by which NOAA identifies and organizes the various management issues and the methods and tools with which to address a given issue. Each action plan has an overarching goal, an introduction of the issue and, in some cases, what has been done to date on the issue. Each plan consists of a series of strategies articulating what needs to be implemented and the various steps (activities) in the program or project. Each action plan contains a table of identified measures by which MBNMS will evaluate progress toward a desired outcome. These measures will be evaluated periodically and reported as explained in the Operations and Administration Action Plan.

### **Multidisciplinary Implementation**

The action plans are grouped by common themes: issue-based action plans and program-based action plans. Each action plan is intended to be a discrete plan addressing the issue or problem. However, all issues require common tools of research, monitoring, education, outreach, enforcement, agency coordination, and partnership development. ONMS will seek to maximize the synergy between and among plans by exploring mutual research and monitoring needs for the various action plans and combining outreach needs to common audiences. Each of the action plans requires support from all four program areas to ensure the multi-disciplinary approach of the action plans and MBNMS staff are successful in implementing sanctuary management.

### **Performance Evaluation**

Success will be evaluated through performance measures identified in each of the action plans and summarized in the Operations and Administration Action Plan. In addition to MBNMS staff members working toward the implementation of each of the action plans, MBNMS will work cooperatively with its partners, including federal, state, and local agencies and non-governmental organizations, as well as the Sanctuary Advisory Council and its working groups. Successful implementation of previous management plans relied on stakeholder and partnership coordination and collaboration, which will continue as MBNMS addresses the new and continued marine management issues outlined in this management plan.

### **Action Plan Prioritization**

The action plans and strategies in this management plan comprise a body of work that is well beyond the standard of effective management and if fully implemented would require resources well beyond what is currently available to ONMS. ONMS staff worked with the Sanctuary Advisory Council and upper leadership to execute prioritization of the issues in order to identify the order in which to implement action plans. 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 occur at different stages based on urgency, benefit to sanctuary resources, and resource availability.

## Management Plan Implementation and Funding Scenarios

The following table (Table I-2) provides an outline of how the various action plans and strategies in the management plan will be implemented. The implementation of these new action plans and strategies depends on various factors including:

- Status of strategy implementation;
- Level of implementation (with federal funding);
- Level of implementation with a 5% per year increase in funding;
- Level of implementation with a 5% decrease in funding;
- Coordination level necessary with partners for implementation; and
- Funding source for strategy implementation.

The current status column indicates the amount of work already completed on any given strategy at the time of the new management plan's release. Some strategies and activities from the 2008 plan are rolling over into this new plan, so will reflect partial implementation, while other strategies are completely new and will not be initiated until the future.

The level of implementation indicates the priority assigned to a strategy or action plan and subsequent level of effort that could be put into it, based on level funding. The table outlines the priority level (high, medium, or low) of the action and identifies the likelihood how increases or decreases in resources would affect the level of implementation possible for each strategy or action plan.

Implementing most of the strategies in this management plan will require input or coordination from partners, particularly other government agencies, research institutions, and non-government organizations. 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 (federal) ONMS funds and funding from external sources such as grants, Monterey Bay National Marine Sanctuary Foundation, California Marine Sanctuary Foundation, or in-kind work from partner agencies. The table highlights the probable source of funding, primarily internal, external, or a mix of funding sources.



Table I-2: Implementation Table

Key:

**Strategy status:**

- – Existing w/o significant modification
- ◐ – Existing w/ significant modification
- – New or future (not implemented)

**Implementation (w/ federal funding):**

- H – High
- M – Medium
- L – Low

**Partnership coordination:**

- – Not possible w/o partners
- ◐ – Significant reliance on partners
- – Little reliance on partners

**Funding Sources:**

- – External (e.g. Grants)
- ◐ – Internal and External
- – Internal

|   | Strategy Status | Implementation Level Funding | Implementation 5% Per Year Increase | Implementation 5% Decrease | Partnership Coordination | Internal/External Funding Sources |
|---|-----------------|------------------------------|-------------------------------------|----------------------------|--------------------------|-----------------------------------|
| <b>ISSUE-BASED ACTION PLANS</b>   |                 |                              |                                     |                            |                          |                                   |
| <b>Climate Change</b>   |                 |                              |                                     |                            |                          |                                   |
| Strategy CC-1: Develop capacity to address coastal resilience and adaptation planning | ○               | M                            | M                                   | M                          | ●                        | ◐                                 |
| Strategy CC-2: Reduce greenhouse gas emissions  | ○               | M                            | M                                   | M                          | ○                        | ○                                 |
| Strategy CC-3: Communicate ocean-climate impacts and solutions                        | ○               | L                            | L                                   | L                          | ○                        | ○                                 |
| Strategy CC-4: Implement coastal sediment management plans                            | ○               | H                            | H                                   | H                          | ●                        | ●                                 |
| Strategy CC-5: Track and share ocean acidification research                           | ◐               | L                            | L                                   | L                          | ◐                        | ○                                 |
| <b>Coastal Erosion and Sediment Management</b>  |                 |                              |                                     |                            |                          |                                   |
| Strategy CESM-1: Track progress on coastal sediment management plans for MBNMS        | ◐               | L                            | L                                   | L                          | ●                        | ○                                 |
| Strategy CESM-2: Collaborate on land management plan for CEMEX site                   | ○               | L                            | L                                   | L                          | ●                        | ○                                 |
| Strategy CESM-3: Implement site-specific beach nourishment programs                   | ●               | L                            | L                                   | L                          | ●                        | ◐                                 |

|   | Strategy Status | Implementation Level Funding | Implementation 5% Per Year Increase | Implementation 5% Decrease | Partnership Coordination | Internal/External Funding Sources |
|---|-----------------|------------------------------|-------------------------------------|----------------------------|--------------------------|-----------------------------------|
| Strategy CESM-4: Coordinate with regulatory agencies to determine appropriate disposal of dredge material   | ●               | L                            | L                                   | L                          | ○                        | ○                                 |
| Strategy CESM-5: Track and reduce coastal armoring  | ◐               | L                            | L                                   | L                          | ○                        | ○                                 |
| Strategy CESM-6: Reduce impacts to sanctuary resources due to landslides and subsequent emergency responses | ●               | L                            | L                                   | L                          | ○                        | ○                                 |
| Strategy CESM-7: Reduce impacts to sanctuary resources due to anthropogenic coastal changes to river mouths | ◐               | L                            | L                                   | L                          | ○                        | ○                                 |
| Davidson Seamount   |                 |                              |                                     |                            |                          |                                   |
| Strategy DS-1: Conduct site characterizations   | ●               | H                            | H                                   | M                          | ●                        | ●                                 |
| Strategy DS-2: Conduct ecological processes investigations  | ●               | M                            | H                                   | M                          | ●                        | ●                                 |
| Strategy DS-3: Conduct seamount education and outreach initiatives  | ◐               | M                            | H                                   | M                          | ○                        | ◐                                 |
| Emerging Issues   |                 |                              |                                     |                            |                          |                                   |
| Strategy EI-1: Develop process to identify and track emerging issues  | ●               | H                            | H                                   | H                          | ◐                        | ○                                 |
| Strategy EI-2: Develop process to address emerging issues   | ●               | M                            | M                                   | M                          | ◐                        | ○                                 |
| Introduced Species  |                 |                              |                                     |                            |                          |                                   |
| Strategy IS-1: Manage pathways and promote prevention   | ●               | L                            | L                                   | L                          | ●                        | ◐                                 |

|   | Strategy Status | Implementation Level Funding | Implementation 5% Per Year Increase | Implementation 5% Decrease | Partnership Coordination | Internal/External Funding Sources |
|---|-----------------|------------------------------|-------------------------------------|----------------------------|--------------------------|-----------------------------------|
| Strategy IS-2: Promote early detection and rapid response   | ●               | L                            | L                                   | L                          | ●                        | ●                                 |
| Strategy IS-3: Implement eradication or control   | ●               | M                            | H                                   | L                          | ●                        | ●                                 |
| Strategy IS-4: Sustain research and monitoring  | ●               | H                            | H                                   | H                          | ●                        | ●                                 |
| Strategy IS-5: Implement restoration  | ○               | L                            | L                                   | L                          | ●                        | ●                                 |
| <b>Marine Debris</b>  |                 |                              |                                     |                            |                          |                                   |
| Strategy MD-1: Assess scope and scale of marine debris  | ●               | M                            | H                                   | M                          | ●                        | ●                                 |
| Strategy MD-2: Foster public participation and support policies leading to reduced marine debris  | ○               | M                            | M                                   | L                          | ●                        | ●                                 |
| Strategy MD-3: Reduce marine debris threats by removing the debris and preventing point source inputs   | ●               | M                            | H                                   | M                          | ●                        | ○                                 |
| <b>Water Quality Protection Program Strategies</b>  |                 |                              |                                     |                            |                          |                                   |
| Strategy WQ-1: Facilitate and coordinate regional efforts to improve water quality through the Water Quality Protection Program Committee (and MOA), Agriculture Water Quality Alliance (AWQA), storm water programs, and Integrated Regional Water Management programs | ●               | M                            | M                                   | M                          | ●                        | ●                                 |
| Strategy WQ-2: Understand the land-sea connection   | ●               | M                            | H                                   | L                          | ●                        | ●                                 |
| Strategy WQ-3: Quantify effectiveness of management practices   | ●               | L                            | M                                   | L                          | ●                        | ●                                 |

|  | Strategy Status | Implementation Level Funding | Implementation 5% Per Year Increase | Implementation 5% Decrease | Partnership Coordination | Internal/External Funding Sources |
|--|-----------------|------------------------------|-------------------------------------|----------------------------|--------------------------|-----------------------------------|
| Strategy WQ-4: Monitor and reduce pollutant loads flowing into MBNMS   | ●               | L                            | M                                   | L                          | ●                        | ●                                 |
| Strategy WQ-5: Promote public engagement and stewardship through citizen science monitoring programs and other Water Quality Protection Program (WQPP) efforts | ●               | H                            | H                                   | L                          | ○                        | ○                                 |
| Strategy WQ-6: Communicate findings of projects and monitoring conducted by the WQPP   | ●               | H                            | H                                   | M                          | ○                        | ○                                 |
| <b>Wildlife Disturbance</b>  |                 |                              |                                     |                            |                          |                                   |
| Strategy WD-1: Mitigate wildlife disturbance from marine vessels and shore-based activities  | ●               | M                            | H                                   | M                          | ●                        | ●                                 |
| Strategy WD-2: Mitigate wildlife disturbance from aircraft   | ●               | M                            | M                                   | M                          | ●                        | ●                                 |
| Strategy WD-3: Develop acoustic baseline profiles within MBNMS   | ○               | H                            | H                                   | M                          | ●                        | ●                                 |
| Strategy WD-4: Reduce underwater low-frequency mechanical sound emissions  | ○               | M                            | M                                   | M                          | ●                        | ●                                 |
| Strategy WD-5: Use administrative methods to reduce wildlife disturbance   | ●               | H                            | H                                   | H                          | ○                        | ○                                 |
| Strategy WD-6: Use law enforcement resources to reduce wildlife disturbance  | ●               | M                            | H                                   | M                          | ●                        | ●                                 |
| Strategy WD-7: Reduce the risk of wildlife entanglement in fishing gear  | ○               | H                            | H                                   | H                          | ●                        | ●                                 |
| Strategy WD-8: Respond to wildlife entangled in fishing gear   | ○               | H                            | H                                   | M                          | ●                        | ●                                 |
| <b>PROGRAM-BASED ACTION PLANS</b>  |                 |                              |                                     |                            |                          |                                   |

|  | Strategy Status | Implementation Level Funding | Implementation 5% Per Year Increase | Implementation 5% Decrease | Partnership Coordination | Internal/External Funding Sources |
|--|-----------------|------------------------------|-------------------------------------|----------------------------|--------------------------|-----------------------------------|
| <b>Education, Outreach, and Communications</b>   |                 |                              |                                     |                            |                          |                                   |
| Strategy EO-1: Coordinate education programs through sanctuary visitor centers   | ●               | H                            | H                                   | H                          | ►                        | ►                                 |
| Strategy EO-2: Enhance sanctuary interpretation and outreach programs  | ●               | H                            | H                                   | H                          | ►                        | ►                                 |
| Strategy EO-3: Promote public engagement and stewardship through citizen science monitoring programs                   | ►               | L                            | M                                   | L                          | ●                        | ●                                 |
| Strategy EO-4: Maintain and develop sanctuary-wide exhibits and interpretive signage                                   | ►               | M                            | M                                   | L                          | ►                        | ●                                 |
| Strategy EO-5: Promote government and community relations  | ●               | M                            | M                                   | M                          | ●                        | ○                                 |
| Strategy EO-6: Increase awareness of sanctuary through effective media and communication tools                         | ●               | M                            | M                                   | L                          | ►                        | ○                                 |
| Strategy EO-7: Engage in local, regional, and national collaborations to leverage education and outreach opportunities | ●               | L                            | M                                   | L                          | ●                        | ○                                 |
| Strategy EO-8: Evaluate effectiveness of sanctuary education and outreach efforts                                      | ►               | M                            | M                                   | L                          | ○                        | ○                                 |
| <b>Marine Spatial Planning</b>   |                 |                              |                                     |                            |                          |                                   |
| Strategy MSP-1: Implement Sanctuary Ecologically Significant Areas (SESAs)   | ○               | M                            | M                                   | M                          | ►                        | ►                                 |
| Strategy MSP-2: Track and monitor vessel traffic compliance  | ►               | M                            | M                                   | M                          | ►                        | ►                                 |
| Strategy MSP-3: Collaborate on fishery management issues   | ○               | H                            | H                                   | H                          | ►                        | ○                                 |
| Strategy MSP-4: Motorized personal water craft   | ○               | M                            | M                                   | M                          | ○                        | ○                                 |



|  | Strategy Status | Implementation Level Funding | Implementation 5% Per Year Increase | Implementation 5% Decrease | Partnership Coordination | Internal/External Funding Sources |
|--|-----------------|------------------------------|-------------------------------------|----------------------------|--------------------------|-----------------------------------|
| Strategy MSP-5: Coordinate regionally, nationally, and internationally on MPAs                     | ○               | L                            | L                                   | L                          | ○                        | ○                                 |
| Strategy MSP-6: Aircraft overflight zones  | ◐               | L                            | L                                   | L                          | ○                        | ○                                 |
| Strategy MSP-7: Track and respond to offshore wind and wave energy proposals                       | ○               | L                            | L                                   | L                          | ●                        | ◐                                 |
| Strategy MSP-8: Assess use of artificial reefs for recreation, restoration, or other uses in MBNMS | ○               | L                            | L                                   | L                          | ●                        | ◐                                 |
| Maritime Heritage  |                 |                              |                                     |                            |                          |                                   |
| Strategy MH-1: Maritime heritage program development   | ●               | H                            | H                                   | M                          | ●                        | ◐                                 |
| Strategy MH-2: Threat assessment for shipwrecks and submerged structures                           | ●               | M                            | M                                   | M                          | ●                        | ◐                                 |
| Strategy MH-3: Protect and manage submerged archaeological resources                               | ●               | L                            | L                                   | L                          | ●                        | ◐                                 |
| Strategy MH-4: Develop maritime cultural landscape-focused education and outreach programs         | ●               | M                            | M                                   | L                          | ●                        | ◐                                 |
| Operations and Administration  |                 |                              |                                     |                            |                          |                                   |
| Strategy OA-1: Management of MBNMS budget  | ●               | H                            | H                                   | H                          | ○                        | ○                                 |
| Strategy OA-2: Support management priorities   | ●               | H                            | H                                   | H                          | ◐                        | ◐                                 |
| Strategy OA-3: Coordinate and support Sanctuary Advisory Council                                   | ●               | H                            | H                                   | H                          | ●                        | ○                                 |
| Strategy OA-4: Support training of MBNMS staff and maintain facilities                             | ●               | H                            | H                                   | H                          | ○                        | ◐                                 |

|  | Strategy Status | Implementation Level Funding | Implementation 5% Per Year Increase | Implementation 5% Decrease | Partnership Coordination | Internal/External Funding Sources |
|--|-----------------|------------------------------|-------------------------------------|----------------------------|--------------------------|-----------------------------------|
| Strategy OA-5: Oversee MBNMS facilities  | ►               | H                            | H                                   | H                          | ○                        | ○                                 |
| Strategy OA-6: Facilitate field operations   | ►               | H                            | H                                   | H                          | ►                        | ►                                 |
| Strategy OA-7: Provide general administrative support  | ●               | H                            | H                                   | H                          | ○                        | ○                                 |
| Strategy OA-8: Administer human resources  | ●               | H                            | H                                   | H                          | ○                        | ○                                 |
| Research and Monitoring  |                 |                              |                                     |                            |                          |                                   |
| Strategy RM-1: Characterize biological and physical features in MBNMS  | ○               | H                            | H                                   | H                          | ●                        | ►                                 |
| Strategy RM-2: Maintain and expand the Sanctuary Integrated Monitoring Network (SIMoN)   | ►               | H                            | H                                   | M                          | ●                        | ►                                 |
| Strategy RM-3: Support science focused on priority sanctuary needs   | ○               | H                            | H                                   | H                          | ●                        | ●                                 |
| Strategy RM-4: Facilitate the flow of science information among academic institutions, government agencies, and other institutions | ○               | H                            | H                                   | H                          | ●                        | ○                                 |
| Strategy RM-5: Coordinate with and participate in implementing research components of ONMS and West Coast Regional Office          | ○               | M                            | H                                   | M                          | ►                        | ►                                 |
| Strategy RM-6: Coordinate with and participate in implementing policies of ONMS Conservation Science Program                       | ○               | M                            | H                                   | M                          | ►                        | ○                                 |
| Strategy RM-7: Interpret select technical science information  | ○               | H                            | H                                   | H                          | ►                        | ○                                 |
| Resource Protection  |                 |                              |                                     |                            |                          |                                   |

|   | Strategy Status | Implementation Level Funding | Implementation 5% Per Year Increase | Implementation 5% Decrease | Partnership Coordination | Internal/External Funding Sources |
|---|-----------------|------------------------------|-------------------------------------|----------------------------|--------------------------|-----------------------------------|
| Strategy RP-1: Build partnerships and leverage opportunities for protecting sanctuary wildlife, habitats, qualities, and cultural resources through collaborative planning and management | ►               | H                            | H                                   | H                          | ●                        | ►                                 |
| Strategy RP-2: Enhance socioeconomic program through collaboration with ONMS headquarters socioeconomic team  | ○               | L                            | L                                   | L                          | ►                        | ○                                 |
| Strategy RP-3: Maintain and enhance permitting and environmental review program   | ●               | M                            | M                                   | M                          | ○                        | ►                                 |
| Strategy RP-4: Review projects, plans, and permits of other agencies  | ●               | L                            | L                                   | L                          | ○                        | ►                                 |
| Strategy RP-5: Implement enforcement programs   | ►               | L                            | L                                   | L                          | ●                        | ○                                 |
| Strategy RP-6: Interpret and distribute resource protection information   | ►               | L                            | L                                   | L                          | ○                        | ○                                 |
| Strategy RP-7: Coordinate resource protection programs including interpretive enforcement and citizen science programs  | ►               | M                            | M                                   | M                          | ►                        | ●                                 |
| Strategy RP-8: Coordinate with and participate in implementing resource protection components of ONMS West Coast Regional Office  | ●               | L                            | L                                   | L                          | ○                        | ○                                 |
| Strategy RP-9: Coordinate with and participate in implementing policies and programs of ONMS  | ●               | L                            | L                                   | L                          | ○                        | ○                                 |
| Strategy RP-10: Review and revise the sanctuary's spill response plan and emergency response information in order to be prepared to respond to an incident                                | ●               | L                            | L                                   | L                          | ○                        | ○                                 |
| Strategy RP-11: Develop and implement restoration and recovery plans to address habitat damages and endangered species  | ●               | M                            | M                                   | M                          | ○                        | ○                                 |

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## SECTION 2: ISSUE BASED ACTION PLANS



- Climate Change Action Plan
- Coastal Erosion and Sediment Management Action Plan
- Davidson Seamount Action Plan
- Emerging Issues Action Plan
- Introduced Species Action Plan
- Marine Debris Action Plan
- Water Quality Protection Program Action Plan
- Wildlife Disturbance Action Plan

Images from left to right:

Members of the West Coast Entangled Whale Response Network practice their line grappling and release techniques. Photo: Nicole Capps/NOAA

Example of invasive Bryozoan surrounding pier pilings in Elkhorn Slough. Photo: NOAA

Coastal armoring on Del Monte Beach. Photo: NOAA



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## Climate Change Action Plan

**Goal:** Address coastal resilience, climate adaptation, and ocean acidification through capacity building and collaborative partnerships.

### ***Introduction***

The waters of MBNMS, as well as surrounding coastal areas and communities, are experiencing the effects of climate-related stressors (e.g., sea level rise, extreme storms, and ocean acidification). These stressors are expected to worsen over the coming decades. Through regional collaboration and coordination, coastal communities are preparing for the effects of increasing greenhouse gas emissions, increased levels of ocean carbon dioxide (CO<sub>2</sub>) and ocean acidification. Climate change is a global problem requiring solutions at many levels. This action plan focuses on the activities needed at the local/regional level to contribute to the understanding of and response to climate change.

MBNMS staff have worked on a number of climate change projects in recent years, including coordinating a set of collaborative workshops for regional public works staff, developing a West Coast action plan on ocean acidification, and contributing to a report clarifying the benefits, costs, and effectiveness of a range of erosion mitigation management measures for the entire California shoreline. Staff will continue to work with other West Coast national marine sanctuaries and partners to integrate coastal resilience adaptation planning, climate change monitoring, education, and adaptation into sanctuary management through the following five strategies.

### ***Strategy CC-1: Address coastal resilience and adaptation planning***

Addressing coastal resilience and developing adaptations to reduce effects from climate change has been worked on collaboratively over the past decade (Abeles 2011). ONMS has worked across the organization and with partners as they implement the Climate Smart Conservation Project, an effort to integrate climate change mitigation, monitoring, education, and adaptation into sanctuary management.

**Activity 1.1:** Conduct vulnerability assessment stakeholder workshop. Modeling from the Greater Farallones National Marine Sanctuary vulnerability assessment, MBNMS staff will coordinate a science-based effort to identify how and why focal resources (habitats, species, and ecosystem services) across the Central California coast and ocean region are likely to be affected by future climate/ocean conditions. An outcome will be climate indicators for MBNMS that link to regional indicators (e.g., ocean acidification, sea surface temperature) for focused research and monitoring across the region to detect climate effects.

**Activity 1.2:** Develop a vulnerability assessment report. Using the information from the stakeholder workshop, provide expert-driven, scientifically sound assessments to

enable marine resource managers to respond to, plan for, and manage for the impacts of climate change to habitats, species, and ecosystem services within the region.

**Activity 1.3:** Develop a climate adaptation plan. The plan will identify actions to address specific aspects of MBNMS resources vulnerable to climate change stressors and to build adaptive capacity. The plan will lay the foundation for implementing management actions to achieve the action plan's vision of a healthier central California coast and ocean that is more resilient to climate change. By implementing living shorelines, promoting education, protecting and restoring habitat, limiting human disturbance, eliminating invasive species to the extent possible, and investing in science needs, the sanctuary can effectively enhance resource resilience to climate impacts and ensure the health and viability of the sanctuary's natural resources.

### ***Strategy CC-2: Reduce greenhouse gas emissions***

As part of the sanctuary's mission to reduce its carbon footprint, MBNMS has conducted an annual emissions inventory. This approach will be used for the current sanctuary offices, visitor centers, and cars and other transportation. Emissions will be measured for energy, transportation, waste, and water use and tallied up annually for comparison.

**Activity 2.1:** Complete an annual emissions inventory for MBNMS facilities and operations. The emissions inventory is the first step in taking a baseline on the sanctuary's use of cars and travel, use of energy in offices and other facilities, and reduction of waste with on-site recycling and composting, as well as water conservation.

**Activity 2.2:** Develop, implement, and evaluate a green operations plan. The assessment will yield areas in which MBNMS can improve. Staff will need to develop and implement a green operations plan to address, where it can, transportation management, energy efficiency, waste management, water management, and education and outreach, with the goal of ultimately reducing the sanctuary's carbon footprint. Implementation strategies and assessment will be included in the plan.

### ***Strategy CC-3: Communicate ocean-climate impacts and solutions***

MBNMS will develop a variety of education resources for the public to interpret the effects of climate impacts on the ocean and provide ideas and solutions to reduce impacts.

**Activity 3.1:** Develop an ocean climate education plan outlining future sanctuary outreach efforts to address a changing ocean climate, including ocean acidification, sea level rise, and strengthening coastal resilience.

**Activity 3.2:** Use NOAA-developed curriculum resources for K-12 students through visitor center education programs highlighting emerging ocean issues such as climate change, ocean acidification, and rising sea levels.

**Activity 3.3:** Maintain and improve sanctuary visitor center-based exhibits for interpretation of sanctuary resources, research, and ecosystem protection issues (e.g., ocean acidification, harmful algal blooms, climate change, sea level rise, water quality, marine debris, wildlife disturbance).

**Activity 3.4:** Participate in ongoing ONMS Climate Committee and West Coast Region efforts, as needed.

### ***Strategy CC-4: Implement Coastal Regional Sediment Management Plans (CRSMP)***

ONMS and partners have developed two regional coastal sediment management plans, for southern Monterey Bay (ESA PWA 2012) and for the Santa Cruz Littoral Cell. The plan's objectives are to restore, preserve, and maintain coastal beaches, enhance sustainable recreation and tourism, enhance public safety and access, and identify areas that could benefit from restoration.

**Activity 4.1:** Continue to participate in planning for and support projects to restore natural sources of sediment. For example, Elkhorn Slough has a scouring/erosion issue and could benefit from placement of clean sediment in eroded areas.

**Activity 4.2:** Work with partners to identify components supporting site-specific adaptation actions, such as managed retreat and rolling easements and reduce coastal armoring. There are a number of areas along the coast that are heavily impacted by erosion. The CRSMPs lay out ideas for management solutions on a case by case basis.

### ***Strategy CC-5: Track and share ocean acidification research***

Oceanic and coastal waters are expected to become more acidic as pH lowers in response to increased concentrations of atmospheric carbon dioxide settling in the ocean. Current knowledge is insufficient to be certain how pH will change in MBNMS (Lott 2011). However, research is critical, as this phenomenon is likely to decrease the availability of chemical building blocks for marine organisms that use structural components made out of calcium carbonate (e.g., shells, spines, bones). Ocean acidification leads to decreased shell growth in key species (e.g., sea urchins, mussels, oysters, abalone, and crabs) making animals more susceptible to predation or mortality at early life stages. It also decreases skeleton production of deep-sea corals and hydrocorals. As deeper water tends to be more acidic naturally, deep-sea corals may be among the first to experience the deleterious effects of ocean acidification. The larval and juvenile stages of many marine organisms rely on calcium structures and will be more susceptible to the effects of ocean acidification due to their small size. In addition, there is concern for negative effects on shell-building plankton at the base of the food web.

**Activity 5.1:** Collaborate with partners to monitor changes in pH and effects on organisms and promote sharing of data and information.

### ***Relevant strategies/activities located elsewhere within this management plan:***

Activity CC-3.1 → Education, Outreach, and Communication Activity 1.3

Activity CC-3.2 → Education, Outreach, and Communication Activity 1.3

Activity CC-3.3 → Education, Outreach, and Communication Activity 4.3

### ***Potential Partners***

Ocean Protection Council, California Department of Fish and Wildlife, U.S. Fish and Wildlife, California Coastal Commission, California State Parks, National Marine Fisheries Service, Monterey Bay National Marine Sanctuary Research Activity Panel, citizen science monitoring groups, nonprofit organizations, Monterey Bay Aquarium, Monterey Bay Aquarium Research Institute, Moss Landing Marine Labs, University of California Santa Cruz.

**Climate Change Action Plan Goal:** Address coastal resilience, climate adaptation, and ocean acidification through capacity building and collaborative partnerships.

**Performance Measures Table**

| Strategy Title   | Desired Outcome (Objective)  | Output Measure                            | Who Measures  | Timeline               |
|--|--|---|---|------------------------|
| Strategy CC-1:<br>Address coastal resilience and adaptation planning | Identification of coastal and ocean resources likely to be affected by future climate conditions | Vulnerability assessment workshop         | Project Coordinator<br>Research Coordinator                     | Annual Year 1-2        |
|  |  | Vulnerability assessment report published | Climate Project Coordinator                                     | Year 3                 |
| Strategy CC-2:<br>Reduce greenhouse gas emissions                    | Identification of MBNMS's carbon footprint   | Emissions inventory                       | Climate Project Coordinator                                     | Year 3                 |
|  |  | Green operations plan                     | Climate Project Coordinator                                     | Year 4                 |
|  | Implementation of plan to reduce emissions   | Annual progress report                    | Climate Project Coordinator                                     | Annually, after year 4 |
| Strategy CC-3:<br>Communicate ocean-climate impacts and solutions    | Resources developed for public awareness of ocean and coastal climate issues                     | Ocean climate education plan              | Education & Outreach Coordinator<br>Climate Project Coordinator | Year 2-3               |



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## Coastal Erosion and Sediment Management Action Plan

**Goal:** Reduce human-caused coastal erosion and collaborate with local, state, and federal agencies to address and restore sediment balance in nearshore habitats throughout MBNMS.

### *Introduction*

The natural shoreline of MBNMS has been altered by humans conducting activities such as coastal armoring, mining operations, building breakwaters, and altering streams and rivers. These activities limit or preclude the natural flow of sediments. Eighty-five percent of the California coast experiences active erosion, and southern Monterey Bay experiences the highest erosion rates in California. Many beaches have lost their width and valuable sand, placing coastal infrastructure (roads, buildings, and habitats) at risk. Impacts are both site-specific and cumulative. Some mitigation can be done through nourishing eroded beaches through use of clean dredged sand from harbors.

### **Coastal Regional Sediment Management Plans**

A coastal regional sediment management plan (CRSMP) is a consensus-driven guidance and policy document for specific areas of the California coast. These plans present ways to: restore and maintain coastal beaches and other critical areas with sediment deficit; reduce the proliferation of protective shoreline structures (which exacerbate erosion); sustain recreation and tourism; enhance public safety and access; and restore coastal sandy habitats.

A littoral cell is a coastal compartment that contains a complete cycle of sedimentation including sources, transport paths, and sinks. A CRSMP compiles the best available data on sources of sediment inputs into the littoral cell (e.g., rivers, bluff erosion), sediment sinks (e.g. harbors, submarine canyons), shoreline erosion rates, threatened infrastructure, erosion hotspots) and recommends future regional and site-specific strategies managing and responding to these issues to best protect coastal resources and infrastructure.

The coastal regional sediment management plan for southern Monterey Bay was completed in November 2008 and the coastal regional sediment management plan for the Santa Cruz Littoral Cell was completed in September 2015. MBNMS will continue to implement and support strategies outlined in the plans, addressing issues such as coastal erosion, coastal armoring, sand mining, and beach nourishment. These are described in the following paragraphs, along with additional issues affecting coastal processes such as beach nourishment, dredge disposal, landslides, and lagoon and river mouth breaching.

### ***Sand Mining***

One of the key recommendations included in the 2008 Southern Monterey Bay CRSMP was to eliminate the removal of sand from the beach at Marina. The large extraction of beach sand permanently removes sediment that would otherwise feed beaches elsewhere along southern Monterey Bay. If this sand is released and subsequently transported alongshore, it could provide a significant additional buffer to dune erosion

by waves. For example, the beach in front of the Sanctuary Beach Resort and the Marina Coast Water District buildings are critical erosion sites and would eventually benefit as the sand migrates.

In March 2016, the California Coastal Commission issued a [notice to cease and desist](#) to the owner of the last remaining coastal sand mine located in the U.S. In July 2017, all parties, including the California State Lands Commission and the city of Marina, signed a settlement agreement stipulating closure of the plant by December 31, 2020. In addition, the property will be transferred to a nonprofit or government entity to hold and manage the property primarily for conservation purposes, with the only other allowable uses being for low-impact, passive recreation purposes or activities, public access, public education, and removal activities to restore native habitat. MBNMS is a participant in the community visioning for this property transfer and will partner on research and monitoring for this coastal region.

### ***Beach Nourishment***

Beach nourishment means the introduction of sand onto a beach to supplement a decreased supply of sand, for the purpose of beach restoration, enhancement, or maintenance. Two different beach nourishment approaches include placement on the beach (above mean high water, and placement in the surf zone (below mean high water). Waves will then move the sand around until an equilibrium is reached. The intent is that the subtidal sand will buffer waves and at the same time the waves will transport some of the sand onshore, with the ultimate outcome being a larger beach.

Since 2012, the city of Monterey has conducted the Monterey Harbor Dredging and Beach Restoration Project, which entails the removal of up to 10,000 cubic yards of dredged sediment annually in the Monterey Harbor, with disposal of those sediments at two onshore locations adjacent to Del Monte Beach. MBNMS has authorized the coastal development permit based on the assumption only clean sand, as verified by the EPA, would be placed on the beaches and the decant water (which re-enters the sanctuary) would not be contaminated, and thus, no sanctuary resources would be injured. The inclusion of various PCB congeners in the sampling and analysis plans allows monitoring results to be more effectively compared to other sediment monitoring in the region.

In 2019, multiple agency approvals permitted dredging in Moss Landing Harbor of up to 550,000 cubic yards of sediment over a 10-year period, with a dredging cap of no more than 80,000 cubic yards in any given year. Clean sediments greater than or equal to 80% sand composition could be placed on harbor beaches. Clean sediments less than or equal to 80% sand composition had to be placed at SF-12 or SF-14, two historic dredge disposal sites within MBNMS.

The Santa Cruz Port District dredges the Santa Cruz harbor entrance channel on an annual basis. The dredging is typically accomplished with the Port District owned and operated dredge plant during the winter or early spring months, as the dredging season is confined to November 30 to April 1. MBNMS authorizes the Army Corps permit for the Santa Cruz Port District to place dredged material at the federally approved nearshore beach area at Harbor Beach and Twin Lakes State Beach, and the offshore dredge disposal site.

The San Mateo Harbor District is conducting planning for the Surfer's Beach Pilot Sand Replenishment Project to protect and restore the shoreline at Surfer's Beach. Surfer's Beach has suffered from significant beach and bluff erosion and the [goal of the project](#) is to place clean sand from inside the jetty (or other land-based sources) along the shoreline to restore the beach.

### ***Dredge Disposal in MBNMS waters***

The sanctuary does not directly regulate harbor dredging (i.e., the removal of sediment from the harbors and their channels) but does have a regulatory role in the disposal of dredged materials (see Section 922.132(2)(f)). Staff have carefully examined this issue, recognizing while dredging is necessary to ongoing harbor operations, dredged material disposal may affect water quality and can bury or alter habitat, bathymetry, and physical processes. Disposal of dredged material from the four harbors (Pillar Point, Santa Cruz, Moss Landing, and Monterey) is allowed at designated disposal sites within MBNMS, provided it complies with U.S. Army Corps and EPA standards for grain size and contaminant levels, as defined by the Clean Water Act. Dredged materials from certain harbors in the region are sometimes contaminated with toxins, including persistent pesticides such as DDT, and such material is not approved for ocean disposal according to [EPA standards](#).

### ***Coastal Erosion and Armoring***

Development along the coast increases the pressure to protect coastal structures with various types of coastal armoring such as seawalls, bulkheads, and revetments to manage erosion. Approximately 14 miles (22.5 kilometers) of the 276 miles (444.2 kilometers) of coastline is already armored in MBNMS and this amount is estimated to double if trends in sea level rise and coastal erosion continue. The two coastal regional sediment management plans previously mentioned compiled the best existing information on coastal processes, erosion rates, and geomorphology; identified sources of sediment that could potentially be used in beach nourishment projects to reduce erosion hazards; and evaluated some of the regulatory and permitting framework involved in managing sediment within the sanctuary. The plans recommend sediment management approaches to be pursued for the sanctuary including cessation of sand mining from the beach, continuation of natural dune erosion in the less developed reaches, and a sand nourishment project in the southern portion of the littoral cell to provide additional storm protection. Some of these activities have already been successfully implemented. The plans also identify potential sources of sediment for use in nourishment projects to reduce erosion hazards, evaluate the traditional cost benefits of various scales of nourishment projects, and include potential recreational benefits (ESA PWA 2012).

### ***Landslides***

MBNMS regulations prohibit side-casting of materials (e.g., discharging soil, rocks, and vegetation) into the sanctuary. During emergency road closures due to landslides, Caltrans can request permits from the sanctuary to conduct those activities and has been granted authorizations in the past. During such an event MBNMS coordinates with all agencies to ensure protection of sanctuary resources. Occasionally, landslides impact endangered species (e.g., black abalone) or designated critical habitat and sanctuary staff works with NMFS, CDFW, and other partners to determine and implement plans of

action. Actions are case specific, but may include monitoring species and their habitat, baseline assessments to characterize the status of marine resources, or efforts to rescue organisms in imminent danger (e.g., black abalone about to be buried by ongoing, wave-generated movement of sediment). Caltrans issues an emergency notification form during road closures and subsequent emergency response, which opens up the communication between agencies for developing, reviewing, and approving plans to re-open the highway while using best practices for construction activities to protect critical habitat and species on land and in the sanctuary. In addition, MBNMS staff have [developed and implemented](#) a GIS decision support tool to provide data on the sensitivity of shoreline habitats in order to minimize the negative effects of landslide material deposition or redistribution on or near the shoreline.

### ***Lagoon and river mouth breaching***

Rivers are sometimes breached mechanically to alleviate upland flooding. There are five primary rivers draining into MBNMS (not including the northern management area): the San Lorenzo, Soquel Creek, Pajaro, Salinas, and Carmel rivers. Each river mouth has a different set of issues and various solutions are being applied or considered for each location seeking to find a balance between human need (e.g., flood mitigation) and natural resource protection (e.g., preventing fish from being released into ocean prematurely). For the San Lorenzo and Carmel rivers, protection of endangered and threatened species of fish required by the Endangered Species Act are of paramount concern. Artificially breaching the lagoon can sweep fish out to sea, instead of allowing them to thrive in the lagoon. Conversely, if left to breach naturally, lagoons can remain closed so long that water quality suffers (higher water temperature, low oxygen levels) and this impacts endangered fish species such as steelhead. Separately, rising water levels through the lower rivers can cause flooding problems for residential areas, storm water drains, and businesses near the river. MBNMS staff coordinates with other agencies on a management plan for each river mouth and determines if breaching activities will occur in sanctuary jurisdiction (below mean high water).

### ***Strategy CESM-1: Support progress on Coastal Regional Sediment Management Plans (CRSMPs) for MBNMS***

MBNMS currently has two CRSMPs. Each plan includes a series of management strategies that provide options for site-specific measures. For example, one location could have a variety of options to choose from, including but not limited to: no action, beach nourishment, retention structures, or bluff stabilization. A collaborative community approach will help flesh out these options and develop a path forward to restore, preserve, and maintain coastal beaches.

**Activity 1.1:** Continue to support implementation of the [Southern Monterey Bay Coastal Regional Sediment Management Plan](#).

**Activity 1.2:** Continue to support implementation of the [Santa Cruz Littoral Cell Coastal Sediment Management Plan](#).

**Activity 1.3:** Support research monitoring coastal climate changes related to coastal erosion and sediment movement.

**Activity 1.4:** Coordinate with local municipalities to ensure the best available science is used for local coastal planning processes.

***Strategy CESM-2: Collaborate on land management plan for CEMEX site***

Use the best available science regarding the unique biodiversity, ecological function, coastal processes and threats to help inform the future acquisition, ownership, restoration and management of the CEMEX property for public benefit. California American Water's proposed desalination project, Monterey Peninsula Water Supply Project, has a settlement agreement with CEMEX for use of an easement on the disturbed mining site. MBNMS will work with all parties to find a solution that balances commercial use with public access and use.

**Activity 2.1:** Participate in the public process guiding the restoration and management of the CEMEX sand mining property in Marina, California.

**Activity 2.2:** Clarify policies related to mining, for example, salt extraction.

***Strategy CESM-3: Reduce the loss of Elkhorn Slough habitat***

There has been a net loss of 1,000 acres of salt marsh in the slough over the last century due to the following anthropogenic impacts: (1) reclamation of tidal marsh for pasture and agriculture; (2) decreased input of freshwater and sediment input from the diversion of the Salinas River; (3) an increased tidal prism with increased flow in and out of the slough with the creation of the harbor; and (4) extremely high levels of nitrates have caused eutrophication, ultimately reducing the health of existing the salt marsh and its ability to hold marsh soils in place.



**Activity 3.1:** Participate in Elkhorn Slough National Estuarine Research Reserve's (ESNERR) Tidal Wetland Project strategic planning team and advisory panel to help reduce erosion in the slough.

**Activity 3.2:** Participate in biennial bank erosion monitoring in partnership with ESNERR staff.

**Activity 3.3:** Participate in ESNERR science advisory committee, providing input to the monitoring process.

***Strategy CESM-4: Implement site-specific beach nourishment programs***

MBNMS regulations prohibit disposal of dredged material in the sanctuary (below mean high water) except at disposal sites authorized by EPA prior to designation. The four harbors within MBNMS have identified and executed dredging projects that resulted in disposal of material at the preapproved sites, as well as reuse of clean sand placed above mean high water to nourish adjacent beaches. These beach nourishment projects were approved by the regulatory agencies, including MBNMS. MBNMS is concurrently proposing a regulatory change to clarify that the beneficial use of clean and suitable dredged material from the four harbors adjacent to the sanctuary is not disposal of dredged material, and, therefore, such beneficial use is not subject to the prohibition on permitting disposal of dredged material in the sanctuary.

**Activity 4.1:** Continue to coordinate with local harbors and cities on use of clean sand for beach nourishment as opportunities arise.

**Activity 4.2:** Continue to improve and participate in coordinated permit review with the Coastal Commission, USACE, and EPA to review permits and authorizations on beach nourishment activities.

**Activity 4.3:** Support research and monitoring on beach nourishment and identify sites above mean high water with potential to benefit from nourishment.

***Strategy CESM-5: Coordinate with regulatory agencies to determine appropriate disposal of dredge material***

EPA will continue oversight on dredge sediment monitoring in coordination with permitting agencies and MBNMS.

**Activity 5.1:** The harbors may require sanctuary permits or authorizations for their dredge disposal activities. Continue working collaboratively with the harbors and federal, state, and local agencies on the permitting processes for dredge disposal activities.

**Activity 5.2:** MBNMS will continue to review and comment on sediment sampling plans and contaminant testing and analysis overseen by EPA, as appropriate.

***Strategy CESM-6: Track and reduce coastal armoring***

Coastal armoring has historically occurred along the coast in response to rising sea levels and coastal erosion. Armoring is no longer the first option, as soft engineering alternatives have been developed and are replacing hard engineering options.

**Activity 6.1:** Track compliance of permit conditions (e.g., removing temporary revetments or appropriate maintenance of existing armoring projects) and conduct permit compliance inspections, as needed.

**Activity 6.2:** Conduct general shoreline surveillance patrols to detect non-permitted coastal development activities and review GIS data identifying armoring locations.

**Activity 6.3:** Coordinate with other permitting agencies where armoring alternatives could be implemented. Alternatives can be addressed through land use planning (e.g., rolling easements), soft engineering approaches (e.g., beach nourishment) or hard engineering approaches (e.g., groins or revetments).

***Strategy CESM-7: Reduce impacts to sanctuary resources due to landslides and subsequent emergency responses***

Massive landslides such as the Mud Creek landslide in 2017 have resulted in emergency consultations in order to quickly develop strategies to restore the highway and protect sanctuary resources.

**Activity 7.1:** Formulate special terms and conditions to diminish potential impacts from side-casting and other response activities through permitting program.

**Activity 7.2:** Coordinate with other federal and state agencies to manage emergency landslide disposal activities.

**Activity 7.3:** Conduct and support monitoring and research by staff and partners to determine how intertidal and subtidal species, community structure and function, habitat, and ecosystem processes are impacted by landslide materials, which includes the initial natural deposition, subsequent natural redistribution, and any material mobilized as part of the emergency response.

***Strategy CESM-8: Reduce impacts to sanctuary resources due to anthropogenic coastal changes to river mouths***

Rivers are sometimes breached mechanically to alleviate upland flooding. MBNMS staff coordinates with other agencies on a management plan for river mouths and determines if breaching activities will occur in sanctuary jurisdiction (below mean high water)

**Activity 8.1:** Coordinate with other permitting agencies to develop special terms and conditions to manage MBNMS resources through permitting program.

**Activity 8.2:** Provide public outreach on a broad array of human impact issues.

***Relevant strategies/activities located elsewhere within this management plan:***

Activity CESM-2.2 → Emerging Issues Strategy EI-2  
Activity CESM-6.2 → Resource Protection Strategy RP-5  
Activity CESM-7.3 → Research & Monitoring Strategy RM-3,  
Activity CESM-7.3 → Resource Protection Strategy RP-4  
Activity CESM-8.2 → Education, Outreach, and Communications Strategy EOC-2

***Potential Partners***

Caltrans, Bureau of Land Management, United States Environmental Protection Agency, California Coastal Commission, California State Lands Commission, Coastal Sediment Management Workgroup, Moss Landing Harbor District, Monterey Harbor District, Santa Cruz Harbor District, San Mateo Harbor District, United States Army Corps of Engineers, United States Geological Survey, California Department of Fish and Wildlife, United States Fish and Wildlife Service, Save Our Shores, California Coastal National Monument, National Marine Fisheries Service, California State Parks, Naval Postgraduate School, California State University Monterey Bay, University of California Santa Cruz, University of California Santa Barbara.

**Coastal Erosion & Sediment Management Action Plan Goal:** Reduce human-caused coastal erosion and collaborate with local, state, and federal agencies to address and restore sediment balance in nearshore habitats throughout MBNMS.

**Performance Measures Table**

| Strategy Title   | Desired Outcome (Objective)   | Output Measure   | Who Measures                    | Timeline |
|--|---|--|---------------------------------|----------|
| Strategy CESM-1: Track progress on coastal sediment management plans for MBNMS | Implementation of the Southern Monterey Bay Coastal Regional Sediment Management Plan                                       | Beach erosion reduced at one location  | Research Coordinator            | Year 3   |
|  | Implementation of the Santa Cruz Littoral Cell Coastal Sediment Management Plan   | Hard armoring reduced at one location  | Resource Protection Coordinator | Year 4   |
| Strategy CESM-3: Reduce factors affecting the loss of Elkhorn Slough habitat   | MBNMS staff provide input into strategic planning related to erosion in ESNERR and greater Elkhorn Slough                   | Participation in ESNERR science advisory committee   | Research Coordinator            | Ongoing  |
|  |   | Participation in ESNERR's Tidal Wetland Project strategic planning team and advisory panel | Research Coordinator            | Ongoing  |
|  |   | Reduced erosion measures developed   | Research Coordinator            | Year 2   |
|  |   | Erosion monitoring implemented   | Research Coordinator            | Year 3   |
| Strategy CESM-4: Implement site-specific beach nourishment programs            | Continued coordination with local harbors and cities on dredge disposal options for use of clean sand for beach nourishment | Pilot project implemented  | Resource Protection Coordinator | Year 2   |
|  | Coordinated permit review process with California Coastal Commission, USACE, and EPA  | Authorizations issued  | Permit Coordinator              | Ongoing  |

## Davidson Seamount Management Zone and Sur Ridge Action Plan

**Goal:** Increase understanding of the Davidson Seamount Management Zone (DSMZ) and Sur Ridge through characterization and ecological process studies and develop education programs for the seamount, the ridge, and similar geologic features throughout the nation.

### *Introduction*

Davidson Seamount Management Zone (was added to MBNMS as part of the adoption of the 2008 final MBNMS management plan. This area encompasses 775 square miles (2,007.4 square kilometers) of ocean waters and the submerged lands thereunder. The boundary resembles a square box centered on the summit of Davidson Seamount.

Davidson Seamount itself is located 80 miles (207.2 square kilometers) to the southwest of Monterey, due west of San Simeon, and is one of the largest known seamounts in U.S. waters. From base to crest, Davidson Seamount is 7,480 feet (2,280 meters) tall; yet, it is still 4,101 feet (1,250 meters) below the sea surface at its highest point. It 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 U.S. Coast and Geodetic Survey (forerunner to the National Ocean Service) scientist George Davidson. [Standard MBNMS regulations](#) apply within the DSMZ (without the exemptions for seabed alteration). Taking, disturbing, injuring, or possessing any sanctuary resource below 3,000 feet (914.4 meters) within the DSMZ is prohibited. In addition, NMFS regulations (first effective June 2006) prohibit fishing with bottom contact gear, or any other gear deployed deeper than 3,000 feet (914.4 meters), to protect Essential Fish Habitat.

In the designation process, Davidson Seamount was recognized to have special national significance relative to conservation, ecological, scientific, education, aesthetic, and historical qualities. The area is pristine and dominated by large, fragile, slow-growing organisms that would have long recovery time if impacted. Some corals on Davidson Seamount may be over 1,000 years old and species new to science continue to be described from the area. Since added to MBNMS, it has become one of the best studied seamounts in the world. Nevertheless, the MBNMS condition report determined a deficiency in water quality data from this area of the sanctuary and need for continued characterization and ecological studies.

Sur Ridge is a rocky feature located 28 miles (45.1 kilometers) offshore of Point Sur. It is 11 miles (17.7 kilometers) long and 3 miles (4.8 kilometers) wide, extending 2,680 to 5,148 feet (817 to 1,569 meters) beneath the sea surface. Exploration to Sur Ridge began in December 2013. Since it is more accessible than Davidson Seamount, with similar geologic features and similar species, Sur Ridge has become an important deep-sea research site.

Both Sur Ridge and Davidson Seamount are [sanctuary ecologically significant areas](#). New scientific information will be used to support management decisions related to these areas and general deep-sea biology, for resource protection and education needs.

### **Strategy DS-1: Conduct site characterization**

Complete a number of already initiated studies on the DSMZ and Sur Ridge, ranging from geological and biological characterization to zoological and oceanographic surveys, while also developing a socioeconomic survey. Sur Ridge is also considered in this action plan as it has similar species and habitats as Davidson Seamount and there are ongoing studies at this more easily accessible location.

**Activity 1.1:** Continue geologic and biological characterization of Davidson Seamount and Sur Ridge. In addition to initiated studies, complete analysis of existing video transects of species and habitat types from past NOAA and Monterey Bay Aquarium Research Institute (MBARI) research expeditions will be completed.

**Activity 1.2:** Conduct zoological survey of surface areas above Davidson Seamount. Research cruises are necessary to fully describe surface and mid-water species, sea turtles, birds, and mammals, especially seasonal differences. This will require both extractive surveys (e.g., net tows) and non-extractive surveys (e.g., ROV sampling). As time becomes available on the NOAA Ship *Bell M. Shimada* and the Ocean Exploration Trust Exploration Vessel *Nautilus* (or other vessels of opportunity), these basic surveys will continue. Additionally, the Sanctuary Aerial Monitoring and Spatial Analysis Program (SAMSAP), using local NOAA aircraft when available, will be continued. 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.

**Activity 1.3:** Conduct oceanographic surveys of seamount and Sur Ridge regions. Oceanographic and water quality surveys will be conducted using NOAA ships, MBARI research vessels, and satellite imagery. The data from surveys will be linked with national coastal observatories (e.g., Central and Northern California Ocean Observing System), resulting in a better understanding of ocean current patterns on and around Davidson Seamount and Sur Ridge. The condition report determined a dire need for water quality data for Davidson Seamount, and ocean current measurements at Sur Ridge are particularly important for understanding environmental conditions necessary for optimal coral growth.

**Activity 1.4:** Complete socioeconomic (commercial, recreational, research uses) analysis. Work with the ONMS socioeconomic team to learn more about human uses in the seamount region, which is also critical information for effective education and protection. In comparison to the rest of MBNMS, there are relatively few user groups in the Davidson Seamount region. However, a comprehensive understanding of key users of the seamount region is required for the next condition report.

**Activity 1.5:** Provide periodic scientific information and review for proposals to protect California offshore banks, seamounts, and ridges. Periodically, there are national and international efforts to include seamounts into marine protected areas and proposals for



new multiple uses. Because MBNMS staff have unique experience gained at Davidson Seamount and Sur Ridge, they are often contacted for advice and will share all available information as needed.

### ***Strategy DS-2: Conduct ecological processes investigations***

Ecological process studies are used to determine the causes of distribution and abundance of species. General hypotheses on the role of seamounts around the world include if they act 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. Marked and transplanted corals are helping us understand the physical conditions necessary for growth, predator-prey relations, and associations with other fauna. The age of corals and how they will be impacted by ocean acidification are also of broad interest.

**Activity 2.1:** Conduct regular benthic surveys. Repeat characterization studies through time help determine trends needed for sanctuary condition reports and to assess the health of the areas we manage. Based on information from early site characterization and preliminary studies, a benthic monitoring plan will be developed for Davidson Seamount and Sur Ridge. Data from these monitoring programs will be made available through the SIMoN website.

**Activity 2.2:** Conduct deep-water coral age determination and restoration studies in concert with Sur Ridge research activities. Cold-water corals are receiving increased attention in terms of scientific studies and conservation. The relatively pristine nature of Davidson Seamount and Sur Ridge and their diverse coral populations provides for a number of opportunities for age determination and restoration efforts. A research plan for deep-water coral studies will be developed, then implemented in concert with the Benthic Biology and Ecology Group at MBARI.

**Activity 2.3:** Conduct research to understand the distribution and abundance of species. Designation of Davidson Seamount as a managed area and Sur Ridge as a [SESA](#) 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. Research results will be presented at the International Deep-Sea Symposium, published in science journals and condition reports, and used in educational videos.

**Activity 2.4:** Compile existing faunal inventories of Davidson Seamount. Taxonomic guides for Sur Ridge and Davidson Seamount will be completed and maintained and published in the Office of National Marine Sanctuaries Conservation Science Series technical reports.

**Activity 2.5:** Incorporate monitoring data into MBNMS condition reports. A literature review, expert interview process, and information from the above activities will be compiled to assess sanctuary seamount and Sur Ridge health in the next condition report.

### ***Strategy DS-3: Conduct seamount education and outreach initiatives***

Davidson Seamount has captivated the public through numerous media reports (e.g., CBS Nightly News, National Geographic, and American Airlines in-flight news) and through [NOAA's Ocean Explorer website](#). A survey of the public related to developing a visitor center for MBNMS found that one of their top interests was in “seafloor topography,” of which seamounts and ridges are dramatic examples (Horner 2005). Proximity to the Monterey Bay Aquarium and other education institutions provides excellent education opportunities (e.g., interpretive 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 sanctuary research efforts have generated significant interest in the Cambria and San Simeon area and has been prominently featured in the Coastal Discovery Center and Santa Cruz Exploration Center.

**Activity 3.1:** Develop and implement Davidson Seamount education and outreach program. Information on the DSMZ and Sur Ridge will be incorporated into volunteer training, public seminars, and exhibits at interpretive centers. Building on the opportunity that Davidson Seamount is the best studied seamount in the National Marine Sanctuary System, educational information on technology needed for deep-sea research, seamount biological diversity, habitats, ocean acidification, and species of related interest, such as cold-water corals and sponges, will be provided to all relevant NOAA programs. A better-informed public on this topic will enhance a conservation ethic and support wise use of this unique deep-sea habitats.

**Activity 3.2:** Involve the education and outreach mechanisms within MBNMS and broader NOAA to promote existing and new research on Davidson Seamount. Past missions to the seamount, in conjunction with NOAA's Office of Exploration and Research and the British Broadcasting Corporation, were successful due to the combined efforts of education and research disciplines. This model should be considered when new cruises and campaigns are considered, particularly for upcoming expeditions with the Ocean Exploration Trust on the Exploration Vessel *Nautilus*.

### ***Relevant strategies/activities located elsewhere within this management plan:***

Strategy DS-3 → Education, Outreach, and Communication Strategies 1, 2, 4, 6

### ***Potential Partners***

Monterey Bay Aquarium Research Institute; Monterey Bay Aquarium; California State University, Monterey Bay; NOAA's Office of Marine and Aviation Operations; National Marine Fisheries Service; University of California at Santa Cruz; Lawrence Livermore National Laboratory; Moss Landing Marine Laboratories; Stanford University; Ocean Exploration Trust; Applied Marine Sciences; Naval Postgraduate School.

**Davidson Seamount Management Zone and Sur Ridge Action Plan Goal:** Increase understanding of the Davidson Seamount Management Zone and Sur Ridge through characterization and ecological process studies and develop education programs for the seamount and similar geologic features throughout the nation.

**Performance Measures Table**

| Strategy Title   | Desired Outcome (Objective)   | Output Measure  | Who Measures                                 | Timeline      |
|--|---|---|--|---------------|
| Strategy DS-1: Conduct site characterization                       | Geologic and biological characterization of Davidson Seamount   | Biennial airplane or ship cruise  | Research Specialist                          | Years 2, 4, 6 |
|  |   | Project updates to SIMoN Project Pages  | Research Specialist                          | Ongoing       |
| Strategy DS-2: Conduct ecological processes investigations         | Deep-water coral restoration studies conducted in the Sur Ridge Sanctuary Ecologically Significant Area | Deep-sea coral restoration manual   | Research Coordinator                         | Year 2        |
|  | Compile existing faunal inventories of Davidson Seamount and Sur Ridge                                  | Online inventories, building on existing ONMS taxonomic guides for Sur Ridge and Davidson Seamount      | Research Specialist                          | Years 1-5     |
|  | Davidson Seamount monitoring data incorporated into MBNMS condition report                              | New water quality data in MBNMS condition report  | Research Specialist                          | Year 5        |
| Strategy DS-3: Conduct seamount education and outreach initiatives | Public awareness of sanctuary deep-sea and seamount research  | News media and social media campaigns developed for research cruises to Davidson Seamount and Sur Ridge | Research Specialist<br>Education Coordinator | Years 1-5     |

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## Emerging Issues Action Plan

**Goal:** Develop a system to identify, track, and appropriately respond to emerging issues representing high public interest and/or potential threats to MBNMS resources.

### ***Introduction***

The goals and objectives set forth by the NMSA direct NOAA to take an ecosystem-based approach to managing national marine sanctuaries. The ecosystems include habitat structure, species assemblages, and ecological processes, as well as the many interactions with humans and their activities. MBNMS staff need to develop a system to identify 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, other issues are not addressed. This plan focuses on developing a framework to identify and address future resource protection issues.

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

- A. Coastal and offshore energy development
- B. Commercial/private activities
- C. Recreational activities
- D. Military/U.S. Coast Guard/NASA activities
- E. Research activities
- F. Coastal development and access
- G. Water quality
- H. Threats from beyond MBNMS boundaries (with potential to affect sanctuary resources)

### ***Strategy EI-1: Identify and track emerging issues***

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

**Activity 1.1:** Work with staff, SAC, working groups, and nongovernment organizations drawing on existing knowledge to develop and characterize a list of potential emerging issues.

**Activity 1.2:** Prioritize the emerging issues list to identify those issues warranting some level of additional tracking.

**Activity 1.3:** Identify how to best obtain information on new and unforeseen issues.

**Strategy EI-2: Develop process to address emerging issues**

MBNMS staff must develop and 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 identified in a public process of scoping, prioritization, and selection with the Sanctuary Advisory Council. However, MBNMS staff recognize 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 ONMS'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; and
- E. Priority ranking relative to other MBNMS initiatives.

**Activity 2.2:** Outline alternative categories and processes to address emerging issues, including:

- A. New, relatively small issues which staff address internally;
- B. Large or significant issues where adequate information is lacking and additional research is required;
- C. Issues initially appearing to be large, but determined to be relatively small after analysis, should be addressed by an effective communication plan;
- D. Large issues deferred due to lack of time and resources to address;
- E. Large, short term issues requiring no formal action plan; and
- F. Large, complex, long-term issues with multiple interested parties requiring action plan development by either staff or a multi-stakeholder working group of the SAC.

**Activity 2.3:** Identify process for bringing emerging issues forward to the Sanctuary Advisory Council where necessary.

**Activity 2.4:** Elevate issues within NOAA's Office of National Marine Sanctuaries on issues with regional or national scope, or refer to other agencies for action.

**Relevant strategies/activities located elsewhere within this management plan:**

Strategy EI-2 → Coastal Erosion and Sediment Management Activity CES 2.2



**Emerging Issues Action Plan Goal:** Develop a system to identify, track, and appropriately respond to emerging issues presenting potential threats to MBNMS resources.

**Performance Measures Table**

| Strategy Title  | Desired Outcome (Objective)  | Output Measure                     | Who Measures                          | Timeline  |
|---|--|------------------------------------|---------------------------------------|-----------|
| Strategy EI-1: Identify and track emerging issues         | Identification of potential emerging threats to sanctuary resources. | Emerging issues list               | Superintendent                        | Annually  |
|   | Prioritization process for emerging issues list                      | Prioritized issue list             | MBNMS Staff<br>MBNMS Advisory Council | As needed |
| Strategy EI-2: Develop process to address emerging issues | Defined process addressing issues                                    | Flow chart with criteria explained | Deputy Superintendent                 | Year 2    |

## Introduced Species Action Plan

**Goal:** Prevent the introduction, spread, and establishment of introduced species and control and/or eradicate populations of introduced species already established in MBNMS.

### *Introduction*

Introduced species pose threats to our prosperity, security, and quality of life. They have negative impacts on agriculture and food production systems, water quality and availability, human, animal and plant health, the environment, infrastructure, the economy, energy, cultural resources, and military readiness. Implementation of this action plan will support native biological communities, ecological processes, and cultural resources in MBNMS and protect them from the potentially adverse impacts of introduced species by preventing new introduced species from establishing in MBNMS and through early detection, control, and, when feasible, eradication of introduced species that are found within MBNMS.

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 relatively resistant to invasions, estuaries are particularly vulnerable to invasion (Preisler 2009). Large ports, such as San Francisco Bay, can support hundreds of introduced species, many of which significantly impact native ecosystems (Cohen 1998). Harbors and marinas are also susceptible to introduced species and these areas can be hot spots for invasions. Recent research demonstrates that subtidal marine communities in ports, harbors, and marinas are highly invaded, more so than the adjacent open coast.

Numerous terms are used to describe species not native to a particular ecosystem. For clarity in this action plan, the following definitions are applied to these terms:

- A. “Introduced species” means any non-human organism, including its seeds, eggs, spores, or other biological material capable of propagating that species, that is not native to a particular ecosystem. A synonym used in this action plan is “non-native species.”
- B. “Introduction” means the intentional or unintentional escape, release, dissemination, or placement of an organism into an ecosystem to which it is not native.
- C. “Invasive species” means with regard to a particular ecosystem, an introduced species, including those that are parasites, vectors, reservoirs and causative agents of disease, whose introduction, as a result of human activity, causes harm or is likely to cause harm to the environment, economy, cultural or historical resources, animal or plant health, or public health and safety.
- D. “Pathway” means the vectors, mechanisms, and processes by which introduced species are moved, intentionally or unintentionally, into a new ecosystem where they are currently absent.
- E. “Prevention” means the action of stopping introduced species from spreading within an invaded ecosystem or being added to a new ecosystem where they are currently absent.
- F. “Established” means a population of an introduced species is self-sustaining within an invaded ecosystem.

G. “Spread” means an introduced species increases its spatial extent within an invaded ecosystem through movement of individuals or dispersal of propagules, which may be natural or anthropogenic.

H. “Control” means containing, suppressing, or reducing populations of introduced species within an invaded ecosystem.

I. “Eradication” means the removal or destruction of an entire population of introduced species from an invaded ecosystem.

In 2015, MBNMS promulgated regulations against introduced species due to the threats posed to endangered species, native species diversity, and the composition and resilience of natural biological communities and hydrological processes. In this regulation, introduced species referred to “any species (including but not limited to any of its biological matter capable of propagation) that is non-native to the ecosystems of the sanctuary; or any organism into which altered genetic matter, or genetic matter from another species, has been transferred in order that the host organism acquires the genetic traits of the transferred genes.” Following is the MBNMS regulatory language:

Section 922.132 Prohibited or otherwise regulated activities (MBNMS 1992).

Except as specified in paragraphs (b) through (e) of this section, the following activities are prohibited and thus are unlawful for any [person](#) to conduct or to cause to be conducted:

- Introducing or otherwise releasing from within or into the sanctuary an [introduced species](#), except striped bass (*Morone saxatilis*) released during catch and release fishing activity.

The regulations were developed with considerable public review, as well as input from the sanctuary advisory councils and an introduced species working group of the sanctuary advisory councils for Monterey Bay and Greater Farallones national marine sanctuaries. These regulations are consistent in all four of the national marine sanctuaries in California (Channel Islands, Cordell Bank, Greater Farallones, and Monterey Bay). NOAA crafted the regulations to also be consistent with other state restrictions on introduced species, including California State Lands Commission rules limiting ballast water exchange. Furthermore, the sanctuary definition of an introduced species mirrors that of the California Department of Fish & Wildlife. Consistent regulations avoid a conflict where release of introduced species would be allowed in state waters of some sanctuaries but entirely prohibited throughout other sanctuaries.

In 2016 a memorandum of agreement was signed between the Office of National Marine Sanctuaries and the state of California to collaborate and cooperate on the review of commercial shellfish aquaculture leases or permit applications. The agreement defined “non-native introduced species” as an introduced species whose introduction will not cause significant adverse effects to sanctuary resources or qualities. The definition was intended to apply to a proposed project for a species already under cultivation in Tomales Bay within Greater Farallones National Marine Sanctuary or in MBNMS.

This action plan is not intended to address gradual or episodic changes in species composition caused by climate change (e.g., range expansions linked to increasing sea surface temperatures). 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 by competing for prey or space.

Introduced species may cause changes to the structure of physical and biogenic habitat (Crooks 1999). Introduced species in MBNMS pose a significant threat to native biological communities and ecological processes 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.

On December 5, 2016, President Obama issued an [executive order](#) entitled “Safeguarding the Nation from the Impacts of Invasive Species” This executive order serves as a template for the following three items. Because actions taken by staff may affect the introduction, establishment, or spread of introduced species, staff shall, to the extent practicable and permitted by law:

- A. Identify such actions;
- B. Subject to the availability of appropriations and within administrative, budgetary, and jurisdictional limits, use relevant agency programs and authorities to:
  1. Prevent species introductions and the spread;
  2. Detect and respond rapidly to eradicate or control populations of introduced species in a manner that is cost-effective and minimizes human health risks;
  3. Monitor introduced species populations accurately and reliably;
  4. Provide for the restoration of native species, ecosystems, and other assets that have been impacted by introduced species or their eradication and control;
  5. Conduct research on introduced species and develop and apply technologies to prevent their introduction and spread and provide for environmentally sound methods of eradication and control of introduced species; and
  6. Coordinate with and complement similar efforts, including education and outreach, of states, territories, federally-recognized First Nation peoples, local governments, non-government organizations, and the private sector; and
- C. Refrain from authorizing, funding, or implementing actions that are likely to cause or promote the introduction or spread of introduced species in the United States or elsewhere unless, pursuant to guidelines that it has prescribed, NOAA has determined and made public its determination that the benefits of such actions clearly outweigh the potential harm caused by the introduced species; and all feasible and prudent measures to minimize risk of harm will be taken in conjunction with the actions.

Species have been introduced to the sanctuary in the past and this will continue into the future. Staff have worked on a variety of projects related to introduced species, including management of *Undaria pinnatifida* in Monterey Harbor, monitoring the spread of

*Watersipora subtorquata* in Monterey and Carmel bays and via surveys in Elkhorn Slough, and monitoring for the presence of *Sargassum horneri*. Staff work with local researchers on a variety of issues related to introduced species and will continue to take advantage of future opportunities.

### **Strategy IS-1: Manage pathways and promote prevention**

Introduced species can become established very quickly and once established are costly and difficult, if not impossible, to eradicate. Therefore, it is critical for resource managers to focus efforts on the prevention of new introductions by addressing known pathways of introduction and prohibiting the release of introduced species into the sanctuary. Multiple pathways can lead to introductions of species within MBNMS: aquaculture; aquarium trade wholesale importers, culture facilities, and retail pet stores; ballast water, hull fouling, and vessel discharge; biological control; fisheries enhancement; intentional introductions (both legal and illegal); live bait; restaurants, seafood retail, seafood wholesaling and processing, and packing materials (e.g., seaweed); and scientific research institutions, schools, and public aquariums. MBNMS staff uses authorization of aquaculture facilities to manage the prevention of introduced species. In addition, numerous prevention programs are also in place due to the jurisdiction of other agencies and institutions.

**Activity 1.1:** Continue to coordinate and implement the prohibition of introduced species through review and issuance of authorizations for National Pollutant Discharge Elimination System (NPDES) applications issued by the Regional Water Quality Control Board to ensure all dischargers adequately address introduced species prevention. This also includes other permit applications to MBNMS as well as authorizations of permits from other agencies.

**Activity 1.2:** Apply best management practices focused on pathways and vectors of transmission, including discharges, as needed. These best management practices have already been developed by other agencies and institutions and are applicable to sanctuary management. As the need arises in case-specific responses, staff will follow these practices, possibly with guidance from other entities already implementing them. For example, this could arise during permitting, consultation with other agencies, or in the planning phase of a new activity in the sanctuary.

**Activity 1.3:** Integrate existing prevention strategies (e.g., Hazard Analysis and Critical Control Points) when planning field operations, during permit review, and in any other activities that could lead to introductions (i.e., implement best management practices related to prevention). Consider how a planned activity could serve as a pathway for introduction or spread and to implement controls preventing of a species introduction. MBNMS staff will coordinate with agency partners and support state and federal efforts to prevent introductions through regulatory promulgation, permitting, and interpretive and regulatory enforcement.

### **Strategy IS-2: Promote early detection and rapid response**

It is important to be able to quickly assess the threat posed by a newly introduced or newly identified species when new introductions do occur. Ideally, resource protection

agencies would be able to quickly identify a newly introduced species and respond with effective control or eradication efforts.

**Activity 2.1:** Continue support for existing early detection and monitoring programs. Work with Elkhorn Slough National Estuarine Research Reserve, Partnership for Interdisciplinary Studies of Coastal Oceans, and Smithsonian Environmental Research Center to detect new introductions and monitor the spread of introduced species.

**Activity 2.2:** Develop a rapid response plan. Work with appropriate partner agencies and institutions as needed to adapt existing decision-making frameworks to help guide sanctuary-specific responses to detecting a new introduced species. Use the existing network of NOAA and academic experts to identify potential introduced species.

### ***Strategy IS-3: Implement eradication or control***

Once a nascent or established population of an introduced species has been found, the next step is to determine whether eradication is feasible, or if control and long-term management are the only course of action. Plans to control or eradicate will be species-specific and which plan of action to pursue generally depends on the spatial extent and duration of the introduction and whether the population is (1) well established, (2) serves as a sink with a stable source, or (3) is vulnerable to local extinction. Established populations are self-sustaining, but eradication may still be possible depending on the species and its life history characteristics. Sink populations are sustained only through the arrival of new individuals from a distant source population. While it may be possible to eradicate the sink populations, unless the pathway from the source is addressed, new individuals will soon arrive and replace those eradicated.

**Activity 3.1:** Assess feasibility of eradication compared to control or no action strategies. Assess the probability of eradication based on logistical and financial constraints, which will contribute to determining overall feasibility and likelihood of success. Determination to eradicate, control, or do nothing will be made in consultation with other relevant resource protection agencies.

**Activity 3.2:** Develop and implement eradication plan(s). Staff will develop eradication plan(s) with partners on a case-by-case basis. Staff will implement eradication plan(s) with partnering agencies, academia, and nongovernmental organizations.

**Activity 3.3:** Develop and implement control plans. Develop control plans with partners if eradication is not feasible, or fails. Staff will implement control plans with partnering agencies, academia, and nongovernmental organizations.



### ***Strategy IS-4: Sustain research and monitoring***

This strategy attempts to improve the knowledge of existing introduced species in MBNMS, population changes by introduced species, and introduced species' ecological effects.

Some studies have attempted to determine the extent of established introductions in portions of MBNMS. To date, these studies have focused largely on Elkhorn Slough, which is part of MBNMS, and to a lesser degree on harbors adjacent to MBNMS.

**Activity 4.1:** Maintain and periodically update a list of known non-native introduced species on the SIMoN website using MBNMS research staff and collaborating scientists.

**Activity 4.2:** Publish the latest results generated by research and monitoring projects focused on introduced species on the SIMoN website.

### ***Strategy IS-5: Implement restoration***

To the extent practicable and with assistance from partners, implement restoration of habitats and communities altered by introduced species or the effects of their eradication and control.

**Activity 5.1:** Assess ability to restore native community structure and function. Collaborate with other relevant resource trust agencies to determine whether habitats and local ecological communities can be restored given the current extent of invasion.

**Activity 5.2:** Develop restoration plans with collaborators if assessment of restoration is deemed feasible and warranted, then work with partners to implement the restoration plan(s) to both reduce introduced species and either enhance or restore native diversity.

### ***Strategy IS-6: Implementation in Elkhorn Slough***

The section on Elkhorn Slough in the 2015 condition report used the most recent available data, published studies, and expert opinions to assess the status and trends of the slough. The 2015 assessment reinforced the 2009 condition report's assessment that Elkhorn Slough is an area of concern within the sanctuary. Invasive species to the slough are common and require extensive mitigation.

**Activity 6.1:** Participate in long-term monitoring of non-native species with ESNERR staff.

**Activity 6.2:** Participate in the process to eradicate or control introduced species to eliminate discharges into the slough.

**Activity 6.3:** Reduce negative impacts of introduced species.

**Activity 6.4:** Investigate types of activities with potential to increase or introduce non-native species.

## ***Partners***

Scientific institutions, Regional Water Quality Control Board, California Department of Boating and Waterways, University of California 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, Smithsonian Environmental Research Center (SERC), California State Lands Commission, local researchers, divers, boaters, municipalities, harbor masters.

**Introduced Species Action Plan Goal:** Prevent the introduction, spread, and establishment of introduced species and control and eradicate populations of introduced species already established in MBNMS.

**Performance Measures Table**

| Strategy Title  | Desired Outcome  | Output Measure                               | Who Measures                           | Timeline |
|---|--|--|--|----------|
| Strategy IS-1: Manage pathways and promote prevention     | Authorizations for NPDES are reviewed and issued   | Permits reviewed, authorized                 | Resource Protection                    | Annually |
|   | Existing prevention strategies are integrated when planning field operations, during permit review, and in any other activities that could lead to introductions | Permits reviewed, authorized                 | Research Team                          | Annually |
| Strategy IS-2: Promote early detection and rapid response | Continued detection and response to invasive species   | Monitoring programs developed                | Research Team                          | Annually |
|   |  | Number of plans developed                    | Research Team                          | Annually |
| Strategy IS-4: Sustain research and monitoring            | Maintain and periodically update a list of known non-native introduced species on the SIMoN website using MBNMS research staff and collaborating scientists      | List of non-native introduced species on web | Research Team                          | Annually |
|   | Publish the latest results generated by introduced species projects on the SIMoN website   | Publications on website                      | Research Team                          | Annually |
| Strategy IS-6: Implementation in Elkhorn Slough           | Long-term monitoring of non-native species with ESNERR staff is conducted  | Monitoring data on SIMoN                     | Research Team in partnership w/ ESNERR | Annually |

## Marine Debris Action Plan

**Goal:** Assess and reduce the amount of marine debris in or entering Monterey Bay National Marine Sanctuary

### *Introduction*

Marine debris is defined as “any persistent solid material manufactured or processed and directly or indirectly, intentionally or unintentionally, disposed of or abandoned into the marine environment” (33 CFR 151.3000 - Definition of marine debris for the purposes of the Marine Debris Research, Prevention and Reduction Act). Marine debris can enter MBNMS from land- and ocean-based sources. Marine debris found in MBNMS includes food wrappers, bottles, plastic bags, construction materials, agricultural waste, lost shipping containers, derelict fishing gear, and abandoned vessels. Marine debris can impact living resources, human health, the structure of natural habitats, and navigation.

In the past, MBNMS has focused on a variety of marine debris control efforts. For example, staff respond to about a dozen vessel groundings and sinkings annually to ensure the response is conducted in an environmentally sound manner. Staff have studied and reported on the impacts of lost shipping containers, have hosted public science presentations on marine debris, and have distributed project descriptions dealing with marine debris on the SIMoN website to raise awareness. Staff have also conducted lost fishing gear removal efforts using a specialized ROV to remove nets and traps and participated in outreach efforts to reduce the amount of marine debris entering MBNMS. In 2016, the Sanctuary Advisory Council reaffirmed their 2011 support for federal and statewide legislative efforts and local ordinances to ban the use and distribution of single-use plastic bags. These resolutions included supporting efforts to remove plastic bag litter from the shores, rivers, and waters of the sanctuary.

Source reduction is the most effective strategy to limit the amount of debris entering the ocean. Reducing the amount of plastic marine debris is especially imperative since plastics never fully degrade but rather break down into progressively smaller particles, releasing chemical additives, while also absorbing chemicals from the ambient water. Microplastics, plastics smaller than 5 mm, are an especially growing concern as studies have found microplastics in deep-sea sediments and organisms, and they can potentially get passed along in the food chain. Scoping comments received in 2016 identified a few ways to focus on source reduction, including educating inland populations about marine debris and working with local restaurants. The Sanctuary Advisory Council’s Conservation Working Group identified marine debris priorities and made recommendations considered in this action plan.

Future efforts to address marine debris will include focused field measurements to better understand distribution and abundance of different types of marine debris; removal and mitigation efforts such as beach cleanups; and targeted education and outreach programs to highlight the importance of source reduction, community involvement, and personal actions. None of these efforts is considered a comprehensive solution, but each represents an effective step to mitigate impacts. MBNMS has developed partnerships with local, state, and federal agencies, such as the [NOAA Marine](#)

[Debris Program](#), to leverage resources to contribute to addressing marine debris impacts.

We need a better understanding of types of marine debris impacting MBNMS resources and how those impacts can be reduced or eliminated.

### ***Strategy MD-1: Assess scope and scale of marine debris***

MBNMS staff and partners will evaluate the types of marine debris impacting sanctuary resources. The evaluation will concentrate on identifying the level of persistence of plastic pollution, how plastic pollution enters the sanctuary, and the distribution of plastic pollution in the sanctuary. The assessments will focus on pelagic and coastal environments and will also specifically consider plastic inputs from agricultural activity within sanctuary watersheds. Results will be publicly available on MBNMS's website and will be used to inform future policy development.

**Activity 1.1:** Complete an assessment of ongoing current marine debris data collection efforts within MBNMS. Determine if data collected by the numerous groups in the sanctuary region and the state of California can be standardized for data collection and reporting and if historical or existing data can be integrated with new data. Past work includes microplastic work conducted by San Francisco Estuary Institute, plastic pollution analysis by the Conservation Working Group, and analysis by Monterey Bay Aquarium Research Institute of mega debris.

**Activity 1.2:** Support monthly citizen science led surveys of marine debris on shorelines.

Work with partners to explore potential modification of Beach COMBERS (Coastal Ocean Mammal and Bird Education and Research Surveys) program or other existing citizen science programs to include monthly assessments of marine debris at each assigned beach segment, using protocols from NOAA's [Marine Debris Monitoring and Assessment Project](#). Ensure that coordination and post-survey analytical resources are available before implementing such program modifications.

**Activity 1.3:** Conduct monitoring of microplastics debris in offshore waters and rivers within MBNMS watersheds. Systematically collect microplastic samples at sea to determine the spatial extent of the occurrence of microplastics. Collect microplastic samples in streams to assess the influx of plastic pollution from agricultural activities within watersheds flowing to MBNMS.

### ***Strategy MD-2: Foster public participation and support policies leading to reduced marine debris (focus on plastic pollution)***

Incorporate plastic pollution information, including impacts on sanctuary, into existing education and outreach programs and work with business and tourism partners to reduce plastic pollution, focusing on single-use plastics such as straws and drink containers. Work in tandem with communities' efforts to comply with storm drain runoff regulations and structural controls.

**Activity 2.1:** Develop and conduct general and targeted outreach programs about reducing plastic marine debris, in concert with partners and stakeholders. Some potential outreach tools include: beach and waterway cleanup events, event booths, signage, media stories, social media, videos, brochures, public presentations, visitor center displays, and interpretative programs. MBNMS will lead by example by reducing single-use plastic items, e.g., straws and water bottles, at MBNMS-hosted events, and will strive for zero-waste events.

**Activity 2.2:** Support existing school programs to educate about the impacts of marine debris and work to monitor and reduce the amount of plastic debris entering the sanctuary. Engage with local K-12 students through education programs to conduct shoreline monitoring using NOAA's Marine Debris Monitoring and Assessment Project protocols. This activity will lead to increasing awareness of the negative impacts of marine debris while generating solutions that help communities become more sustainable.

**Activity 2.3:** Collaborate with partners to reduce plastic pollution from on-the-water businesses. Focus outreach efforts on on-the-water businesses who can in turn share strategies with their customers through orientations or incorporation into rental guidelines. Support partner efforts to develop outreach products on reducing plastic pollution to coastal businesses, such as hotels and tourist services. Work with partners to develop best practices for reducing marine pollution, focusing on plastics. Work with the Sanctuary Advisory Council to write letters of support for local advocacy efforts.

### ***Strategy MD-3: Reduce marine debris threats by removing the debris and preventing point source inputs***

MBNMS staff will focus on reducing marine debris inputs as noted in strategies MD-1 and MD-2, and have identified activities to remove debris from within the sanctuary known to have adverse effects on marine life.

**Activity 3.1:** Respond to marine vessel incidents and other discharge incidents. Use regulatory and other authorities to effect removal of debris from discharge incidents, including from cargo ships and other vessels, aircrafts, vehicles, and incidental shoreline discharges.

**Activity 3.2:** Continue inland watershed protection efforts. Collaborate with partners to prevent or reduce discharge of marine debris into waterways leading to MBNMS.

**Activity 3.3:** Work with entities and individuals who work and live on the ocean to reduce debris released while at sea. Discourage specific unlawful discharge activities such as shipping containers lost at sea.

**Activity 3.4:** Coordinate with state and local partners on lost fishing gear removal program, on an as needed basis. Determine if MBNMS can provide any support that would materially increase recovery of lost fishing gear within the sanctuary. Lost gear can change the physical structure of the benthos, entangle wildlife, and pose a threat to personnel and equipment, such as autonomous underwater vehicles (AUVs) and ROVs. Research MBNMS policy barriers to lost fishing gear removal and ocean-based marine



debris cleanup and share results with agencies working on California's Ocean Litter Strategy.

**Activity 3.5:** Use MBNMS permit authority to prevent or reduce potential marine debris. Identify any debris that could be released into the sanctuary as a result of planned human activities and require removal within permit terms and conditions. Work with discharge permit holders.

***Relevant strategies/activities located elsewhere within this management plan:***

Activity MD-1.3 → Water Quality Activity 2.2

Activity MD-2.2 → Education, Outreach, & Communication Strategies EOC-2, EOC-3

Activity MD-3.2 → Water Quality Strategy WQ-4

Activity MD-3.5 → Wildlife Disturbance Strategy WD-8

Strategy MD-3 → Marine Spatial Planning MSP-9

***Potential Partners***

NOAA Marine Debris Program, California Whale Rescue, United States Coast Guard, Save Our Shores, Surfrider Foundation, SeaDoc Society, Association of Monterey Bay Area Governments, California Coastal Commission, California Marine Sanctuary Foundation, California State University Monterey Bay, California State Water Resources Control Board, Central Coast Regional Water Quality Control Board, Central Coast Wetlands Group, Elkhorn Slough Foundation, Elkhorn Slough National Estuarine Research Reserve, Central Coast Integrated Regional Water Management Programs, MBNMS Research Activities Panel, Monterey County Farm Bureau, Monterey Regional Storm Water Management Program, Natural Resources Conservation Service (NRCS), Ocean Protection Council (OPC), Resource Conservation District (RCD) of Monterey County, RCD of Santa Cruz County, RCD of San Mateo County, The Nature Conservancy, United States Environmental Protection Agency, Department of the Interior, U.S. Fish and Wildlife Service.

***Resources***

[NOAA Marine Debris Program](#)

**Marine Debris Action Plan Goal:** Assess and reduce the amount of marine debris in or entering Monterey Bay National Marine Sanctuary.

**Performance Measures Table**

| Strategy Title  | Desired Outcome (Objective)   | Output Measure                      | Who Measures                         | Timeline  |
|---|---|-------------------------------------|--------------------------------------|-----------|
| Strategy MD-1: Assess scope and scale of marine debris  | Assessment of the types and sources of persistent marine debris in pelagic and coastal environments | Database created                    | Resource Protection & Research Teams | Year 1    |
|   |   | Produce reports                     | Resource Protection & Research Teams | As needed |
| Strategy MD-2: Foster public participation and support policies leading to reduced marine debris focused on plastic pollution | Increase public participation in marine debris reduction activities                                 | Marine debris outreach programming  | Education Coordinator                | Year 2    |
|   | Reduction of plastic pollution from on-the-water businesses   | Best practices developed            | Resource Protection Coordinator      | Year 4    |
| Strategy MD-3: Reduce marine debris threats by removing the debris and preventing point source inputs                         | Marine vessel and other discharge incidents are responded to and tracked                            | Emergency response efforts          | Enforcement Coordinator              | As needed |
|   |   | Updated database                    | Enforcement Coordinator              | As needed |
|   | Use MBNMS permit authority to prevent or reduce potential marine debris                             | Updated permit terms and conditions | Permit Coordinator                   | Annually  |

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## Water Quality Protection Program Action Plan

**Goal:** Raise awareness of water quality issues in the watersheds and to improve the quality of water entering and within Monterey Bay National Marine Sanctuary.

### Introduction

MBNMS encompasses a shoreline length of 276 miles (444.2 kilometers) from Marin County in the north to San Luis Obispo County in the south and 6,094 square miles (15,783.4 square kilometers) of ocean. This proximity to the coastline makes the sanctuary vulnerable to pollution originating from approximately 7,000 square miles (18,129.9 square kilometers) of watershed areas draining to it, including contaminants such as sediments, nutrients, bacteria, pesticides, metals, detergents, and others (Figure WQ-1).

The quality of surface waters in the region is greatly influenced by land use practices. Primary causes of pollutants include urban runoff, agricultural runoff, erosion and sedimentation, and septic systems.

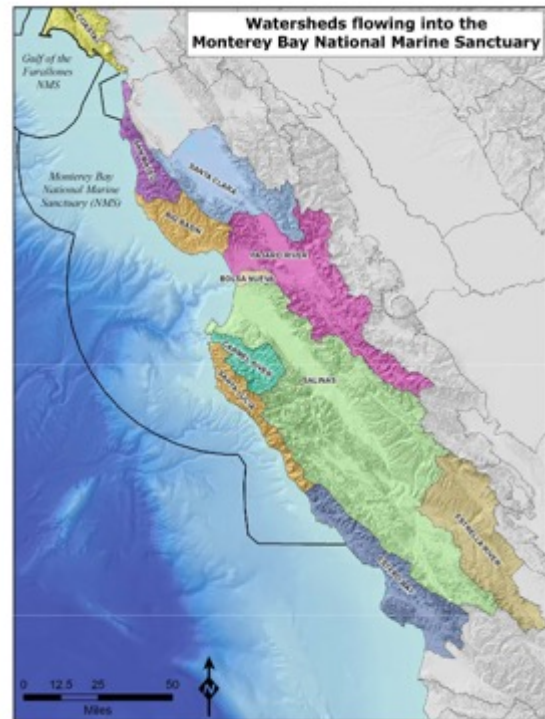


Figure WQ-1. Image shows watersheds flowing into MBNMS. Image: NOAA

Erosion is a widespread problem in MBNMS watersheds, due in part to the erosive nature of local soils as well as to land use practices (including farming on steep slopes, unmaintained or improperly designed dirt roads, altered water channels increasing water velocities and altering the natural sediment balance, and areas denuded of vegetation by fire, overgrazing, or clearing).

The coastal rivers of the Big Sur region and San Mateo coast, where urban and agricultural land uses are minimal, are generally considered to be of good water quality. Primary land-based loading of nutrients to Monterey Bay comes from the Pajaro and Salinas river watersheds. Annual loads from the rivers are highly variable and highly influenced by precipitation. Because of relatively high flows and concentrations, the Pajaro River contributes the largest loads of nutrients to the sanctuary. San Lorenzo River and Carmel River typically contribute nutrient loads an order of magnitude lower.

Within MBNMS watersheds, water bodies have been [determined](#) by the Central Coast Regional Water Quality Control Board to be impaired under Sections 303(d) and 305(b) of the Clean Water Act. In the 2014 Integrated Report<sup>1</sup> there are 55 waterbodies listed that do not attain their designated beneficial uses because of frequently high concentrations of specific contaminants. These water bodies flow to MBNMS and many of the persistent pollutants are then detected in sediment, mussels and other animals' tissues (Figure WQ-2) (California Water Boards (2018)).

### 2014 303(d) Pollutant Breakdown of 55 Water Bodies on the Central Coast

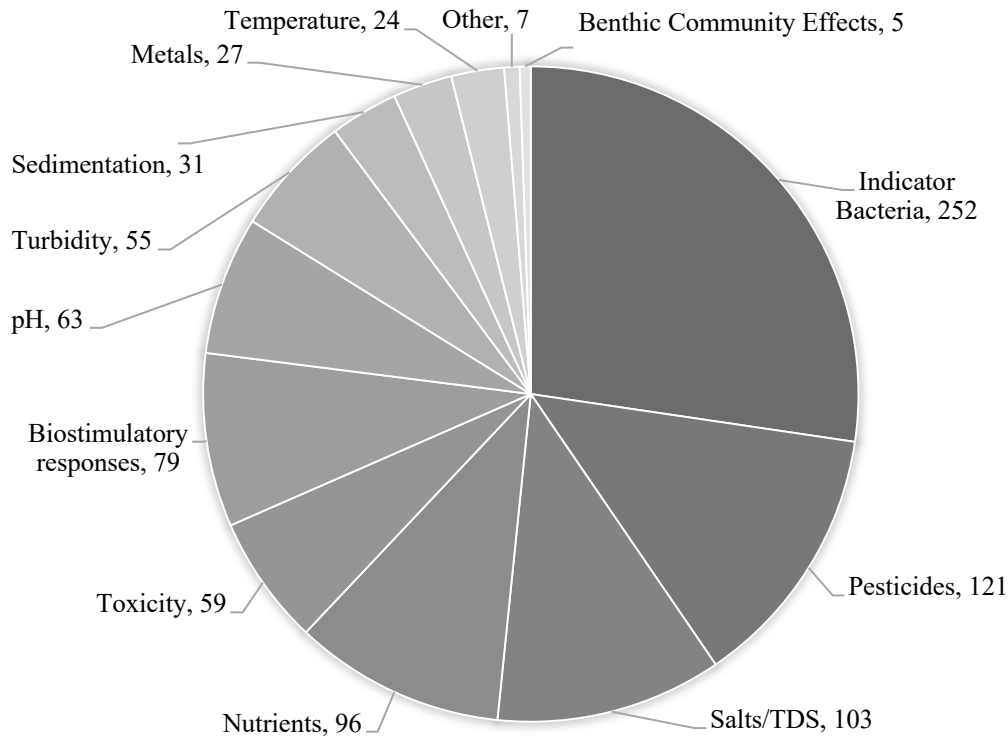


Figure WQ-2. Chart representing the number of listings by pollutant classification. Image: Central Coast Regional Water Quality Control Board

The Water Quality Protection Program (WQPP) began in 1993 with the establishment of a committee to oversee program development and implementation. An MOA was signed by eight federal, state, and local water quality agencies during the sanctuary designation process and has been updated twice since the creation of the original document. The broader WQPP Committee has met quarterly for many years to carry the mission forward. The committee is made up of 20 organizations, including the MOA signatories, which represent federal, state, and local government, NGOs, agriculture industry, municipalities, research, and academia.

The purpose of the WQPP is to provide a framework for regional coordination, communication, planning, and strategy implementation among local, state, and federal agencies and public and private groups addressing water quality in the sanctuary and its watersheds. The group has addressed regional monitoring and data sharing, urban and agricultural runoff, marinas and boating activities, wetland/riparian issues, and point sources of pollution. Water quality issues addressed include erosion and sedimentation, persistent pesticides, nutrients, oil and grease, metals, and coliform bacteria, as well as degradation of wetland and riparian areas, which can reduce their natural filtering capabilities. A main focus of the program is to more efficiently leverage and encourage collaboration between the large number of existing programs and projects related to these issues.

Since the original water quality action plans were developed, much has been accomplished by sanctuary staff and partners. On March 8, 2017, the Central Coast Regional Water Quality Control Board (CCRWQCB) adopted a [third agricultural order](#) (No. R3-2017-0002) applying to owners and operators of irrigated land used for commercial crop production. The CCRWQCB regulates discharges from irrigated agricultural lands to protect surface water and groundwater. Many of the regulatory requirements identified in the agricultural order directly correspond with strategies identified in MBNMS's Agriculture and Rural Lands Action Plan.

The CCRWQCB also oversees a stormwater program to prevent runoff from transporting urban pollutants to surface waterbodies and ultimately MBNMS. The [Stormwater Program](#) is an NPDES Program implemented in two phases based on the size of the jurisdiction (Phase I and Phase II). The city of Salinas (population greater than 155,000 in 2013) holds the only individual Phase I municipal stormwater permit in the central coast region. On March 10, 2003, coastal cities meeting the definition of Phase II Regulated Small Municipal Separate Storm Sewer Systems (MS4s) were required to obtain permits. Finally, on February 5, 2013, a proposed final draft of the Phase II Small MS4 General Permit was adopted and became effective on July 1, 2013 (Order No. 2013-0001). Similar to the agriculture regulations, the local municipalities are now implementing many of the strategies identified in MBNMS's Solutions to Urban Runoff Action Plan.

Boat marinas are also doing their part to reduce pollution from vessels. Most marinas adjacent to MBNMS have installed bilge pumpouts to remove oily water from vessels. They also have sewage pumpouts used by boaters to pump sewage from vessel holding tanks to the wastewater treatment plant, thereby reducing the amount of nutrients, pathogens, and chemicals entering the sanctuary from boats.

Because so many of the original strategies are now being implemented, this version of the Water Quality Action Plan has combined all of the issue-based original action plan strategies into one Water Quality Action Plan focusing specifically on activities in which MBNMS WQPP staff are directly involved. The primary strategies WQPP staff will focus on include coordinating regional efforts to improve water quality, better understanding the land-sea connection, quantifying effectiveness of management practices in improving water quality, monitoring and reducing pollutant loads of contaminants entering MBNMS, promoting public engagement and stewardship, and better communicating the findings of projects and monitoring conducted by WQPP staff. We want to better understand the fate and magnitude of contaminants entering MBNMS so we can more effectively prioritize efforts to minimize the threats to MBNMS resources.



***Strategy WQ-1: Facilitate and coordinate regional efforts to improve water quality through the Water Quality Protection Program Committee (and MOA), Agriculture Water Quality Alliance (AWQA), stormwater programs, and Integrated Regional Water Management programs***

MBNMS's WQPP has a regional perspective on water quality issues crossing jurisdictional and watershed boundaries. The emphasis is on bringing people together to share information, promote success, and leverage resources to improve water quality. Regardless of the source, it is important to create a collaborative environment where the goal is to improve the quality of water flowing into MBNMS. The following activities include efforts within the Elkhorn Slough watersheds.

**Activity 1.1:** Promote examples of successful, innovative, and effective practices, technologies, and systematic approaches to reduce pollutant loads. There are many practices and innovative technologies implemented by NGOs, researchers, growers, and local cities to improve water quality. WQPP staff will promote these efforts through AWQA meetings, WQPP Committee meetings, grant proposals, sharing monitoring results, presenting at workshops, and the AWQA website.

**Activity 1.2:** Review, evaluate, and comment on ordinances, regulations, and permits with potential effects on MBNMS resources. MBNMS staff will review and provide comments on any NPDES permits discharging directly into the sanctuary and review any MBNMS permit requests that might affect water quality. As resources permit, other coastal permits, projects, or ordinances affecting water quality may be evaluated.

**Activity 1.3:** Participate in and support urban and agricultural sustainability efforts. MBNMS staff support and encourage efforts to promote sustainable use of resources, e.g., reducing water usage and promoting healthy soils through best practices.

**Activity 1.4:** Assist in the development and implementation of storm water resource plans (SWRP). Staff will aid in the promotion of a SWRP for the Greater Monterey County region to help better understand and identify opportunities for water retention, groundwater recharge, and improved water quality. Several other SWRPs are in development for Santa Cruz County and the Monterey Peninsula. MBNMS will help share information and promote regional cooperation and strategies.

**Activity 1.5:** Assist in establishing watershed working groups or focus groups. As resources permit, the agriculture water quality coordinator will assist partners in identifying watersheds where the agriculture community might be interested in working together to demonstrate collective solutions to reducing pollutant loads, leveraging resources, and meeting regulatory requirements.

**Activity 1.6:** Coordinate and facilitate WQPP Committee, Agriculture Water Quality Alliance, and Citizen Watershed Monitoring Network meetings. On a quarterly basis, the WQPP Committee will meet to strengthen collaboration and reinforce mutual efforts related to improving water quality. AWQA and the Citizen Watershed Monitoring

Network will meet as needed to coordinate and support regional water quality enhancement.

**Activity 1.7:** Ensure MBNMS Water Quality MOA remains current. The WQPP MOA is an agreement between NOAA and eight federal, state, and local agencies with some regulatory authority over water. The MOA is valid for five years and will expire on September 1, 2020. It can either be extended or re-issued. One follow-up action item is to describe the contact information and steps for coordination of enforcement activities between agencies related to water quality violations.

**Activity 1.8:** Develop new partnerships and strive to maintain and improve existing relationships. It is important to remain connected with a diverse stakeholder group that is inclusive and continues to expand with new ideas and opportunities. WQPP staff will attend meetings, trainings, and networking events looking for new partners and projects to improve water quality.

### ***Strategy WQ-2: Understand the land-sea connection***

The WQPP is focused on collaborative efforts to improve water quality in the watersheds draining to MBNMS. This strategy emphasizes the importance of understanding how runoff from land affects sanctuary resources. This will help prioritize work by knowing where sanctuary resources are at risk and where there is opportunity for corrective action. The following activities include efforts within the Elkhorn Slough watersheds.

**Activity 2.1:** Promote investigation into the effects of pollutants on marine ecosystems. A list of research questions will be developed where insufficient knowledge exists (data gaps) or new emerging issues are identified. This list will be maintained and provided to local researchers and students as opportunities arise for special studies or student projects.

**Activity 2.2:** Facilitate discussion and coordinate efforts to develop an integrated regional water quality monitoring program. For many years, WQPP staff and partners have been working toward an integrated regional water quality monitoring framework. This is important to leverage resources and provide a long-term, robust data set to inform management decisions. Efforts to date include identifying existing programs, monitoring sites, and design. Regional questions were developed and a framework designed. All pertinent data is uploaded into a statewide database called the California Environmental Data Exchange Network (CEDEN). At a minimum, funding is needed to analyze existing data from multiple programs to answer the regional questions and/or identify data gaps and where additional monitoring or modeling is needed. WQPP staff will work with funding agencies to integrate this effort into regional monitoring programs and other statewide initiatives. (See Research and Monitoring Action Plan.)

**Activity 2.3:** Collect and assimilate pertinent data to better respond to MBNMS condition report questions. The MBNMS condition report is updated approximately every five years and includes six questions in each of four environments (estuarine, nearshore, offshore, and Davidson Seamount) specific to water quality condition and human effects. New research publications will be collected for reference in the condition report. Local experts will be solicited for input and will assist staff in updating the

condition report with new status, trends, confidence, and narrative related to any new information used in the report.

**Activity 2.4:** Pursue opportunities for incorporating or expanding monitoring programs to measure plastic debris and other pollutants of concern in surface waters and the waters below. An effort is underway to identify the quantity and fate of plastic used in agriculture operations. When funding is available, microplastics will be measured in freshwater systems to determine presence and abundance. Other monitoring programs are beginning to look at human specific pollutants such as trash, bacteria, and caffeine. Monitoring results will be provided to local municipalities to inform potential sources and mitigations to reduce or eliminate the pollutant.

**Activity 2.5:** Contribute to HAB research. By collaborating with local researchers/resource agencies, staff will provide water samples to researchers at the University of California at Santa Cruz, collected during the Dry Run and First Flush volunteer monitoring programs, for analysis of urea, microcystin, and possibly other contaminants of interest, thus adding to the pool of knowledge to better understand cause and effects of HABs.

### ***Strategy WQ-3: Quantify effectiveness of management practices***

With limited resources, it is more important than ever to measure and report effectiveness of both management practices and implementation projects for reducing contaminants flowing into surface waters and ultimately MBNMS. This is difficult to quantify, but the information is important to justify costs and encourage implementation of projects reducing pollutant loads to MBNMS. The following activities include efforts within the Elkhorn Slough watersheds.

**Activity 3.1:** Promote innovative projects to better understand effectiveness of water quality improvement. Grant proposals will be developed with partners to construct pilot projects and measure their effectiveness at reducing pollutant loads. Successful projects will be highlighted at AWQA meetings, at workshops, and on the AWQA and Central Coast Action Tracker (CCAT) websites.

**Activity 3.2:** Manage and encourage use of the CCAT online portal. This online tool tracks practices being constructed or implemented in watersheds to improve water quality. Maps identify where practices are installed and pollutant loads are estimated. This tool is not widely used but has the potential to provide valuable information. Updates will be made to enhance the performance and align with stormwater projects.

**Activity 3.3:** Measure and identify most effective management practices. Monitoring of municipal infrastructure repairs in local cities will be conducted and data analyzed and reported. Analysis of agriculture best practices (reported annually to the Central Coast Water Board) are being evaluated through reporting and mapping to better understand level of implementation, challenges, and successes.

### ***Strategy WQ-4: Monitor and reduce pollutant loads flowing into MBNMS***

For over 15 years, WQPP staff, partners, and volunteers have been collecting water samples in surface waters and storm drains along the Central Coast. The majority of these were grab samples and the concentration of specific contaminants in each were compared to regulatory water quality objectives or action levels established by the EPA and the Central Coast Water Quality Control Board. If funding is available, MBNMS will strive to incorporate flow measurements to better calculate contaminant loading, informative for prioritizing true pollution problems.

**Activity 4.1:** Reduce pollutant discharges to storm drains and surface waters through source tracking. Through our dry weather monitoring program, Urban Watch, potential sources of pollutants are tracked upstream when there is flowing water or pollutants are detected using field kits and meters for real time analysis. Staff will also assist municipalities with illicit discharge detection required by stormwater permits on an annual basis.

**Activity 4.2:** Promote and increase use of “human source” and “rapid” indicators. New analytes such as caffeine and quantitative polymerase chain reaction (qPCR) analysis are being incorporated into monitoring programs when funding is available to identify human pollutant sources and devise solutions to eliminate them from the runoff. Urban Watch programs will continue to expand and adapt to the needs of municipalities to meet stormwater permit requirements.

**Activity 4.3:** Increase availability of online tools and resource materials. The AWQA website will continue to be used as a resource for the latest research publications. New print materials, informational resources, and web tools will be added that aid in the reduction of pollutant loads from agriculture operations. In addition, the AWQA calendar is updated twice a month to inform partners of upcoming events and educational opportunities.

**Activity 4.4:** Respond to any unusual discharges threatening MBNMS resources. Investigate any reports of discharges to MBNMS reported to the 24-hour emergency response number, the MBNMS website, or from any other reporting party. This might include overflows to the sanitary sewer system or illicit discharges to a storm drain that flows to MBNMS. All available information will be communicated to the MBNMS regulatory coordinator and superintendent for potential enforcement or follow-up actions.

### ***Strategy WQ-5: Promote public engagement and stewardship through citizen science monitoring programs and other WQPP efforts***

Since 2000, the WQPP team has coordinated several volunteer water quality monitoring programs promoting public involvement while educating individuals about water quality conditions and other human related activities affecting our natural environment. Snapshot Day, First Flush, and Urban Watch programs empower community stewardship. Other opportunities to inform and educate the public about water quality

conditions will be used. The following activities include efforts within the Elkhorn Slough watersheds.

**Activity 5.1:** Coordinate volunteer citizen science programs. Annual programs such as Snapshot Day and First Flush will be conducted, offering opportunities for public engagement and stewardship through scientific data gathering that is important to MBNMS, state, and regional water boards and municipalities.

**Activity 5.2:** Participate in events such as watershed festivals, expert panels, planning/working groups, and trainings. Opportunities will arise to support partners and broaden the reach and knowledge of MBNMS and more specifically water quality issues by participating in these types of events. Examples include Snapshot Day trainings in San Mateo and Santa Cruz and Santa Rita Creek Watershed Festival.

**Activity 5.3:** Highlight successful efforts of individuals, cities, and agriculture operations. Recognize partner organizations and individuals that have shown exemplary commitment and dedication to improving water quality through the MBNMS Volunteer of the Year Award, Star of the Sea awards given to long-time partners, and recognition of individuals at AWQA events or at an annual water quality symposium.

**Activity 5.4:** Provide relevant MBNMS water quality messaging. Current monitoring summary data or relevant water quality facts and messages will be provided for use in print and digital/media materials.

### ***Strategy WQ-6: Communicate findings of projects and monitoring conducted by the WQPP***

Information is only meaningful if it is shared. This strategy is intended to better communicate WQPP projects and results. Water quality data, summary reports, and activities related to improving water quality need to be communicated to a broad audience. Reports, events, and monitoring opportunities will be promoted through multiple channels.

**Activity 6.1:** Increase the public's understanding of effects of pollutants on marine ecosystems. Use MBNMS visitor centers, volunteers, social media, TV, and other opportunities to communicate how humans affect marine resources (e.g., pollution) as well as issues that affect humans directly such as contaminated seafood or harmful algae.

**Activity 6.2:** Convey and promote water quality results and reports for sanctuary-led programs such as Snapshot Day and First Flush for resource managers and the public. Ensure timely completion of water quality reports. For reports that can be made public, send the final report out to appropriate listservs and volunteers and post on MBNMS "What's New" webpage.

**Activity 6.3:** Regularly update the SIMoN portal with MBNMS water quality monitoring results.

**Activity 6.4:** Upload MBNMS water quality data to the CEDEN. In order to make data available to the public, water quality results will be uploaded on a quarterly basis to

CEDEN, pending available State Water Board resources and assistance to maintain CEDEN.

**Activity 6.5:** Coordinate a water quality forum every two years. Work with the WQPP Committee to plan and implement water quality forums with the main intent to share information and further WQPP strategies and activities listed in this action plan.

**Activity 6.6:** Highlight water quality issues and research needs at MBNMS Research Activity Panel meetings.

***Relevant strategies/activities located elsewhere within this management plan:***

Activity WQ-1.3 → Marine Debris Strategy MD-1  
Activity WQ 2.2 → Marine Debris Strategy MD-1  
Activity WQ 2.2 → Marine Debris Activity MD-1.3  
Activity WQ-4.1 → Marine Debris Strategy MD-4  
Activity WQ-5.1 → Marine Debris Strategy MD-5  
Activity WQ-5.2 → Marine Debris Strategy MD-5

***Potential Partners***

Agriculture Water Quality Alliance (AWQA), Association of Monterey Bay Area Governments, California Coastal Commission, California Marine Sanctuary Foundation, California State University Monterey Bay, California State Water Resources Control Board, Central Coast Ambient Monitoring Program (CCAMP), Central Coast Long-term Environmental Assessment Network (CCLEAN), Central Coast Water Quality Preservation, Inc., Central Coast Regional Water Quality Control Board, Central Coast Wetlands Group, Coastal Conservation and Research, Inc., Coastal Watershed Council, Elkhorn Slough Foundation, Elkhorn Slough National Estuarine Research Reserve, Central Coast Integrated Regional Water Management Programs, MBNMS Research Activities Panel, Monterey County Farm Bureau, Monterey Regional Storm Water Management Program, Natural Resources Conservation Service (NRCS), RCD of Monterey County, RCD of Santa Cruz County, RCD of San Mateo County, Surfrider, The Nature Conservancy, University of California Cooperative Extension, US EPA Region 9.



**Water Quality Protection Program Action Plan Goal:** Raise awareness of water quality issues in the watersheds and improve the quality of water entering and within Monterey Bay National Marine Sanctuary.

**Performance Measures Table**

| Strategy Title   | Desired Outcome (Objective)  | Output Measure  | Who Measures      | Timeline |
|--|--|---|-------------------|----------|
| Strategy WQ-1: Facilitate and coordinate regional efforts to improve water quality | Leverage cross-jurisdictional resources to improve sanctuary water quality | Best practices promoted at meetings and on AWQA website.          | WQPP Team         | Annually |
|  |  | NPDES permits reviewed for potential WQ impacts.                  | WQPP Director     | Annually |
|  |  | Agriculture watershed focus group established.                    | Ag WQ Coordinator | Annually |
|  |  | Quarterly WQPP meeting held                                       | WQ Team           | Annually |
|  |  | WQPP MOA extension  | WQPP Director     | Year 1   |
| Strategy WQ-2: Understand the land-sea connection                                  | Develop an understanding how runoff from land effects the sanctuary.       | List of water quality research questions developed                | WQPP Team         | Year 1   |
|  |  | Funding sources for analysis of data identified.                  | WQPP Director     | Ongoing  |
|  |  | Collect and assimilate pertinent data to update condition report. | WQPP Director     | Year 3   |
|  | Contribute to HAB research   | HAB analysis conducted  | WQPP Team         | Annually |

## Section 2: Issue Based Action Plans

|   |   |   |                             |                  |
|---|---|---|-----------------------------|------------------|
| Strategy WQ-3: Quantify effectiveness of management practices   | Management practices are developed, piloted, tracked, and assessed.   | One partner project per year measured effectiveness of water quality improvement. | WQPP Team                   | Annually         |
|   |   | Projects added to Central Coast Action Tracker.                                   | WQPP Team                   | Annually         |
| Strategy WQ-4: Monitor and reduce pollutant loads flowing into MBNMS  | Reduced pollutant discharges to storm drains and surface waters through source tracking                                       | Urban Watch dry weather monitoring program  | Vol. Monitoring Coordinator | Annually         |
|   | Unusual discharges threatening MBNMS resources are immediately responded to   | Incidents investigated  | WQPP Director               | Annually         |
| Strategy WQ-5: Promote public engagement and stewardship through citizen science monitoring programs and other WQPP efforts | Volunteer citizen science programs (Snapshot Day, First Flush) increase community stewardship related to sanctuary watersheds | Two events implemented annually   | WQPP Team                   | Annually         |
| Strategy WQ-6: Communicate findings of projects and monitoring conducted by the WQPP.                                       | Increase the public's understanding of WQ data results and the effects of pollutants on marine ecosystems                     | Pollutant reports for at least two programs                                       | WQPP Team                   | Annually         |
|   |   | SIMoN website has current MBNMS water quality monitoring results                  | Vol. Monitoring Coordinator | Annually         |
|   |   | Water quality data is uploaded to California Environmental Data Exchange Network  | WQPP Team                   | Annually         |
|   |   | MBNMS water quality forum   | WQPP Team                   | Years 2, 4, 6, 8 |

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## Wildlife Disturbance Action Plan

**Goal:** Maintain and improve protection of wildlife within the sanctuary by evaluating and remediating adverse impacts from human activities.

### *Introduction*

Disturbance of marine wildlife is increasing in frequency and severity as an expanding urbanized society increasingly interacts with wild animals, which are often falsely portrayed by media and social media as receptive to human physical contact. Elevated wildlife stress levels from repeated close approach by humans can have chronic negative effects on wildlife health and survival. When an animal enters an alert posture (such as a raised head or nervous movement) due to human encroachment, physiological changes occur that drain the animal's energy and interrupt critical resting and feeding patterns. Most marine animals, unlike pets, live on a fine margin of survival and must feed and rest often. Repeated human encroachment throughout the day and/or night can weaken an animal, leading to weight loss and higher susceptibility to exposure, illness, and disease. In addition, the threat of entanglement from fishing gear or other marine debris can lead to injury or loss of life. High-intensity sound emissions in the marine environment can interrupt wildlife communication, feeding, and navigation and induce harmful physiological stress responses in animals. Persistent cumulative disturbance of wildlife can lead to death.

As human activities have increased at the coastline and technological advances facilitate human access into previously isolated and remote ocean areas, the stress upon marine wildlife has intensified. Highly maneuverable and efficient water and aerial craft can now access any rocky point or distant pocket cove with relative ease. The reduced risk to human operators enables them to boldly intrude into previously inaccessible areas with enhanced confidence and frequency. Thus, previous safe havens for wildlife resting and breeding are no longer impervious to human disturbance. A motorized personal watercraft (MPWC) or unmanned aircraft system (UAS) can appear without warning, creating a startle effect and initiating a full-scale flight response from a colonial seabird rookery or a marine mammal pupping site. Such abrupt, chaotic evacuations often result in broken and exposed eggs, crushed juveniles, and separated mothers and young.

The proliferation of quality wildlife media programs and publications with high-definition close-up images of wildlife in natural settings has spurred a public fascination and desire for intimate contact with animals in the wild. California tourism continues to rise, resulting in increased coastal and nearshore activities, such as paddle sports, boating, sightseeing, wildlife viewing, tide pooling, diving, surfing, hiking, kite and sail sports, general aviation, videography, and photography. The rapid proliferation of hobby aerial drones (also known as unmanned aircraft systems) presents a significant threat of frequent cumulative disturbance of wildlife in all areas of the marine sanctuary. Tourists now carry and deploy compact drones to capture unique vacation photos from aerial vantage points, sometimes flying within a few feet of individual animals or wildlife groups. Commercial tour operators have begun using aerial drones to search for, observe, and film marine birds and mammals at close range as part of their daily operations.

Social media has created the ability to instantly post imagery of episodic marine events, such as a nearshore whale feeding and provide detailed real-time information about location and access points. Consequently, events previously viewed by a few fortunate bystanders now become public events, luring large numbers of people to a specific site within an hour or two. A social dynamic then develops on-site that can lead to multiple wildlife disturbance events as individual people or groups actively pursue marine animals, drawing closer and closer, even to the point of physical contact. As one person draws close, the next person draws even closer, and so on. The short focal length of mobile phone cameras (the most commonly used camera today) exacerbates this problem since phone cameras require close proximity to the subject for any detailed photo. Due to social media, remote coves or lookouts that were known only to a few people for decades are now revealed to the broader public, along with detailed access instructions. This has resulted in trampling of sensitive habitats and increased disturbance of wildlife during vulnerable stages of their development. Residents of Big Sur have reported increased foot and aerial drone traffic into formerly secluded areas, changing the very character of a community renowned for quiet coastal vistas and solitude.

Greater human use of MBNMS has increased the levels of sound in both air and water within the sanctuary. Shipping, boating, and operation of more powerful sonar systems flood the ocean with mechanical and electronic sound 24 hours a day, impacting marine animals that use sound for navigation, feeding, communicating, and mating courtship. In addition, low-altitude flight operations, coastal construction activity, marine fireworks displays, and large-scale public shoreline events can elevate atmospheric sound levels, negatively affecting marine wildlife at the water's surface. At the same time, low-intensity sound can be an effective tool for conducting valuable marine research and surveys that aid protection of marine ecosystems. Therefore, managing levels and intensity of underwater sound is a present natural resource management challenge.

In addition to chronic audible and visual sources of disturbance, marine wildlife can be acutely impaired by entanglement hazards stemming from human activities in the ocean. Marine mammals and seabirds are routinely entangled in both active and lost fishing gear, as well as other sources of ocean debris. Wildlife entanglement is a loss for all involved. Wildlife endure injury or die, and fishermen lose valuable equipment, time, and effort. Understanding sources and patterns of marine debris relative to wildlife movement patterns is crucial for determining how to reduce entanglements. Developing and supporting response programs for disentangling marine wildlife at-sea is necessary to rescue federally protected animals, such as whales, from mortal injury.

MBNMS staff strive to identify and reduce impacts to wildlife and other protected resources through collaborative management efforts with local stakeholders. Staff will use interpretive education and outreach, permitting, and regulatory enforcement methods to implement the following series of strategies and activities to reduce wildlife disturbance threats.

**Strategy WD-1: Mitigate wildlife disturbance from marine vessels and shore-based activities**

Wildlife disturbance is best addressed by measures that prevent disturbance before it occurs. The activities below focus on creating consistent, effective messaging and outdoor programs/projects persuading ocean users to reduce chronic wildlife disturbance through improved personal knowledge and practices (proper wildlife viewing practices).

**Activity 1.1:** Collaborate with partner agencies and stakeholders to develop quantitative, standardized wildlife approach distances and approach/viewing protocols within MBNMS followed by an effective outreach campaign to advertise the standards. The guidelines should be applicable to all motorized and non-motorized vessels operating in the sanctuary.

**Activity 1.2:** Develop and implement sanctuary-wide outreach programs on wildlife viewing guidelines and approach distances to wildlife, in coordination with partners and stakeholders. Examples of outreach tools include signage, media articles, media releases, social media, videos, brochures, public presentations, event booths, visitor center displays, and docent programs.

**Activity 1.3:** Expand the Bay Net and Team OCEAN (Ocean Conservation Education Action Network) docent programs to the maximum extent possible to establish regular field presence at existing and additional sites for a minimum of four days per week (including holidays), year-round. Provide a docent coordinator to train, equip, and coordinate volunteer docents.

**Activity 1.4:** Explore the plausibility and potential for non-profit environmental education/outreach organizations to provide regular trainings for staff at water sport rental shops regarding wildlife approach rules and techniques. Equipping water sport rental staff with quality information and standardized messaging enables those staff to provide enhanced orientations to customers about appropriate marine wildlife viewing guidelines.

**Activity 1.5:** Reduce disturbance to marine wildlife from rented paddle craft (e.g., kayaks, stand-up paddleboards) by promoting enhanced customer accountability through improved customer orientation messaging and techniques, standardized marking protocol for rental craft and enhanced vendor policies, rental agreements, liability notices/clauses, and management controls.

**Activity 1.6:** Continue MPWC regulatory zone management and zone awareness outreach to the MPWC community to keep MPWC confined to areas with minimal risk of wildlife disturbance.

**Activity 1.7:** Develop and implement a management strategy for addressing seabird attraction activities by commercial seabird tour operators.



**Activity 1.8:** Develop and conduct (for a minimum of one year) a science-based assessment of boater compliance with quantitative, standardized regional whale approach distances. Then assess effectiveness of the voluntary compliance program and pursue appropriate regulatory controls if willful violations remain problematic.

**Activity 1.9:** Assist local governments and nonprofit environmental education/outreach organizations to develop tailored strategies for protecting sensitive marine mammal and seabird sites from human disturbance (e.g., Pacific Grove harbor seal protection initiative and San Simeon elephant seal protection plan).

***Strategy WD-2: Mitigate wildlife disturbance from aircraft***

Wildlife disturbance is best addressed by measures that prevent disturbance before it occurs. The activities below focus on creating consistent, effective messaging and use of technological and regulatory methods to reduce chronic wildlife disturbance from traditional and non-crewed flight systems (e.g., planes, helicopters, aerial drones). Several activities specifically address growing encroachment upon wildlife by recreational aerial drone operations within MBNMS.

**Activity 2.1:** Continue collaboration with the Seabird Protection Network (managed by staff at Greater Farallones National Marine Sanctuary) to provide broad outreach to the general aviation community about best flight practices to prevent aircraft disturbance of marine wildlife.

**Activity 2.2:** Develop outreach programs about responsible operation of UAS, or aerial drones, within MBNMS. Some possible outreach tools include signage, targeted outreach to wildlife tour operators, media articles, media releases, social media, videos, brochures, public presentations, event booths (e.g., at air shows and fly-ins), visitor center displays, and docent programs.

**Activity 2.3:** Continue regulated overflight zone monitoring and zone awareness outreach to the general aviation community (including unmanned aircraft system operators) to protect the most sensitive seabird and marine mammal sites along the coast of the sanctuary.

**Activity 2.4:** Immediately participate in the Federal Aviation Administration's (FAA) process to revise airspace designations for the San Francisco area and advocate moving the current Class B airspace away from Point San Pedro to facilitate safe pilot avoidance of seabird colonies at Devil's Slide Rock.

**Activity 2.5:** Verify that FAA and third-party paper and digital aeronautical charts include FAA graphics and notices regarding NOAA regulated overflight zones and rectify as necessary. This is critical to pilot awareness of and compliance with NOAA-regulated overflight zones.

**Activity 2.6:** Coordinate with the Seabird Protection Network and the U.S. Fish & Wildlife Service to evaluate the effectiveness of Activity 2.4 in reducing aircraft disturbance of seabirds at Devil's Slide Rock. If outreach efforts fall short of seabird

protection objectives, assess whether creation of a NOAA regulated overflight zone is warranted at that location.

**Activity 2.7:** Coordinate with California Department of Parks and Recreation (CDPR) and California Department of Fish and Wildlife (CDFW) to determine current or pending state regulatory policies regarding UAS operations within state marine protected areas. Work with CDPR and CDFW to coordinate management, messaging, and enforcement concerning UAS disturbance.

**Activity 2.8:** Coordinate with government and non-government organizations (e.g., Seabird Protection Network, U.S. Fish & Wildlife Service, MPA Watch, and Oikonos Ecosystem Knowledge) to collect data and statistics on disturbance of wildlife by traditional aircraft and UAS within MBNMS.

**Activity 2.9:** Promote public use of the Seabird Protection Network [online incident report](#) to record observed disturbance of wildlife by traditional aircraft and UAS. This will help refine the known scope and scale of this issue.

### ***Strategy WD-3: Develop acoustic baseline profiles within MBNMS***

This strategy recognizes a need for systematic assessment of the soundscape within MBNMS to characterize potential threats to marine habitats and wildlife. It initiates a process for defining essential elements for investigation and developing findings and potential recommendations for management action.

**Activity 3.1:** Develop goals and objectives for characterizing and measuring the underwater soundscape within MBNMS. Collaborate with ONMS staff on national priorities, protocols and issue identification.

**Activity 3.2:** Foster research efforts to monitor sound as a core variable tracked over time. Promote and aid acquisition of equipment required to better quantify the acoustic landscape and identify experts who can precisely locate, measure, and analyze sonic activity.

### ***Strategy WD-4: Reduce underwater low-frequency mechanical sound emissions***

Activities within this strategy focus on direct reduction of underwater sound source emissions that pose a threat to marine wildlife and habitats, but also acknowledge the value of non-harmful sound emissions that advance sanctuary research and stewardship goals. Methods of sound reduction include development of best management practices, acoustics education/outreach to the public, upgrades of marine propulsion systems, permit administration, and legal controls.

**Activity 4.1:** Assess monitoring results from WD-3 specific to use of seal bombs and take appropriate action based on findings.

**Activity 4.2:** Include best management practices for minimizing acoustic interference with marine wildlife from motorized tour boat operations in sanctuary wildlife etiquette guidelines (see Activity 1.2) and disseminate to tour operators.

**Activity 4.3:** Improve public understanding of the importance of underwater acoustics in the marine environment through visitor center exhibits, special events, and other outreach methods that highlight how marine wildlife use acoustics for survival and how low-intensity sound can be employed for marine research and other natural resource management activities. This will help people make personal and societal decisions about reducing noise in the sea.

**Activity 4.4:** Support programs expediting replacement of old marine propulsion plants with modern systems designed for reduced noise emissions.

***Strategy WD-5: Use administrative methods to reduce wildlife disturbance***

The activities under this strategy promote public compliance with wildlife protection regulations and guidelines without action by the NOAA Office of Law Enforcement (OLE).

**Activity 5.1:** Explore and implement (as practicable) innovative, collaborative solutions for enhancing compliance with MBNMS wildlife protection regulations and policies (e.g., expanded docent programs, enhanced enforcement of partner agency natural resource ordinances and regulations, camera surveillance, and community service options).

**Activity 5.2:** Use permit authority to prevent and reduce negative impacts from proposed activities presenting a risk of wildlife disturbance (e.g., marine fireworks displays and coastal construction).

***Strategy WD-6: Use law enforcement resources to reduce wildlife disturbance***

The activities below are designed to optimize NOAA and partner law enforcement capabilities to ensure public compliance with MBNMS wildlife protection regulations and detection/prosecution of violation activity.

**Activity 6.1:** Work with NOAA OLE and federal/state partner agencies to increase uniform and investigative OLE presence within MBNMS for enhanced prevention of, immediate response to, and reduction of wildlife disturbance.

**Activity 6.2:** Work with NOAA OLE to optimize the joint enforcement agreement with California Department of Fish & Wildlife to address wildlife disturbance issues within MBNMS.

**Activity 6.3:** Coordinate with NOAA OLE and NOAA General Counsel to develop enforcement response protocols for addressing social media posts containing evidence of sanctuary regulatory violations related to wildlife disturbance.

**Activity 6.4:** Standardize notification protocols from the U.S. Coast Guard to MBNMS regarding lost shipping containers at sea to enhance MBNMS response to such incidents and mitigate potential marine debris impacts to wildlife.

### ***Strategy WD-7: Reduce the risk of wildlife entanglement in fishing gear***

This strategy implements collaborative efforts between the fishing industry, fisheries management, NGOs, scientists, and other stakeholders to better understand patterns of marine mammal entanglement with fishing gear and develop programs for reducing entanglements (e.g., lost fishing gear removal and best fishing practices guide).

**Activity 7.1:** Collaborate with federal and state fisheries managers, scientists, NGOs, fishermen, and other stakeholders to address an increase in large whale entanglements in Dungeness crab fishing gear. MBNMS staff will continue to participate in the State Dungeness Crab Fishing Gear Working Group, which may evolve to include additional fisheries such as sablefish and spot prawn that involve incidental whale entanglements. The working group has developed a Risk Assessment and Mitigation Program which will determine whether any management measures need to be taken to reduce entanglement risk during the fishing season. Management measures may be employed during medium- to high-risk scenarios and could include reducing the number of pots in an area or temporary area restrictions based on best available data on the co-occurrence of whales and gear.

**Activity 7.2:** Collaborate with fisheries managers and multiple stakeholders to provide input on data gaps such as whale and crab gear distribution surveys (e.g., Applied California Current Ecosystem Studies [ACCESS] surveys) and whale forage distribution research. MBNMS will collaborate with researchers to provide synthesized information on whale densities that can be used during a whale entanglement risk assessment for a particular fishery.

**Activity 7.3:** Coordinate with multiple agencies on lost fishing gear removal programs in coastal ports on an as needed basis. A number of ports in MBNMS have established a lost fishing gear program for pots and traps and MBNMS will continue to coordinate with the program leads on any recovered gear in the sanctuary.

**Activity 7.4:** Promote the use of outreach tools, such as the best fishing practices guide that provides guidance on deployment and recovery for trap and pot related fisheries. As needed, MBNMS staff will assist on promoting the [best practices guide](#) to minimize whale entanglement risk and any updated revisions and other outreach tools developed in the future.

### ***Strategy WD- 8: Respond to wildlife entangled in fishing gear***

This strategy includes activities that improve direct, rapid, and coordinated notification to response team members upon detection of entangled whales and other marine mammals. It also includes activities that provide direct logistical support for entanglement response efforts.

**Activity 8.1:** In close coordination with the NMFS Marine Mammal Stranding Network, continue providing logistical support (e.g., vessel assets, trained staff) for whale entanglement incidents in MBNMS. ONMS staff participate in whale disentanglement trainings (levels are I to IV), maintain gear such as buoys and satellite tags for deployment during rescues, and are on call for vessel support for the R/V *Fulmar*.

**Activity 8.2:** Continue rapid notifications of reported wildlife entanglements to the appropriate agencies and consortiums equipped and trained to remove lines and nets from marine wildlife. Many types of wildlife are entrapped or entangled in fishing gear, including leatherback sea turtle, seals, sea lions, and seabirds. MBNMS staff refers calls from the public to the appropriate agencies and follows up to ensure appropriate action is taken for serious cases.

**Activity 8.3:** Maintain updated contact information on MBNMS website for public communication with appropriate entangled wildlife responders, according to wildlife category and county. The current listings for reporting of wildlife emergencies can be found [on the MBNMS website](#).

***Relevant strategies/activities located elsewhere within this management plan***

Activity WD-1.3 → Resource Protection Activity RP 7.2

Strategy WD-8 → Marine Debris Activity MD-3.5

***Potential Partners***

Monterey Bay National Marine Sanctuary Foundation, Seabird Protection Network, Monterey Bay Aquarium, water sport rental vendors, environmental education/outreach organizations, universities and research community, Pacific Fisheries Management Council, fishing organizations, shipping organizations, wildlife tour vendors, unmanned aircraft system manufacturers, coastal county and city authorities, harbor authorities, California Department of Fish & Wildlife, California Department of Parks & Recreation, California Division of Boating & Waterways, National Marine Fisheries Service, NOAA Office of Law Enforcement, NOAA General Counsel, U.S. Coast Guard, U.S. Bureau of Land Management, U.S. Fish & Wildlife Service, U.S. Forest Service, and Federal Aviation Administration.

**Wildlife Disturbance Action Plan Goal:** Maintain and improve protection of wildlife within the sanctuary by evaluating and remediating adverse impacts from human activities.

**Performance Measures Table**

| Strategy Title  | Desired Outcome (Objective)   | Output Measure  | Who Measures                            | Timeline  |
|---|---|---|---|-----------|
| Strategy WD-1: Mitigate wildlife disturbance from marine vessels and shore-based activities | Prevention of wildlife disturbance before it becomes an issue                                 | Approach distance guidance & protocols developed for whales | Resource Protection Team & stakeholders | Years 1-2 |
|   |   | Guidance distributed to user groups                         | Resource Protection & Education Teams   | Years 2-3 |
|   |   | Compliance assessment conducted                             | Resource Protection Team                | Year 4    |
|   |   | Expanded Team OCEAN and Bay Net                             | Resource Protection Specialist          | Year 4    |
| Strategy WD-3: Develop acoustic baseline profiles within MBNMS                              | Characterize the underwater soundscape within MBNMS   | Characterization goals and objectives finalized             | Research Team                           | Year 1    |
| Strategy WD-4: Reduce underwater low-frequency mechanical sound emissions                   | Reduction of underwater sound-source emissions posing a threat to marine wildlife and habitat | Assessment of monitoring data.                              | Resource Protection Team                | Year 2    |



## Section 2: Issue Based Action Plans

|  |   |   |  |          |
|--|---|---|--|----------|
|  | Best management practices for minimizing acoustic interference with marine wildlife developed for motorized tour boat operations in sanctuary | Coordination with whale watch operators and whale experts conducted   | Resource Protection Team                             | Year 1   |
|  |   | Distribution of best management practices   | Resource Protection Team                             | Year 2   |
|  | Improved public understanding of the importance of underwater acoustics in the marine environment   | Visitor center exhibits installed at Sanctuary Exploration Center and Coastal Discovery Center revealing how marine organisms use acoustics | Education Team                                       | Year 4   |
| Strategy WD-8: Respond to wildlife entangled in fishing gear | Improve rapid and coordinated response for entangled wildlife   | Participation in whale disentanglement trainings, maintained rescue gear and on-call vessel support   | Resource Protection Team and West Coast Region staff | Annually |
|  | Provide public information on who to contact for wildlife issues  | Updated MBNMS webpage and phone tree directing public to appropriate regional marine wildlife response organizations                        | Resource Protection Team                             | Annually |

## SECTION 3: PROGRAM BASED ACTION PLANS



- Education, Outreach, and Communication Action Plan
- Marine Spatial Planning Action Plan
- Maritime Heritage Action Plan
- Operations and Administration Action Plan
- Research and Monitoring Action Plan
- Resource Protection Action Plan

Sanctuary Exploration Center. Photo: NOAA

Dr. Steve Lonhart monitors for invasive species. Photo: Chad King/NOAA

ONMS vessel and a cruise ship. Photo: NOAA

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## Education, Outreach, and Communication Action Plan

**Goal:** To increase protection and appreciation of sanctuary resources by building greater public understanding, engagement, and stewardship throughout our highly diverse coastal communities.

### *Introduction*

MBNMS requires extensive education, outreach, and communication strategies to engage public constituents and help fulfill the overarching mission “to understand and protect the coastal ecosystem and cultural resources of Monterey Bay National Marine Sanctuary.”

Education programs are designed to enhance public awareness and understanding of the sanctuary and its resources and build stewards to help take on the responsibility of protecting these special underwater treasures. MBNMS education programs are in direct alignment with the ONMS education vision and mission.

ONMS Education Vision: An ocean-literate public making informed environmental decisions.

ONMS Education Mission: To inspire ocean and climate literacy and conservation through national marine sanctuaries.

The development of effective and coordinated education programs is a priority for all national marine sanctuaries. Over the past 25 years, MBNMS has invested in long-term education strategies to raise the public’s awareness and understanding of the local and regional marine environment, while creating engagement opportunities for protecting sanctuary resources. These education programs complement the sanctuary’s broad-based community outreach efforts by focusing on targeted audiences such as students, teachers, families, and businesses.

MBNMS works collaboratively with a number of partners to implement community-based education, interpretation, and volunteer programs. The sanctuary uses education as a resource management tool to address specific priority ecosystem protection issues identified during the management plan review process. Education is essential to achieving many of the sanctuary’s management objectives. In addition, education is used to both complement and promote other sanctuary programs such as research, resource protection, and enforcement through multiple outreach and communication strategies.

To meet education and outreach goals, the 2008 MBNMS management plan laid out a set of specific strategies and activities for exploring new opportunities to reach constituents, such as the development of interpretative facilities, including visitor centers and signage, promoting fisheries related education, and increasing ocean literacy through volunteer engagements, business relations, and targeted multicultural K-12 education programs for teachers and students.

Since 2008, MBNMS focused its efforts with governmental and nonprofit partners on construction of the Sanctuary Exploration Center in the city of Santa Cruz, a large 12,000 ft<sup>2</sup> interpretative visitor center for education, outreach, and community engagement. Opened in 2012, the Sanctuary Exploration Center features state-of-the-art interactive multimedia exhibits, virtual theater experiences, a gift and bookstore showcasing local artists, and a teaching lab/classroom used for education programs and as a public meeting space. The Sanctuary Exploration Center provides a critical vehicle for interpretation of ocean resources and provides a tangible presence in the Monterey Bay community and across the five coastal counties adjacent to the sanctuary.

The Sanctuary Exploration Center offers multiple public programs, including docent-led guided tours, school field trips, and special events such as film festivals, science speaker symposiums, First Friday events promoting local community artists, and science and conservation conferences and workshops. Through interactive programs, visitors immerse themselves in the role of the sanctuary in coastal and ocean protection.

In addition to the Sanctuary Exploration Center, the Coastal Discovery Center, a 1,000 sq. foot office and interpretative center in partnership with California State Parks, is located at William Randolph Hearst Memorial State Beach in San Simeon and has served as an established sanctuary interpretation presence in MBNMS southern region since 2006. Hosting about 15,000 visitors annually, the Coastal Discovery Center introduces the natural and cultural history of this special part of the Central Coast.

More than 2,500 schoolchildren annually engage in experiential education programs at MBNMS visitor centers. Visitor centers feature hands-on activities such as pier oceanography, plankton sampling, beach exploration, marine debris assessment, marine mammal and bird identification, and sustainable fisheries management games. Students from diverse multicultural backgrounds learn about their role in ocean and wildlife protection and MBNMS builds a new generation of stewards. Since 2006, over 650,000 visitors have experienced sanctuary interpretative facilities to heighten their awareness of ocean issues and resources, promote environmental stewardship, and foster community support and engagement in MBNMS programs and NOAA's National Marine Sanctuary System.

MBNMS has developed and supported numerous community-based citizen science programs. Programs began in 1997 with Beach COMBERS, which was followed by the

## CITIZEN SCIENCE PROGRAMS

### **Beach COMBERS**

A beach monitoring study, using volunteers to sample selected sections of beach for stranded marine birds and mammals.

### **First Flush**

Held during the first major storm of the year, volunteers analyze water quality to characterize "first flush" storm water runoff.

### **Snapshot Day**

Volunteers test water quality throughout the sanctuary's watersheds one day each spring.

### **Urban Watch**

Volunteers collect urban runoff water samples from storm drains during dry weather months. Samples are analyzed for contaminants.

creation of water quality citizen science programs Urban Watch, Snapshot Day, and First Flush. MBNMS also coordinated the early years of the sandy beach and rocky intertidal monitoring program LiMPETS (Long-Term Monitoring Program and Experiential Training for Students). Over the years, an increased number of partners have supported and taken the lead on several successful citizen science efforts. A consortium of agencies and Moss Landing Marine Labs now coordinates the Beach COMBERS program, while Pacific Grove Museum of Natural History, Greater Farallones Association, and Channel Islands and Greater Farallones national marine sanctuaries all coordinate the LiMPETS network. Although MBNMS continues to support these efforts, much of the focus on citizen science is placed on monitoring programs addressing specific resource protection priorities, such as sanctuary water quality.

### ***Strategy EOC-1: Coordinate education programs through sanctuary visitor centers***

MBNMS will further develop and deliver K-12 educational programs aimed to increase ocean literacy and stewardship among students and teachers. Programs will be based on sanctuary ecosystems and resource protection issues and will be relevant to content standards in K-12 classrooms. Students and teacher participation and engagement in sanctuary education programs will increase knowledge of ocean issues and allow for opportunities to be more active stewards of the sanctuary.

**Activity 1.1:** Continue to deliver hands-on, K-12 student and teacher programming focused on sanctuary resources, research, and ecosystem protection issues at the Sanctuary Exploration Center and Coastal Discovery Center.

**Activity 1.2:** Develop a sanctuary visitor center K-12 education plan with theme-based activities for specific grade levels aligning with California Environmental Literacy Initiative standards and Next Generation Science Standards and incorporating ocean and climate literacy principles.

**Activity 1.3:** Use NOAA developed curriculum resources for K-12 students through visitor center education programs to address emerging ocean issues such as a changing climate, ocean acidification, rising sea levels, and marine debris.

**Activity 1.4:** Implement K-12 teacher professional development trainings using NOAA curriculum resources and sanctuary citizen science monitoring through visitor center education programs.

### ***Strategy EOC-2: Enhance sanctuary interpretation and outreach programs***

Develop community support and partnerships for ocean conservation through targeted outreach and interpretation efforts. Strategies developed to address specific resource protection issues, such as water quality monitoring and field-based wildlife disturbance interpretative enforcement programs, are described in the Resource Protection, Wildlife Disturbance, and Water Quality action plans.



**Activity 2.1:** Provide comprehensive training, coordination, and support for volunteers in monitoring, interpretation, and outreach needs of the sanctuary, including visitor centers and citizen science monitoring.

**Activity 2.2:** Implement guided learning experiences for a wide range of audiences at sanctuary visitor centers to build awareness and increase understanding of sanctuary resources, research, and ecosystem protection issues (e.g., lecture series, docent-led tours, family and youth-focused programs).

**Activity 2.3:** Implement fisheries-related education programs that promote sustainable fisheries through an understanding of fisheries science, including natural history, fishing techniques, and socioeconomics of fishing in the sanctuary (e.g., Voices of the Bay, Fishermen in the Classroom).

**Activity 2.4:** Host and participate in local, regional, and national outreach events to increase sanctuary awareness and public engagement and promote volunteer opportunities (e.g., Whale Fest, Get Into Your Sanctuary day, Coastal Discovery Fair).

**Activity 2.5:** Assess opportunities, develop outreach plans, and implement interpretative experiences using virtual technology (e.g., distance learning programs, telepresence, live video streaming).

***Strategy EOC-3: Promote public engagement and stewardship through citizen science monitoring programs***

Create stewards of the sanctuary by engaging youth and adults in large-scale, long-term citizen monitoring programs. Working with partner organizations, volunteers, students, and teachers, MBNMS staff will support field-based monitoring programs relevant to MBNMS research, policy, and management. Strategies developed to address specific resource protection issues, such as long-term water quality monitoring, are described in the Water Quality and Resource Protection action plans.

**Activity 3.1:** Collaborate with other California national marine sanctuaries, the Pacific Grove Museum of Natural History, and partners to support on-going intertidal and sandy beach monitoring efforts and coordinated activities for the LiMPETS network.

**Activity 3.2:** In collaboration with Moss Landing Marine Laboratories, support ongoing beach monitoring efforts of the Beach COMBERS program, engaging volunteers to conduct surveys of sanctuary beaches for deposition of beach-cast carcasses of birds and mammals.

**Activity 3.3:** Identify and conduct needs assessments to develop additional citizen science monitoring programs to engage students, partner organizations, and volunteers

using NOAA designed protocols with an emphasis in supporting K-12 education (e.g., NOAA Marine Debris Monitoring and Assessment Project, plankton monitoring).

***Strategy EOC-4: Maintain and develop sanctuary-wide exhibits and interpretive signage***

Increase awareness and build knowledge of the sanctuary through the development of interpretative signage and exhibits throughout the region.

**Activity 4.1:** Maintain and update existing interpretative signage inventory, including identification of repairs, replacements, or removals needed.

**Activity 4.2:** Identify opportunities and leverage partnerships for sanctuary-related interpretative signage projects at strategic locations for increased exposure of sanctuary messages to wide-ranging audiences (e.g., Sanctuary Scenic Trail, California Coastal Trail, Whale Trail).

**Activity 4.3:** Maintain and improve sanctuary visitor center-based exhibits for interpretation of sanctuary resources, research, ecosystem protection issues, and maritime heritage (e.g., ocean acidification, harmful algal blooms, coastal resilience and sea level rise, water quality, marine debris, wildlife disturbance, shipwrecks, underwater acoustics).

**Activity 4.4:** Develop and maintain placement of mobile exhibits and wayside technologies at strategic locations for increased exposure of sanctuary messages to wide-ranging audiences.

**Activity 4.5:** Develop a sanctuary visitor center interpretation and exhibit plan, using ONMS best practices, for the creation of new exhibits incorporating new themes, messages, research and technologies.

***Strategy EOC-5: Foster and promote government and community relations***

Increase awareness of the inherent socioeconomic value of national marine sanctuaries to promote positive sentiment toward the sanctuary and to create a larger coalition of support for sanctuary programs among a broader and more diverse audience.

**Activity 5.1:** Build collaborative partnerships with local business and the tourism industry, such as visitor bureaus, travel and hospitality associations, and recreational on-the-water tour operators to raise ocean health awareness, develop sanctuary brand recognition, strengthen and broaden the community of support for MBNMS goals, and promote value-added benefits of the sanctuary to local economies.

**Activity 5.2:** Participate in the Monterey Bay Ecotourism Regional Initiative (MBETR). MBETR is a regional (Monterey, Santa Cruz, San Benito counties) effort to develop, integrate, and implement sustainable practices in the hospitality, tourism, recreation, and wellness business sectors. Highlight MBNMS as the inspiration and backdrop for why this region should be both protecting and promoting the sanctuary. One element of

this work for MBNMS will be the development and implementation of a Whale Tail Business Recognition Program.

**Activity 5.3:** Engage in targeted outreach to local government, advisory boards, and educational institutions to foster and promote sanctuary relevance and awareness of the inherent socioeconomic value of national marine sanctuaries while garnering support from the broader constituency.

**Activity 5.4:** Deliver public presentations and serve as guest speakers with local communities, governments, and partner organizations with a focus on increasing awareness of sanctuary resources, research, ecosystem protection issues, education, and conservation efforts.

***Strategy EOC-6: Increase awareness of the sanctuary through effective media and communication tools***

Leverage local, regional, and national media opportunities to engage the public through targeted communication of sanctuary resources, research, ecosystem protection issues, education, and volunteer programs.

**Activity 6.1:** Maintain and grow a contact database of media representatives and outlets with interest in sanctuary-related stories.

**Activity 6.2:** Develop a media communication plan for promoting ongoing public interest stories and short-term, event-driven media plans when appropriate.

**Activity 6.3:** Supply media outlets with sanctuary events and public interest stories and work with ONMS to distribute community announcements, media advisories, press releases, news articles, and web stories to the media when appropriate.

**Activity 6.4:** Build relationships with key local media representatives by organizing media visits to sanctuary activities, including research cruises and public events as appropriate.

**Activity 6.5:** Develop a comprehensive social media strategy, using NOAA/NOS social media protocols, to increase awareness of sanctuary research, education, and ecosystem protection programs and foster stewardship of sanctuary resources.

**Activity 6.6:** Assess opportunities, develop outreach plan, and produce educational video products to promote protection of sanctuary resources, including regular programming on local access television stations.

***Strategy EOC-7: Engage in local, regional, and national collaborations to leverage education and outreach opportunities***

Engage in local and regional groups to explore collaborations for the development of education partnerships and joint programs to reduce potential duplication of efforts (e.g., Monterey Bay Environmental Educators, Ocean Communicators Alliance, state marine protected areas collaboratives, Save Our Shores).

**Activity 7.1:** Support the Sanctuary Advisory Council in creating an Education Working Group or subcommittees for the development of specific education-related initiatives for addressing management issues as appropriate.

**Activity 7.2:** Develop appropriate ONMS West Coast Region education and outreach projects that leverage opportunities and promote resources across West Coast national marine sanctuaries (e.g., ocean acidification outreach products, deep sea coral curriculum).

**Activity 7.3:** Support ONMS education and outreach initiatives leveraging and promoting the National Marine Sanctuary System-wide resources and messages (e.g., Earth is Blue campaign).

### ***Strategy EOC-8: evaluate effectiveness of sanctuary education and outreach efforts***

Conducting evaluations for the systematic collection of information about activities and outcomes will provide the basis for assessment, improving effectiveness of program implementation and informing decisions about future program development. The evaluation methods and tools developed for education programs will track short- and long-term outcomes in measuring whether goals and objectives have been met.

**Activity 8.1:** Design and implement comprehensive evaluation strategies for existing and new K-12 education and citizen science programs, products, and activities to provide formative and summative assessments designed to meet stated goals, objectives, and desired outcomes.

**Activity 8.2:** Work through Office of Management and Budget approval process to develop surveys or evaluation tools needed to support evaluation plans.

### ***Relevant strategies/activities located elsewhere within this management plan***

Strategy EOC-1 → Davidson Seamount Strategy DS-3  
 Activity EOC 1.1 → Climate Change Activity CC-3.1  
 Activity EOC 1.3 → Climate Change Activity CC-3.2  
 Strategy EOC-2 → Davidson Seamount Strategy DS-3  
 Strategy EOC-2 → Coastal Erosion and Sediment Management Activity CESM-8.2  
 Strategy EOC-4 → Davidson Seamount Strategy DS-3  
 Activity EOC 4.3 → Climate Change Activity CC-3.3  
 Activity EOC 5.4 → Marine Spatial Planning Activity MSP-4.2, 6.2  
 Strategy EOC-6 → Davidson Seamount Strategy DS-3

### ***Potential Partners***

NOAA Office of Ocean Exploration and Research, National Marine Fisheries Service, NOAA Marine Debris Program, U.S. Forest Service, Elkhorn Slough National Estuarine Research Reserve, California State Parks, California Department of Fish and Wildlife, City of Monterey, City of Santa Cruz, National Marine Sanctuary Foundation, Monterey Bay National Marine Sanctuary Foundation, Ocean Protection Council, Save Our

Shores, O'Neill Sea Odyssey, Seabird Protection Network, Friends of the Elephant Seal, One Cool Earth, Pacific Grove Museum of Natural History, Cabrillo College, Moss Landing Marine Laboratories, California State University Monterey Bay, Santa Cruz County Office of Education, Monterey County Office of Education, San Luis Obispo County Office of Education.

**Education, Outreach, and Communications Action Plan Goal:** To increase protection of sanctuary resources by building greater public understanding, engagement, and stewardship in our highly diverse coastal communities.

**Performance Measures Table**

| Strategy Title  | Desired Outcome  | Measure   | Who Measures              | Timeline                 |
|---|--|---|---------------------------|--------------------------|
| Strategy EOC-1: Coordinate education programs through sanctuary visitor centers | Increase ocean literacy and stewardship among students and teachers                | Five-year education plan for formal audiences                                 | Education & Outreach Team | 1. Year 3                |
|   |  | Student programs delivered  | Education & Outreach Team | Ongoing                  |
|   |  | K-12 teacher professional development trainings developed and delivered.      | Education & Outreach Team | Year 4                   |
| Strategy EOC-2: Enhance sanctuary interpretation and outreach programs          | Address specific resource protection issues through a variety of outreach programs | Volunteer programs have comprehensive training, coordination, and support     | Education & Outreach Team | Ongoing                  |
|   |  | Guided learning experiences implemented                                       | Education & Outreach Team | Ongoing                  |
|   |  | Fisheries-related education programs implemented                              | Education & Outreach Team | Opportunistic            |
|   |  | Interpretative experiences using virtual technology developed and implemented | Education & Outreach Team | Years 3-5, opportunistic |

### Section 3: Program Based Action Plans

|   |   |   |                                       |           |
|---|---|---|---------------------------------------|-----------|
| Strategy EOC-3: Promote public engagement and stewardship through citizen science monitoring programs | Create sanctuary stewards by engaging youth and adults in long-term, large-scale citizen monitoring programs. | LiMPETS network participation   | Education & Outreach, Research teams  | Ongoing   |
|   |   | Beach COMBERS program supported   | Education & Outreach, Research teams  | Ongoing   |
|   |   | Needs assessments developed and implemented   | Education & Outreach Team             | Year 2    |
| Strategy EOC-4: Maintain and develop sanctuary-wide exhibits and interpretive signage                 | Increase awareness and build knowledge of the sanctuary through signage and exhibits                          | Updated interpretative signage inventory  | Education & Outreach Team             | Year 1    |
|   |   | Exhibits are properly maintained and provide relevant, updated content  | Deputy Superintendent                 | Years 2-4 |
|   |   | Technologies are properly maintained and updated  | Deputy Superintendent                 | Ongoing   |
|   |   | Five-year exhibit plan  | Education & Outreach Team             | Year 1    |
| Strategy EOC-5: Foster and promote government and community relations                                 | Promote positive sentiment toward the sanctuary   | Increased engagement with business and tourism partners to raise awareness of sanctuary resources, programs, and issues | Superintendent, Education Team        | Years 1-3 |
|   | Create a larger coalition of support for sanctuary programs   | Recreation and Tourism Working Group supported  | Superintendent, Education Team        | Ongoing   |
| Strategy EOC-6: Increase awareness of the sanctuary through effective media and communication tools   | Leverage media opportunities to engage the public through targeted communication                              | Updated database of media outlets and reporters   | Education Coordinator, Superintendent | Ongoing   |
|   |   | Five-year media engagement plan with comprehensive social media plan  | Education Coordinator                 | Year 3    |



### Section 3: Program Based Action Plans

|  |   |   |                       |        |
|--|---|---|-----------------------|--------|
| Strategy EOC-8: Evaluate effectiveness of sanctuary education and outreach efforts | Conduct periodic assessment of education and outreach programs to inform future program development | Comprehensive evaluation plan for existing and future education and outreach programs | Education Coordinator | Year 2 |
|  |   | Program assessments   | Education Team        | Year 3 |

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## Marine Spatial Planning Action Plan

**Goal:** To improve conservation science and resource protection and management on select site-specific issues through the application of marine spatial planning (MSP) principles.

### ***Introduction***

MBNMS staff address a wide range of resource protection and management issues, varying in complexity and geographic scope. This action plan focuses on nine issues requiring special approaches and strategies. It seeks to balance uses and protections of sanctuary resources and to improve scientific understanding. Significant staff time and resources are dedicated to these complex issues.

MSP is a comprehensive, ecosystem-based approach and process through which compatible human uses are objectively and transparently allocated to appropriate ocean areas to sustain critical ecological, economic, and cultural services for future generations. The goals of MSP are to maximize societal benefits of ocean uses while minimizing impacts on ecologically sensitive areas and species and reducing conflicts between activities sharing marine locations. This action plan addresses a wide range of activities, including research, vessel traffic, collaboration with fisheries managers, recreation (MPWCs and golf courses), low flying aircraft, alternative energy, and conservation practices (MPAs). Proposed actions generally involve enhanced coordination or collaboration with partners and/or stakeholders, or monitoring and evaluation to determine impacts, benefits, and best management practices.

### ***Strategy MSP-1: Implement sanctuary ecologically significant areas (SESAs)***

In response to the needs for more ecosystem-based management and for focal areas in such a large sanctuary, MBNMS staff identified 16 sanctuary ecologically significant areas (SESAs) in 2013. These areas encompass remarkable, representative, and/or sensitive marine habitats, communities, and ecological processes. SESAs are focused on deep-water benthic habitats located in offshore (> 3 miles from shore) federal waters, including portions of MBNMS to the west of state waters and the Davidson Seamount Management Zone. SESAs support the following management needs:

- A. Improving our understanding of deep-water habitats and organisms.
- B. Improving our ability to adaptively manage important resources and serve as test cases for other areas within MBNMS. SESA information prepares staff for engaging in National Marine Fisheries Service review of groundfish Essential Fish Habitat, as well as future potential issues including offshore energy development, offshore aquaculture, oil spills, proposed changes to shipping lanes, noise, or climate changes.
- C. Targeting research and monitoring efforts and coordinating with the scientific community. Findings from focal areas may help inform future management decisions and policy in other parts of MBNMS.
- D. Measuring and evaluating the status, trends, and protection levels for condition reports and management plans.

In order to identify SESAs, MBNMS staff worked with the scientists, fishermen, conservation NGOs, and other agencies to collect and evaluate over 150 layers of GIS data. Primary and secondary criteria were identified to select areas addressing multiple objectives. Primary criteria include benthic habitat identified by depth zones, substrate type, benthic structure-forming invertebrates (e.g., deep-sea corals and sponges) and locations where visual or research data have been collected. Secondary criteria include upwelling hotspots, visual imagery, stakeholder input and existing management connections.

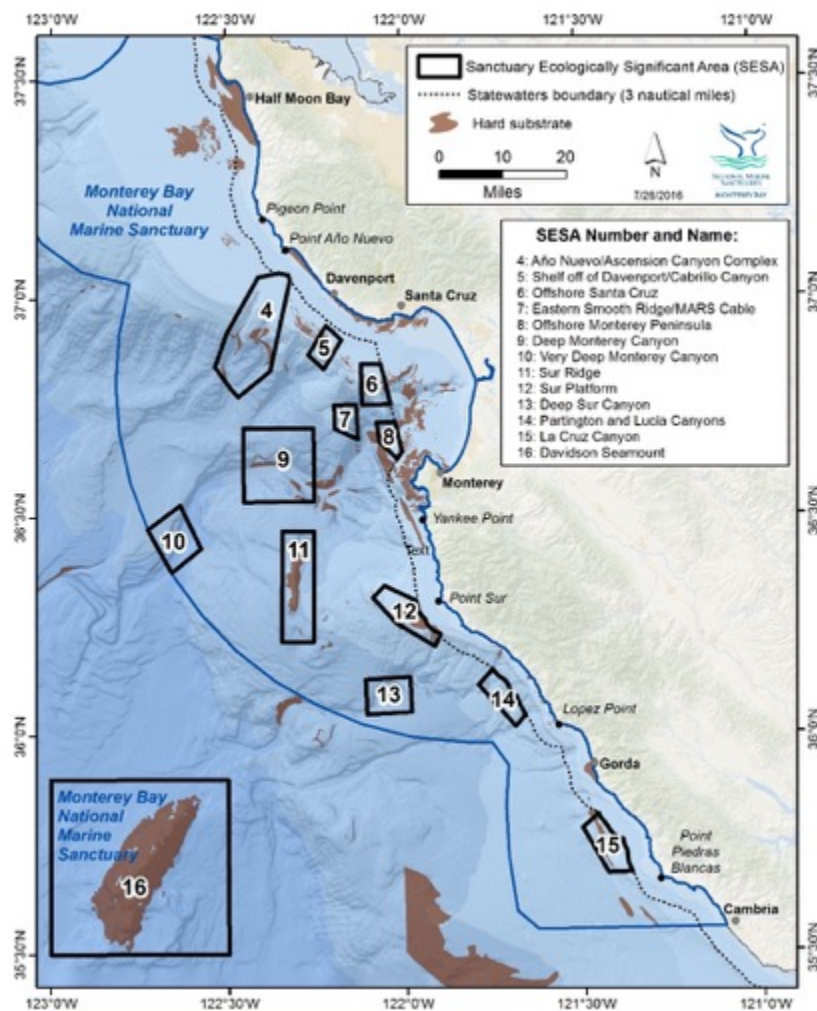


Figure MSP-1. Sanctuary Ecologically Significant Areas (SESA)  
Image: NOAA

**Activity 1.1:** Target research and monitoring efforts in SESAs through coordination with the scientific community. Continue to image areas identified in SESAs in order to characterize and map biogenic hot spots through ROV and AUV technologies.

**Activity 1.2:** Complete a SESA technical report to describe the methods applied for the identification of SESAs.

**Activity 1.3:** Continue to use SESA data in ecosystem management decisions (i.e., contribute data and information to state and federal fishery management agencies as needed).

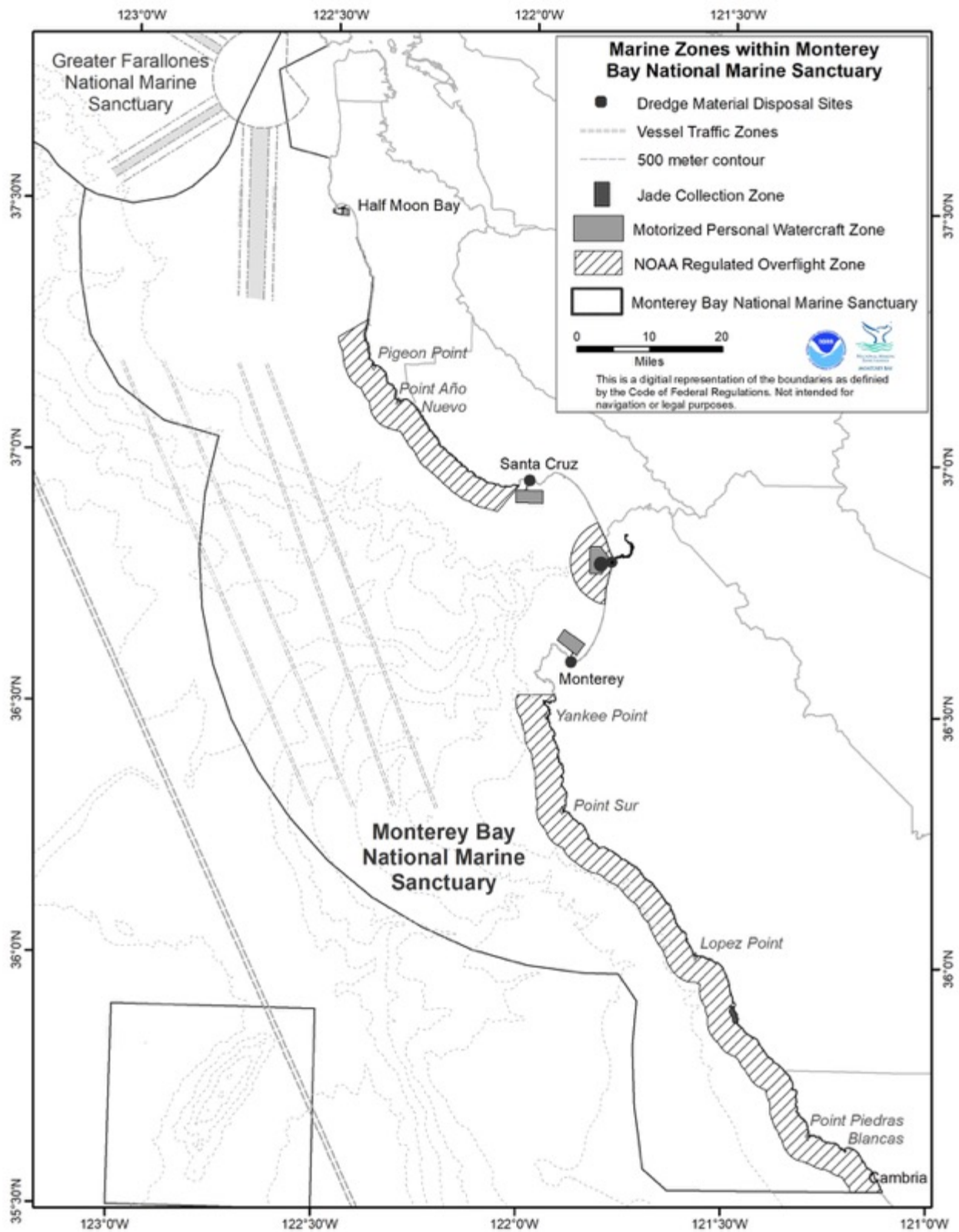


Figure MSP-2. Marine Zones in MBNMS. Image: NOAA

### ***Strategy MSP-2: Track and monitor vessel traffic compliance***

The IMO-adopted recommended tracks were established in 2000 to reduce threats of spills by vessel traffic such as container ships, bulk carriers, and oil tankers. Since that time, MBNMS has periodically [analyzed compliance and published reports](#). (MBNMS 2014)

**Activity 2.1:** Continue to track and monitor container ships, bulk freighters, and vessels carrying hazardous materials for compliance with IMO recommended tracks.

**Activity 2.2:** Coordinate with the U.S. Coast Guard on contact and notifications for vessels deviating from tracks. USCG has jurisdiction for all mariners and can contact a vessel directly while underway and request they resume use of the recommended tracks.

**Activity 2.3:** Coordinate at a regional level on reducing the number of whale ship strikes in national marine sanctuaries in California. Channel Islands, Greater Farallones, Cordell Bank, and Monterey Bay national marine sanctuaries have an ongoing vessel speed reduction program in the San Francisco and Santa Barbara traffic separation schemes (TSS) to protect whales listed under the Endangered Species Act, the Marine Mammal Protection Act, and the National Marine Sanctuaries Act.

### ***Strategy MSP-3: Collaborate on fishery management issues***

MBNMS staff collaborates with NMFS, the Pacific Fishery Management Council, the California Fish and Game Commission, and the California Department of Fish and Wildlife on a variety of fisheries related issues, as described in the following activities.

**Activity 3.1:** Coordinate research on EFH areas with NMFS.

**Activity 3.2:** Implement voluntary management area (VMA) program in collaboration with NMFS, NGOs, and fishermen. Activities include conducting research to characterize the seafloor and associated benthic habitat. VMAs are adopted by fishermen as “areas to avoid” trawling, as they are small areas associated with sensitive, biogenic habitat.

**Activity 3.3:** Continue to collaborate with the Pacific Fishery Management Council, NMFS, California Department of Fish and Wildlife, and California Fish and Game Commission on fishery issues of concern.

### ***Strategy MSP-4: Assess motorized personal water craft (MPWC) zones***

MBNMS regulations have restricted the use of MPWC to five zones within the sanctuary since 1992. MPWC’s high speed and maneuverability pose a unique and significant threat of disturbance to nearshore sanctuary habitats and wildlife through persistent and repetitive operation within sensitive nearshore environments that are usually safe from such intensive mechanized activity. Potential impacts include physical damage to marine life and shallow habitats, and behavioral modification and site abandonment/avoidance by seabirds, marine mammals, and sea turtles. In addition to environmental impact threats, conflicts have persisted between MPWCs and other



recreational ocean users due to the erratic noise signature and operating patterns. Use and maintenance of the zones (buoy markers) are issues of concern, specifically in regards to relative value.

**Activity 4.1:** Complete a study to determine recreational use levels of MPWC zones, their environmental, aesthetic and navigational impacts, and the current relevance of the zones in meeting their originally intended purposes and present findings.

**Activity 4.2:** Develop an outreach strategy to address any alteration to MPWC zoning.

### ***Strategy MSP-5: Coordinate regionally, nationally, and internationally on marine protected areas***

MPAs are special places (including national marine sanctuaries) where human activities are carefully managed to achieve conservation goals. They vary in size and allow different types of use depending upon their conservation goals. Some are designed to protect large ocean ecosystems. Others may safeguard a particular fishery, rare species, critical habitat for marine life, or underwater historical sites. Some may be "no take" areas prohibiting all fishing, drilling, mining and/or other extractive activities. Others allow some commercial and recreational fishing. Most MPAs allow research, education, and recreational activities like kayaking, surfing, and diving.

California has created a statewide system of MPAs in state waters (<3 miles from shore). There are 29 state MPAs within MBNMS, with various levels of protection. MBNMS supports the state of California's implementation of these MPAs through assistance with research and monitoring, education and outreach, and enforcement. Nationally, MBNMS is part of a network of MPAs, the National Marine Sanctuary System. This system includes 14 national marine sanctuaries and Papahānaumokuākea and Rose Atoll marine national monuments.

**Activity 5.1:** Collaborate with state of California on MPA management, including research and monitoring, outreach and education, and policy and compliance-related issues. The MPA work plan can be [found online](#).

**Activity 5.2:** Assess and track new proposed MPA and other area-based management designations as they relate to MBNMS (e.g., proposed Chumash Heritage National Marine Sanctuary, proposed changes to state and federal fishery zones) in coordination with the ONMS West Coast Regional Office.

### ***Strategy MSP-6: Maintain aircraft overflight zones***

MBNMS staff addresses overflight disturbance through a mix of educational outreach, regulatory, and enforcement approaches. Sanctuary regulations explicitly prohibit harassment of marine mammals, turtles and birds by any means, including disturbance from the air. All of the marine mammal and turtle species and most birds that frequent the sanctuary are also protected under the Endangered Species Act, Marine Mammal Protection Act, or Migratory Bird Treaty Act everywhere within the United States and its territories.



In addition to the general prohibition against disturbance of marine mammals, turtle, and birds, sanctuary regulations prohibit the operation of motorized aircraft (including model aircraft, quadcopters, and drones) within four NOAA regulated overflight zones in the sanctuary. If a flying apparatus of any kind has a motor, then it must remain above 1,000 feet (304.8 meters) altitude within the four zones. The zones include coastal waters from the mean high tide line seaward to distances of up to 5.75 miles (9.3 kilometers) offshore. This work will require collaboration with Greater Farallones National Marine Sanctuary staff and the Seabird Protection Network on tracking and compliance activities.

**Activity 6.1:** Track and monitor compliance with overflight zone restrictions. Staff will keep a record of reported and observed alleged and apparent violations of the zones and report as needed.

**Activity 6.2:** Provide outreach on overflight zone restrictions including use of drones. Staff will implement periodic outreach to pilots and/or pilot associations and clubs. This may include in-person presentations, providing one-pagers or brochures, or sending links to MBNMS webpages.

### ***Strategy MSP-7: Track and respond to offshore wind and wave energy proposals***

Offshore wind power is the use of wind farms in the ocean to harvest and transport wind energy (generate electricity). Higher and more consistent/persistent winds are available offshore compared to on land, so offshore wind power's electrical generation is typically higher per amount of capacity installed, though costs for such operations tend to be much greater. At the end of 2016, the total worldwide offshore wind power capacity was 14,384 megawatts. The largest offshore wind farms are currently in northern Europe, especially in the United Kingdom and Germany, which together account for over two thirds of the total offshore wind power installed worldwide.

As California continues to seek a great percentage of statewide energy usage by electricity and promote alternative (renewable) power sources, the demand for alternative energy generation is expected to increase. Offshore areas within and adjacent to MBNMS have consistent wind suitable for development. Interest currently exists for using floating wind turbines, secured by mooring cables and connected to onshore receiving stations, in deep-water areas offshore of central California. The use of such turbines poses unique resource protection issues for MBNMS. The southern region of MBNMS, near the Monterey/San Luis Obispo county line, has received the most serious, dedicated interest by energy developers and regulatory agencies. While MBNMS regulations do not explicitly restrict wind turbine installation or operation, ancillary structures such as anchors for floating turbines and power cables on the seabed would be prohibited without a permit. Yet, sanctuary regulations do not currently include a permit-lease process such as that managed by the Bureau of Ocean Energy Management (BOEM) for many parts of the outer continental shelf. As proposals for offshore wind energy production in or near MBNMS are further developed, MBNMS staff will expand its current efforts with the ONMS West Coast Regional Office to track and review as appropriate. Necessary public processes would proceed as outlined in the Emerging Issues Action Plan.

**Activity 7.1:** Share SESA and other information on environmentally sensitive areas and species and human use areas of potential conflict with proposed offshore wind or wave energy activities with BOEM and other agencies.

**Activity 7.2:** Outline proposed guidelines for siting constraints of offshore wind and wave energy activities.

**Activity 7.3:** Develop baseline information, research, and monitoring program for proposed areas.

**Activity 7.4:** Develop regulatory response strategies (including special use permit options) for proposed projects sited outside and/or inside MBNMS boundaries.

**Activity 7.5:** Assess non-market value of habitat loss due to installation.

**Activity 7.6:** Explore decommissioning guideline options.

***Strategy MSP-8: Initiate assessment for the use of artificial reefs for recreation, restoration, or other uses in MBNMS***

Installation of artificial reefs in MBNMS has been suggested by the diving community as a dive attraction. Permitting for this activity falls under the primary jurisdiction of the state of California, with the sanctuary having authorization authority (for a state permit). The state lacked resources to update an artificial reef plan previously, but initiated a process in 2017 to update the 1990 plan. The plan will likely take some time to finalize, as its focus was primarily on sportfish enhancement and did not consider diving reefs. As proposals for artificial reefs in MBNMS are developed, MBNMS staff will need to track and review as appropriate. There are many questions related to the impacts of installation and maintenance to the habitat, the costs and responsibility of maintenance and/or removal of the artificial reef, and ultimately, liability.

**Activity 8.1:** Track progress of the state's artificial reef policy development.

**Activity 8.2:** Share relevant information with state of California artificial reef team.

**Activity 8.3:** Assess the current regulatory, funding, and liability conditions for existing artificial reefs used for diving.

**Activity 8.4:** Develop baseline information, as needed, for proposed sites.

**Activity 8.5:** Assess non-market value of habitat loss due to installation.

***Strategy MSP-9: Monitor and assess golf ball deposition and remediation efforts associated with errant golf ball deposition to the sanctuary from area golf courses.***

Plastics and non-organic materials, like golf balls, represent one of many forms of marine debris that can impact marine habitats. MBNMS works on many fronts, with

support from partners and public stewardship, to prevent, remove, and reduce marine debris whenever possible.

Local recreational free divers began to find and routinely recover thousands of golf balls in the sanctuary near the Pebble Beach golf course in 2016. They reported their findings to MBNMS staff in September 2016. During a 16-month period in 2017 and 2018, MBNMS staff conducted a series of survey and sampling dives to assess golf ball deposition patterns, volumes, potential ecosystem impacts, and natural aggregation points within Stillwater Cove, Pebble Beach. MBNMS and Pebble Beach Company developed a plan for large-scale removal of balls and a mitigation strategy implemented by Pebble Beach Company to include prevention strategies/incentives, active and on-going retrieval efforts, golfer and caddie education, and golf course policy changes. MBNMS has been carefully investigating the newly revealed natural resource management issue at Stillwater Cove to understand its full nature and scope and develop an informed management response applicable to the entire sanctuary.

**Activity 9.1:** Monitor golf ball cleanup and education efforts at Pebble Beach.

**Activity 9.2:** Assess golf ball deposition at other coastal golf courses along the sanctuary.

**Activity 9.3:** Develop clean-up, remediation, and education plans with other golf courses with errant golf ball deposition issues.

### ***Relevant strategies/activities located elsewhere within this management plan***

Activity MSP-1.1 → Research & Monitoring Strategies RM-1, 2

Activity MSP-1.2 → Research & Monitoring Strategy RM-7

Activity MSP-4.2 → Education, Outreach and Communications Activity EOC 5.4

Activity MSP-6.2 → Education, Outreach and Communications Activity EOC 5.4

Activity MSP-7.3 → Research & Monitoring Strategies RM-1, 2

Activity MSP-7.4 → Resource Protection Strategy RP-3

Activity MSP-8.2 → Research & Monitoring Strategies RM-4

Activity MSP-8.4 → Research & Monitoring Strategies RM-1, 2

Activity MSP-8.5 → Resource Protection Strategy RP-2

### ***Potential Partners***

California State University Monterey Bay, University of California, Santa Cruz, Moss Landing Marine Laboratories, Monterey Bay Aquarium Research Institute, Naval Post Graduate School, National Marine Fisheries Service, California Department of Fish and Wildlife, California Fish and Game Commission, Pacific Fisheries Management Council, International Maritime Organization, Federal Aviation Administration, Bureau of Ocean Energy Management, US Coast Guard, Pillar Point, Santa Cruz, Moss Landing and Monterey Harbors

**Marine Spatial Planning Action Plan Goal:** To improve conservation science and resource protection and management on select site-specific issues through the application of MSP principles.

**Performance Measures Table**

| Strategy Title   | Desired Outcome (Objective)                | Output Measure                                       | Who Measures                                  | Timeline  |
|--|--|--|---|-----------|
| Strategy MSP-1: Implement sanctuary ecologically significant areas (SESAs) | Biogenic hot spots identified in SESAs     | SESAs mapped and characterized                       | Research and Resource Protection Coordinators | Years 1-4 |
| Strategy MSP-2: Track and monitor vessel traffic compliance                | Container ships compliant with regulations | Ships tracked and monitored for zone use             | Resource Protection Team                      | Ongoing   |
| Strategy MSP-3: Collaborate on fishery management issues                   | New EFH conservation area monitored        | Monitoring program in place                          | Research and Resource Protection Coordinators | Ongoing   |
|  | Voluntary management area implemented      | Implementation plan disseminated                     | Resource Protection Coordinator               | Year 1    |
| Strategy MSP-4: Motorized personal water craft (MPWC)                      | Improved MPWC Zone demarcation             | Completed MPWC zone use study & marker buoy impacts. | Regulatory Coordinator                        | Year 2    |
|  |  | MPWC Zone relevance report                           | Regulatory Coordinator                        | Year 3    |

### Section 3: Program Based Action Plans

|  |  |   |  |           |
|--|--|---|--|-----------|
| Strategy MSP-6: Aircraft overflight zones  | Compliance with restricted overflight zones  | Monitoring program and data summary                                   | Regulatory Coordinator   | Years 2-4 |
|  | Public knowledge of overflight zones restrictions including use of drones  | Outreach plan implementation  | Permit Coordinator, Education & Outreach Coordinator, and Resource Protection team | Years 2-4 |
| Strategy MSP-7: Track and respond to offshore wind and wave energy proposals   | BOEM possesses information regarding sensitive areas, species, and human uses of potential conflicts with proposed offshore wind or wave energy activities | Data sets shared  | Resource Protection Coordinator and GIS Specialist                                 | As needed |
|  |  | Siting constraints identified   | Superintendent and Resource Protection Coordinator                                 | As needed |
|  |  | Baseline data requirements identified                                 | Superintendent, Resource Protection Coordinator and Research Coordinator           | As needed |
| Strategy MSP8: Initiate assessment for the use of artificial reefs for recreation, restoration, or other uses in MBNMS | State of California artificial reef team has relevant habitat and species data   | Data sets shared  | Research and Resource Protection Coordinators                                      | As needed |
|  | Regulatory, funding, and liability conditions for existing artificial reefs (dive) compiled  | Report  | Regulatory Coordinator   | Year 4-5  |
|  | Clear understanding of costs to environment  | Socioeconomic assessment of non-market value of habitat area proposed | ONMS Socioeconomic team  | Year 4-5  |

## Maritime Heritage Action Plan

**Goal:** Identify, protect, and raise awareness of the maritime cultural, historical, and archaeological resources in MBNMS.

### *Introduction*

The history of California's central coast is predominantly a maritime one. From the days of the early Ohlone inhabitants to the European-American exploration and settlement of California to the present, coastal waterways have been a main route of travel, subsistence, and supply. Ocean-based commerce and industries (e.g., fisheries, shipping, military, recreation, tourism, extraction, exploration, research, and aesthetics) are important to the maritime history, modern economy, and social character of this region. These constantly changing human uses define the maritime heritage of the Central Coast sanctuaries and help interpret our evolving relationship with 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 sanctuaries through commercial and recreational activities such as surfing, boating, and diving.

The term “maritime heritage” encompasses elements in the cultural landscape, such as shipwrecks and other sites or objects, that are of archaeological, historical, or cultural significance found in, on, or under the seabed and which have been underwater for at least 50 years in most cases. Included within are archaeological resources (physical remains of past human activities), cultural heritage resources (native and indigenous groups and traditional practices), and historical resources (existing, still standing objects of historical interest).

Records indicate 463 vessel and aircraft losses occurred within the jurisdiction, or adjacent to the boundaries, of MBNMS (Smith 2003). These shipwrecks were a result of the significant maritime exploration and commerce historically occurring in the region, coupled with a coastline dotted with shallow, rocky headlands, largely exposed to prevailing winds, storms, and fog. The seafloor has preserved 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 myriad other heritage treasures lay covered by water, sand, and time.

The National Marine Sanctuaries Act and site regulations mandate the management and protection of cultural and historical resources in the sanctuary. As with natural resources, numerous user and interest groups, from archaeologists to recreational divers, seek to interact with maritime heritage resources in many positive ways (e.g., discovery, exploration, survey, photography) but may also have negative impacts (e.g., anchor damage, artifact collecting). Cultural and historical resources are also impacted by natural factors like storm surge, currents, and degradation through corrosion and natural processes. Therefore, responsible, informed decisions must be made on how to manage these resources for the enjoyment and appreciation of current and future



generations. Maritime heritage resources, unlike living resources, are nonrenewable, so it is especially important we protect these important links to our past.

ONMS is placing increasing emphasis on the development of maritime heritage programs to identify and protect submerged archaeological sites and to increase public awareness and appreciation of the maritime history associated with sanctuaries. A well-coordinated program is required to identify and assess shipwrecks for significance in accordance with the National Historic Preservation Act (NHPA); determine which sites may pose significant environmental hazards; protect sites from unauthorized disturbance; and develop heritage partnerships and education programs.

There have been several accomplishments since initiation and implementation of the 2008 management plan. The West Coast Regional Maritime Heritage Coordinator position was created and oversees maritime heritage projects in California and Washington. The coordinator completed the West Coast Regional Needs Assessment (Schwemmer 2012), which served as the five-year plan for national marine sanctuaries along the West Coast.

Several wrecks have been extensively surveyed, including one just outside of MBNMS boundaries. The [\*SS Montebello\*](#) was studied as a potential oil spill threat and as a relevant historic shipwreck. Since 2003, ONMS and partners have carefully characterized and mapped the shipwreck and surrounding debris field. In 2011, NOAA worked with United States Coast Guard, California's Department of Fish and Game, and partners to determine that there is no substantial oil threat from the *Montebello* to California waters and shorelines. Detailed mapping and site characterizations of the [\*USS Macon\*](#) and *SS Montebello* led to nomination submissions to the National Park Service and subsequent listings on the National Register of Historic Places. In 2015-16, NOAA and partners mapped and surveyed the WWII-era aircraft carrier [\*USS Independence\*](#).

Outreach efforts have included expanding MBNMS maritime heritage webpages to include the known losses inventory, field research, technical reports, and links to local maritime heritage exhibits. Educational materials (*Macon* DVD and *Noticias de Monterey* publication) were created and shared with the public and used for docent training. Preserve America funding was received to update the *Montebello* video for the Coastal Discovery Center. Maritime heritage and fishing topics were included in signage for the city of Monterey. In addition, several exhibits were created: fishing history exhibit and multi-beam sonar interactive at the Sanctuary Exploration Center; whaling exhibit at the Coastal Discovery Center; and lighthouse history exhibit at Pigeon Point Light Station.

Activities will include inventorying, locating, surveying, and monitoring both historic shipwrecks and those posing an environmental threat to sanctuary marine resources; and characterizing and protecting maritime heritage resources.

### **Strategy MH-1: Inventory and assess submerged sites**

MBNMS staff, in conjunction with the West Coast Regional Maritime Heritage 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 in accordance with sections 106 and 110 of the NHPA.

**Activity 1.1:** Inventory shipwrecks and expand the MBNMS shipwreck database with the goal of furthering section 110 compliance and determining eligibility for inclusion on the National Register of Historic Places. Continue to establish external partnerships to inventory potential shipwreck sites with other federal, state, and local agencies, vocational archaeologists, commercial and recreational divers, and fishermen. Continue to populate and expand the MBNMS shipwreck database managed by the West Coast Regional Maritime Heritage Coordinator.

**Activity 1.2:** Conduct shipwreck reconnaissance expeditions that include systematic research and surveys of archaeological sites. Reconnaissance surveys should include seafloor mapping associated with historic documentation on last reported positions of ship and aircraft wreck sites, including the barge *Umpqua 11* and passenger steamship *San Juan*. Systematic research should include a return survey to the USS *Independence*. Ocean Exploration Trust E/V *Nautilus* surveys within national marine sanctuaries along the West Coast will have a World War II focus and may include high-definition video survey at the *Montebello* site.

**Activity 1.3:** Determine eligibility and nominate appropriate submerged archaeological sites for inclusion in the National Register of Historic Places.

**Activity 1.4:** Conduct research on maritime cultural landscapes, including:

1. Shipwrecks, exploration, fishing and fisheries, trade vessels, routes, and nationalities;
2. Shoreline structures such as lighthouses, life-saving stations, fort, canneries, dog-hole ports, and whaling facilities;
3. Native and indigenous groups and traditional practices;
4. Traditional recreational activities such as diving, surfing, and boating; and
5. Stewardship of our cultural and historic maritime resources.

### ***Strategy MH-2: Threat assessment for shipwrecks and submerged structures***

MBNMS staff and the West Coast Regional Maritime Heritage Coordinator are faced with the challenge of identifying and monitoring historic and non-historic shipwrecks potentially posing environmental threats to sanctuary marine resources. Information pertaining to shipwrecks as environmental threats is provided to NOAA's Emergency Response Division and ONMS for the development of the [Environmental Response and Management Application \(ERMA\)](#) and [Remediation of Underwater Legacy Environmental Threats \(RULET\)](#) database systems. In compliance with Section 106 of the NHPA and the NMSA, the sanctuaries will develop a plan to address this issue, as there are many historic shipwrecks with hazardous potential.

**Activity 2.1:** As needed, add to the 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, as well as interviews with commercial and recreational divers and fishermen who frequently visit submerged shipwrecks.

**Activity 2.2:** Monitor hazardous shipwreck sites. Monitor sites already identified as threats to sanctuary marine resources. Facilitate a research design with other trustee agencies to develop a plan to monitor and prevent, reduce, and respond to environmental threats from any such vessels. Use protocols for site evaluation based on monitoring work similar to the shipwrecks *Jacob Luckenbach* and *Montebello*.

### ***Strategy MH-3: Protect and manage submerged archaeological resources***

As part of the NEPA compliance process, MBNMS management is required to submit a review under Section 106 of the NHPA identifying historic and prehistoric archaeological properties and to consider activities that may have an adverse or no adverse effect on these properties. MBNMS management will protect and manage submerged archaeological resources in several ways, including: (1) permitting and authorization decisions, (2) through enforcement and education, and (3) by assessing shipwrecks as potential environmental threats.

**Activity 3.1:** Coordinate stewardship of submerged resources. Develop protocols to manage, monitor, and protect submerged sites in partnership with appropriate local law enforcement agencies where required.

**Activity 3.2:** 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 under Section 106 requirements.

**Activity 3.3:** Inventory archaeological and historic resources currently outside sanctuary boundaries that may be of significant historic interest or may pose a threat to sanctuary resources.

**Activity 3.4:** Develop and implement outreach campaign focused on how to deal with artifacts and historic resources inadvertently brought to the surface (e.g., traditional fishing resources, anchor lines).

### ***Strategy MH-4: Develop maritime cultural landscape-focused education and outreach programs***

The maritime cultural landscape provides a theme to educate and inform people along the California coast and throughout the country about the relationship between humans and the ocean. Through websites, museum exhibits, and other tools, MBNMS will continue to provide information on maritime cultural landscapes.

**Activity 4.1:** Create, expand, and populate MBNMS's website. The website should include specific information about maritime heritage resources, such as native and indigenous connections to place, living journals of shipwreck survivors, archaeological project updates, potential environmental threats and maps.

**Activity 4.2:** Develop and implement education and outreach programs and materials. Products will include: (1) USS *Macon* book created by Texas A&M University and NOAA staff; (2) USS *Macon* curriculum to be made publicly available.

**Activity 4.3:** Collaborate on maritime heritage resource exhibits and signage. MBNMS will incorporate maritime cultural landscape themes and messages as part of the California Statewide Signage, Exhibits, and Facilities Plan.

**Activity 4.4:** Provide lectures to the public and academic community.

***Potential Partners***

NOAA Emergency Response Division, NOAA Office of Response and Restoration, NOAA Office of Law Enforcement, National Park Service, California State Historic Preservation Office, California Sea Grant, California State Parks, California State Lands Commission, Coastal Maritime Archaeology Resources, local museums, and historic parks.

**Maritime Heritage Action Plan Goal:** Identify, protect, and raise awareness of the maritime cultural, historical, and archaeological resources in MBNMS.

**Performance Measures Table**

| Strategy Title   | Desired Outcome (Objective)  | Output Measure               | Who Measures                                    | Timeline       |
|--|--|------------------------------|---|----------------|
| Strategy MH-1: Inventory and assess submerged sites  | Resource documentation gathered to create opportunities to local and recorded submerged archeological resources                  | Expanded shipwreck database  | West Coast Region Maritime Heritage Coordinator | Year 3 Ongoing |
| Strategy MH-2: Threat assessment for shipwrecks and submerged structures                   | Protection and management of submerged archeological resources through permitting, enforcement, education, and threat assessment | Hazardous wrecks in database | West Coast Region Maritime Heritage Coordinator | Year 2         |
|  |  |                              | Resource Protection Coordinator                 | Year 2         |
| Strategy MH-4: Develop maritime cultural landscape-focused education and outreach programs | Expanded sanctuary maritime heritage webpages  | Website                      | Research Specialist                             | Ongoing        |
|  | The public is informed about relationship between humans and the ocean   | Exhibits and signage         | Education Coordinator                           | Year 3         |

## Operations and Administration Action Plan

**Goal:** Address the necessary operations and administration activities required for implementation of an effective program, including identifying staffing and infrastructure resource needs and operational improvements.

### *Introduction*

The desired outcome of the Operations and Administration Action Plan is the increased protection of Monterey Bay National Marine Sanctuary resources and qualities, achieved with the budget and staff necessary for implementation of the action plans. In order to effectively achieve the strategies outlined in the other action plans, MBNMS needs to maintain basic staffing, infrastructure, and administrative functions. This action plan addresses these operational needs and details MBNMS plans to maintain its field-based capabilities, maintain and train its staff and volunteers, maintain adequate facilities and other infrastructure, complete its annual budgeting process, manage contracts, maintain its advisory council (and subgroups), and report on management plan implementation progress. In effect, this Operations and Administration Action Plan supports all other action plans in the final management plan.

MBNMS will coordinate with ONMS Headquarters, the West Coast Region Office, and other sanctuaries on administrative and operational matters in addition to resource management, outreach, and research activities.

### *Strategy OA-1: Management of MBNMS*

Operating funds for sanctuary management come primarily from federal appropriations to ONMS. These funds cover expenses such as personnel salaries, vessel use and maintenance, utilities, property rental, equipment, and supplies.

Unpredictable and variable funding for staff and program development may affect specific aspects of the sanctuary management plan. The scale and scope of certain programs may be modified due to unforeseeable changes in funding levels. However, the overarching goals of the plan will remain unchanged.

**Activity 1.1:** Develop, manage, and track MBNMS annual operating plans and budget per ONMS and West Coast Region guidance. MBNMS will continue to perform budget planning and tracking and produce an annual operating plan. The management plan will be used as a guide to set budget and project priorities outlined each year in annual operating plans.

**Activity 1.2:** Facilitate contracts, grants, and acquisitions in compliance with Federal Acquisition Regulations. MBNMS staff will continue to work with the NOAA Western Regional Center (WRC) to provide a comprehensive suite of administrative services including procurement, program support services, health and safety, administrative payments, space management, publications, and security. MBNMS staff will continue to work with the WRC as needed for services.

### ***Strategy OA-2: Support management plan priorities***

The implementation of these action plans is highly dependent on available staffing and financial resource allocation. Implementation of the management plan requires coordination within and between action plans, sharing of staff and financial resources between program areas, and cooperation and coordination among many federal, state, and local government agencies, as well as private organizations and individuals. MBNMS administration provides an organized structure and support system for implementing management strategies while providing the flexibility and guidance necessary to address changing, new and emerging resource management issues.

**Activity 2.1:** Track management plan accomplishments. Establish reporting mechanisms/processes for management plan implementation and emerging issues.

**Activity 2.2:** Assess management plan performance through the development of performance goals, measures, and outcomes for each strategy. MBNMS staff will conduct routine evaluations to collect and record data on MBNMS performance over time. Using these data, staff will (a) evaluate progress towards achievement of each action plan's desired outcomes and (b) assess the role or added value of those outcomes in the overall accomplishment of site goals and objectives.

**Activity 2.3:** Develop memoranda of agreement for programs, partnerships, and administrative needs to support management and programmatic activities as needed.

**Activity 2.4:** Cultivate foundation partnerships to facilitate programs in support of the management plan. Staff will focus on partnerships with the California Marine Sanctuary Foundation and the Monterey Bay National Marine Sanctuary Foundation (a local chapter of the National Marine Sanctuary Foundation).

**Activity 2.5:** Cultivate external partnerships to support management activities. Overlapping jurisdictions, different agency mandates, and limited resources necessitate the development of a management plan that brings together multiple institutions for the common purpose of ecosystem protection. ONMS and MBNMS are committed to coordinating with other federal, state, and local agencies in a continuous ecosystem management process to ensure the long-term protection of the unique cultural resources, habitats, and wildlife of this region, while considering the demands of multi-use interests.

### ***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 Office of National Marine Sanctuaries who, working with local community interests, established the MBNMS Advisory Council in 1994. The council functions in an advisory capacity to MBNMS's superintendent to:

- A. Help strengthen and provide support for the growth of MBNMS programs;
- B. Assist in protection of MBNMS resources by helping identify needed research to protect MBNMS resources; and

- C. Assist in building community support through problem solving, consensus building, new constituency development, increasing opportunities for revenue enhancement, and increasing understanding about MBNMS.

The [MBNMS Advisory Council](#) assists in carrying out the goals and objectives of the MBNMS management plan. MBNMS programs promoting research, education, and resource protection are a major focus for the Sanctuary Advisory Council and members serve as ambassadors promoting sanctuary stewardship.

**Activity 3.1:** Support the MBNMS Advisory Council. The council has proven to be a powerful voice for the general public, channeling citizen concerns, ideas, and needs. The 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 sanctuary superintendent, NOAA, and the Department of Commerce. The Sanctuary Advisory Council meets six times per year in open sessions located throughout MBNMS.

Staff support the following council activities:

- A. Administration of the Sanctuary Advisory Council website (meeting schedules, agendas, locations, meeting minutes, membership contact information, and log of Sanctuary Advisory Council actions);
- B. Administration of the Sanctuary Advisory Council listserv and “interests” email list for members of the public to receive Sanctuary Advisory Council meeting notices and other information;
- C. Development of the Sanctuary Advisory Council’s annual work plan; and
- D. Compilation of an annual report of Sanctuary Advisory Council achievements, milestones, and recommendations.

**Activity 3.2:** Periodically review and update the Sanctuary Advisory Council charter. The superintendent and the Sanctuary Advisory Council review the charter on a five-year cycle to ensure it is up to date and adequately addresses problems or needs of the Sanctuary Advisory Council, or any new legal or programmatic requirements of the program. The Sanctuary Advisory Council charter outlines the objectives and scope of the Sanctuary Advisory Council’s activities, description of duties for which the Sanctuary Advisory Council is responsible, procedural requirements on the appointment of Sanctuary Advisory Council members and officers, requirements for the conduct of Sanctuary Advisory Council members and meetings, and other requirements. (See National Marine Sanctuaries Act, Section 315, Advisory Councils.)

**Activity 3.3:** Periodically review Sanctuary Advisory Council membership. The Sanctuary Advisory Council may periodically review its membership to determine if it has the appropriate membership for community and agency involvement. The council may also review the focus and membership of its working groups as necessary to implement MBNMS programs.

**Activity 3.4:** Continue coordination between MBNMS and Greater Farallones National Marine Sanctuary advisory councils. To ensure integration on issues and opportunities for MBNMS’s northern management area, a meeting of the two councils will be held



biannually. The two councils may also choose to appoint liaisons from their councils to attend each other's meetings.

**Activity 3.5:** Support with MBNMS staff the three standing working groups of the Sanctuary Advisory Council: the Research Advisory Panel, the Conservation Working Group, and the Recreation and Tourism Working Group. MBNMS staff will continue to work with each working group to refine membership and decision-making protocols.

#### ***Strategy OA-4: Support technical requirements of MBNMS staff and facilities***

MBNMS information technology (IT) staff work under the DOC/NOAA/NOS/ONMS IT umbrella. Within this structure, MBNMS staff purchases, maintains, and implements policy, standardization, and assessment of most IT systems.

**Activity 4.1:** Provide support of computers, servers, and peripherals. Maintain working hardware and licensed software. Maintenance done on site when possible. This includes budgeting for new computers as part of the lifecycle planning.

**Activity 4.2:** Oversee IT policy compliance. All staff are required to take annual IT security course. Conduct annual security and compliance assessments for network, workstations, and servers. Annual social media certifications are required.

**Activity 4.3:** Administer and enhance MBNMS website. Staff create new updated webpages adhering to DOC/NOAA standards. Updates should be done in a timely manner and understood by the widest possible audience.

**Activity 4.4:** Oversee social media development. Engage and educate the public through social media while adhering to NOAA/NOS best practices.

#### ***Strategy OA-5: Oversee MBNMS facilities***

The MBNMS main office is located in Monterey, California, with satellite offices in Santa Cruz and San Simeon, California. The sanctuary's premier 14,000 square foot visitor facility, the Sanctuary Exploration Center, is in Santa Cruz and additional staff are co-located at the National Marine Fisheries Laboratory. In San Simeon, sanctuary assets include an 800 square foot visitor center and office co-located with California State Parks at William Randolph Hearst Memorial Beach. Additional facilities include a shared space at the U.S. Coast Guard Station for marine operations (diving and boating) and a floating dock (currently managed by the West Coast Regional Office).

**Activity 5.1:** Coordinate and oversee acquisition (retention) of sanctuary offices, visitor facilities, marine operations, and vessel slips. Develop and oversee leases, agreements, memoranda of agreement, or other options to build out MBNMS's facility requirements.

**Activity 5.2:** Provide operational support for facility maintenance, inspections, and contract work to ensure uninterrupted use of facilities. Outline the annual requirements for each facility allows staff to address maintenance needs and develop long-term life-

cycle plans. Develop and oversee contracting needs for utilities, facility maintenance, and upkeep where required.

**Activity 5.3:** Ensure safety and security at all sites. Outline safety plans for all facilities per Federal Protective Service' Facility Security Assessments and conduct routine safety assessments of facilities. Conduct periodic safety drills for fire, shelter in place, earthquake, and tsunami warnings. Incorporate safety training into employee orientations.

### ***Strategy OA-6: Facilitate field operations***

Field operations on or in the water or the air, or along the shoreline, are critical to ensuring effective and efficient sanctuary activities for research, resource protection, emergency response, and education. Providing staff with the appropriate equipment, training, and oversight is essential to maintaining the highest level of safety while planning and conducting field operations.

**Activity 6.1:** Pursue a variety of platforms for conducting field activities in MBNMS. Small boats and planes are the primary platform for on-the-water operations for purposes of research monitoring, resource protection activities, and support of select educational programs. Other platforms (e.g., NOAA ships, partner vessels) for research and resource protection activities are used as available. The West Coast Regional Office manages the R/V *Fulmar*. Supporting MBNMS field activities includes:

- A. Planning and coordinating missions relative to MBNMS management needs;
- B. Seeking opportunities for small boat, ship, and aircraft time to implement research, monitoring, and resource protection needs (NOAA, USCG, other partners);
- C. Planning and acquiring a small boat for localized diving and resource protection actions using existing staff capabilities and training; and
- D. Maintaining training and certifications to conduct field operations on a variety of vessels and aircraft (e.g., boat safety drills, aircraft evacuation drills).

**Activity 6.2:** Support safe field operations (e.g., shoreline reconnaissance, diving). Field operations in MBNMS encompass a variety of shoreline, diving, and overflight activities, each with a unique set of environmental factors, safety requirements, and training. MBNMS staff is committed to maintaining the highest level of safety for staff, observers, and research partners.

To conduct safe field operations, MBNMS staff is committed to:

- A. Maintaining annual hazardous waste operations and emergency response (HAZWOPER) training for field operatives;
- B. Maintaining field kits and personal protective equipment for approved field operations; and
- C. Participating in oil spill response training and drills for both field operations (Shoreline Cleanup and Assessment Technique [SCAT]) and incident command.

To conduct safe dive operations, MBNMS staff is committed to:

- A. Adhering to the NOAA/ONMS requirements for all divers;
- B. Maintaining a unit diving supervisor on staff;
- C. Maintaining NOAA Diver certifications for dive staff;

- D. Maintaining dive equipment to NOAA/ONMS standards; and
- E. Participating in regular safety training/drills, simulations, and inspections.

**Activity 6.3:** Identify needs for diving operations from the MBNMS management plan. MBNMS will develop a dive operations plan articulating the needs of a diving program, including the projected needs as indicated in other action plans.

**Activity 6.4:** Implement small boat operations to address activities identified in the management plan. MBNMS staff will develop a small boat operation plan articulating the use of a new small boat, which will be operated in adherence to all safety guidelines currently in place with NOAA/ONMS and the WCRO.

### ***Strategy OA-7: Provide general administrative support***

MBNMS staff will continue to conduct administrative operations by providing effective, day-to-day administration of the services necessary to fulfill the mission of MBNMS and facilitate management of MBNMS.

**Activity 7.1:** Collaborate with regional sites and West Coast Regional Office on administrative efficiencies. Consider collaborative approaches to procurements, large-scale projects, or specialized functions. Recognizing there are instances where it is more cost-effective to share resources among the sites and some instances when it may be more appropriate for each site to have their own. Currently, each sanctuary office is responsible for managing most of its own administration and information technology functions, including contracts, procurements, time and attendance, travel orders and vouchers, websites, databases, and geographic information systems. Collaboration across these tasks is critical to maintaining continuity of operations in times of emergency.

**Activity 7.2:** Maintain property in Sunflower accurately and in a timely manner with an annual property review. Property staff shall also adhere to training schedule requirements.

**Activity 7.3:** MBNMS staff will continue to process travel orders/vouchers for federal employees.

**Activity 7.4:** Oversee MBNMS time and attendance for federal employees. Records are maintained based on general schedule records requirements.

**Activity 7.5:** Maintain vehicle leases (e.g., maintenance, safety recalls, and repairs) and enter/provide data to the General Services Administration (GSA) as required.

### ***Strategy OA-8: Administer human resources***

Recruit, retain, and support staff in order to support ongoing programs and achieve the goals and objectives presented in the management plan.

**Activity 8.1:** Administer staff, intern, and volunteer requirements. Support and maintain appropriate staffing to implement the MBNMS management plan. Actively recruit, train, and recognize volunteers to promote community stewardship and to assist in the implementation of the MBNMS management plan.

**Activity 8.2:** Facilitate security related to staff, volunteers, and foreign nationals. Submit all staff, volunteer, and intern paperwork for appropriate level of background checks. Facilitate the acquisition of Common Access Cards as required and maintain records for all entities based on general schedule records requirements.

**Activity 8.3:** Coordinate performance planning for staff. ONMS employees operate under the Commerce Alternative Personnel System (CAPS), which is a performance-based system. This system reinforces individual accountability for meeting annual goals and tracks and evaluates individual and organizational performance results. Annual performance plan development, review, and assessment requires a thoughtful, collaborative approach to goal-setting based on management needs. Annual plans will be developed with mid-term and year-end assessments performed.

**Activity 8.4:** Oversee training and develop training schedules. Improve training opportunities for staff, prioritizing training to support management plan implementation.

**Activity 8.5:** Develop a recognition program. MBNMS leadership will pursue opportunities to recognize the contribution of employees and accomplishments made to protect, enhance, or restore sanctuary resources. There are internal and external mechanisms for this as well as opportunities for elevated recognition through the DOC, NOAA, NOS, and ONMS.

**Activity 8.6:** Coordinate with NOAA/ONMS staff on implementation of [NOAA's Diversity and Inclusion Strategic Plan](#).

**Operations and Administration Action Plan Goal:** Address the necessary operations and administration activities required for implementation of an effective program, including identifying staffing and infrastructure resource needs and operational improvements.

**Performance Measures Table**

| Strategy Title  | Desired Outcome (Objective)  | Output Measure  | Who Measures   | Timeline          |
|---|--|---|--|-------------------|
| OA-1: Management of MBNMS budget                        | MBNMS's annual appropriation is tracked and managed                                | Budget plan and annual operating plans                  | Superintendent and Deputy                              | Annually          |
|   |  | Finalized contracts and acquisitions                    | Superintendent and Deputy                              | Annually          |
| OA-2: Support management plan priorities                | Management plan accomplishments tracked  | Annual accomplishments report                           | Superintendent and Deputy                              | Annual            |
| OA-3: Coordinate and support Sanctuary Advisory Council | Sanctuary Advisory Council maintained  | Six meetings/year                                       | Advisory Council Coordinator and Deputy Superintendent | Annually          |
|   |  | Annual Sanctuary Advisory Council report                | Deputy Superintendent                                  | Annually          |
|   | Sanctuary Advisory Council charter updated as needed                               | Revised and approved charter                            | Deputy Superintendent                                  | 2025              |
| OA-6: Facilitate field operations                       | Maintain the highest level of safety when planning and conducting field operations | HAZWOPER certification maintained                       | Emergency Response Coordinator                         | Annually          |
|   |  | Field kits and personal protective equipment maintained | Emergency Response Coordinator                         | Annually          |
|   |  | Participation in oil spill response trainings           | Superintendent   | Opportunistically |

### Section 3: Program Based Action Plans

|  |   |  |  |          |
|--|---|--|--|----------|
|  |   | Adherence to NOAA/ONMS diver requirements                                    | MBNMS Dive Safety Officer                | Ongoing  |
|  |   | Unit Diving Supervisor on staff  | MBNMS Dive Safety Officer                | Ongoing  |
|  |   | NOAA Diver certifications and equipment maintained                           | MBNMS Dive Safety Officer                | Ongoing  |
|  |   | Participation in regular safety training/drills, simulations and inspections | MBNMS Dive Safety Officer                | Ongoing  |
| OA-7: Provide general administrative support | Provide effective day to day administration of services necessary to fulfill MBNMS's mission    | MBNMS property inventory maintained  | Deputy Superintendent                    | Annually |
|  |   | Time & attendance and travel records processed and maintained                | Deputy Superintendent                    | Ongoing  |
| OA-8: Administer human resources             | Support and retain staff and volunteers to support sanctuary programs and management plan goals | Staff and volunteer requirements supported                                   | Superintendent and Deputy Superintendent | Ongoing  |
|  |   | Performance planning coordinated for staff                                   | Deputy Superintendent                    | Annually |
|  |   | Training opportunities implemented   | Deputy Superintendent                    | Ongoing  |

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## Research and Monitoring Action Plan

**Goal:** To assess changes in species, habitats, and processes and participate in regional research and monitoring to better characterize and understand the sanctuary ecosystem and support ecosystem management, resource protection, and education.

### ***Introduction***

One of the specifically stated purposes of the NMSA is to support, promote, and coordinate scientific research on and long-term monitoring of the resources of areas designated as sanctuaries. The general approach of the MBNMS research program is to synthesize existing scientific information, determine applied science information gaps, develop collaborations to gather information, and interpret research results for the sanctuary superintendent and other NOAA staff. An [overview of the MBNMS research program](#) is available online, with specific information on a regional collaboration to compile information on 176 major monitoring programs available at <https://sanctuarysimon.org/>.

### ***Strategy RM-1: Characterize biological and physical features in MBNMS***

To understand and protect an area of the ocean, we must know the distribution of habitats present and species living there. MBNMS has technical reports (MBNMS 2019) and a series of maps (e.g., <https://sanctuarysimon.org/?s=maps>) characterizing the sanctuary. However, at 6,094 square miles (15,783.4 square kilometers), MBNMS is a large and complex area, a majority of which has never been visited or studied.

**Activity 1.1:** Continue characterization of marine environments identified in the condition report: estuarine, nearshore (high tide to 98.4 feet/30 meters), offshore (beyond 98.4 feet/30 meters deep), and Davidson Seamount. Develop opportunistic, collaborative, and grant-funded projects to continue characterizing the sanctuary to inform required condition reports, with a focus on the least sampled habitats: beaches, mid-water, and Davidson Seamount. Staff will continue, pending ship time availability, characterization of the Big Sur nearshore habitats through the MBNMS dive program. Information will be included in scientific publication and on the [SIMoN website](#), and available for management response on issues like damage assessments.

**Activity 1.2:** Encourage research in SESAs. Through regular Research Activity Panel meetings and permit applications, regional scientists will be encouraged to focus research on SESAs. Through allocation processes for NOAA ships and airplanes and through a collaboration with the Benthic Ecology Lab at MBARI, staff will continue to characterize the Davidson Seamount Management Zone and Sur Ridge.

**Activity 1.3:** Maintain a bibliography and technical report database on sanctuary-related science. Publications by MBNMS staff and other papers relevant to sanctuary

management issues will be updated to the online [bibliographic and technical report database](#) for easy access, to inform education, protection, and science efforts.

### ***Strategy RM-2: Maintain and expand the Sanctuary Integrated Monitoring Network (SIMoN)***

Continue site-driven, partner-supported collaborations focused on monitoring in the sanctuary. In addition to conducting science, the [SIMoN website](#) is maintained to serve as a portal to information from historical and ongoing research and monitoring programs taking place in the sanctuary. Differentiating between human-caused and natural variation is key to understanding those aspects of the system affected by human actions and providing insight on how we may be able to change human behavior to maintain resources and ecosystem services.

**Activity 2.1:** Maintain existing and implement new monitoring and research programs to understand natural and human caused changes in sanctuary resources, including the effectiveness of management actions. Using MBNMS staff's field expertise and by developing regional collaborations, provide data to assess the status and trends of ecological and environmental resources, addressing research needs identified in the action plans making up the MBNMS management plan. The research program typically has no internal funds to support this work other than for staff time, so the focus is on identifying information gaps, grant writing, and collaborating with other agencies and academic institutions. Efforts will continue to assess beach cast organisms and subtidal reefs within scuba depths and in SESAs.

**Activity 2.2:** Maintain an online database of existing and historic monitoring programs. SIMoN has an online database of over 100 monitoring related projects that will be kept up to date if they are active or designated as historical if they are not. Information on additional monitoring projects relevant to this management plan will be added to continue informing adaptive management efforts.

**Activity 2.3:** Provide online updates to managers and the public on sporadic natural and human caused events in the sanctuary. Populate the news-like feature on the SIMoN website as relevant marine events happen. MBNMS staff uses this system to detect trends in natural and human caused events not happening often enough to detect with standard monitoring programs and to efficiently inform news media, managers, and the public about sporadic events as they occur.

**Activity 2.4:** Develop new and maintain existing online tools to synthesize and disseminate monitoring and research information. Based on priorities in this management plan and opportunistic funding, SIMoN team members, along with contractors and collaborators, will develop new tools to visualize metadata, locate information about research and monitoring projects, and share images and videos of sanctuary resources with the public.

**Activity 2.5:** Maintain and develop natural history information and digital images of common sanctuary species, habitats and human uses. Continue to supervise volunteers and interns to add new content on species found in the sanctuary, expanding on field

guide resources available on the web and via smart phones (e.g., the [SeaPhoto app](#)). New images will be added to the [SIMoN photo library](#) on a regular basis.

**Activity 2.6:** Support infrastructure and system guidance for Cordell Bank, Channel Islands, and Greater Farallones national marine sanctuaries SIMoN efforts. Continue ongoing efforts to secure external funding for hosting and maintaining the regional SIMoN website and, as staff time permits, continue to support expansion of web-based capabilities at all West Coast Region sites.

### ***Strategy RM-3: Support science focused on priority sanctuary needs***

This management plan identifies a wide variety of research and monitoring needs. These needs can be addressed through existing staff knowledge, literature reviews, interviewing experts in the related subjects, developing collaborations, writing research grants, or conducting field research.

**Activity 3.1:** Maintain an annotated list of applied research needs for management of the sanctuary. Maintain and update MBNMS science needs assessment documents on the [National Marine Sanctuary System website](#), including background and science products needed for effective resource characterization and management. These documents are used by scientists interested in doing research in MBNMS.

**Activity 3.2:** Provide letters of support for appropriate applied science proposals. Many grant funding agencies require an applied use component to their grants, or some indication of the societal benefits of the proposed research. Staff will continue writing letters of support for scientists proposing sanctuary related research.

**Activity 3.3:** Apply for NOAA Ship time (i.e., the *Bell M. Shimada*) and airplane time to support regional applied science. NOAA provides annual opportunities to apply for use of large NOAA Corps research vessels and airplanes. Staff will continue to participate in annual proposal writing efforts for NOAA research assets, particularly as these assets tend to be the only access to the Davidson Seamount Management Zone.

**Activity 3.4:** Write research proposals for grant funds. When necessary science for management decisions are not available, staff will develop research proposals for outside funds to implement the research. Staff expects to continue writing grants to support: Beach COMBERS monitoring program, deep-sea coral restoration, analyzing data from the MARS hydrophone, characterizing deep seafloor habitats, monitoring subtidal reefs, microplastics sampling, and integrated ecosystem assessments. Other projects will be pursued as opportunities become available.

**Activity 3.5:** Promote regional science to obtain funding from different levels of the Office of National Marine Sanctuaries. ONMS periodically has program funds and staff support for specific projects. Staff will pursue these assets to address applied science needs, including: Dr. Nancy Foster and Hollings scholars to characterize the sanctuary with comprehensive species lists; mitigation funds to characterize the sanctuary soundscape; national diver program funds for cross-site kelp forest monitoring; and

integrated funds for ocean observatory program development. Other opportunities will be pursued as they develop and address other needs identified in this management plan.

**Activity 3.6:** Serve on thesis and dissertation committees at regional academic institutions for projects specific to addressing MBNMS research needs. Supervise interns, scholars, and fellows working on science projects related to sanctuary resources.

**Activity 3.7:** Promote use of sanctuary vessels (boats) to further sanctuary science. The ONMS West Coast Regional Office manages research vessels, the flagship being the R/V *Fulmar*. These vessels are well suited for sanctuary research and staff will encourage and facilitate their use to address research and monitoring needs. Writing grants may include covering the cost of vessel operations.

**Activity 3.8:** Provide scuba diving expertise and related ecological knowledge to science collaborations. MBNMS has an active dive program including a dive unit supervisor serving NOAA divers at other organizational units. MBNMS divers are also experts in subtidal ecology and singularly informed on the Big Sur coastline. Staff will collaborate with groups monitoring resources, maintaining buoys, making collections, and undertaking other activities addressing MBNMS research and monitoring needs.

**Activity 3.9:** Conduct research and monitoring when staff expertise is the most effective way to address management needs for information and support is available. Where appropriate this expertise will be used to gather information needed for management decisions, when other options are less effective.

#### ***Strategy RM-4: Facilitate the flow of science information among academic institutions, government agencies, and other institutions***

To effectively compile existing or develop new research to address sanctuary needs, it is necessary to match available science capabilities with these needs. Moreover, it takes coordination skills to develop products that experts in different fields can understand and use. Through extensive collaborations, sanctuary research needs are integrated among regional and national groups and information is presented across a broad spectrum of interested users of scientific information.

**Activity 4.1:** Administer the Research Activity Panel. Coordinate five meetings per year of the MBNMS [Research Activity Panel](#), made up of 23 representatives from regional research organizations. Panel members advise sanctuary staff as requested and provide links to subject experts if they cannot address an issue. This panel is an effective networking group for developing cooperative research projects. The chair and vice chair of the Research Activity panel serve as research representatives on the Sanctuary Advisory Council.

**Activity 4.2:** Support condition report needs for monitoring information through integration of SIMoN with NOAA's Integrated Ecosystem Assessment, the Marine Biodiversity Observation Network collaboration, and the Central and Northern California Ocean Observing System. Staff are required to complete a condition report on the health of the sanctuary before initiating a management plan review. To provide updated information in between publications of condition reports, staff are working on

several grants and with several organizations to develop online monitoring information, in graphic ecosystem models, to describe the ongoing health and ecosystem interactions in the sanctuary.

**Activity 4.3:** Participate in the development of web portals external to MBNMS to share information supporting resource management data needs. Continue grant funded work on the Monterey Bay Marine Biodiversity Observation Network (MBON) to develop web portals with information on changes in sanctuary resources through time and their correlations. This is part of a collaboration among ONMS headquarters, Monterey Bay, Channel Islands, and Florida Keys national marine sanctuaries, and a dozen other academic and government organizations. One of the main products of this multi-million-dollar grant is to develop a portal to serve MBNMS condition report information needs.

**Activity 4.4:** Participate in formal research agreements with academic institutions. MBNMS research staff have formal positions at local research institutions as adjunct research faculty, research affiliates, and research associates. Staff also serve on governing councils and strategic planning groups and as program advisors, including the NOAA Center for Coastal and Marine Ecosystems at CSUMB. These positions allow staff to integrate sanctuary research needs into operational requirements of these institutions. A large focus of these efforts is to share computer and data resources with faculty and students to address marine conservation research needs.

**Activity 4.5:** Provide regular communications about the health of Elkhorn Slough. Sanctuary staff gather, synthesize, and share the research, policy, and science of regional partners through the MBNMS condition report, the SIMoN website, and interactive models as a way to continue to inform partners about Elkhorn Slough, monitoring efforts, and overall health.

### ***Strategy RM-5: Coordinate with and participate in implementing research components of the Office of National Marine Sanctuaries West Coast Regional Office***

MBNMS is part of the ONMS West Coast Region, composed of five sanctuaries. Being part of this region includes sharing information, collaborating, and responding to requirements, protocols, and information requests.

**Activity 5.1:** Share research expertise across West Coast sites. MBNMS research interests can overlap with those of Channel Islands, Greater Farallones, Cordell Bank, and Olympic Coast national marine sanctuaries. Research staff regularly share information and resources, such as MBNMS advising how to develop a kelp forest monitoring program at Olympic Coast and sites sharing “lessons learned” from using NOAA vessels of opportunity.

**Activity 5.2:** Contribute to implementation of research components of West Coast Region priorities. The West Coast Region identifies annual research priorities, some of which require MBNMS staff oversight. Recent priorities have included tracking deep-sea coral research and developing outreach products; sharing expertise on developing condition reports; coordinating soundscape development efforts; and enhancing the



scientific rigor of the LiMPETS program. MBNMS staff expertise is tasked by the West Coast Region as needed for topics such as compiling information for presidential executive orders, wind energy project proposals, and new sanctuary site designations.

**Activity 5.3:** Lead West Coast Region efforts to develop known species inventory for MBNMS to serve as a model for other sites in the region. This initiative may require continued data input by MBNMS staff, overseeing work by interns or assistants, collaborating with regional taxonomic experts, and explaining outputs and processes to other ONMS sites.

**Activity 5.4:** Participate in annual research meetings and contribute information to monthly calls. MBNMS staff provide regionally relevant information for monthly calls for program representatives and West Coast Region staff, facilitating coordination among sites. West Coast Region research coordinators attend an annual meeting to coordinate implementation of science projects.

**Activity 5.5:** Manage SIMoN website and systems for Cordell Bank, Channel Islands, and Greater Farallones national marine sanctuaries SIMoN efforts. Administer the SIMoN website, including coding for database integration and web tool development and technical support, for four sanctuaries.

***Strategy RM-6: Coordinate with and participate in implementing policies and programs of the Office of National Marine Sanctuaries Conservation Science Program***

MBNMS is part of the overall National Marine Sanctuary System composed of 14 sanctuaries and two marine national monuments. Being part of this organization includes sharing information, collaborating, and responding to requirements, protocols and information requests.

**Activity 6.1:** Produce condition reports in advance of any management plan update. Staff are required to complete [condition reports](#) on the health of MBNMS prior to management plan updates. Between reports, MBNMS contributes to national efforts at improving the reports such as adding confidence levels to assessments and including socioeconomic indicators. Expertise from our site will be shared with other sites as they develop condition reports.

**Activity 6.2:** Contribute to documents outlining sanctuary research priority needs. Contribute to the ONMS Headquarters website, where [documents are listed](#) for a variety of site research needs, for interested scientists.

**Activity 6.3:** Develop cross-site funding opportunities and ship time proposals (e.g., E/V *Nautilus*). Coordinate proposal submission, cruise planning, and cruise implementation with NOAA and Ocean Exploration Trust opportunities for use of large research vessels and associated remotely operated vehicles.

**Activity 6.4:** Participate in monthly calls and annual meetings of research coordinators across the sanctuary system. Research coordinators participate in monthly calls with research staff from all other sanctuary sites and provide information as needed for

national program efforts. Research staff also serve on national committees to address specific issues, including sound in the ocean, deep-sea coral coordination with NMFS, and national dive program planning.

### ***Strategy RM-7: Interpret select technical science information***

Scientific information can be complex and therefore needs special interpretation for use by policy makers, educators, and the general public.

**Activity 7.1:** Publish scientific papers and technical reports and provide related information appropriate for social media and websites. Make research and monitoring information available for future use by writing scientific papers and technical reports. Update the research and maritime heritage sections of the MBNMS website and regularly post to the MBNMS Facebook and Twitter accounts.

**Activity 7.2:** Participate in the development of public speaker series. Lead the process for selection and presentation forum for the annual Ricketts Memorial Award and Lecture and work on sanctuary sponsored events by identifying appropriate science speakers.

**Activity 7.3:** Mentor interns, research fellows, graduate students, Dr. Nancy Foster Scholars, and Hollings Scholars. Serve on review panels for the ONMS process for selecting Dr. Nancy Foster and Hollings scholars. Interns are supervised every summer and sometimes throughout the year to help address science needs in this management plan.

**Activity 7.4:** Provide information to the Sanctuary Advisory Council through the Research Activity Panel and direct staff reports. Regularly present research needs and results to MBNMS staff, Research Activity Panel, and Sanctuary Advisory Council as part of informing management and policy.

**Activity 7.5:** Serve as experts on marine health, technology, and events for local, regional, and national media. Staff serve as national experts on some topics (e.g., kelp forests, invasive species, lost shipping containers) and are frequently contacted by national and international media for information and comments. Moreover, local media expect sanctuary staff to be informed contacts on any marine topic of public interest. Staff perform regular media interviews and provide contacts for regional experts to help educate the public about marine science.

**Activity 7.6:** Participate in presentations to share sanctuary science with the general public, volunteer groups, community groups, agency scientists, and agency (including international) leadership. Upon request, staff will give presentations on science at scientific meetings, to advisory councils, to agency leaders, at academic institutions, and to the public.

**Activity 7.7:** Assist in technical and mapping graphics for exhibit development at MBNMS education centers and assist in video productions that highlight habitats, species, and science in the sanctuary. Use scientific expertise, ability to gather information, and GIS skills to assist with exhibit and program development at the



Sanctuary Exploration Center and Coastal Discovery Center. Provide imagery and expertise in video productions.

***Relevant strategies/activities located elsewhere within this management plan***

Strategy RM-1 → Marine Spatial Planning Activity MSP 1.1

→ Marine Spatial Planning Activity MSP-7.3

Strategy RM-2 → Marine Spatial Planning Activity MSP 1.1

→ Marine Spatial Planning Activity MSP-7.3

Strategy RM-3 → Coastal Erosion and Sediment Management Activity CESM-7.

Strategy RM-7 → Coastal Erosion and Sediment Management Activity MSP-1.2

***Potential Partners***

California Department of Fish and Wildlife; California Ocean Science Trust; California Sea Grant; California State University, Monterey Bay; Central and Northern California Ocean Observing System; Central Coast Regional Water Quality Control Board; Central Coast Wetlands Group; Channel Islands National Marine Sanctuary; Cordell Bank National Marine Sanctuary; Elkhorn Slough National Estuarine Research Reserve; Greater Farallones National Marine Sanctuary; Hopkins Marine Station; Monterey Bay Aquarium; Middlebury Institute of International Studies at Monterey; Monterey Bay Aquarium Research Institute; Moss Landing Marine Laboratories; National Marine Fisheries Service; Naval Postgraduate School; Office of Marine and Aviation Operations; Stanford University; State Water Resources Control Board; United States Environmental Protection Agency; United States Geological Survey; University of California at Davis; University of California at Santa Cruz (also see SIMoN Network Partners).

**Research and Monitoring Action Plan Goal:** Assess changes in species, habitats, and processes and participate in regional research and monitoring to better characterize and understand the sanctuary ecosystem and to support ecosystem management, resource protection, and education programs.

**Performance Measures Table**

| Strategy Title   | Desired Outcome (Objective)   | Output Measure  | Who Measures         | Timeline   |
|--|---|---|----------------------|------------|
| Strategy RM-1: Characterize biological and physical features in MBNMS                  | Continue characterizing the sanctuary to inform nationally mandated condition reports | Grant proposal to the U.S. Integrated Ocean Observing System to fund condition report critical parameter measurements | Research Coordinator | Year 1     |
|  |   | Grant proposal to assess impacts of anthropogenic sounds  | Research Coordinator | Year 2     |
| Strategy RM-2: Maintain and expand the Sanctuary Integrated Monitoring Network (SIMoN) | Site driven, partner supported collaboration focused on monitoring are maintained     | Monitoring programs, natural history information and digital images on SIMoN website                                  | SIMoN Scientist      | Years 1-5  |
|  | SIMoN provides a portal of historic and current monitoring programs in sanctuary      | "Sporadic Events" updated on SIMoN website as identified  | SIMoN Scientist      | Years 1-5  |
| Strategy RM-3: Support science focused on priority sanctuary needs                     | MBNMS research and monitoring needs identified.                                       | Annotated list of applied research needs for sanctuary developed  | Research Team        | Years 3, 5 |
|  | NOAA Ship time is used  | Annual research proposals developed   | Research Team        | Years 1-5  |
|  | Staff expertise used when it is the most effective way to address management needs    | Annual training of PISCO divers for kelp forest monitoring  | Research Team        | Years 1-5  |

|  |   |   |                      |               |
|--|---|---|----------------------|---------------|
| Strategy RM-4: Facilitate the flow of science information among academic institutions, government agencies, and other institutions | Sanctuary research and monitoring efforts, projects, and data are widely communicated and available to partners | Research Activity Panel administered                | Research Team        | Years 1-5     |
|  |   | Ecosystem trend data portals added to SIMoN website | Research Team        | Years 1-5     |
| Strategy RM-7: Interpret select technical science information  | Make sanctuary science topics accessible to policy makers and the public  | Publish scientific papers and technical reports     | Research Coordinator | Years 1, 3, 5 |

## Resource Protection Action Plan

**Goal:** Maintain and improve the sanctuary's natural biological and ecological processes by evaluating and addressing adverse impacts from human activities on sanctuary ecosystems.

### ***Introduction***

One of the primary mandates of the NMSA and MBNMS's resource protection programs are to protect and restore the biological, historical, and cultural resources in the sanctuary.

The general approach of the resource protection program is to identify and reduce impacts to wildlife and other protected resources through collaborative management efforts with local stakeholders to directly address impacts. Resource protection issues are also addressed through response to emergency events, reviewing and commenting on coastal development projects and permits with potential to impact the sanctuary, regulations on prohibited activities, and issuing permits with conditions to minimize impacts.

A number of the 2008 issue-based action plans were fully or partially completed and new strategies incorporated into this management plan. For example, the Desalination Action Plan is no longer a stand-alone action plan, as desalination guidelines were published in 2010 and environmental review and permitting for proposed desalination projects will be included in Strategy 3 of this plan. Similarly, the Submerged Cables, Coastal Erosion, and Cruise Ship Discharges plans were implemented and remaining actions are tied to MBNMS's permit processes, so are no longer individual plans.

This action plan includes strategies and activities in the areas of collaborative planning and management; marine policy, permitting, and enforcement; resource protection outreach and interpretation; and emergency response and restoration.

### ***Strategy RP-1: Continue to build partnerships and leverage opportunities for protecting sanctuary wildlife, habitats, qualities, and cultural resources through collaborative planning and management***

MBNMS resource protection programs rely on collaborative partnerships to be sustainable. They include the Water Quality Protection Program (a separate action plan) and the work with the Coastal Regional Sediment Management Plans (a strategy in the Climate Change action plan). Below are two additional collaborative resource protection programs.

**Activity 1.1:** Continue to image areas identified in SESAs in order to characterize and map biogenic hot spots. Encourage use of research to develop innovative management approaches in SESAs through ROV and AUV technologies.

**Activity 1.2:** Coordinate with other agencies to track compliance of the IMO-adopted recommended tracks for vessels carrying hazardous cargo. The IMO-adopted

recommended tracks were established in 2000 to reduce threats of spills by vessel traffic such as container ships, bulk carriers, and oil tankers.

**Activity 1.3:** Participate with Channel Islands, Cordell Bank, and Greater Farallones national marine sanctuaries in a regional risk assessment of whale strikes from vessels over 300 tons.

**Activity 1.4:** Participate in landslide management along California State Route 1 in partnership with Caltrans and other resource management partners. MBNMS staff will work with NMFS, CDFW, and other partners to determine and implement a plan of action. Actions are case specific, but may include monitoring species and their habitat, baseline assessments to characterize the status of marine resources, or efforts to rescue organisms in imminent danger (e.g., black abalone in danger of burial by ongoing, wave-generated movement of sediment).

***Strategy RP-2: Enhance socioeconomic program through collaboration with ONMS Headquarters socioeconomic team***

Up-to-date socioeconomic data is needed to support the conservation and management goals of MBNMS (strengthen and improve conservation of marine wildlife, including whales, pinnipeds, sea otters, and seabirds) within the jurisdiction of the sanctuary and to satisfy legal mandates under the National Marine Sanctuaries Act (16 U.S.C. 1431 et seq), Endangered Species Act (16 U.S.C. 1531 et seq), Marine Mammal Protection Act (16 U.S.C. 1361 et seq), National Environmental Policy Act (42 U.S.C. 4321), Executive Order 12866 (EO 12866), and other pertinent statutes.

**Activity 2.1:** Conduct surveys to targeted user groups (e.g., wildlife viewing operators) to gather data on the non-consumptive market value of marine wildlife and other sanctuary resources.

**Activity 2.2:** Analyze data to better understand how wildlife viewing operators are using the sanctuary from a spatial use and economic perspective.

***Strategy RP-3: Maintain and enhance permitting and environmental review program***

The MBNMS [permit program](#) provides a mechanism to review requests to conduct prohibited activities, such as altering the submerged lands or discharging within the sanctuary. Where appropriate, MBNMS staff will permit or authorize these activities with specific terms and conditions focused on reducing and/or mitigating impacts to sanctuary resources. Types of permits include research, education and special uses.

**Activity 3.1:** Evaluate and process permit applications for research and education activities, authorization activities, or special use permit activities. General permits are issued for research and education activities that benefit the sanctuary. Authorizations are issued as appropriate for agency-issued coastal development permits (CDPs) or National Pollution Discharge Elimination System (NPDES) permits for discharges entering the sanctuary.

**Activity 3.2:** Conduct environmental review, as necessary, under NEPA. Levels of NEPA review can include a categorical exclusion, an environmental assessment, or an environmental impact statement. The NEPA process includes conducting informal and formal consultation with other agencies to ensure compliance. For example, consultations on proposed coastal development projects in sanctuary jurisdiction (below mean high water) include conducting Section 7 consultations for Endangered Species Act, Section 106 for the Historic Preservation Act, and the Coastal Zone Management Act.

**Activity 3.3:** Heighten stakeholder knowledge of permitting program through an improved permit website, reporting, and more frequent interaction with the Research Advisory Panel and Sanctuary Advisory Council.

**Activity 3.4:** Monitor and review permit compliance by reviewing reports, tracking permitted activities using tools such as the permit online database, and reporting any non-compliance to the enforcement program.

**Activity 3.5:** Streamline permit application and evaluation process by collaborating with ONMS staff to develop online application that directly links to the online permit database.

**Activity 3.6:** Manage and track special use permits for all ONMS-approved categories, including new desalination pipelines, overflights, placement of objects on the seafloor, fireworks displays, and submarine cables.

***Strategy RP-4: Review projects, plans, and permits of other agencies***

MBNMS staff conduct interagency program reviews on a variety of marine policy issues in order to provide policy guidance to federal and state agencies in order to implement MBNMS policies and regulations. This would include activities in federal, state, and local jurisdictions and includes actions by NMFS, EPA, USCG, California Coastal Commission, Regional Water Board, and the California Resources Agency.

**Activity 4.1:** Review and comment on other federal, state, and local agencies' programs, policies, regulation modifications, and environmental reviews during public processes, including general plan updates and local coastal plan updates.

***Strategy RP-5: Implement enforcement programs***

Having effective surveillance and enforcement capabilities are critical to ensure protection of sanctuary resources. This includes the visibility of MBNMS enforcement through an officer in the field as well as deputized state enforcement partners who can carry out activities through a joint enforcement agreement.

**Activity 5.1:** Increase the field presence within MBNMS to detect prohibited activities and enhance protection of sanctuary resources. This increased field presence can include on-the-water presence, aircraft, and shoreline surveys.

**Activity 5.2:** Improve the interagency coordination of MBNMS enforcement through coordination with NOAA Office of Law Enforcement and with California state wardens and rangers to address potential and actual sanctuary violations in the field.

**Activity 5.3:** Develop annual enforcement priorities for inclusion in the NOAA Joint Enforcement Agreement (JEA).

**Activity 5.4:** Facilitate communication among law enforcement entities through coordination of the Law Enforcement Technical Advisory Committee.

**Activity 5.5:** Continue collaboration with USCG to conduct random joint inspections of cruise ships visiting Monterey (or other MBNMS ports) to verify their adherence with ONMS and Coast Guard regulations. Inspections will review ship logs, interview crew members, and physically inspect engine room, waste management, and other work spaces to ensure that prescribed environmental safeguards and practices are in order.

***Strategy RP-6: Interpret and distribute resource protection information***

Resource protection staff will continue to provide information to the Sanctuary Advisory Council, volunteers, interns, and the public on issues of concern. Outreach will be delivered through reports, products, and presentations.

**Activity 6.1:** Publish technical reports and provide information appropriate for social media, websites, presentations, and verbal reports for the public.

**Activity 6.2:** Conduct targeted outreach to appropriate groups on the definition of cruise ships, which is inclusive of condo ships (purchased berths).

**Activity 6.3:** Conduct targeted outreach to appropriate groups regarding clarification of what vessel conditions constitute desertion of a vessel at anchor in the sanctuary and how to correct this condition.

**Activity 6.4:** Share sanctuary information with volunteer groups, visitor center docents, community groups, agency scientists, and the general public.

**Activity 6.5:** Mentor interns including local graduate students, Bren School students, and Hollings Scholars.

**Activity 6.6:** Update the Sanctuary Advisory Council, the Conservation Working Group, and Research Activity Panel on key policy developments and changes. The Conservation Working Group is administered by the resource protection team and serves as a forum for conservation issues, identifying resource protection needs, and providing advice and information on issues in response to requests from staff and the Sanctuary Advisory Council.



**Activity 6.7:** Serve as experts on water quality, desalination, wildlife disturbance, coastal erosion issues, and other topics of interest for local, regional, and national media.

**Activity 6.8:** Participate in conferences, workshops, presentations, and panel discussions regarding marine policy issues.

***Strategy RP-7: Coordinate resource protection programs, including interpretive enforcement and citizen science programs***

Resource protection programs include a variety of interpretive and citizen science efforts, including approximately 250 active and trained water quality volunteers. Citizen science programs require significant program oversight, scientific review, data processing, and reporting in addition to recruiting, training, and recognizing volunteers for their service.

**Activity 7.1:** Administer and support citizen water quality programs like First Flush, Urban Watch, and Snapshot Day volunteer programs.

**Activity 7.2:** Administer and support interpretive enforcement programs like Team OCEAN and Bay Net volunteer programs.

***Strategy RP-8: Coordinate with and participate in implementing resource protection components of the Office of National Marine Sanctuaries West Coast Regional Office***

If an issue crosses two or more sites, the coordination on the issue is sometimes managed through the West Coast Regional Office.

**Activity 8.1:** Share resource protection expertise across West Coast sites and nationally.

**Activity 8.2:** Implement resource protection components of West Coast regional priorities (e.g., whale ship strikes).

**Activity 8.3:** Participate in annual meetings and contribute information to quarterly calls.

**Activity 8.4:** Lead key regional resource protection priorities as identified.

***Strategy RP-9: Coordinate with and participate in implementing policies and programs of the Office of National Marine Sanctuaries***

MBNMS is part of a national system of sanctuaries and therefore is in close coordination with ONMS Headquarters for high-level issues that may affect or involve multiple sites.

**Activity 9.1:** Support condition reports in advance of any management plan update and provide information on water quality or other resource protection data needs.

**Activity 9.2:** Contribute to documents outlining sanctuary resource protection priority needs.

**Activity 9.3:** Develop cross-site funding opportunities and proposals for priority programs and projects (e.g., climate vulnerability assessments).

**Activity 9.4:** Participate in monthly resource protection and programmatic calls and annual meetings as needed (e.g., climate committee, volunteer coordinators).

***Strategy RP-10: Review and revise the sanctuary's spill response plan and emergency response information***

Oil spills are a threat to sanctuary resources. Therefore, trained emergency response staff must be ready at any time to respond to an oil spill in MBNMS or another sanctuary site.

**Activity 10.1:** Review and revise existing oil spill response plan. This would include emergency response notification and identifying specific duties and response protocols for sanctuary staff.

**Activity 10.2:** Continue to participate and train staff during tabletop and other emergency response drills.

**Activity 10.3:** Update GIS and other data in the Environmental Response Management Application (ERMA). This database is widely used by NOAA and other agencies during emergency situations.

***Strategy RP-11: Develop and implement restoration and recovery plans to address habitat damages and endangered species***

When sanctuary resources are injured, lost, or destroyed, a restoration plan is developed in order to implement restoration actions to restore injured natural resources. Examples include lost shipping containers or sunken vessels.

**Activity 11.1:** Coordinate with NOAA, ONMS Headquarters, and other pertinent agencies to implement approved restoration plans to restore sanctuary wildlife and habitats.

**Activity 11.2:** Participate in black abalone recovery efforts in partnership with NMFS, CDFW, and UCSC.

***Relevant strategies/activities located elsewhere within this management plan:***

Activity RP 1.1 → Marine Spatial Planning Strategy MSP-3

Activity RP 1.2 → Marine Spatial Planning Strategy MSP-1

Strategy RP-2 → Marine Spatial Planning Activity MSP-8.4

Strategy RP-3 → Marine Spatial Planning Activity MSP-7.4

Strategy RP-4 → Coastal Erosion and Sediment Management Activity CESM-7.3

Strategy RP-5 → Coastal Erosion and Sediment Management Activity CESM-6.2

Activity RP 7.2 → Wildlife Disturbance Activity WD-1.3

Activity RP 7.2 → Wildlife Disturbance Activity WD-1.3

### ***Potential Partners***

California Resources Agency; California Department of Fish and Wildlife; California State Lands Commission; California Coastal Commission; Central Coast Regional Water Quality Control Board; Central Coast Wetlands Group; Caltrans; Elkhorn Slough National Estuarine Research Reserve; Hopkins Marine Station; Monterey Bay Aquarium; Middlebury Institute of International Studies at Monterey; Monterey Bay Aquarium Research Institute; Moss Landing Marine Laboratories; National Marine Fisheries Service; Naval Postgraduate School; Pacific Fishery Management Council; State Water Resources Control Board; EPA; U.S. Geological Survey; U.S. Fish and Wildlife Service, University of California at Santa Cruz; Santa Cruz and Monterey counties; cities of Monterey, Pacific Grove, Marina, Salinas, Castroville, Santa Cruz; Moss Landing Harbor District; WQPP Partners.

**Resource Protection Action Plan Goal:** Maintain and improve the sanctuary's natural biological and ecological processes by evaluating and addressing adverse impacts from human activities on sanctuary ecosystems.

**Performance Measures Table**

| Strategy Title  | Desired Outcome (Objective)   | Output Measure                              | Who Measures                    | Timeline |
|---|---|---|---------------------------------|----------|
| Strategy RP-1: Continue to build partnerships and leverage opportunities for protecting sanctuary wildlife, habitats, qualities, and cultural resources through collaborative planning and management | Maintain collaborative partnerships to implement management plan activities                   | Vessel traffic compliance report            | Resource Protection Coordinator | Annually |
|   |   | Whale strike risk assessment completed      | Permit Coordinator              | Year 1   |
|   |   | Landslide meetings and activities monitored | Resource Protection Coordinator | Annually |
| Strategy RP-2: Enhance socioeconomic program through collaboration with ONMS headquarters socioeconomic team.   | Current socioeconomic data to support conservation and management goals of MBNMS are compiled | Survey results report                       | Resource Protection Coordinator | Year 3   |
| Strategy RP-3: Maintain and enhance permitting and environmental review program   | Continually improve the permit process from application through issuance                      | Permitting evaluation                       | Permit Coordinator              | Annually |
|   |   | NEPA documents                              | Resource Protection Staff       | Annually |
|   |   | Permit website updated                      | Permit Coordinator              | Year 2   |
|   |   | Special use permit tracking database        | Resource Protection Staff       | Annually |

### Section 3: Program Based Action Plans

|  |  |  |                                |           |
|--|--|--|--------------------------------|-----------|
| Strategy RP-5: Implement enforcement programs  | Implement an effective enforcement program                           | Annual enforcement priorities for NOAA Joint Enforcement Agreement developed | Regulatory Coordinator         | Annually  |
|  |  | Law Enforcement Technical Advisory Committee coordinated                     | Regulatory Coordinator         | Quarterly |
| Strategy RP-7: Coordinate resource protection programs, including interpretive enforcement and citizen science programs                                    | Increase protection of sanctuary resources through public engagement | Water quality volunteer programs implemented                                 | Volunteer Coordinator          | Annually  |
|  |  | Interpretive enforcement programs implemented                                | Volunteer Coordinator          | Annually  |
| Strategy RP-10: Review and revise the sanctuary's spill response plan and emergency response information in order to be prepared to respond to an incident | MBNMS staff (and others) are prepared for spill response             | Revised oil spill response plan  | Emergency Response Coordinator | Year 1    |
|  |  | Updated entries in the Environmental Response Management Application         | GIS staff                      | Annually  |

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## SECTION 4: APPENDICES



- Acronyms
- Jurisdictional Authorities
- Management Plan/Condition Report Connections
- Prohibitions, Permitting, and Exceptions

Waves crash near San Simeon. Photo: Robert Schwemmer/NOAA

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## Appendix A - Acronyms

|                    |   |
|--------------------|---|
| ACCESS .....       | Applied California Current Ecosystem Studies                                    |
| AMBAG .....        | Association of Monterey Bay Area Governments                                    |
| APPS .....         | Act to Prevent Pollution from Ships   |
| ASBS .....         | Area of special biological significance   |
| AUV .....          | Autonomous Underwater Vehicle   |
| AWQA.....          | Agriculture Water Quality Alliance  |
| Beach COMBERS..... | Beach Coastal Ocean Mammal/Bird Education & Research Surveys                    |
| BLM.....           | Bureau of Land Management   |
| BOEM.....          | Bureau of Ocean Energy Management   |
| BSEE.....          | Bureau of Safety and Environmental Enforcement                                  |
| Caltrans .....     | California Department of Transportation   |
| CAPS.....          | Commerce Alternative Personnel System   |
| CCA.....           | California Coastal Act  |
| CCAMP .....        | California Coast Ambient Monitoring Program                                     |
| CCAT .....         | Central Coast Action Tracker  |
| CCC.....           | California Coastal Commission   |
| CCLEAN .....       | Central Coast Long-Term Environmental Assessment Network                        |
| CCRWQCB .....      | Central Coast Regional Water Quality Control Board                              |
| CDFW .....         | California Department of Fish and Wildlife                                      |
| CDP.....           | Coastal development permit  |
| CDPR.....          | California Department of Parks and Recreation                                   |
| CEDEN .....        | California Environmental Data Exchange Network                                  |
| CERCLA .....       | Comprehensive Environmental Response, Compensation, and Liability Act           |
| CRSMP .....        | Coastal Regional Sediment Management Plan                                       |
| CSCAPE.....        | West Coast Collaborative Survey of Cetacean Abundance and the Pelagic Ecosystem |
| CSP .....          | California State Parks  |
| CSUMB.....         | California State University Monterey Bay  |
| CWA .....          | Clean Water Act   |
| CWG .....          | Conservation Working Group  |
| CZMA .....         | Coastal Zone Management Act   |
| DBW .....          | California Department of Boating and Waterways                                  |
| DDT .....          | dichlorodiphenyltrichloroethane   |
| DOC.....           | Department of Commerce  |
| DOD.....           | Department of Defense   |
| DOI.....           | Department of Interior  |
| DPS.....           | Distinct Population Segment   |
| DSMZ .....         | Davison Seamount Management Zone  |
| EFH .....          | Essential Fish Habitat  |
| EO.....            | Executive Order   |
| EPA.....           | Environmental Protection Agency   |
| ERMA.....          | Environmental Response and Management Application                               |
| ESA.....           | Endangered Species Act  |

|                  |   |
|------------------|---|
| ESNERR.....      | Elkhorn Slough National Estuarine Research Reserve  |
| ESU.....         | Evolutionary Significant Unit   |
| FAA.....         | Federal Aviation Administration   |
| GIS.....         | Geographic Information System   |
| GPO.....         | U.S. Government Publishing Office   |
| GRT.....         | Gross registered tons   |
| GSA.....         | General Services Administration   |
| HAB.....         | Harmful Algal Bloom   |
| HAZWOPER.....    | Hazardous Waste Operations and Emergency Response   |
| IC.....          | Incident Command  |
| IMO.....         | International Maritime Organization   |
| IT.....          | Information technology  |
| JEA.....         | NOAA Joint Enforcement Agreement  |
| JIC.....         | Joint Incident Command  |
| LETAC.....       | Law Enforcement Technical Advisory Committee  |
| LiMPETS.....     | Long-term Monitoring Program & Experiential Training for Students   |
| MARPOL73/78..... | United States Annex V of the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 |
| MARS.....        | Monterey Accelerated Research System  |
| MBARI.....       | Monterey Bay Aquarium Research Institute  |
| MBNMS.....       | Monterey Bay National Marine Sanctuary  |
| MBON.....        | Marine Biodiversity Observation Network   |
| MBTA.....        | Migratory Bird Treaty Act   |
| MDS.....         | Marine sanitation device  |
| MERITO.....      | Multicultural Education for Resource Issues Threatening Oceans  |
| MLPA.....        | Marine Life Protection Act  |
| MMA.....         | State marine managed areas  |
| MMPA.....        | Marine Mammal Protection Act  |
| MOA.....         | Memorandum of agreement   |
| MPA.....         | Marine Protected Area   |
| MPRSA.....       | Marine Protection, Research, and Sanctuaries Act  |
| MPWC.....        | Motorized personal watercraft   |
| MS4.....         | Municipal Separate Storm Sewer System   |
| MSFCMA.....      | Magnuson-Stevens Fishery Conservation and Management Act  |
| MSP.....         | Marine spatial planning   |
| NEPA.....        | National Environmental Policy Act   |
| NGO.....         | Non-governmental organization   |
| NHPA.....        | National Historic Preservation Act  |
| NMFS.....        | NOAA National Marine Fisheries Service  |
| NMSA.....        | National Marine Sanctuaries Act   |
| NOAA.....        | National Oceanic and Atmospheric Administration   |
| NOS.....         | National Ocean Service  |
| NPDES.....       | National Pollution Discharge Elimination System   |
| NPS.....         | National Park Service   |
| OLE.....         | NOAA Office of Law Enforcement  |

|                 |  |
|-----------------|--|
| ONMS.....       | NOAA Office of National Marine Sanctuaries             |
| OPA .....       | Oil Spill Prevention Act of 1990                       |
| OPC.....        | Ocean Protection Council                               |
| PBDE .....      | Polybrominated diphenyl ether                          |
| PCB.....        | Polychlorinated biphenyls                              |
| PFMC.....       | Pacific Fishery Management Council                     |
| psu .....       | Practical salinity unit                                |
| qPCR.....       | Quantitative polymerase chain reaction                 |
| RAP.....        | Research Activity Panel                                |
| RCD .....       | Resource Conservation District                         |
| ROV .....       | Remotely Operated Vehicle                              |
| RULET.....      | Remediation of Underwater Legacy Environmental Threats |
| SAMSAP .....    | Sanctuary Aerial Monitoring and Spatial Analysis       |
| SCAT.....       | Shoreline Cleanup and Assessment Technique             |
| SERC .....      | Smithsonian Environmental Research Center              |
| SESA.....       | Sanctuary ecologically significant area                |
| SIMoN .....     | Sanctuary Integrated Monitoring Network                |
| SLC .....       | California State Lands Commission                      |
| SRWCB.....      | State and Regional Water Control Boards                |
| SWQPA.....      | State Water Quality Protection Areas                   |
| SWRCB.....      | State Water Resources Control Board                    |
| SWRP .....      | Storm Water Resource Plans                             |
| Team OCEAN..... | Ocean Conservation Education Action Network            |
| TMDL .....      | Total maximum daily loads                              |
| TOPP .....      | Tagging of Pacific Predators                           |
| TSS .....       | Traffic separation scheme                              |
| UAS.....        | Unmanned Aircraft Systems                              |
| UCSB .....      | University of California Santa Barbara                 |
| UCSC .....      | University of California Santa Cruz                    |
| USACE.....      | United States Army Corps of Engineers                  |
| USCG .....      | United State Coast Guard                               |
| USFS.....       | United States Forest Service                           |
| USFWS .....     | United States Fish and Wildlife Service                |
| USGS .....      | United States Geological Survey                        |
| VMA.....        | Voluntary management area                              |
| WQPP .....      | Water Quality Protection Program                       |
| WRC .....       | Western Regional Center                                |

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## **Appendix B - Jurisdictional Authorities**

The sanctuary overlaps and borders the jurisdictions of several other agencies. Coordination and cooperation among the responsible agencies are critical to the success of the sanctuary. These agencies and their roles in assisting management of the sanctuary are described below.

### ***Federal Authorities***

#### **National Marine Sanctuaries**

One other national marine sanctuary shares a boundary with MBNMS. To the north is Greater Farallones National Marine Sanctuary. MBNMS works closely with Greater Farallones National Marine Sanctuary to protect shared populations and habitats.

Greater Farallones National Marine Sanctuary is responsible for managing programs and regulations of the Northern Management Area of MBNMS, which includes all MBNMS waters and submerged lands north of Point Año Nuevo and the San Mateo/Santa Cruz county line.

#### **United States Forest Service**

The sanctuary manages waters adjacent to the Los Padres National Forest. The USFS works closely with the sanctuary on the protection and management of natural and cultural marine resources as well as on education.

#### **United States Fish and Wildlife Service (USFWS)**

Within the waters of MBNMS, USFWS is responsible for protecting all marine mammal species, including sea otters and excluding cetaceans and pinnipeds listed under MMPA and short-tailed albatross and other bird species listed as threatened or endangered under the ESA. NMFS is responsible for protecting cetaceans and pinnipeds under the MMPA and sea turtles and fish that are listed as threatened or endangered under the ESA.

#### **National Park Service (NPS)**

Although there are no national parks adjacent to sanctuary waters, there is significant collaboration between the agencies for protection of maritime heritage resources and submerged archeological resources.

#### ***Abandoned Shipwreck Act***

The Abandoned Shipwreck Act establishes government ownership over the majority of abandoned shipwrecks located in U.S. waters and creates a framework within which shipwrecks are managed. Enacted in 1988, it affirms the authority of state governments to claim and manage abandoned shipwrecks on state submerged lands. Under the Abandoned Shipwreck Act, the laws of salvage and finds do not apply to any shipwreck covered under the act. The act asserts that shipwrecks are multiple-use resources.

NPS has prepared guidelines to assist states and federal agencies in carrying out their responsibilities under the act. Issued in 1990, the guidelines provide advice on establishing and funding shipwreck management programs and technical guidance on surveying, identifying, documenting, and evaluating shipwrecks. In addition, the guidelines suggest ways to make sites publicly accessible and to recover shipwrecks using public and private entities. They also include advice on establishing volunteer programs, interpreting shipwreck sites, and creating and operating underwater parks.

### **National Marine Fisheries Service (NMFS)**

NMFS is responsible for enforcing the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA), the MMPA, and the ESA. Pursuant to the MSFCMA, NMFS approves, implements, and enforces fishery management plans prepared by regional fishery management councils. NMFS works closely with CSFW and USCG for enforcement operations both within and outside the three-mile territorial sea. Monterey Bay fish populations affected by fishery management plan regulations include coastal pelagic species, flatfish, highly migratory species, rockfish, groundfish, and salmon.

NMFS shares responsibility with USFWS for implementation of the MMPA and the ESA (see USFWS entry above).

NMFS has responsibility under the MSFCMA for approving, implementing, and enforcing fishery management plans prepared by regional fishery management councils to ensure protection of fishery resources in the exclusive economic zone. NMFS also shares responsibility with USFWS for the implementation of the MMPA and the ESA to prevent taking of any endangered, threatened, or otherwise depleted species.

### **United States Coast Guard (USCG)**

The USCG is the federal government's primary maritime law enforcement agency. USCG missions include maritime law enforcement, national security, maritime safety, and marine environmental protection. For ocean and coastal activities, the USCG manages maritime transportation activities in order to minimize loss of life and damage to the environment. The USCG has historically held the primary responsibility for ensuring cleanup of any oil spill or other pollutants in the marine environment. To avert oil spills and promote safety, the USCG inspects vessels carrying oil and other hazardous materials. The USCG requires vessels to have approved response plans detailing owner and operator response to an oil spill and ensuring proper response activities. Pursuant to the Oil Spill Prevention Act of 1990 (OPA), which defines ground rules for dealing with oil pollution events and recommends pollution prevention measures, the USCG has responsibility for preparing most of the regulations necessary to implement OPA. Additionally, the USCG must be consulted in the development of oil spill contingency plans for marine oil and gas facilities and terminals. The OPA also allows for natural resource damage recovery by federal and state resource trustees.

The USCG holds broad responsibility for enforcing all federal laws throughout the

sanctuary and assists NOAA in the enforcement of sanctuary regulations. The USCG provides on-scene coordination with regional response center facilities under the National Contingency Plan for removal of oil and hazardous substances in the event of a spill that threatens sanctuary resource.

### **Bureau of Ocean Energy Management (BOEM)**

BOEM is responsible for managing development of the nation's offshore resources in an environmentally and economically responsible way. Functions include leasing, plan administration, environmental studies, NEPA analysis, resource evaluation, economic analysis, and the Renewable Energy Program.

### ***Outer Continental Shelf Lands Act***

The Outer Continental Shelf Lands Act, created on August 7, 1953, defines the outer continental shelf as all submerged lands lying seaward of state coastal waters (three miles offshore) which are under U.S. jurisdiction. Under the act, the Secretary of the Interior is responsible for the administration of mineral exploration and development of the outer continental shelf. The act empowers the Secretary to grant leases to the highest qualified responsible bidder on the basis of sealed competitive bids and to formulate regulations as necessary to carry out the provisions of the act. The act, as amended, provides guidelines for implementing an outer continental shelf oil and gas exploration and development program.

### ***Submerged Lands Act***

The Submerged Lands Act of 1953 grants individual states rights to the natural resources of submerged lands from the coastline to no more than three nautical miles (5.6 km) into the Atlantic, Pacific, and Arctic oceans, and the Gulf of Mexico. The only exceptions are Texas and the west coast of Florida, where state jurisdiction extends from the coastline to no more than three marine leagues (16.2 km) into the Gulf of Mexico.

The Submerged Lands Act also reaffirmed the federal claim to the lands of the outer continental shelf, which consists of those submerged lands seaward of state jurisdiction. The Submerged Lands Act led to the passage of the Outer Continental Shelf Lands Act later in 1953. The Outer Continental Shelf Lands Act and subsequent amendments, in later years, outlines the federal responsibility over the submerged lands of the outer continental shelf.

### **Bureau of Safety and Environmental Enforcement (BSEE)**

BSEE was created to enforce safety and environmental regulations. Functions include all field operations including permitting and research, inspections, offshore regulatory programs, oil spill response, and newly formed training and environmental compliance functions.

### **Environmental Protection Agency (EPA)**

The EPA has regulatory responsibilities with regard to ocean water quality. Under the U.S. Clean Water Act (CWA), EPA establishes and enforces water quality standards for waters outside of the three-mile state waters. Title 1 of the Marine Protection, Research, and Sanctuaries Act (Ocean Dumping Act) prohibits the unpermitted

dumping of “any material transported from a location outside the United States” into the territorial sea of the United States, or into the zone contiguous to the territorial sea, to the extent discharge into the contiguous zone would affect the territorial sea or the territory of the United States. The act is administered by the EPA and supersedes any CWA requirements.

The EPA has regulatory responsibilities with regard to sewage outfalls (under the CWA via NPDES permits), and ocean dumping (under Title I of the Marine Protection, Research, and Sanctuaries Act) to protect water quality.

### ***Federal Water Pollution Control Act***

The Federal Water Pollution Control Act, commonly known as the Clean Water Act (CWA), 33 U.S.C § 1251 et seq., requires California to submit statewide and basin plans to the EPA for approval. The CWA differentiates between point-source and non-point-source pollution. Point sources of pollution are those that have a fixed discharge point. For example, sewage treatment plants (also called publicly owned treatment works) or industrial facilities (such as power plants or oil refineries) are considered point sources.

Point source discharges are illegal under the CWA unless authorized by NPDES permit. Under CWA Section 402 (33 U.S.C. § 1342), any discharge of a pollutant from a point source (e.g., a municipal or industrial facility) to the navigable waters of the United States or beyond must obtain an NPDES permit, which requires compliance with technology- and water-quality-based treatment standards.

CWA Section 312 (33 U.S.C. § 1322) contains regulations protecting human health and the aquatic environment from disease-causing microorganisms that may be present in sewage from boats. Pursuant to Section 312 of the CWA, all recreational boats with installed toilet facilities must have an operable marine sanitation device on board. All installed marine sanitation devices must be Coast Guard-certified. Coast Guard-certified devices are so labeled except for some holding tanks, which are certified by definition under Section 312 of the CWA (33 U.S.C. § 1322). In 2012, under the authority of the CA Section 312, the EPA established national no discharge zones within which sewage discharges are prohibited from all large passenger vessels (of 300 gross tons or greater) and from large oceangoing vessels (of 300 gross tons or greater) with available holding tank capacity or containing sewage generated while the vessel was outside of the marine waters of the state of California. In California, no discharge zones have been created for 10 bays and harbors along the outer coast and for all state marine waters (i.e., within three nautical miles of the shore).

### ***Water Quality Impairments***

Section 303(d) of the CWA requires the states to submit to the EPA a list of water bodies that do not meet water quality standards for specific pollutants (i.e., are “impaired”). On November 12, 2010, USEPA approved the inclusion of all waters to California's 2010 303(d) list of impaired waters requiring total maximum daily loads (TMDLs) and disapproved the omission of several water bodies and associated pollutants that meet federal listing requirements. On October 11, 2011, USEPA issued its final decision regarding the water bodies and pollutants USEPA added to California's 2010 303(d) List. In the vicinity of MBNMS, the following areas were

identified in the 2010 303(d) list: Capitola Beach, Rio Del Mar Beach and Stillwater Cove.

### ***Total Maximum Daily Loads (TMDLs)***

Under the CWA, TMDLs are required to be developed for 303(d) listed water bodies. The purpose of a TMDL is to bring a water body back into compliance with the water quality objective for which it was listed. The development of a TMDL involves the identification of the various sources contributing to the water quality standard exceedance, including both point and nonpoint sources. The TMDL must also consider the natural background level and a margin of safety. Once a TMDL is developed, it must be approved and included in the basin plan. Implementation of the TMDLs will, by necessity, include public involvement and education, since many of our pollution problems are related to nonpoint sources and urban stormwater runoff, which are not regulated activities.

### ***Title I of the Marine Protection, Research, and Sanctuaries Act, also known as the Ocean Dumping Act, 33 U.S.C. §§ 1401-1445***

The Marine Protection, Research, and Sanctuaries Act (MPRSA) regulates the dumping of wastes into marine waters. It is the primary federal environmental statute governing transportation of dredged material for the purpose of disposal into ocean waters, while CWA Section 404 governs the discharge of dredged or fill material into all waters of the U.S. In 1983, a global ban on the dumping of radioactive wastes was implemented. The MPRSA and the CWA regulate materials that are disposed of into the marine environment, and only sediments determined to be nontoxic by EPA standards may be disposed of into the marine environment. The EPA and the USACE share responsibility for managing the disposal of dredged materials.

### **Bureau of Land Management (BLM)**

The BLM is responsible for managing the California Coastal National Monument that was established by Presidential Proclamation on January 11, 2000, under the authority of the Antiquities Act of 1906. It is composed of over 20,000 rocks and small islands spread along the 1,100 mile California coastline. The Point Arena-Stornetta Unit includes 1,665 acres of federal land administered by the BLM along the Northern California coastline, immediately south of Point Arena.

### **United States Army Corps of Engineers (USACE)**

#### ***Rivers and Harbors Appropriations Act of 1899, 33 U.S.C §§ 401, 403***

USACE acts in accordance with the provisions of the Rivers and Harbors Act, which regulates placement of structures or other work in addition to fill in “navigable waters,” and CWA (Section 404), which governs fill in “waters of the United States,” including wetlands. A USACE permit is required if a project would place structures within navigable waters or if it would result in altering waters of the U.S. below the ordinary high water mark in nontidal waters. The USACE does not issue these types of permits in cases where the USACE itself is the lead agency; instead it evaluates the project to determine compliance and acceptability. Typical activities requiring Section 10 permits are construction of buoys, piers, wharves, bulkheads, marinas, ramps,



floats, intake structures, and cable or pipeline crossings, and dredging and excavation.

## **State Authorities**

### **California Department of Fish and Wildlife (CDFW)**

The CDFW, under the Fish and Game Code (and Chapter 14 of the Administrative Code), regulates and manages a wide variety of activities affecting the living marine resources found in the territorial sea and in the 200-mile-wide exclusive economic zone. In cooperation with NMFS, the CDFW enforces federal regulations established under the MSFCMA. It also enforces and implements the Marine Life Management Act and the Marine Life Protection Act (MLPA). The CDFW has established ecological reserves, marine reserves, game refuges, and marine life refuges in the ocean waters and submerged lands surrounding Monterey Bay. The agency has the authority to prohibit or restrict activities that may harm resources, including fishing, collecting, swimming, boating, and public entry. The CDFW works closely with the sanctuary in oil spill response, damage assessment, and restoration through its Office of Spill Prevention and Response.

Several fisheries conducted within MBNMS are managed by the state of California. The CDFW is responsible for preparing fishery management plans under the authority of the California Fish and Game Commission and the California State Legislature. Monterey Bay fish populations affected by California regulations include California halibut, Dungeness crab, nearshore finfish, market squid, and rock crab.

The CDFW regulates commercial fishing, including the taking of tidal invertebrates for commercial purposes, under a licensing system. CDFW also regulates sport fishing through license and bag limit systems. A sport fishing license is required for the taking and possession of fish for any non-commercial purpose. CDFW also leases state water bottoms for the purpose of aquaculture.

### **State Water Resources Control Board (SWRCB)**

The SWRCB is responsible for water quality within state waters. The SWRCB adopts statewide water quality control plans and policies, such as the Ocean Plan, the Thermal Plan, and the State Implementation Policy. The regional water control boards adopt and submit basin plans to the state board for approval. Title III, Section 303 of the CWA requires California to submit statewide and basin plans to the EPA for approval.

On March 21, 1974, the SWRCB decided that, “The list of Areas of Special Biological Significance (ASBS) will be used to identify for planning purposes, those areas where the regional water quality control boards will prohibit waste discharges.” The SWRCB established a system of 34 ASBS, now known as state water quality protection areas (SWQPA). These are areas designated for special protection from undesirable alteration in natural water quality. Seven ASBSs are located in MBNMS. These are James V. Fitzgerald Marine Reserve, Año Nuevo Point and Island, Pacific Grove Marine Gardens Fish Refuge/Hopkins Marine Life Refuge, Carmel Bay, Point Lobos Ecological Reserve, Julia Pfeiffer Burns Underwater Park, and the ocean area

surrounding the mouth of Salmon Creek.

An ASBS is a marine or estuarine area that is designed to protect marine species or biological communities from an undesirable alteration in natural water quality. The SWRCB is responsible for designating these areas. In an ASBS, point source waste and thermal discharges are prohibited or limited by special conditions. Nonpoint source pollution is controlled to the extent practicable. No other use is restricted by the state in these areas.

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

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

***Porter-Cologne Water Quality Control Act, California Water Code §§ 13000-14958***

The Porter-Cologne Water Quality Control Act contains provisions for enforcing water quality standards through issuance of waste discharge requirements. Pursuant to the act, the SWRCB has the primary responsibility to protect California's coastal and ocean water quality. SWRCB has been given the authority by the EPA to administer the NPDES program for California. The regional water quality control boards, in coordination with the SWRCB, issue both state waste discharge requirements and NPDES permits to individual dischargers. Dischargers are required to establish self-monitoring programs for their discharges and to submit compliance reports to regional water quality control boards. The SWRCB has established regulations to implement these measures through water quality control plans, including the California Ocean Plan (Ocean Plan), the Regional Water Quality Control Plans (Basin Plans), and the Thermal Water Quality Control Plan (California Ocean Resources Management Program 1995). The Ocean Plan is applicable to nearshore ocean waters, but does not cover enclosed bays and estuaries. The Thermal Plan covers waste heat (e.g., from power plants) into all of the state's coastal waters. The Regional Board Basin Plans are applicable to freshwater bodies (e.g., streams and rivers) as well as enclosed bays and estuaries.

In addition, the state has a Policy for Implementation of Toxics Standards for Inland



Surface Waters, Enclosed Bays, and Estuaries of California (State Implementation Policy). The State Implementation Policy includes the measures by which California implements the EPA California Toxics Rule. The California Toxics Rule establishes water quality criteria for priority toxic pollutants.

The State Water Resources Control Board adopts the statewide water quality control plans and policies, such as the Ocean Plan, the Thermal Plan, and the State Implementation Policy. The regional boards adopt and submit basin plans to the state board for approval.

### **California Coastal Commission (CCC)**

The CCC was established under the California Coastal Zone Management Act (CZMA) of 1972, which gives authority to the commission to establish policy for activities in state waters. The CZMA established the authority for a federal-state partnership to manage development and use of the coastal zone. The CCC also has the authority to review federal activities in the coastal zone to ensure consistency with California's Coastal Zone Management Program.

The CCC was established under the California Coastal Act, which gives authority to the commission to establish policy for activities in state waters. In addition, seaward of state jurisdiction, federal development and activities directly affecting the coastal zone must be conducted in a manner consistent with these policies to the maximum extent practicable.

### ***Coastal Zone Management Act, 16 U.S.C. §§ 1451-1466***

The Coastal Zone Management Act (CZMA) provides incentives for coastal states to develop and implement coastal area management programs. It is significant with regards to water pollution abatement, particularly concerning nonpoint source pollution. Under the CZMA, the NOAA Office of Ocean and Coastal Resource Management reviews state coastal nonpoint source control programs developed for approval under the Coastal Zone Act Reauthorization Amendments of 1990. The office also administers grants to states for coastal nonpoint source control program implementation activities. The Plan for California's Nonpoint Source Pollution Control Program, developed by the State Water Resources Control Board and the CCC, received full approval from the EPA and NOAA in 2000. The plan provides an outline for nonpoint source pollution management measures.

The CCC has the authority to review federal activities in the coastal zone to ensure consistency with California's coastal zone management program. The CCC also addresses water quality issues through additional programs including:

- A. Water Quality Unit, which provides technical assistance to district offices and statewide nonpoint source pollution coordination;
- B. Local coastal programs;
- C. Interagency Coordination Committee;
- D. Critical coastal areas;
- E. Model Urban Runoff Program;
- F. Contaminated Sediments Task Force;
- G. Snapshot Day; and

## H. First Flush.

### ***California Coastal Act, Cal. Pub. Res. Code §30000 et seq.***

The California Coastal Act (CCA) defines the “coastal zone” as the area of the state that extends three miles seaward and generally about 1,000 yards (910 meters) inland. The CCA mandates protections for terrestrial and marine habitat through its policies on visual resources, land development, agriculture, commercial fisheries, industrial uses, water quality, offshore oil and gas development, transportation, power plants, ports, and public works. The CCC administers various programs, including local coastal programs and the Water Quality Program, which facilitates the interagency Nonpoint Source Pollution Control Program. Almost all development within the coastal zone, which contains many wetlands, requires a coastal development permit from either the CCC or a local government with a certified local coastal program.

### **California State Lands Commission (SLC)**

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

The SLC administers land including the beds of all waterways of the state below the ordinary high water mark, as well as tidelands (located between the mean high and low tide lines) and submerged lands (located below the mean low tide line and extending three nautical miles seaward). These sovereign state lands are held by the state “in trust” for the benefit of the public.

### **California Department of Boating and Waterways (DBW)**

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

### **California State Parks**

The California Public Resources Code provides for California Department of Parks and Recreation’s (California State Parks’) control of the state park system, including management of submerged archaeological and historical resources within state park units.

The department may manage state marine reserves, state marine parks, state marine conservation areas, state marine cultural preservation areas, and state marine recreational management areas. Department authority over units within the state park system shall extend to units of the State Marine Managed Areas (MMAs) system that are managed by the department.

The California State Parks regulations are found in the California Code of Regulations, Title 14, Natural Resources, §§ 4300-4971. Several of the regulations pertain to historic or cultural resources.

### **California Department of Parks and Recreation**

California Department of Parks and Recreation manages 280 park units, including over 280 miles of coastline. Responsible for almost one-third of California's scenic coastline, California State Parks manages the state's finest coastal wetlands, estuaries, beaches, and dune systems.

### ***Oil Pollution Control Act, 33 U.S.C. § 2701 et seq.***

The Oil Pollution Control Act of 1990 requires extensive planning for oil spills from tank vessels and onshore and offshore facilities and places strict liability on parties responsible for oil spills. See Impacts from Vessel Spills Action Plan for more information.

### ***Act to Prevent Pollution from Ships, 33 U.S.C. § 1901 et seq.***

The discharge of solid wastes is regulated under the Act to Prevent Pollution from Ships (APPS). The APPS regulates the disposal of plastics and garbage for the United States Annex V of the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 (MARPOL73/78). Under these regulations, the disposal of plastics is prohibited in all waters, and other garbage, including paper, glass, rags, metal, and similar materials, is prohibited within 22 km (12 nm; 14 miles) from shore (unless macerated).

### ***Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. §§ 9601-9675***

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) addresses cleanup of hazardous substances and mandates liability for environmental cleanup on those whose actions cause release into the environment. In conjunction with the CWA, it requires preparation of a National Contingency Plan for responding to oil or hazardous substances release.

### ***Resource Conservation and Recovery Act, 42 U.S.C §§ 6901-6992K***

The Resource Conservation and Recovery Act addresses hazardous waste management, establishing duties and responsibilities for hazardous waste generators, transporters, handlers, and disposers.

### ***California Health and Safety Code §115880 et seq.***

California has established minimum standards for the sanitation of public beaches, including: (1) requiring the testing of the waters adjacent to all public beaches for microbiological contaminants; (2) establishing protective minimum standards for total coliform, fecal coliform, and enterococci bacteria, or for other microbiological indicators; and (3) requiring that the waters adjacent to public beaches are tested for total coliform, fecal coliform, and enterococci bacteria, or for other microbiological indicators if appropriate. Since 2012, testing on beaches that are visited by more than 50,000 people annually and are located on an area adjacent to a storm drain that flows

in the summer is required on a weekly basis from April 1 to October 31, inclusive, of each year.

***California Ballast Water Regulations, CCR, Title 2, Division 3, Chapter 1, Article 4.6 et seq.***

The master, operator, or person in charge of vessels arriving at a California port or place carrying ballast water from another port or place within the Pacific Coast must employ at least one of the following ballast water management practices: (1) exchange the vessel's ballast water in near-coastal waters (more than 50 nm from land and at least 657 feet deep) before entering the waters of the state, if that ballast water has been taken on in a port or place within the Pacific Coast region; (2) retain all ballast water on board the vessel; (3) use an alternative, environmentally sound method of ballast water management that, before the vessel begins the voyage, has been approved by the SLC or the USCG as being at least as effective as exchange, using mid-ocean waters, in removing or killing nonindigenous species; (4) discharge the ballast water to a reception facility approved by the commission; or (5) under extraordinary circumstances where compliance with the four options above is not practicable, perform a ballast water exchange within an area agreed to by the SLC in consultation with the USCG. "Pacific Coast Region" is defined in Article 4.6 as all estuarine and ocean waters within 200 nm of land or less than 2,000 meters (6,560 feet, 1,093 fathoms) deep, and rivers, lakes, or other water bodies navigably connected to the ocean on the Pacific Coast of North America east of 154 degrees west longitude and north of 25 degrees north latitude, exclusive of the Gulf of California.

***California Clean Coast Act, Cal. Pub. Res. Code §72400 et seq.***

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 bilge water, other waste, and sewage sludge into the marine waters of the state and marine sanctuaries and sets up notification protocols for release of these substances into state waters or waters of a national marine sanctuary. 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. The act is more stringent than federal regulation of cruise ships and also provides the strongest state protections from cruise ship pollution in the United States.

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## Appendix C - Management Plan/Condition Report Connections

This section identifies the linkages between the various action plan activities and the [2015 MBNMS condition report partial update](#) findings for water, habitat, living resources, and maritime archaeological resources in estuarine, nearshore, offshore, and Davidson Seamount study areas.

The table cross references actions plan linkages and the current state of the particular study area in relation to a series of questions. The development of these strategies and activities are in direct relationship to the areas of need identified in the report.

### Status:

**Good** **Good/Fair** **Fair** **Fair/Poor** **Poor** **Undet.**

### Trends:

- ▲ Conditions appear to be improving
- Conditions do not appear to be changing
- ▼ Conditions appear to be declining
- ? Undetermined trend
- N/A Question not applicable

### Reference numbers:

▲<sup>4</sup> Superscript numbers refer to the issue number in the category the activity is linked to.

| Water                  | Habitat                       | Living Resources                  | Maritime Archaeological Resources |
|------------------------|-------------------------------|-----------------------------------|-----------------------------------|
| 1. Stressors           | 5. Abundance/<br>Distribution | 9. Biodiversity                   | 15. Integrity                     |
| 2. Eutrophic Condition | 6. Biologically Structured    | 11* Non-Indigenous Species Status | 16. Threat to Environment         |
| 1. Human Health        | 7. Contaminants               | 12. Key Species Status            | 17. Human Activities              |
| 2. Human Activities    | 1. Human Impacts              | 13. Key Species Condition         |                                   |
|                        |                               | 14. Human Activities              |                                   |

\*There is no number 10 in the 2015 condition report update

|   | Environment |                |                  |                                  |           |                |                  |                                  |                |         |                  |                                  |                   |         |                  |                                  |
|---|-------------|----------------|------------------|----------------------------------|-----------|----------------|------------------|----------------------------------|----------------|---------|------------------|----------------------------------|-------------------|---------|------------------|----------------------------------|
|   | Estuarine   |                |                  |                                  | Nearshore |                |                  |                                  | Offshore       |         |                  |                                  | Davidson Seamount |         |                  |                                  |
|   | Water       | Habitat        | Living Resources | Maritime Archeological Resources | Water     | Habitat        | Living Resources | Maritime Archeological Resources | Water          | Habitat | Living Resources | Maritime Archeological Resources | Water             | Habitat | Living Resources | Maritime Archeological Resources |
| ISSUE BASED ACTION PLANS  |             |                |                  |                                  |           |                |                  |                                  |                |         |                  |                                  |                   |         |                  |                                  |
| CLIMATE CHANGE  |             |                |                  |                                  |           |                |                  |                                  |                |         |                  |                                  |                   |         |                  |                                  |
| Strategy CC-3: Communicate ocean-climate impacts and solutions            |             |                |                  |                                  |           |                |                  |                                  |                |         |                  |                                  |                   |         |                  |                                  |
| Activity CC-3.3   |             |                |                  |                                  |           |                |                  |                                  | ▼ <sup>2</sup> |         |                  |                                  |                   |         |                  |                                  |
| COASTAL EROSION & SEDIMENT MANAGEMENT                                     |             |                |                  |                                  |           |                |                  |                                  |                |         |                  |                                  |                   |         |                  |                                  |
| Strategy 1: Track progress on coastal sediment management plans for MBNMS |             |                |                  |                                  |           |                |                  |                                  |                |         |                  |                                  |                   |         |                  |                                  |
| Activity CESM-1.3   |             | – <sup>5</sup> |                  |                                  |           | ▼ <sup>5</sup> |                  |                                  |                |         |                  |                                  |                   |         |                  |                                  |
| Strategy 2: Collaborate on land management plan for CEMEX site            |             |                |                  |                                  |           |                |                  |                                  |                |         |                  |                                  |                   |         |                  |                                  |
| Activity CESM-2.1   |             |                |                  |                                  |           | ▼ <sup>5</sup> |                  |                                  |                |         |                  |                                  |                   |         |                  |                                  |
| Strategy 3: Implement site-specific beach nourishment programs            |             |                |                  |                                  |           |                |                  |                                  |                |         |                  |                                  |                   |         |                  |                                  |
| Activity CESM-3.1   |             | – <sup>5</sup> |                  |                                  |           | ▼ <sup>5</sup> |                  |                                  |                |         |                  |                                  |                   |         |                  |                                  |
| Activity CESM-3.2   |             | – <sup>5</sup> |                  |                                  |           | ▼ <sup>5</sup> |                  |                                  |                |         |                  |                                  |                   |         |                  |                                  |
| Activity CESM-3.3   |             | – <sup>5</sup> |                  |                                  |           | ▼ <sup>5</sup> |                  |                                  |                |         |                  |                                  |                   |         |                  |                                  |



|  | Environment |                |                  |                                  |                |         |                  |                                  |          |         |                  |                                  |                   |                |                  |                                  |
|--|-------------|----------------|------------------|----------------------------------|----------------|---------|------------------|----------------------------------|----------|---------|------------------|----------------------------------|-------------------|----------------|------------------|----------------------------------|
|  | Estuarine   |                |                  |                                  | Nearshore      |         |                  |                                  | Offshore |         |                  |                                  | Davidson Seamount |                |                  |                                  |
|  | Water       | Habitat        | Living Resources | Maritime Archeological Resources | Water          | Habitat | Living Resources | Maritime Archeological Resources | Water    | Habitat | Living Resources | Maritime Archeological Resources | Water             | Habitat        | Living Resources | Maritime Archeological Resources |
| Strategy 4: Safeguard MBNMS from contaminated dredge disposal  |             |                |                  |                                  |                |         |                  |                                  |          |         |                  |                                  |                   |                |                  |                                  |
| Activity CESM-4.2  |             | ▼ <sup>7</sup> |                  |                                  | ▼ <sup>7</sup> |         |                  |                                  |          |         |                  |                                  |                   |                |                  |                                  |
| Strategy 5: Reduce coastal armoring  |             |                |                  |                                  |                |         |                  |                                  |          |         |                  |                                  |                   |                |                  |                                  |
| Activity CESM-5.2  |             | – <sup>5</sup> |                  |                                  | ▼ <sup>5</sup> |         |                  |                                  |          |         |                  |                                  |                   |                |                  |                                  |
| Strategy 6: Reduce impacts to sanctuary resources due to landslides and subsequent emergency responses |             |                |                  |                                  |                |         |                  |                                  |          |         |                  |                                  |                   |                |                  |                                  |
| Activity CESM-6.3  |             | – <sup>5</sup> |                  |                                  | ▼ <sup>5</sup> |         |                  |                                  |          |         |                  |                                  |                   |                |                  |                                  |
| DAVIDSON SEAMOUNT  |             |                |                  |                                  |                |         |                  |                                  |          |         |                  |                                  |                   |                |                  |                                  |
| Strategy DS-1: Conduct site characterization   |             |                |                  |                                  |                |         |                  |                                  |          |         |                  |                                  |                   |                |                  |                                  |
| Activity DS-1.1  |             |                |                  |                                  |                |         |                  |                                  |          |         |                  |                                  |                   |                | ▲ <sup>12</sup>  |                                  |
| Activity DS-1.2  |             |                |                  |                                  |                |         |                  |                                  |          |         |                  |                                  |                   |                | ▲ <sup>12</sup>  |                                  |
| Activity DS-1.4  |             |                |                  |                                  |                |         |                  |                                  |          |         |                  |                                  |                   |                | ? <sup>14</sup>  |                                  |
| Activity DS-1.5  |             |                |                  |                                  |                |         |                  |                                  |          |         |                  |                                  |                   | ? <sup>7</sup> |                  |                                  |
| Strategy DS-2: Conduct ecological processes investigations   |             |                |                  |                                  |                |         |                  |                                  |          |         |                  |                                  |                   |                |                  |                                  |
| Activity DS-2.2  |             |                |                  |                                  |                |         |                  |                                  |          |         |                  |                                  |                   |                | ▲ <sup>12</sup>  |                                  |

|   | Environment |         |                  |                                  |           |         |                  |                                  |          |         |                  |                                  |                   |         |                  |                                  |
|---|-------------|---------|------------------|----------------------------------|-----------|---------|------------------|----------------------------------|----------|---------|------------------|----------------------------------|-------------------|---------|------------------|----------------------------------|
|   | Estuarine   |         |                  |                                  | Nearshore |         |                  |                                  | Offshore |         |                  |                                  | Davidson Seamount |         |                  |                                  |
|   | Water       | Habitat | Living Resources | Maritime Archeological Resources | Water     | Habitat | Living Resources | Maritime Archeological Resources | Water    | Habitat | Living Resources | Maritime Archeological Resources | Water             | Habitat | Living Resources | Maritime Archeological Resources |
| Activity DS-2.3   |             |         |                  |                                  |           |         |                  |                                  |          |         |                  |                                  |                   |         | ▲ <sup>12</sup>  |                                  |
| Activity DS-2.4   |             |         |                  |                                  |           |         |                  |                                  |          |         |                  |                                  |                   |         | ▲ <sup>12</sup>  |                                  |
| INTRODUCED SPECIES  |             |         |                  |                                  |           |         |                  |                                  |          |         |                  |                                  |                   |         |                  |                                  |
| Strategy IS-1: Manage pathways and promote prevention     |             |         |                  |                                  |           |         |                  |                                  |          |         |                  |                                  |                   |         |                  |                                  |
| Activity IS-1.1   |             |         | - <sup>11</sup>  |                                  |           |         | ▼ <sup>11</sup>  |                                  |          |         | - <sup>11</sup>  |                                  |                   |         | - <sup>11</sup>  |                                  |
| Strategy IS-2: Promote early detection and rapid response |             |         |                  |                                  |           |         |                  |                                  |          |         |                  |                                  |                   |         |                  |                                  |
| Activity IS-2.1   |             |         | - <sup>11</sup>  |                                  |           |         | ▼ <sup>11</sup>  |                                  |          |         | - <sup>11</sup>  |                                  |                   |         | - <sup>11</sup>  |                                  |
| Activity IS-2.2   |             |         | - <sup>11</sup>  |                                  |           |         | ▼ <sup>11</sup>  |                                  |          |         | - <sup>11</sup>  |                                  |                   |         | - <sup>11</sup>  |                                  |
| Strategy IS-3: Implement eradication or control           |             |         |                  |                                  |           |         |                  |                                  |          |         |                  |                                  |                   |         |                  |                                  |
| Activity IS-3.1   |             |         | - <sup>11</sup>  |                                  |           |         | ▼ <sup>11</sup>  |                                  |          |         | - <sup>11</sup>  |                                  |                   |         | - <sup>11</sup>  |                                  |
| Activity IS-3.2   |             |         | - <sup>11</sup>  |                                  |           |         | ▼ <sup>11</sup>  |                                  |          |         | - <sup>11</sup>  |                                  |                   |         | - <sup>11</sup>  |                                  |
| Activity IS-3.3   |             |         | - <sup>11</sup>  |                                  |           |         | ▼ <sup>11</sup>  |                                  |          |         | - <sup>11</sup>  |                                  |                   |         | - <sup>11</sup>  |                                  |
| Strategy IS-5: Implement restoration                      |             |         |                  |                                  |           |         |                  |                                  |          |         |                  |                                  |                   |         |                  |                                  |
| Activity IS-5.1   |             |         | - <sup>9</sup>   |                                  |           |         | - <sup>9</sup>   |                                  |          |         | - <sup>9</sup>   |                                  |                   |         | ? <sup>9</sup>   |                                  |

|   | Environment |         |                  |                                  |           |                |                  |                                  |          |                |                  |                                  |                   |         |                  |                                  |
|---|-------------|---------|------------------|----------------------------------|-----------|----------------|------------------|----------------------------------|----------|----------------|------------------|----------------------------------|-------------------|---------|------------------|----------------------------------|
|   | Estuarine   |         |                  |                                  | Nearshore |                |                  |                                  | Offshore |                |                  |                                  | Davidson Seamount |         |                  |                                  |
|   | Water       | Habitat | Living Resources | Maritime Archeological Resources | Water     | Habitat        | Living Resources | Maritime Archeological Resources | Water    | Habitat        | Living Resources | Maritime Archeological Resources | Water             | Habitat | Living Resources | Maritime Archeological Resources |
| Activity IS-5.2   |             |         | - 9              |                                  |           |                | - 9              |                                  |          |                | - 9              |                                  |                   |         | ? 9              |                                  |
| MARINE DEBRIS   |             |         |                  |                                  |           |                |                  |                                  |          |                |                  |                                  |                   |         |                  |                                  |
| Strategy MD 1: Assess scope and scale of marine debris  |             |         |                  |                                  |           |                |                  |                                  |          |                |                  |                                  |                   |         |                  |                                  |
| Activity MD-1.1   |             |         |                  |                                  |           | ▼ <sup>5</sup> |                  |                                  |          | ▲ <sup>5</sup> |                  |                                  |                   |         |                  |                                  |
| Activity MD-1.3   |             |         |                  |                                  |           | ▼ <sup>5</sup> |                  |                                  |          | ▲ <sup>5</sup> |                  |                                  |                   |         |                  |                                  |
| Strategy MD 2: Foster public participation and support policies leading to reduced marine debris focused on plastic pollution   |             |         |                  |                                  |           |                |                  |                                  |          |                |                  |                                  |                   |         |                  |                                  |
| Activity MD-2.3   |             |         |                  |                                  |           | ▼ <sup>5</sup> |                  |                                  |          | ▲ <sup>5</sup> |                  |                                  |                   |         |                  |                                  |
| Strategy MD 3: Reduce marine debris threats by removing the debris and preventing point source inputs   |             |         |                  |                                  |           |                |                  |                                  |          |                |                  |                                  |                   |         |                  |                                  |
| Activity MD-3.1   |             |         |                  |                                  |           | ? <sup>8</sup> |                  |                                  |          | ▲ <sup>8</sup> |                  |                                  |                   |         |                  |                                  |
| Activity MD-3.5   |             |         |                  |                                  |           | ▼ <sup>5</sup> |                  |                                  |          | ▲ <sup>5</sup> |                  |                                  |                   |         |                  |                                  |
| WATER QUALITY   |             |         |                  |                                  |           |                |                  |                                  |          |                |                  |                                  |                   |         |                  |                                  |
| Strategy WQ-1: Facilitate and coordinate regional efforts to improve water quality through the Water Quality Protection Program Committee (and MOA), Agriculture Water Quality Alliance, stormwater programs, and Integrated Regional Water Management programs |             |         |                  |                                  |           |                |                  |                                  |          |                |                  |                                  |                   |         |                  |                                  |

|   | Environment    |                |                  |                                  |                |         |                  |                                  |                |         |                  |                                  |                   |         |                  |                                  |
|---|----------------|----------------|------------------|----------------------------------|----------------|---------|------------------|----------------------------------|----------------|---------|------------------|----------------------------------|-------------------|---------|------------------|----------------------------------|
|   | Estuarine      |                |                  |                                  | Nearshore      |         |                  |                                  | Offshore       |         |                  |                                  | Davidson Seamount |         |                  |                                  |
|   | Water          | Habitat        | Living Resources | Maritime Archeological Resources | Water          | Habitat | Living Resources | Maritime Archeological Resources | Water          | Habitat | Living Resources | Maritime Archeological Resources | Water             | Habitat | Living Resources | Maritime Archeological Resources |
| Activity WQ-1.1   | ? <sup>3</sup> |                |                  |                                  | ▲ <sup>4</sup> |         |                  |                                  |                |         |                  |                                  |                   |         |                  |                                  |
| Activity WQ-1.2   | ? <sup>3</sup> |                | ? <sup>14</sup>  |                                  | ▲ <sup>4</sup> |         | ▼ <sup>14</sup>  |                                  | ▲ <sup>4</sup> |         |                  |                                  |                   |         |                  |                                  |
| Activity WQ-1.4   | ? <sup>3</sup> |                |                  |                                  | ▲ <sup>4</sup> |         | ▼ <sup>14</sup>  |                                  |                |         |                  |                                  |                   |         |                  |                                  |
| Activity WQ-1.5   | ? <sup>3</sup> |                |                  |                                  | ▲ <sup>4</sup> |         |                  |                                  |                |         |                  |                                  |                   |         |                  |                                  |
| Activity WQ-1.6   | ? <sup>3</sup> |                | ? <sup>14</sup>  |                                  | ▲ <sup>4</sup> |         | ▼ <sup>14</sup>  |                                  |                |         |                  |                                  |                   |         |                  |                                  |
| Activity WQ-1.8   |                |                |                  |                                  | ▲ <sup>4</sup> |         |                  |                                  | ▲ <sup>4</sup> |         |                  |                                  |                   |         |                  |                                  |
| Strategy WQ-2: Understand the land-sea connection             |                |                |                  |                                  |                |         |                  |                                  |                |         |                  |                                  |                   |         |                  |                                  |
| Activity WQ-2.1   | ? <sup>3</sup> | ▲ <sup>8</sup> | ? <sup>14</sup>  |                                  | ▲ <sup>4</sup> | ▼       |                  |                                  |                |         |                  |                                  |                   |         |                  |                                  |
| Activity WQ-2.2   | ? <sup>3</sup> |                | ? <sup>14</sup>  |                                  | ▲ <sup>4</sup> |         | ▼ <sup>14</sup>  |                                  | ▲ <sup>4</sup> |         |                  |                                  |                   |         |                  |                                  |
| Activity WQ-2.3   | ? <sup>3</sup> |                | ? <sup>14</sup>  |                                  | ▲ <sup>4</sup> |         | ▼ <sup>14</sup>  |                                  | ▲ <sup>4</sup> |         |                  |                                  |                   |         |                  |                                  |
| Activity WQ-2.4   |                |                |                  |                                  | ▲ <sup>4</sup> |         |                  |                                  | ▲ <sup>4</sup> |         |                  |                                  |                   |         |                  |                                  |
| Activity WQ-2.5   |                |                |                  |                                  | ▲ <sup>4</sup> |         |                  |                                  | ▲ <sup>4</sup> |         |                  |                                  |                   |         |                  |                                  |
| Strategy WQ-3: Quantify effectiveness of management practices |                |                |                  |                                  |                |         |                  |                                  |                |         |                  |                                  |                   |         |                  |                                  |
| Activity WQ-3.1   | ? <sup>3</sup> |                | ? <sup>14</sup>  |                                  | ▲ <sup>4</sup> |         | ▼ <sup>14</sup>  |                                  |                |         |                  |                                  |                   |         |                  |                                  |

|  | Environment    |         |                  |                                  |                |         |                  |                                  |                |         |                  |                                  |                   |         |                  |                                  |
|--|----------------|---------|------------------|----------------------------------|----------------|---------|------------------|----------------------------------|----------------|---------|------------------|----------------------------------|-------------------|---------|------------------|----------------------------------|
|  | Estuarine      |         |                  |                                  | Nearshore      |         |                  |                                  | Offshore       |         |                  |                                  | Davidson Seamount |         |                  |                                  |
|  | Water          | Habitat | Living Resources | Maritime Archeological Resources | Water          | Habitat | Living Resources | Maritime Archeological Resources | Water          | Habitat | Living Resources | Maritime Archeological Resources | Water             | Habitat | Living Resources | Maritime Archeological Resources |
| Activity WQ-3.2  | ? <sup>3</sup> |         | ? <sup>14</sup>  |                                  | ▲ <sup>4</sup> |         | ▼ <sup>14</sup>  |                                  |                |         |                  |                                  |                   |         |                  |                                  |
| Activity WQ-3.3  | ? <sup>3</sup> |         | ? <sup>14</sup>  |                                  | ▲ <sup>4</sup> |         | ▼ <sup>14</sup>  |                                  |                |         |                  |                                  |                   |         |                  |                                  |
| <b>Strategy WQ-4: Monitor and reduce pollutant loads flowing into MBNMS</b>  |                |         |                  |                                  |                |         |                  |                                  |                |         |                  |                                  |                   |         |                  |                                  |
| Activity WQ-4.1  |                |         |                  |                                  | ▲ <sup>4</sup> |         |                  |                                  |                |         |                  |                                  |                   |         |                  |                                  |
| Activity WQ-4.2  |                |         |                  |                                  | ▲ <sup>4</sup> |         |                  |                                  |                |         |                  |                                  |                   |         |                  |                                  |
| Activity WQ-4.4  | ? <sup>3</sup> |         | ? <sup>14</sup>  |                                  | ▲ <sup>4</sup> |         | ▼ <sup>14</sup>  |                                  | ▲ <sup>4</sup> |         |                  |                                  |                   |         |                  |                                  |
| <b>Strategy WQ-5: Promote public engagement and stewardship through citizen science monitoring programs and other WQPP efforts</b> |                |         |                  |                                  |                |         |                  |                                  |                |         |                  |                                  |                   |         |                  |                                  |
| Activity WQ-5.1  | ? <sup>3</sup> |         |                  |                                  | ▲ <sup>4</sup> |         |                  |                                  |                |         |                  |                                  |                   |         |                  |                                  |
| Activity WQ-5.2  |                |         |                  |                                  | ▲ <sup>4</sup> |         |                  |                                  |                |         |                  |                                  |                   |         |                  |                                  |
| Activity WQ-5.3  | ? <sup>3</sup> |         | ? <sup>14</sup>  |                                  | ▲ <sup>4</sup> |         | ▼ <sup>14</sup>  |                                  |                |         |                  |                                  |                   |         |                  |                                  |
| Activity WQ-5.4  |                |         |                  |                                  | ▲ <sup>4</sup> |         |                  |                                  | ▲ <sup>4</sup> |         |                  |                                  |                   |         |                  |                                  |
| <b>Strategy WQ-6: Communicate findings of projects and monitoring conducted by the WQPP</b>  |                |         |                  |                                  |                |         |                  |                                  |                |         |                  |                                  |                   |         |                  |                                  |
| Activity WQ-6.1  | ? <sup>3</sup> |         |                  |                                  | ▲ <sup>4</sup> |         |                  |                                  |                |         |                  |                                  |                   |         |                  |                                  |
| Activity WQ-6.2  |                |         |                  |                                  | ▲ <sup>4</sup> |         |                  |                                  | ▲ <sup>4</sup> |         |                  |                                  |                   |         |                  |                                  |

|   | Environment    |         |                  |                                  |                |         |                  |                                  |                |         |                  |                                  |                   |         |                  |                                  |
|---|----------------|---------|------------------|----------------------------------|----------------|---------|------------------|----------------------------------|----------------|---------|------------------|----------------------------------|-------------------|---------|------------------|----------------------------------|
|   | Estuarine      |         |                  |                                  | Nearshore      |         |                  |                                  | Offshore       |         |                  |                                  | Davidson Seamount |         |                  |                                  |
|   | Water          | Habitat | Living Resources | Maritime Archeological Resources | Water          | Habitat | Living Resources | Maritime Archeological Resources | Water          | Habitat | Living Resources | Maritime Archeological Resources | Water             | Habitat | Living Resources | Maritime Archeological Resources |
| Activity WQ-6.3   | ? <sup>3</sup> |         |                  |                                  | ▲ <sup>4</sup> |         |                  |                                  |                |         |                  |                                  |                   |         |                  |                                  |
| Activity WQ-6.4   | ? <sup>3</sup> |         |                  |                                  | ▲ <sup>4</sup> |         |                  |                                  |                |         |                  |                                  |                   |         |                  |                                  |
| Activity WQ-6.5   | ? <sup>3</sup> |         |                  |                                  | ▲ <sup>4</sup> |         |                  |                                  |                |         |                  |                                  |                   |         |                  |                                  |
| Activity WQ-6.6   |                |         |                  |                                  | ▲ <sup>4</sup> |         |                  |                                  |                |         |                  |                                  |                   |         |                  |                                  |
| Activity WQ-6.7   |                |         |                  |                                  | ▲ <sup>4</sup> |         |                  |                                  | ▲ <sup>4</sup> |         |                  |                                  |                   |         |                  |                                  |
| WILDLIFE DISTURBANCE  |                |         |                  |                                  |                |         |                  |                                  |                |         |                  |                                  |                   |         |                  |                                  |
| Strategy WD-1: Mitigate wildlife disturbance from marine vessels and shore-based activities |                |         |                  |                                  |                |         |                  |                                  |                |         |                  |                                  |                   |         |                  |                                  |
| Activity WD-1.1   |                |         | ? <sup>14</sup>  |                                  |                |         | ▼ <sup>14</sup>  |                                  |                |         | — <sup>14</sup>  |                                  |                   |         |                  |                                  |
| Activity WD-1.2   |                |         | ? <sup>14</sup>  |                                  |                |         | ▼ <sup>14</sup>  |                                  |                |         | — <sup>14</sup>  |                                  |                   |         |                  |                                  |
| Activity WD-1.3   |                |         | ? <sup>14</sup>  |                                  |                |         | ▼ <sup>14</sup>  |                                  |                |         |                  |                                  |                   |         |                  |                                  |
| Activity WD-1.4   |                |         |                  |                                  |                |         |                  |                                  |                |         | — <sup>14</sup>  |                                  |                   |         |                  |                                  |
| Activity WD-1.5   |                |         | ? <sup>14</sup>  |                                  |                |         | ▼ <sup>14</sup>  |                                  |                |         | — <sup>14</sup>  |                                  |                   |         |                  |                                  |
| Activity WD-1.6   |                |         |                  |                                  |                |         | ▼ <sup>14</sup>  |                                  |                |         | — <sup>14</sup>  |                                  |                   |         |                  |                                  |
| Activity WD-1.8   |                |         |                  |                                  |                |         |                  |                                  |                |         | — <sup>14</sup>  |                                  |                   |         |                  |                                  |

|  | Environment |         |                  |                                  |           |         |                  |                                  |          |         |                  |                                  |                   |         |                  |                                  |
|--|-------------|---------|------------------|----------------------------------|-----------|---------|------------------|----------------------------------|----------|---------|------------------|----------------------------------|-------------------|---------|------------------|----------------------------------|
|  | Estuarine   |         |                  |                                  | Nearshore |         |                  |                                  | Offshore |         |                  |                                  | Davidson Seamount |         |                  |                                  |
|  | Water       | Habitat | Living Resources | Maritime Archeological Resources | Water     | Habitat | Living Resources | Maritime Archeological Resources | Water    | Habitat | Living Resources | Maritime Archeological Resources | Water             | Habitat | Living Resources | Maritime Archeological Resources |
| Activity WD-1.10   |             |         |                  |                                  |           |         | ▼ <sup>14</sup>  |                                  |          |         |                  |                                  |                   |         |                  |                                  |
| <b>Strategy WD-2: Mitigate wildlife disturbance from aircraft</b>                  |             |         |                  |                                  |           |         |                  |                                  |          |         |                  |                                  |                   |         |                  |                                  |
| Activity WD-2.2  |             |         | ? <sup>14</sup>  |                                  |           |         | ▼ <sup>14</sup>  |                                  |          |         | — <sup>14</sup>  |                                  |                   |         |                  |                                  |
| Activity WD-2.3  |             |         | ? <sup>14</sup>  |                                  |           |         | ▼ <sup>14</sup>  |                                  |          |         |                  |                                  |                   |         |                  |                                  |
| Activity WD-2.4  |             |         |                  |                                  |           |         | ▼ <sup>14</sup>  |                                  |          |         |                  |                                  |                   |         |                  |                                  |
| <b>Strategy WD-3: Develop acoustic baseline profiles within MBNMS</b>              |             |         |                  |                                  |           |         |                  |                                  |          |         |                  |                                  |                   |         |                  |                                  |
| Activity WD-3.2  |             |         |                  |                                  |           |         | ▼ <sup>14</sup>  |                                  |          |         | — <sup>14</sup>  |                                  |                   |         | ? <sup>14</sup>  |                                  |
| <b>Strategy WD-4: Reduce underwater low-frequency mechanical sound emissions</b>   |             |         |                  |                                  |           |         |                  |                                  |          |         |                  |                                  |                   |         |                  |                                  |
| Activity WD-4.1  |             |         |                  |                                  |           |         | ▼ <sup>14</sup>  |                                  |          |         | — <sup>14</sup>  |                                  |                   |         |                  |                                  |
| Activity WD-4.2  |             |         |                  |                                  |           |         | ▼ <sup>14</sup>  |                                  |          |         | — <sup>14</sup>  |                                  |                   |         | ? <sup>14</sup>  |                                  |
| Activity WD-4.3  |             |         |                  |                                  |           |         | ▼ <sup>14</sup>  |                                  |          |         | — <sup>14</sup>  |                                  |                   |         |                  |                                  |
| <b>Strategy WD-5: Use administrative methods to reduce wildlife disturbance</b>    |             |         |                  |                                  |           |         |                  |                                  |          |         |                  |                                  |                   |         |                  |                                  |
| Activity WD-5.2  |             |         | ? <sup>14</sup>  |                                  |           |         | ▼ <sup>14</sup>  |                                  |          |         | — <sup>14</sup>  |                                  |                   |         |                  |                                  |
| <b>Strategy WD-6: Use law enforcement resources to reduce wildlife disturbance</b> |             |         |                  |                                  |           |         |                  |                                  |          |         |                  |                                  |                   |         |                  |                                  |



|  | Environment |         |                  |                                  |           |         |                  |                                  |          |                |                  |                                  |                   |         |                  |                                  |
|--|-------------|---------|------------------|----------------------------------|-----------|---------|------------------|----------------------------------|----------|----------------|------------------|----------------------------------|-------------------|---------|------------------|----------------------------------|
|  | Estuarine   |         |                  |                                  | Nearshore |         |                  |                                  | Offshore |                |                  |                                  | Davidson Seamount |         |                  |                                  |
|  | Water       | Habitat | Living Resources | Maritime Archeological Resources | Water     | Habitat | Living Resources | Maritime Archeological Resources | Water    | Habitat        | Living Resources | Maritime Archeological Resources | Water             | Habitat | Living Resources | Maritime Archeological Resources |
| Activity WD-6.1  |             |         | ? <sup>14</sup>  |                                  |           |         | ▼ <sup>14</sup>  |                                  |          |                | – <sup>14</sup>  |                                  |                   |         |                  |                                  |
| Activity WD-6.2  |             |         | ? <sup>14</sup>  |                                  |           |         | ▼ <sup>14</sup>  |                                  |          |                | – <sup>14</sup>  |                                  |                   |         |                  |                                  |
| Activity WD-6.4  |             |         |                  |                                  |           |         |                  |                                  |          | ▲ <sup>8</sup> | – <sup>14</sup>  |                                  |                   |         | ? <sup>14</sup>  |                                  |
| <b>Strategy WD-7: Reduce the risk of wildlife entanglement in fishing gear (working on language with state Dungeness crab working group)</b> |             |         |                  |                                  |           |         |                  |                                  |          |                |                  |                                  |                   |         |                  |                                  |
| Activity WD-7.1  |             |         |                  |                                  |           |         | ▼ <sup>14</sup>  |                                  |          |                |                  |                                  |                   |         |                  |                                  |
| Activity WD-7.3  |             |         |                  |                                  |           |         | ▼ <sup>14</sup>  |                                  |          |                | – <sup>14</sup>  |                                  |                   |         |                  |                                  |
| Activity WD-7.4  |             |         |                  |                                  |           |         | ▼ <sup>14</sup>  |                                  |          |                | – <sup>14</sup>  |                                  |                   |         | ? <sup>14</sup>  |                                  |
| <b>Strategy WD-8: Respond to wildlife entangled in fishing gear</b>  |             |         |                  |                                  |           |         |                  |                                  |          |                |                  |                                  |                   |         |                  |                                  |
| Activity WD-8.2  |             |         |                  |                                  |           |         | ▼ <sup>14</sup>  |                                  |          |                | – <sup>14</sup>  |                                  |                   |         |                  |                                  |
| <b>PROGRAM BASED ACTION PLANS</b>  |             |         |                  |                                  |           |         |                  |                                  |          |                |                  |                                  |                   |         |                  |                                  |
| <b>MARITIME HERITAGE</b>   |             |         |                  |                                  |           |         |                  |                                  |          |                |                  |                                  |                   |         |                  |                                  |
| <b>Strategy MH-1: Inventory and assess submerged sites</b>   |             |         |                  |                                  |           |         |                  |                                  |          |                |                  |                                  |                   |         |                  |                                  |
| Activity MH-1.1  |             |         |                  | ? <sup>15</sup>                  |           |         |                  | ? <sup>15</sup>                  |          |                |                  | ? <sup>15</sup>                  |                   |         |                  |                                  |

|   | Environment    |                |                  |                                  |                |                |                  |                                  |                |                |                  |                                  |                   |                |                  |                                  |
|---|----------------|----------------|------------------|----------------------------------|----------------|----------------|------------------|----------------------------------|----------------|----------------|------------------|----------------------------------|-------------------|----------------|------------------|----------------------------------|
|   | Estuarine      |                |                  |                                  | Nearshore      |                |                  |                                  | Offshore       |                |                  |                                  | Davidson Seamount |                |                  |                                  |
|   | Water          | Habitat        | Living Resources | Maritime Archeological Resources | Water          | Habitat        | Living Resources | Maritime Archeological Resources | Water          | Habitat        | Living Resources | Maritime Archeological Resources | Water             | Habitat        | Living Resources | Maritime Archeological Resources |
| Activity MH-1.2   |                |                |                  | ? <sup>15</sup>                  |                |                |                  | ? <sup>15</sup>                  |                |                |                  | ? <sup>15</sup>                  |                   |                |                  |                                  |
| Activity MH-1.4   |                |                |                  | ? <sup>15</sup>                  |                |                |                  | ? <sup>15</sup>                  |                |                |                  | ? <sup>15</sup>                  |                   |                |                  |                                  |
| <b>Strategy MH-2: Threat assessment for shipwrecks and submerged structures</b>               |                |                |                  |                                  |                |                |                  |                                  |                |                |                  |                                  |                   |                |                  |                                  |
| Activity MH-2.1   |                |                |                  | _ <sup>16</sup>                  |                |                |                  | ▼ <sup>16</sup>                  |                |                |                  | ▼ <sup>16</sup>                  |                   |                |                  |                                  |
| Activity MH-2.2   |                |                |                  | _ <sup>16</sup>                  |                |                |                  | ▼ <sup>16</sup>                  |                |                |                  | ▼ <sup>16</sup>                  |                   |                |                  |                                  |
| <b>Strategy MH-3: Protect and manage submerged archaeological resources</b>                   |                |                |                  |                                  |                |                |                  |                                  |                |                |                  |                                  |                   |                |                  |                                  |
| Activity MH-3.1   |                |                |                  | _ <sup>17</sup>                  |                |                |                  | ? <sup>17</sup>                  |                |                |                  | ? <sup>17</sup>                  |                   |                |                  |                                  |
| Activity MH-3.3   |                |                |                  | _ <sup>16</sup>                  |                |                |                  | ▼ <sup>16</sup>                  |                |                |                  | ▼ <sup>16</sup>                  |                   |                |                  |                                  |
| <b>RESEARCH &amp; MONITORING</b>  |                |                |                  |                                  |                |                |                  |                                  |                |                |                  |                                  |                   |                |                  |                                  |
| <b>Strategy RM-1: Characterize biological and physical features in MBNMS</b>                  |                |                |                  |                                  |                |                |                  |                                  |                |                |                  |                                  |                   |                |                  |                                  |
| Activity RM-1.1   | ? <sup>3</sup> | ▲ <sup>8</sup> | ▲ <sup>12</sup>  |                                  | ▼ <sup>1</sup> | ▼ <sup>5</sup> |                  |                                  | ▼ <sup>1</sup> | ▼ <sup>7</sup> |                  |                                  | ? <sup>1</sup>    | _ <sup>5</sup> |                  |                                  |
| Activity RM-1.2   |                |                |                  |                                  |                |                |                  |                                  | ▼ <sup>1</sup> | ▼ <sup>7</sup> | _ <sup>14</sup>  |                                  |                   |                |                  |                                  |
| <b>Strategy RM-2: Maintain and expand the Sanctuary Integrated Monitoring Network (SIMoN)</b> |                |                |                  |                                  |                |                |                  |                                  |                |                |                  |                                  |                   |                |                  |                                  |
| Activity RM-2.1   | ? <sup>3</sup> | ▲ <sup>8</sup> | ▲ <sup>12</sup>  |                                  | ▼ <sup>1</sup> | ▼ <sup>5</sup> | ▼ <sup>14</sup>  |                                  | ▼ <sup>1</sup> | ▼ <sup>7</sup> | _ <sup>14</sup>  |                                  | ? <sup>1</sup>    | _ <sup>5</sup> | _ <sup>13</sup>  |                                  |

|   | Environment    |                |                  |                                  |                |                |                  |                                  |                |                |                  |                                  |                   |                |                  |                                  |
|---|----------------|----------------|------------------|----------------------------------|----------------|----------------|------------------|----------------------------------|----------------|----------------|------------------|----------------------------------|-------------------|----------------|------------------|----------------------------------|
|   | Estuarine      |                |                  |                                  | Nearshore      |                |                  |                                  | Offshore       |                |                  |                                  | Davidson Seamount |                |                  |                                  |
|   | Water          | Habitat        | Living Resources | Maritime Archeological Resources | Water          | Habitat        | Living Resources | Maritime Archeological Resources | Water          | Habitat        | Living Resources | Maritime Archeological Resources | Water             | Habitat        | Living Resources | Maritime Archeological Resources |
| <b>Strategy RM-3: Support science focused on priority sanctuary needs</b>   |                |                |                  |                                  |                |                |                  |                                  |                |                |                  |                                  |                   |                |                  |                                  |
| Activity RM-3.1   | ? <sup>3</sup> | ▲ <sup>8</sup> | ▲ <sup>12</sup>  |                                  | ▼ <sup>1</sup> | ▼ <sup>5</sup> | ▼ <sup>14</sup>  |                                  | ▼ <sup>1</sup> | ▼ <sup>7</sup> | _ <sup>14</sup>  |                                  | ? <sup>1</sup>    | _ <sup>5</sup> | _ <sup>13</sup>  |                                  |
| Activity RM-3.3   |                |                |                  |                                  |                |                |                  |                                  |                |                |                  |                                  | ? <sup>1</sup>    | _ <sup>5</sup> | _ <sup>13</sup>  |                                  |
| Activity RM-3.4   | ? <sup>3</sup> | ▲ <sup>8</sup> | ▲ <sup>12</sup>  |                                  |                | ▼ <sup>5</sup> | ▼ <sup>14</sup>  |                                  | ▼ <sup>1</sup> | ▼ <sup>7</sup> | _ <sup>14</sup>  |                                  | ? <sup>1</sup>    | _ <sup>5</sup> | _ <sup>13</sup>  |                                  |
| Activity RM-3.5   |                |                |                  |                                  |                | ▼ <sup>5</sup> | ▼ <sup>14</sup>  |                                  |                | ▼ <sup>7</sup> | _ <sup>14</sup>  |                                  | ? <sup>1</sup>    | _ <sup>5</sup> | _ <sup>13</sup>  |                                  |
| Activity RM-3.6   |                | ▲ <sup>8</sup> | ▲ <sup>12</sup>  |                                  |                | ▼ <sup>5</sup> | ▼ <sup>14</sup>  |                                  |                | ▼ <sup>7</sup> | _ <sup>14</sup>  |                                  |                   |                |                  |                                  |
| Activity RM-3.7   |                |                |                  |                                  |                | ▼ <sup>5</sup> | ▼ <sup>14</sup>  |                                  | ▼ <sup>1</sup> | ▼ <sup>7</sup> | _ <sup>14</sup>  |                                  |                   |                |                  |                                  |
| Activity RM-3.8   |                |                |                  |                                  |                | ▼ <sup>5</sup> | ▼ <sup>14</sup>  |                                  |                |                |                  |                                  |                   |                |                  |                                  |
| Activity RM-3.9   |                | ▲ <sup>8</sup> | ▲ <sup>12</sup>  |                                  |                | ▼ <sup>5</sup> | ▼ <sup>14</sup>  |                                  |                | ▼ <sup>7</sup> | _ <sup>14</sup>  |                                  | ? <sup>1</sup>    | _ <sup>5</sup> | _ <sup>13</sup>  |                                  |
| <b>Strategy RM-4: Facilitate the flow of science information among academic institutions, government agencies, and other institutions</b> |                |                |                  |                                  |                |                |                  |                                  |                |                |                  |                                  |                   |                |                  |                                  |
| Activity RM-4.4   |                | ▲ <sup>8</sup> | ▲ <sup>12</sup>  |                                  |                | ▼ <sup>5</sup> | ▼ <sup>14</sup>  |                                  |                |                |                  |                                  |                   |                |                  |                                  |

|   | Environment    |                |                  |                                  |                |                |                  |                                  |                |                |                  |                                  |                   |                |                  |                                  |
|---|----------------|----------------|------------------|----------------------------------|----------------|----------------|------------------|----------------------------------|----------------|----------------|------------------|----------------------------------|-------------------|----------------|------------------|----------------------------------|
|   | Estuarine      |                |                  |                                  | Nearshore      |                |                  |                                  | Offshore       |                |                  |                                  | Davidson Seamount |                |                  |                                  |
|   | Water          | Habitat        | Living Resources | Maritime Archeological Resources | Water          | Habitat        | Living Resources | Maritime Archeological Resources | Water          | Habitat        | Living Resources | Maritime Archeological Resources | Water             | Habitat        | Living Resources | Maritime Archeological Resources |
| Strategy RM-5: Coordinate with and participate in implementing research components of the Office of National Marine Sanctuaries West Coast Regional Office  |                |                |                  |                                  |                |                |                  |                                  |                |                |                  |                                  |                   |                |                  |                                  |
| Activity RM-5.2   |                |                |                  |                                  |                |                |                  |                                  | ▼ <sup>1</sup> | ▼ <sup>7</sup> | – <sup>14</sup>  |                                  |                   |                |                  |                                  |
| Strategy RM-6: Coordinate with and participate in implementing policies of the Office of National Marine Sanctuaries Conservation Science Program   |                |                |                  |                                  |                |                |                  |                                  |                |                |                  |                                  |                   |                |                  |                                  |
| Activity RM-6.1   |                |                |                  |                                  |                |                |                  |                                  |                | ▼ <sup>7</sup> | ▼ <sup>13</sup>  |                                  |                   |                |                  |                                  |
| Activity RM-6.3   |                |                |                  |                                  |                |                |                  |                                  |                | ▼ <sup>7</sup> | ▼ <sup>13</sup>  |                                  |                   | – <sup>5</sup> | – <sup>13</sup>  |                                  |
| RESOURCE PROTECTION   |                |                |                  |                                  |                |                |                  |                                  |                |                |                  |                                  |                   |                |                  |                                  |
| Strategy RP-1: Continue to build partnerships and leverage opportunities for protecting sanctuary wildlife, habitats, qualities, and cultural resources through collaborative planning and management |                |                |                  |                                  |                |                |                  |                                  |                |                |                  |                                  |                   |                |                  |                                  |
| Activity RP-1.1   |                |                |                  |                                  |                | ? <sup>8</sup> | ▼ <sup>14</sup>  |                                  |                | ▲ <sup>4</sup> | – <sup>14</sup>  |                                  |                   | – <sup>5</sup> | ? <sup>9</sup>   |                                  |
| Activity RP-1.2   |                |                |                  |                                  |                | ? <sup>8</sup> | ▼ <sup>14</sup>  |                                  |                | ▲ <sup>4</sup> | – <sup>14</sup>  |                                  |                   | – <sup>5</sup> | ? <sup>9</sup>   |                                  |
| Activity RP-1.3   | ▲ <sup>4</sup> | ▲ <sup>8</sup> | ? <sup>14</sup>  | – <sup>17</sup>                  | ▲ <sup>4</sup> | ? <sup>8</sup> | ▼ <sup>14</sup>  | ? <sup>17</sup>                  | ▲ <sup>4</sup> | ▲ <sup>4</sup> | – <sup>14</sup>  | ? <sup>17</sup>                  | ? <sup>4</sup>    | ? <sup>8</sup> | ? <sup>14</sup>  | N/A                              |
| Activity RP-1.4   |                |                |                  |                                  |                |                |                  |                                  |                |                | – <sup>14</sup>  |                                  |                   |                |                  |                                  |
| Activity RP-1.5   |                |                |                  |                                  |                | ? <sup>8</sup> |                  |                                  |                |                |                  |                                  |                   |                |                  |                                  |

|  | Environment    |                |                  |                                  |                |                |                  |                                  |          |                |                  |                                  |                   |         |                  |                                  |
|--|----------------|----------------|------------------|----------------------------------|----------------|----------------|------------------|----------------------------------|----------|----------------|------------------|----------------------------------|-------------------|---------|------------------|----------------------------------|
|  | Estuarine      |                |                  |                                  | Nearshore      |                |                  |                                  | Offshore |                |                  |                                  | Davidson Seamount |         |                  |                                  |
|  | Water          | Habitat        | Living Resources | Maritime Archeological Resources | Water          | Habitat        | Living Resources | Maritime Archeological Resources | Water    | Habitat        | Living Resources | Maritime Archeological Resources | Water             | Habitat | Living Resources | Maritime Archeological Resources |
| <b>Strategy RP-3: Maintain and enhance permitting and environmental review program</b>   |                |                |                  |                                  |                |                |                  |                                  |          |                |                  |                                  |                   |         |                  |                                  |
| Activity RP-3.1  | ▲ <sup>4</sup> | ▲ <sup>8</sup> |                  |                                  | ▲ <sup>4</sup> | ? <sup>8</sup> |                  |                                  |          | ▲ <sup>4</sup> | – <sup>8</sup>   |                                  |                   |         |                  |                                  |
| Activity RP-3.2  | ▲ <sup>4</sup> | ▲ <sup>8</sup> |                  |                                  | ▲ <sup>4</sup> | ? <sup>8</sup> |                  |                                  |          | ▲ <sup>4</sup> | – <sup>8</sup>   |                                  |                   |         |                  |                                  |
| Activity RP-3.4  | ▲ <sup>4</sup> | ▲ <sup>8</sup> |                  |                                  | ▲ <sup>4</sup> | ? <sup>8</sup> |                  |                                  |          | ▲ <sup>4</sup> | – <sup>8</sup>   |                                  |                   |         |                  |                                  |
| Activity RP-3.6  | ▲ <sup>4</sup> | ▲ <sup>8</sup> |                  |                                  | ▲ <sup>4</sup> | ? <sup>8</sup> |                  |                                  |          | ▲ <sup>4</sup> | – <sup>8</sup>   |                                  |                   |         |                  |                                  |
| <b>Strategy RP-5: Implement enforcement programs</b>   |                |                |                  |                                  |                |                |                  |                                  |          |                |                  |                                  |                   |         |                  |                                  |
| Activity RP-5.1  |                | ▲ <sup>8</sup> | ? <sup>14</sup>  |                                  |                | ? <sup>8</sup> | ▼ <sup>14</sup>  |                                  |          | ▲ <sup>4</sup> | – <sup>14</sup>  |                                  |                   |         |                  |                                  |
| Activity RP-5.5  |                |                |                  |                                  | ▲ <sup>4</sup> |                |                  |                                  |          | ▲ <sup>4</sup> |                  |                                  |                   |         |                  |                                  |
| <b>Strategy RP-7: Coordinate resource protection programs, including interpretive enforcement and citizen science programs</b> |                |                |                  |                                  |                |                |                  |                                  |          |                |                  |                                  |                   |         |                  |                                  |
| Activity RP-7.1  | ▼ <sup>1</sup> |                | ? <sup>14</sup>  |                                  | ▼ <sup>1</sup> |                | ▼ <sup>14</sup>  |                                  |          |                |                  |                                  |                   |         |                  |                                  |
| <b>Strategy RP-11: Develop and implement restoration and recovery plans to address habitat damages and endangered species</b>  |                |                |                  |                                  |                |                |                  |                                  |          |                |                  |                                  |                   |         |                  |                                  |
| Activity RP-11.2   |                |                |                  |                                  |                |                | ▼ <sup>12</sup>  |                                  |          |                |                  |                                  |                   |         |                  |                                  |

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## Appendix D - Prohibitions, Permitting, Exceptions and Authorizations

### ***Prohibitions***

The following is a summary of MBNMS prohibited and restricted activities. The complete official text of these regulatory prohibitions and restrictions can be found at Title 15, Code of Federal Regulations, Section 922.132. All federal regulations are published and made available online by the U.S. Government Publishing Office (GPO).

*Oil, gas, and minerals development:* The first activity prohibited is exploring for, developing or producing oil, gas, or minerals within the sanctuary, except for jade in a small area near Gorda, California in accordance with prescribed collection restrictions.

*Discharge and disposal within or into the sanctuary other than from a cruise ship:* The second activity prohibited is discharging or depositing from within or into the sanctuary, other than from a cruise ship, any material or other matter except:

- A. Fish, fish parts, chumming materials, or bait used in or resulting from lawful fishing operations in the sanctuary;
- B. For a vessel less than 300 gross registered tons (GRT) or a vessel 300 GRT or greater 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 device (MSD). All MSDs must be locked to prevent overboard discharge of untreated sewage;
- C. Clean vessel deck wash down, clean vessel engine cooling water, clean vessel generator cooling water, clean bilge water or anchor wash;
- D. For a vessel less than 300 GRT or a vessel 300 GRT or greater without sufficient holding capacity to hold graywater while within the sanctuary, clean graywater as defined by section 312 of the Federal Water Pollution Control Act (Clean Water Act);
- E. Vessel engine or generator exhaust;
- F. Dredged material deposited at disposal sites authorized by the U.S. Environmental Protection Agency (EPA), in consultation with U.S. Army Corps of Engineers (USACE) 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 January 1, 1993.

*Discharge and disposal within or into the sanctuary from a cruise ship:* The third activity prohibited is any discharge from cruise ships (defined as having more than 250 passenger berths for hire), except clean vessel engine cooling water, clean generator cooling water, engine or generator exhaust, clean bilge water or anchor wash.

*Discharge and disposal from beyond the sanctuary:* The fourth activity prohibited is discharging or depositing from beyond the boundary of the sanctuary, material, or other matter that subsequently enters the sanctuary and injures a sanctuary resource or



quality. Exceptions A-E above apply, as well as an exception for dredged material deposited at authorized disposal sites outside MBNMS as described at 15 CFR 922, Subpart M, Appendix D.

*Protection of historical resources:* The fifth activity prohibited is possessing, moving, removing, or injuring a sanctuary historical resource or attempting to possess, move, remove, or injure a sanctuary historical resource, except when disturbance is incidental to kelp harvesting, aquaculture, and lawful fishing and the responsible party immediately reports the disturbance to sanctuary management and complies with management instructions for the appropriate handling and disposition of the historical resource(s). Historical resources in the marine environment are fragile, finite, and non-renewable and must be protected so they may be studied and interpreted for the benefit of the public.

*Alteration of the submerged lands within the sanctuary:* The sixth 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:

- A. Conduct lawful fishing activities;
- B. Anchor a vessel;
- C. Conduct aquaculture or kelp harvesting;
- D. Install an authorized navigational aid;
- E. Conduct harbor maintenance in an area 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;
- F. Construct, repair, replace, or rehabilitate breakwaters and jetties;
- G. Construct, repair, replace, or rehabilitate a dock or pier; or
- H. Collect jade in accordance with restrictions specified for the regulatory prohibition against oil, gas, and minerals development above, 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 USACE or operated under a permit or other authorization issued by USACE and authorized by federal law.

The intent of the prohibition against altering the submerged lands within the sanctuary is to protect the resources and qualities of the sanctuary from harmful effects of activities that can disturb the seabed.

*Protection of marine mammals, sea turtles, and seabirds:* The seventh activity prohibited is taking marine mammals, sea turtles, or seabirds within or above the sanctuary, except as authorized by the Marine Mammal Protection Act (MMPA), as amended 16 U.S.C. 1361 et seq., the ESA, as amended, 16 U.S.C. 1531 et seq., the Migratory Bird Treaty Act (MBTA), as amended, 16 U.S.C. 703 et seq., or any regulation promulgated under these statutes. The term "taking" includes all forms of disturbance,

molestation, harassment, and harm. The MMPA, ESA, and MBTA prohibit the taking of species protected under these federal laws. This sanctuary prohibition overlaps MMPA, ESA, and MBTA prohibitions, but also extends protection for sanctuary resources on an environmentally holistic basis and provides a greater deterrent with civil penalties of up to \$178,000 per take. MBNMS cannot issue permits for take of these species. Only the federal agency offices assigned to enforce the MMPA, ESA, and MBTA can issue such permits.

*Overflight of motorized aircraft:* The eighth activity prohibited is flying motorized aircraft at less than 1,000 feet (305 meters) above the sanctuary within four specified zones. This area-specific prohibition on overflights below the specified altitude is designed to limit potential noise impacts from motorized aircraft (including planes, helicopters, unmanned aerial drones, and dirigibles) that can startle seals, sea lions, sea otters, and seabirds present within specially protected coastal and estuarine areas of the sanctuary. Failure to maintain an altitude of 1,000 feet (305 meters) above ground level above any of the four restricted overflight zones constitutes a rebuttable presumption that marine mammals or seabirds were disturbed in violation of this prohibition. Federal Aviation Administration (FAA) aeronautical charts include notices and chart icons that describe and identify these zones for pilots.

*Motorized personal watercraft:* The ninth activity prohibited is the operation of motorized personal watercraft (MPWC; e.g., jet skis) 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 MPWC 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 high-speed and highly maneuverable personal watercraft. 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.

*Possessing a marine mammal, seabird, or turtle:* The 10th prohibition makes it unlawful to possess within the sanctuary any marine mammal, sea turtle, or seabird, regardless of where the resource was taken, except as authorized by the MMPA, ESA, and MBTA. This prohibition facilitates enhanced protection of key apex predator species within the sanctuary by maintaining a high bar of liability for possession of such species.

*Deserting a vessel aground, at anchor, or adrift in the sanctuary:* The 11th prohibited activity is deserting a vessel aground, at anchor, or adrift in the sanctuary. This regulation is intended to hold vessel operators accountable for failure to remedy threats to the sanctuary posed by abandoning their vessels or leaving them unsecured. The ultimate goal is the reduction of vessel groundings and sinkings that result in the scattering of debris and harmful matter that damage sanctuary resources and qualities.

*Leaving harmful matter aboard either a grounded or deserted vessel:* The 12th 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 Davidson Seamount:* The 13th prohibited activity pertains to the DSMZ, centered approximately 80 miles (128.7 kilometers) west of Point Piedras Blancas. The regulation prohibits:

- A. Moving, removing, taking, collecting, catching, harvesting, disturbing, breaking, cutting, or otherwise injuring, or attempting the same, of any sanctuary resource located more than 3,000 feet (914 meters) below the sea surface within the DSMZ. This prohibition does not apply to fishing below 3,000 feet (914 meters) within the DSMZ, which is prohibited pursuant to 50 CFR part 660 (Fisheries off West Coast States).
- B. Possessing any sanctuary resource, the source of which is more than 3,000 feet (914 meters) below the sea surface within the DSMZ. This prohibition does not apply to possession of fish resulting from fishing below 3,000 feet (914 meters) within the DSMZ, which is separately prohibited pursuant to 50 CFR part 660 (Fisheries off West Coast States).

This prohibition helps protect the unique features of the seamount from ecological alteration. Davidson Seamount is one of the most studied seamounts in the world and is a living laboratory for gaining a better understanding of deep-sea habitats and living resources that are relatively free from anthropogenic impacts.

*Introduced species:* The 14th prohibited activity is the release or introduction of non-native species, except striped bass (*Morone saxatilis*) released during catch and release fishing activity, into MBNMS. This prohibition restricts activities that threaten native species and cause biological or economic harm to MBNMS or its users.

*Attraction of white sharks:* The 15th activity prohibited is the attraction of white sharks by any means within MBNMS. This regulation is intended to prohibit activities that could harm white sharks or change their behavior in a manner that may cause conflicts with other user activities (e.g., research, surfing, kayaking, and swimming) within MBNMS.

*Interfering with enforcement:* The 16th 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 act. Anyone violating this prohibition is subject to criminal prosecution in accordance with Title 16, United States Code, Section 1437(c).

### ***Exceptions to Prohibitions and Permitting***

When an activity is prohibited by federal regulations of the sanctuary, it may still be conducted under certain circumstances. Below is a discussion of the various authorities by which otherwise prohibited activities may be allowed to proceed.

### **Regulatory Exceptions**

Most MBNMS regulatory prohibitions and restrictions contain exceptions for certain specified activities. For example, it is prohibited to place a structure on or otherwise alter the submerged lands of MBNMS. Since this broad prohibition would prevent certain routine activities, such as anchoring a vessel or installing and maintaining Coast Guard navigational aids on the seafloor, specific exceptions for these activities are embedded in the regulation. Thus, anchoring a vessel or installing a navigational aid is not prohibited. The detailed exceptions for each MBNMS regulatory prohibition can be viewed at Title 15, Code of Federal Regulations, Section 922.132.

### **Department of Defense Exceptions**

Most MBNMS regulatory prohibitions do not apply to military activities that were specifically identified by the DOD as pre-existing at the time of MBNMS designation in 1992 and at the time the DSMZ was added to MBNMS in 2008. All other DOD activities are subject to sanctuary regulations unless specifically exempted by NOAA after consultation with DOD. All DOD activities (whether exempted or not) must be carried out in a manner that avoids to the maximum extent practicable any adverse impacts on sanctuary resources and qualities. Also, in the event of threatened or actual destruction of, loss of, or injury to a sanctuary resource or quality resulting from DOD operations conducted contrary to NOAA recommendations, federal law and regulations require DOD to promptly consult with NOAA to prevent and mitigate further damage and restore or replace the sanctuary resource or quality in a manner approved by NOAA.

### **Emergency Exceptions**

Most MBNMS regulatory prohibitions do not apply to an activity necessary to respond to a legitimate emergency threatening life, property, or the environment, provided MBNMS management ultimately concurs that the emergency was unforeseeable and imminent and that the response action taken was prudent and necessary to prevent significant harm. Should NOAA, upon consideration of the facts of a given incident, determine that an action violating sanctuary regulatory prohibitions was inappropriate or not in response to a legitimate emergency, the agency could pursue enforcement and/or legal action against the responsible party or parties.

### **Permits**

Some prohibited activities may be allowed by a sanctuary permit, special use permit (SUP), or authorization of any lease, permit, license, approval, or other authorization issued by any federal, state, or local authority. Regardless of potential impacts, in no case may ONMS issue a sanctuary permit, special use permit, or authorization for:

- A. The exploration for, development of, or production of oil, gas, or minerals in the sanctuary;
- B. The discharge of primary-treated sewage within the sanctuary; or
- C. The disposal of dredged material within the sanctuary other than at sites authorized by the EPA prior to the effective date of designation. (15 CFR §922.132(f))

ONMS may issue a sanctuary permit for an otherwise prohibited activity if the activity will have at most short-term and negligible adverse effects on sanctuary resources and qualities and:

- A. Is research designed to further understanding of sanctuary resources and qualities;
- B. Will further the educational, natural, or historical value of the sanctuary;
- C. Will further salvage or recovery operations within or near the sanctuary in connection with a recent air or marine casualty;
- D. Will assist in managing the sanctuary;
- E. Will further salvage or recovery operations in connection with an abandoned shipwreck in the sanctuary title to which is held by the state of California; or
- F. Will allow the removal, without the use of pneumatic, mechanical, electrical, hydraulic, or explosive tools, of loose jade from the Jade Cove area. (15 CFR §922.133(b))

MBNMS staff receive approximately 60 requests per year to conduct activities that are otherwise prohibited. Generally, these requests are for research or education purposes, but some involve private or commercial projects, such as low overflights for filming or seawall construction/repair, that require special use permitting or authorization of other agency permits (described in greater detail below). For regular permits, MBNMS evaluates 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. Different criteria are used for activities requiring special use permits or agency authorizations (see below for more details).

### **Special Use Permits**

Even after considering mitigation measures to minimize adverse impacts to sanctuary resources, some prohibited activities do not qualify for ONMS permits because the proposed activity is not for the purpose of resource management, research, education, or salvage. Per 15 CFR §922.132(f), SUPs can only be issued for activities that are needed: (1) to establish conditions of access to and use of any sanctuary resources, or (2) to promote public use and understanding of a sanctuary resource. In addition, the activities covered under a SUP must be compatible with the purposes for which the sanctuary is designated and with protection of sanctuary resources. SUPs may only be issued for activities that can be conducted in a manner that does not destroy, cause the loss of, or injure sanctuary resources. MBNMS can consider issuing a [special use permit](#) for specific activities.

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

- An application fee;
- The costs incurred or expected to be incurred by MBNMS in issuing the permit;

- 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; and
- An amount that represents the fair market value of the use of MBNMS resources.

### **Authorizations**

Other agencies have regulatory authorities similar to MBNMS regulatory authorities. Activities prohibited in MBNMS but not proposed for resource management, research, or education purposes could be permitted by these agencies. Accordingly, MBNMS regulations include the ability to authorize other agencies' permits to allow some otherwise prohibited activities, such as construction, seawall maintenance, the operation of equipment on beaches, and discharges. 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. If the original agency does not impose conditions MBNMS staff believes are essential, then MBNMS staff may impose specific conditions or terms in its authorization.

The authorization process is intended to streamline and alleviate the need to get permits from multiple government agencies. MBNMS staff 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 MBNMS outlines the process for notification and review of applications for leases, licenses, permits, approvals, or other authorizations to conduct a prohibited activity.

Authorizations of projects that may affect water quality are generally conducted under a memorandum of agreement (MOA) between NOAA, the state of California, EPA, and the Association of Monterey Bay Area Governments (AMBAG) regarding MBNMS regulations relating to water quality in state waters within MBNMS. This MOA prohibits any permit from being renewed or otherwise issued allowing the discharge of primary treated sewage within 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 MBNMS authorization process will be administered within state waters within MBNMS in coordination with the state permit program