Office of National Marine Sanctuaries
National Oceanic and Atmospheric Administration

Monterey Bay National Marine Sanctuary

Final Management Plan

montereybay.noaa.gov | November 2021

U.S. Department of Commerce
Gina Raimondo, Secretary

National Oceanic and Atmospheric Administration
Richard W. Spinrad, Ph.D., Under Secretary of Commerce for Oceans and Atmosphere and NOAA Administrator

National Ocean Service
Nicole LeBoeuf, Assistant Administrator

Office of National Marine Sanctuaries
John Armor, Director
Rebecca Holyoke, Deputy Director
William Douros, West Coast Regional Director
Lisa Wooninck, Superintendent, Monterey Bay National Marine Sanctuary
Dawn Hayes, Deputy Superintendent, Monterey Bay National Marine Sanctuary

Cover photos (left to right, top to bottom):
Northern elephant seal (*Mirounga angustirostris*). Photo: Robert Schwemmer/NOAA
Horned Aeolid (*Hermissenda 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

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 620,000 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 15 national marine sanctuaries and Papahānaumokuākea and Rose Atoll marine national monuments.

NOAA's National Ocean Service (NOS) is the parent organizational unit within NOAA 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.

For more information, contact:
Dawn Hayes, Deputy Superintendent
Monterey Bay National Marine Sanctuary
99 Pacific Street, Building 455A
Monterey, CA 93940
(831) 647-4201

Table of Contents

Executive Summary

Monterey Bay National Marine Sanctuary (MBNMS, or "the sanctuary") is one of 15 national marine sanctuaries administered by the National Oceanic and Atmospheric Association's (NOAA) Office of National Marine Sanctuaries (ONMS). MBNMS is located along the central coast of California and encompasses 6,094 square miles (15,783 square kilometers) of ocean. 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. The sanctuary is home to numerous species of mammals, seabirds, fishes, invertebrates, and algae in a productive coastal environment, abounding 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.

This management plan revises the 2008 MBNMS management plan and continues to focus on understanding and protecting the resources of the sanctuary. This update was developed using scientific assessments of the condition of sanctuary resources; public input from public scoping meetings and written comments; and Sanctuary Advisory Council and working group meetings, all providing input and recommendations regarding which issues ONMS should address and how to address them. This final management plan revises the 2008 management plan, and focuses on identifying, characterizing, assessing, and protecting the sanctuary's resources.

The management plan includes 13 action plans grouped into issue-based and program-based themes guiding ONMS's management of the sanctuary over the coming decade. These action plans provide strategies to understand the issues and protect the coastal and marine environments comprising the sanctuary and 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.

The issue-based action plans are:

- Climate Change
- Coastal Erosion and Sediment Management
- Davidson Seamount Management Zone (DSMZ) and Sur Ridge
- Emerging Issues
- Introduced Species
- Marine Debris
- Water Quality
- Wildlife Disturbance

The program-based action plans are:

- Education, Outreach, and Communication
- Maritime Heritage
- Operations and Administration
- Research and Monitoring
- Resource Protection

As a result of this management plan review, NOAA has also revised the regulations for MBNMS to address resource protection concerns in the sanctuary. The regulatory changes will make available an additional option for addressing shoreline erosion in the sanctuary by clarifying NOAA's ability to review and approve the application of suitable dredged material from four harbors adjacent to MBNMS for habitat protection or restoration projects; allow modest increased access for motorized personal watercraft (MPWC) users at the Mavericks surf zone (MPWC Zone 5) by reducing the requirement of High Surf Warning conditions to High Surf Advisory conditions; improve buoy station integrity and reduce the likelihood of detached buoys by changing the configuration of four motorized personal watercraft zones; and correct the existing regulations, which incorrectly state that the Department of Defense's exempted activities appear in the 2008 final environmental impact statement.

A final environmental assessment describes the purpose, need and environmental consequences of the management plan and new regulations.

Section 1:
Introduction

A black oystercatcher (*Haematopus bachmani*) perches on a rock at Moonstone Beach, Cambria, California. Photo: Robert Schwemmer/NOAA

- Background
- Monterey Bay National Marine Sanctuary Regulations and Marine Zones
- Monterey Bay National Marine Sanctuary Management
- Monterey Bay National Marine Sanctuary Setting
- Monterey Bay National Marine Sanctuary Condition Report
- The Management Plan Review Process

Background

Overview of the Office of National Marine Sanctuaries

The Office of National Marine Sanctuaries (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 15 national marine sanctuaries and Papahānaumokuākea and Rose Atoll marine national monuments. The system encompasses more than 620,000 square miles of marine and Great Lakes waters from Washington State to the Florida Keys and from Lake Huron to American Samoa (Figure I-1). ONMS has recently designated two new sanctuaries: Mallows Bay-Potomac River National Marine Sanctuary and Wisconsin Shipwreck Coast National Marine Sanctuary. 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.

Figure I-1. The National Marine Sanctuary System is made up of 15 national marine sanctuaries and Papahānaumokuākea and Rose Atoll marine national monuments. Image: NOAA

The National Marine Sanctuaries Act

The National Marine Sanctuaries Act (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.

A complete version of the NMSA is available from the ONMS website.

Monterey Bay National Marine Sanctuary

NOAA established MBNMS for the purposes 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 the deepest point, the waters within MBNMS reach 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

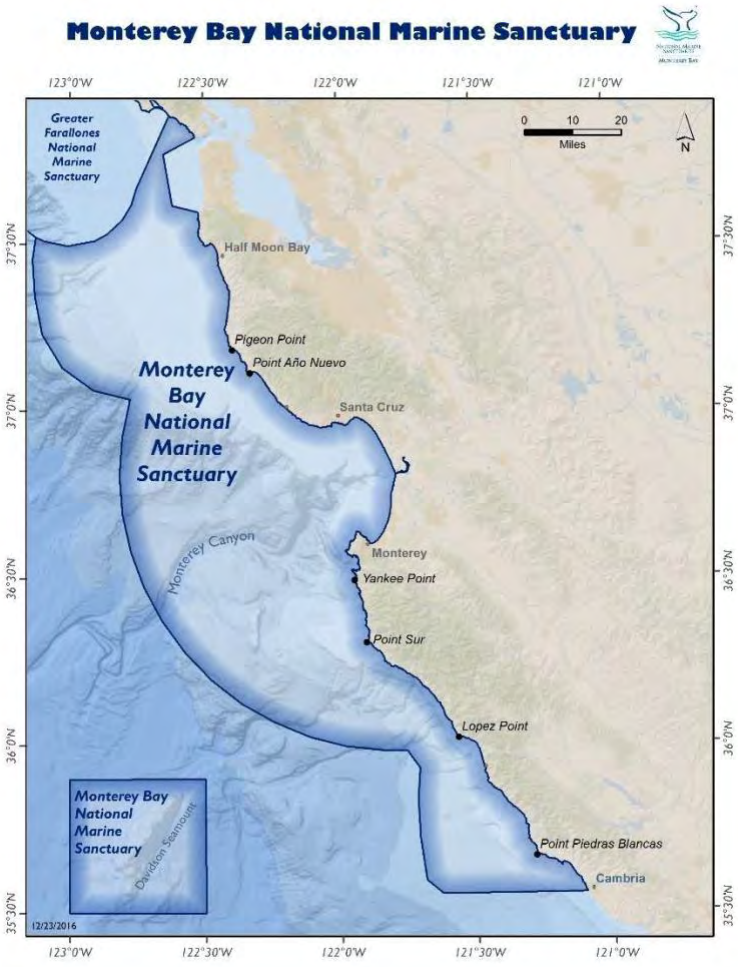

Figure I-2. Monterey Bay National Marine Sanctuary boundary. Image: NOAA

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.

Early human use of resources is evidenced through an abundance of artifacts in MBNMS, and cultural resources in MBNMS are protected by sanctuary regulations. Humans settled in the vicinity of MBNMS at least 10,000 years ago. At the time of Spanish arrival in the early 1700's, about 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 people in the area “Costanoans,” meaning “coast dwellers.” Today they are known as the Ohlone, meaning “people of the west.” Shell middens left by the Costanoans have been found at most substantial watersheds and shorelines between Morro Bay and Monterey Bay.

Archaeologists also estimate 450 reported modern-day 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.

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. ONMS 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. Responsible recreation and tourism activities are opportunities for equitable experiences that are aligned with resource protection. 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.

Monterey Bay National Marine Sanctuary Regulations and Marine Zones

Activities compatible with resource protection (e.g., fishing, boating, diving, research, and education) may be conducted in MBNMS unless prohibited or otherwise regulated. All activities are subject to liability for destruction of, loss of, or injury to sanctuary 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 MBNMS terms of designation can be found in published and online versions of the Federal Register, 73 FR 70488.

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, bird, 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; possessing, moving, or injuring any sanctuary historical resource;
G. Flying a motorized aircraft above the sanctuary;
H. Operating a vessel (i.e., water craft of any description) within the sanctuary;
I. Aquaculture or kelp harvesting within the sanctuary;
J. 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
K. 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.

Marine Zones

Certain human activities can pose 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, U.S. 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, U.S. Army Corps of Engineers (USACE), U.S. Coast Guard (USCG), DOD, and U.S. Environmental Protection Agency (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 NOAA or incorporated by reference within sanctuary regulations (see Figure I-3):

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, NOAA, 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 watersport 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: Congress directed the Secretary of Commerce and the Secretary of 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 traffic separation schemes to maximize protection of sanctuary resources while allowing for safe, efficient, and environmentally sound transportation. 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 Nations' International Maritime Organization (IMO), an organization of the world's key shipping nations.

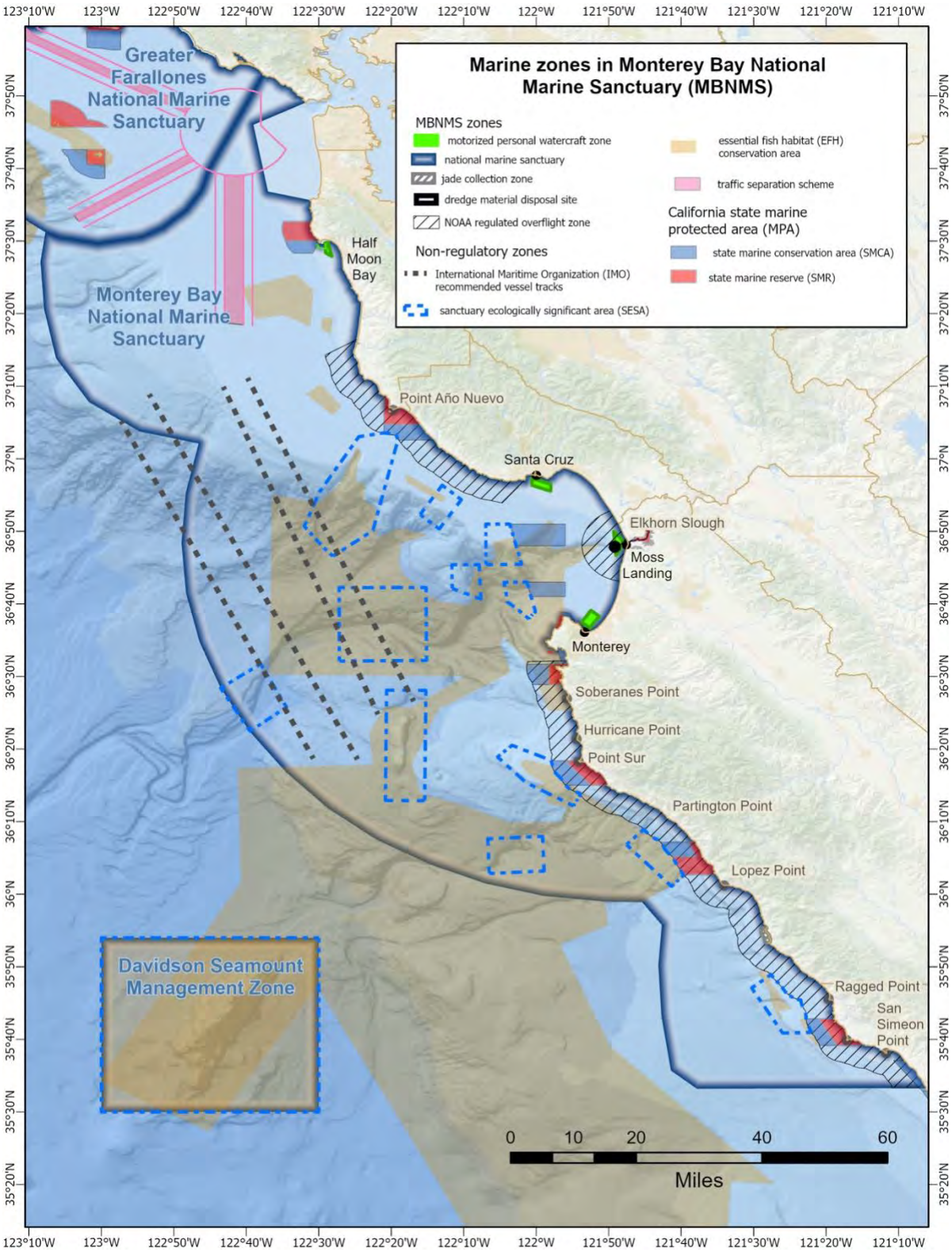

Figure I-3. Monterey Bay National Marine Sanctuary marine zones. Image: NOAA

Monterey Bay National Marine Sanctuary Management

NOAA ONMS's mission for MBNMS is: *To understand and protect the coastal ecosystem and cultural resources of Monterey Bay National Marine Sanctuary.*

ONMS' management goals for MBNMS are to:

A. Collaborate with strategic partners to conserve natural habitats, populations, and ecological processes by preventing, minimizing, and/or mitigating stressors on resources in the sanctuary.
B. Enhance the understanding of ecosystem processes and inform ecosystem-based management efforts through scientific research, monitoring, and characterization.
C. Enhance ocean and climate literacy, promote awareness of the sanctuary, and foster ocean stewardship through education, outreach, and interpretation efforts.
D. Maintain and protect the sanctuary's natural biological diversity and, where appropriate, restore and enhance sanctuary ecosystems.
E. Increase knowledge and appreciation of maritime heritage (living cultures, traditions, and cultural resources).
F. Facilitate wise and sustainable use in sanctuaries to the extent such uses are compatible with resource protection.
G. Build, maintain, and enhance an operational capability and infrastructure.

Focus 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. ONMS 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.

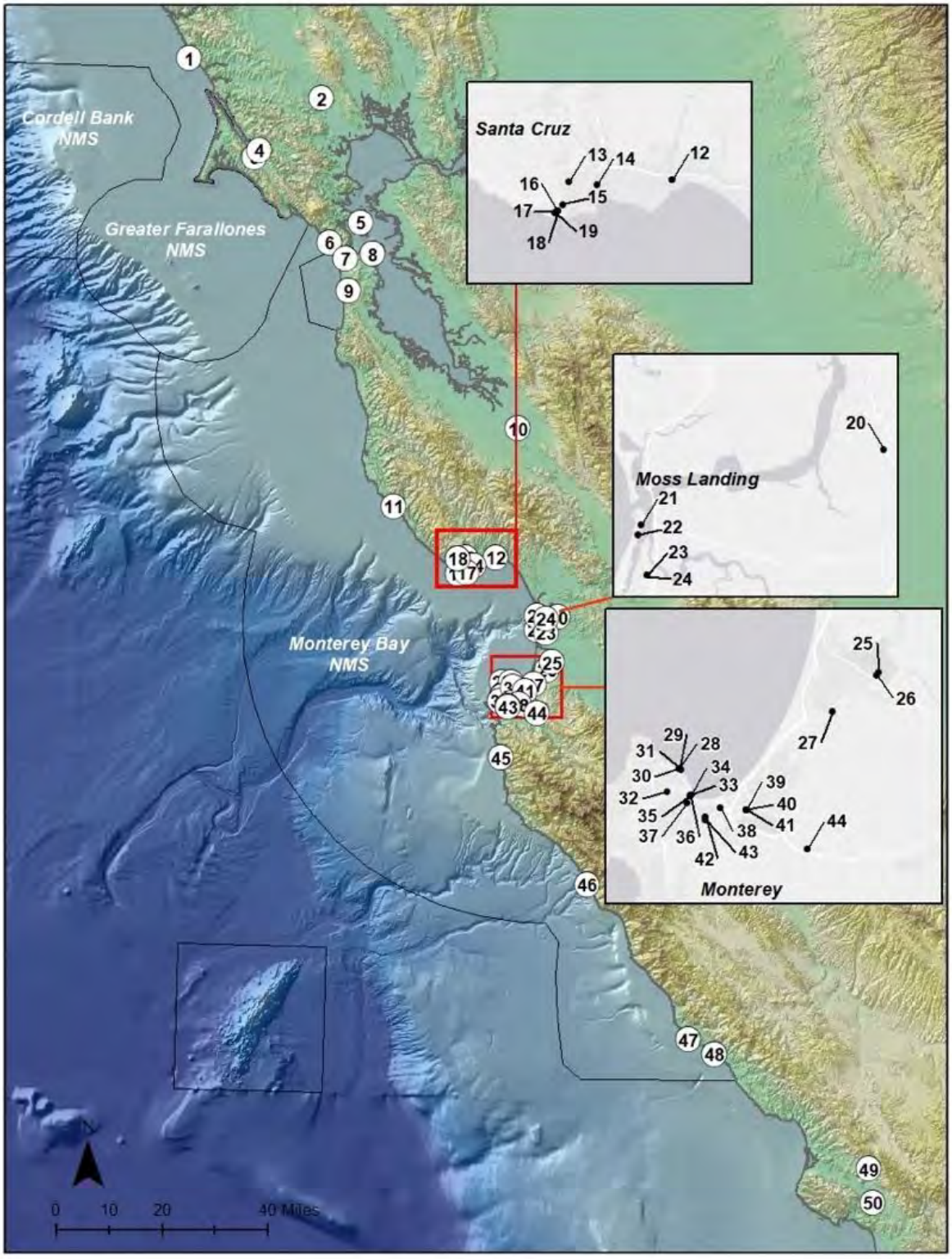

Figure I-4. Regional research institutions. Image: NOAA

Focus 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 education and outreach programs to teach the public about how they can minimize or eliminate harmful impacts to the sanctuary. 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.

Focus and Accomplishments of the Education and Outreach Program

ONMS's 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 sanctuary's 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.

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 ONMS 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 ONMS and local businesses, and provides a forum for local businesses and ONMS to coordinate and promote recreation and tourism opportunities in the sanctuary.

Monterey Bay National Marine Sanctuary Setting

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.

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.

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.

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.

For a complete description of the sanctuary setting (Human Environment, Socioeconomics, Human Uses, Physical Environment, and Living Marine Resource) please refer to the final environmental assessment associated with this management plan.

Monterey Bay National Marine Sanctuary Condition Report

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.

ONMS uses a socioecological approach to assess, protect, and improve resources in national marine 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 also 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, resource status and trends are assessed individually for each environment. 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 mark) 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 most recent condition report update in 2015.

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.

The findings in the 2009 MBNMS condition report and the 2015 update were used 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 links between activities from this management plan and the 2015 condition report update can be found in Appendix C.

The Management Plan Review Process

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. ONMS last reviewed the MBNMS 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.

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 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 ONMS 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 guarantee the multi-disciplinary

approach of the action plans and to ensure that ONMS staff are successful in implementing sanctuary management.

Performance Evaluation

ONMS will use performance measures identified in each of the action plans and summarized in the Operations and Administration Action Plan to evaluate progress. In addition to ONMS working toward the implementation of each of the action plans, its staff 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 ONMS 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 worked with the Sanctuary Advisory Council to prioritize 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. The prioritization of actions is an ongoing process and is formally assessed every 3-5 years.

Regulatory Changes Resulting from the Management Plan Review Process

As a result of management plan review, NOAA is also revising the regulations for MBNMS to address resource protection concerns in the sanctuary. NOAA is making the following changes to the sanctuary's regulations:

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 habitat protection and restoration projects using suitable dredged sediment material from any of the four harbors adjacent to MBNMS because the beneficial use of dredged material would not be considered "disposal of dredged material."
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 final environmental assessment describes the purpose, need and environmental consequences of the management plan and new regulations.

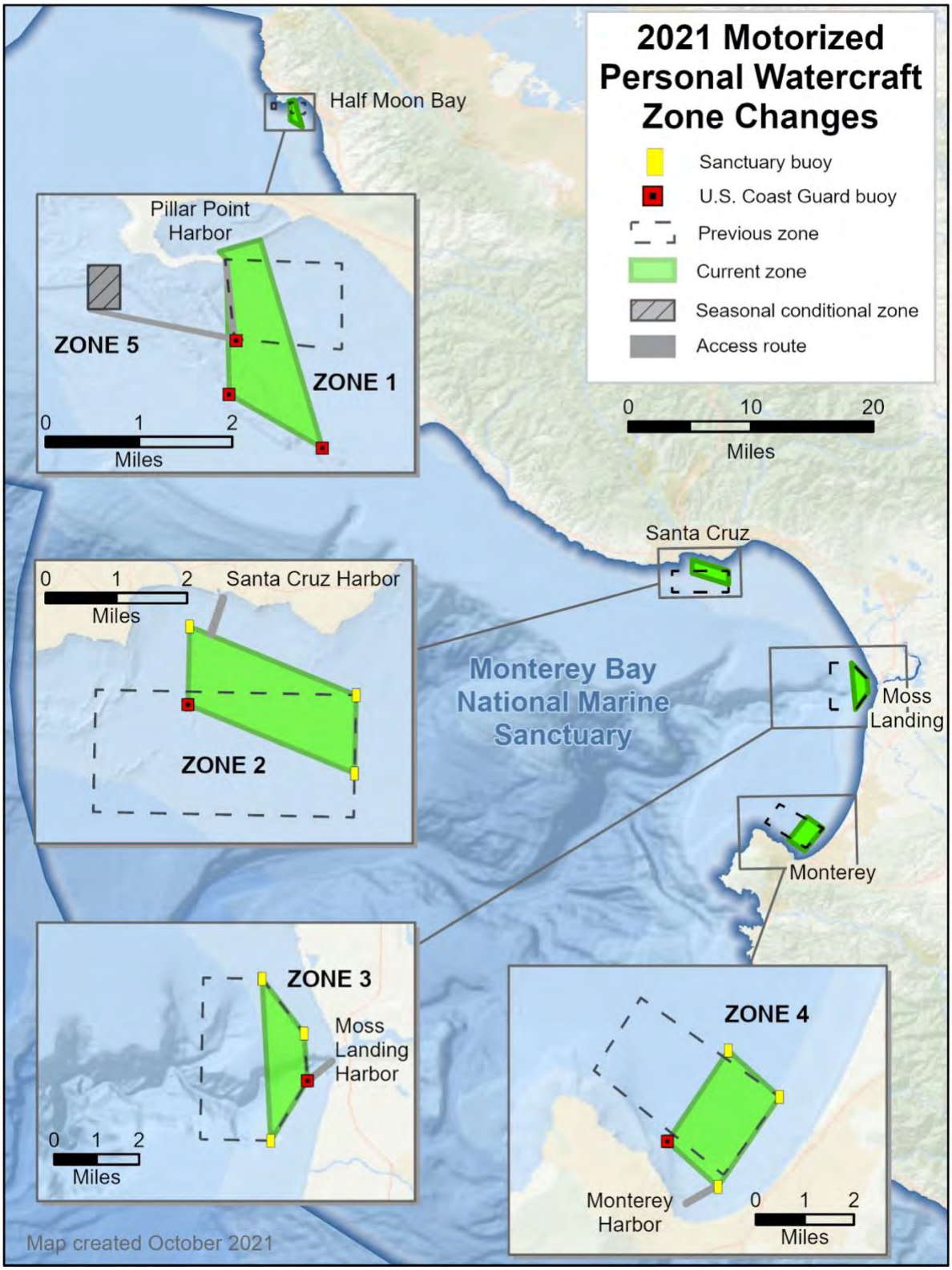

Figure I-5. 2021 Motorized Personal Watercraft Zone Changes in Monterey Bay National Marine Sanctuary

Section 2:
Issue Based Action Plans

(Top) Members of the West Coast Entangled Whale Response Network practice their line grappling and release techniques. (Bottom, left) Example of invasive Bryozoan surrounding pier pilings in Elkhorn Slough. (Bottom, right) Coastal armoring on Del Monte Beach. Photos: (top) Nicole Capps/NOAA; (bottom, left) NOAA; (bottom, right) NOAA

- 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

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_2) 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.

ONMS has worked on a number of climate change projects in the areas 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, ONMS 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, ONMS 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 ONMS facilities at MBNMS and operations conducted within the sanctuary. 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 ONMS can improve. Staff will need to develop and implement a green operations plan, with targets, 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

ONMS 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 outline 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 EOC-1.3
Activity CC-3.2 → Education, Outreach, and Communication Activity EOC-1.3
Activity CC-3.3 → Education, Outreach, and Communication Activity EOC-4.3
Strategy CC-4 → Coastal Erosion and Sediment Management CESM-1 & 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: 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 Research Coordinator	Annually, years 1-2
		Vulnerability assessment report published	Climate Project Coordinator	Year 3
Strategy CC-2: Reduce greenhouse gas emissions	Identification of ONMS's carbon footprint at MBNMS	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: Communicate ocean-climate impacts and solutions	Resources developed for public awareness of ocean and coastal climate issues	Ocean climate education plan	Education & Outreach Coordinator Climate Project Coordinator	Years 2-3

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 suitable 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. ONMS 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 in the City of 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. ONMS 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. ONMS has authorized the coastal development permit based on the assumption only suitable 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 polychlorinated biphenyl (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. Suitable sediments greater than or equal to 80% sand composition could be placed on harbor beaches. Suitable 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. ONMS authorizes the USACE 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 suitable 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

NOAA regulations for MBNMS 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 NOAA ONMS 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, NOAA 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 the 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. NOAA ONMS 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. ONMS 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 and study carbon markets in the slough.

Activity 3.2: Conduct bathymetry monitoring in the main channel of Elkhorn Slough (part of MBNMS) to aid in the development of better management strategies related to erosion.

Activity 3.3: Participate in biennial bank erosion monitoring in partnership with ESNERR staff.

Activity 3.4: Participate in ESNERR science advisory committee, providing input to the monitoring process.

Strategy CESM-4: Implement site-specific habitat protection or restoration projects

NOAA's regulations for MBNMS 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 pre-approved sites, as well as use of suitable sand placed above mean high water to nourish adjacent beaches. These beach nourishment projects were approved by the regulatory agencies, including NOAA. As a result of the management plan review process, NOAA finalized a regulatory change to clarify the beneficial use of suitable dredged material from the four harbors adjacent to the sanctuary for habitat protection or restoration purposes 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. As part of this process, NOAA determined that the protection and restoration purposes of local harbor-driven beach nourishment projects—projects that have, to date, largely relied on onshore placement of suitable material—can be further promoted by allowing placement of suitable dredged material

directly into the sanctuary below the mean high water (MHW) line for habitat protection or restoration purposes.

Activity 4.1: Continue to coordinate with local harbors and cities on use of suitable sand for habitat protection and restoration projects 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 NOAA ONMS.

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: NOAA ONMS 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. NOAA 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:

Strategy CESM 1 → Climate Change Strategy CC-4
Strategy CESM 3 → Climate Change Strategy CC-4
Activity CESM-2.2 → Emerging Issues Strategy EI-2
Activity CESM-6.2 → Resource Protection Strategy RP-5
Activity CESM-6.2 → Research & Monitoring Strategy RM-3
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	NOAA ONMS provides 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 habitat protection or restoration projects	Continued coordination with local harbors and cities on dredge disposal options for use of suitable 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 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 Davidson Seamount was 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 the 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 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. As staff working at MBNMS 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 Sanctuary Ecologically Significant Area (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 have 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 these unique deep-sea habitats.

Activity 3.2: Involve the education and outreach mechanisms within ONMS 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 EOC-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 Education Coordinator	Years 1-5

Emerging Issues Action Plan

Goal: 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 ONMS 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. ONMS will be using a system to identify emerging issues 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 yet addressed. This plan focuses on the framework for identifying and addressing 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. Research activities
E. Coastal development and access
F. Water quality
G. Aquaculture
H. Threats from beyond MBNMS boundaries (with potential to affect sanctuary resources)

Strategy EI-1: Identify and track emerging issues

NOAA 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: Utilize a defined process to address emerging issues

ONMS will utilize the process below to determine the importance and priority of issues as they arise. This management plan is based on addressing the top priority resource issues as identified in a public process of scoping, prioritization, and selection with the Sanctuary Advisory Council.

However, ONMS recognizes certain unforeseen issues may pose a threat and must be understood and addressed in a timely manner.

Activity 2.1: Assess 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 ONMS involvement in issue; and
E. Priority ranking relative to other ONMS initiatives.

Activity 2.2: Consider 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: Clarify 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-1 → Resource Protection Strategy RP-17
Strategy EI-1 → Water Quality Strategy WQPP-2
Strategy EI-2 → Coastal Erosion and Sediment Management Strategy CESM-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 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, NOAA 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 NOAA 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 Executive Order 13751, Safeguarding the Nation from the Impacts of Invasive Species. This 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 their 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. ONMS 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 ONMS 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 a species introduction. NOAA ONMS 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 sanctuary 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.

Relevant strategies/activities located elsewhere within this management plan:

Strategy IS-4 → Research and Monitoring Strategy RM-2

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 sanctuary 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, ONMS has focused on a variety of marine debris control efforts within MBNMS. 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. ONMS 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.

ONMS's goal is to improve its understanding of the types of marine debris that impact MBNMS resources and how those impacts can be reduced or eliminated.

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

NOAA 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. ONMS will lead by example by reducing single-use plastic items, e.g., straws and water bottles, at ONMS-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

NOAA 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 agencies, non-profit partners, and individuals who work and recreate on the ocean to reduce debris released in the sanctuary. Provide outreach to discourage specific unlawful discharge activities ranging from discarding monofilament to the loss of shipping containers in the sanctuary.

Activity 3.4: Explore the adaptation of the Florida Keys National Marine Sanctuary (FKNMS) Clean Seas program for adoption in MBNMS.

Activity 3.5: Coordinate with state and local partners on lost fishing gear removal program, on an as needed basis. Determine if ONMS 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 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 3.6: Use ONMS 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.

Strategy MD-4: Monitor and assess golf ball deposition and remediation efforts associated with area golf courses

Plastics and non-organic materials, like golf balls, represent one of many forms of marine debris that can impact marine habitats. NOAA 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 ONMS in September 2016. During a 16-month period in 2017 and 2018, ONMS 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. ONMS 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. ONMS 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 4.1: Monitor golf ball cleanup and education efforts at Pebble Beach.

Activity 4.2: Assess golf ball deposition at other coastal golf courses along the sanctuary.

Activity 4.3: 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 MD-1.3 → Water Quality Activity WQPP-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

Potential Partners

NOAA Marine Debris Program, California Whale Rescue, United States Coast Guard, Save Our Shores, Surfrider Foundation, SeaDoc Society, Coastal Conservation Association, Green Latinos, American Bird Conservancy, 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
	Explore the adaptation of the FKNMS Clean Seas program	Assessment of program adaptability	Resource Protection Coordinator	Year 2
	Use ONMS permit authority to prevent or reduce potential marine debris	Updated permit terms and conditions	Permit Coordinator	Annually

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

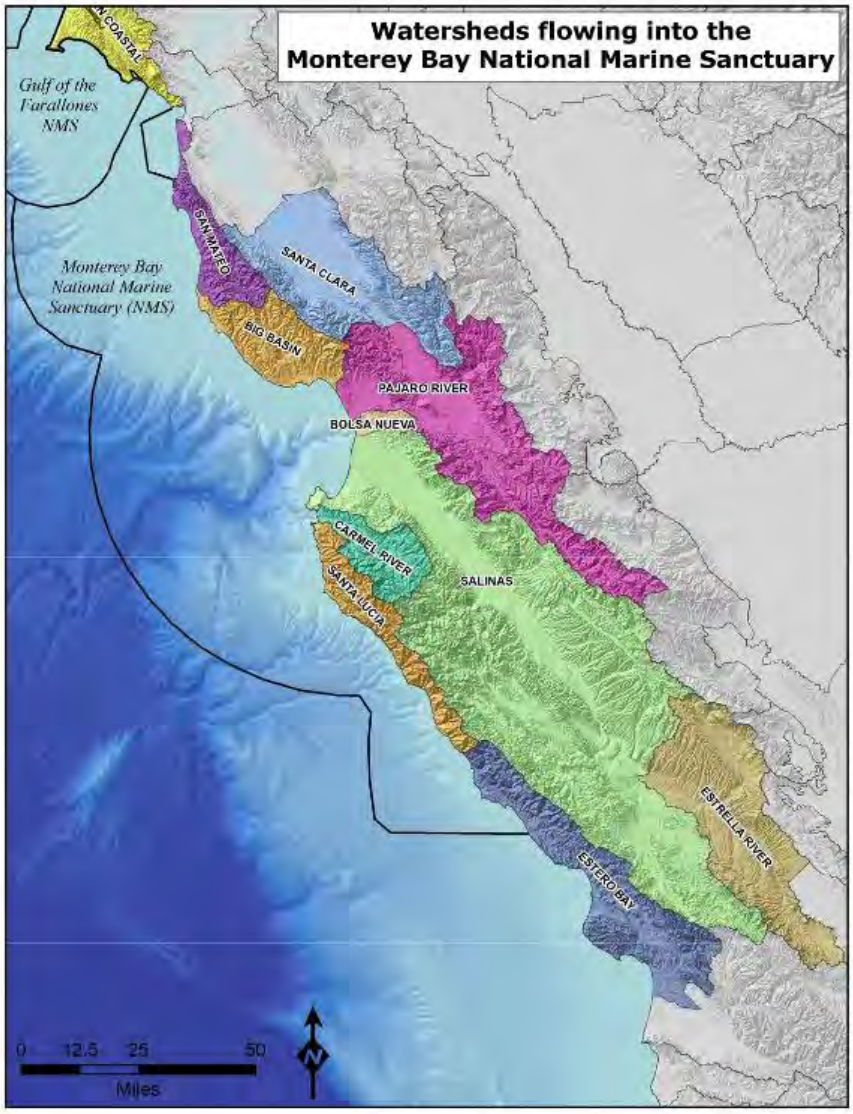

Figure WQ-1. Image shows watersheds flowing into MBNMS. Image: NOAA

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. This includes runoff from watersheds draining directly into MBNMS as well as from the San Francisco Bay and being transported down coast by ocean currents.

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 rivers 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 there are 55 water bodies 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

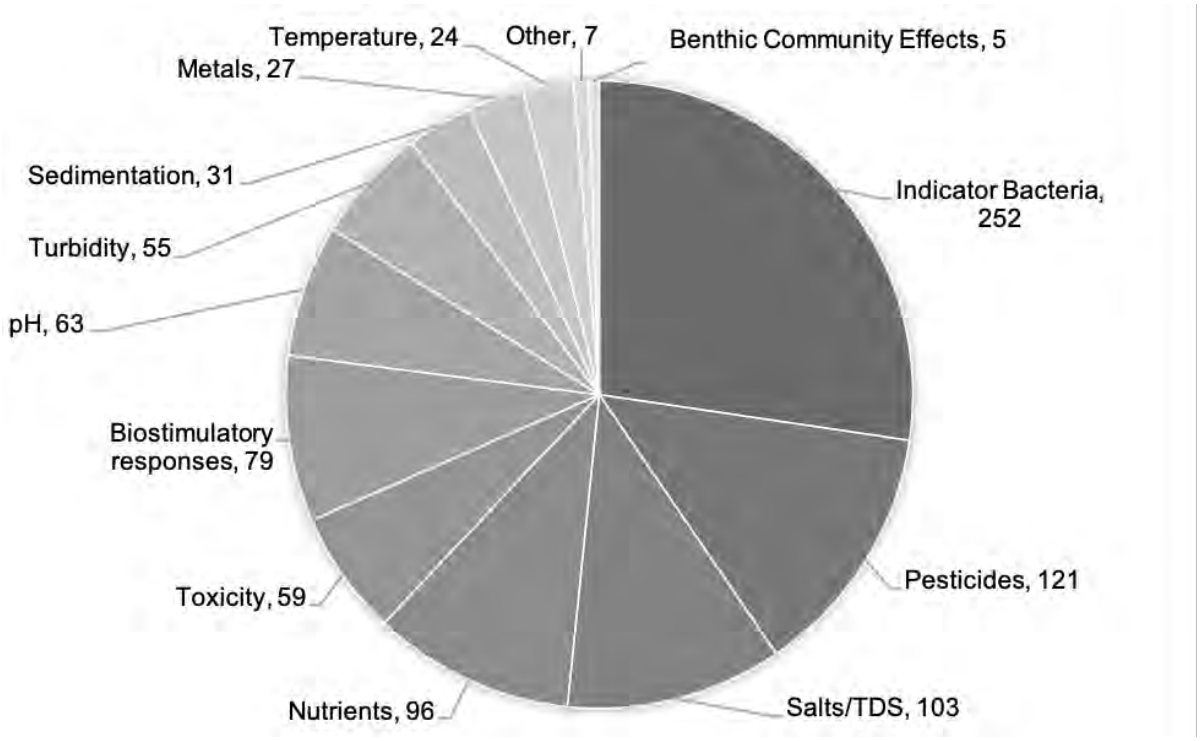

Figure WQ-2. Chart representing the number of listings by pollutant classification. Image: Central Coast Regional Water Quality Control Board

The Central Coast Long-Term Environmental Assessment Network (CCLEAN) is a regional monitoring program funded by Monterey Bay area wastewater treatment plant dischargers and Dynegy Moss Landing Power Plant as a requirement of their NPDES monitoring requirements with an emphasis on receiving waters. CCLEAN focuses on measuring persistent organic pollutants (POPs) and contaminants of emerging concern (CECs) in ocean water. Twenty plus years of monitoring water, sediment, and mussel tissue have indicated there is cause for concern of elevated levels of PCBs, DDTs, Dieldrin, PBDEs, Chlordane and some heavy metals within Monterey Bay. These POPs are known to accumulate in animals with concentrations increasing higher in the food chain (e.g., killer whales).

The Water Quality Protection Program (WQPP) began in 1993 with the establishment of a committee to oversee program development and implementation. A memorandum of agreement (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 the sanctuary's Agriculture and Rural Lands Action Plan.

The CCRWQCB also oversees a stormwater program to prevent runoff from transporting urban pollutants to surface water bodies 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 the sanctuary'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 ONMS 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. ONMS wants to improve its understanding of the fate and magnitude of contaminants entering MBNMS so that it 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

The 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. NOAA ONMS will review and provide comments on any NPDES permits for discharges directly into the sanctuary and review any MBNMS permit requests that might affect water quality. As resources permit, other coastal permits, projects, or

ordinances including development of Total Maximum Daily Loads (TMDLs) affecting water quality may be evaluated.

Activity 1.3: Participate in and support urban and agricultural sustainability efforts. ONMS supports and encourages 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. ONMS 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 the Water Quality MOA for MBNMS 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 30, 2025. 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. These questions may be added to the Science Needs page on the MBNMS website. 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 Harmful Algal Bloom (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 California 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, ONMS will strive to incorporate flow measurements to better calculate contaminant loading and estimate pollutant exposure in coastal waters.

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 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 sanctuary 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. In addition to our monitoring programs, 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 NOAA, 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, of 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 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
Strategy WQ-2 → Emerging Issues Strategy EI-1
Activity WQ-2.2 → Marine Debris Strategy MD-1
Activity WQ-2.2 → Marine Debris Activity MD-1.3
Strategy WQ-4 → Marine Debris Activity MD-3.2

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, and many other local agencies and organizations.

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 affects 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

Strategy Title	Desired Outcome (Objective)	Output Measure	Who Measures	Timeline
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

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 approaches 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 uncrewed 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 UAS) 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.

NOAA strives 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 UAS 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.

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 the sanctuary's 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 the sanctuary's 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 ONMS regarding lost shipping containers at sea to enhance ONMS's 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 wildlife 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. ONMS 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. ONMS 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 ONMS 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, ONMS will assist with 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 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 turtles, seals, sea lions, and seabirds. NOAA 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's 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, NOAA 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
	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

Strategy Title	Desired Outcome (Objective)	Output Measure	Who Measures	Timeline
	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

(Top) Sanctuary Exploration Center. (Bottom, left) Dr. Steve Lonhart monitors for invasive species. (Bottom, right) ONMS vessel and a cruise ship. Photos: (top) NOAA; (bottom, right) Chad King/NOAA; (bottom, left) NOAA

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

Education, Outreach, and Communication Action Plan

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

Introduction

ONMS implements extensive education, outreach, recreation, 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. Education programs conducted at MBNMS 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, ONMS 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.

ONMS 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.

Beginning in 2008, ONMS 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^2 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 school children 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 ONMS 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 sanctuary programs and NOAA's National Marine Sanctuary System.

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.

ONMS has developed and supported numerous community-based citizen science programs. Programs began in 1997 with Beach COMBERS, which was followed by the creation of water quality citizen science programs Urban Watch, Snapshot Day, and First Flush. ONMS 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 ONMS 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

ONMS 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 ONMS-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. Programs will emphasize the role individuals can take to help mitigate and prevent the effects of changing ocean conditions.

Activity 1.4: Implement K-12 teacher professional development trainings using ONMS 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 culturally diverse audiences to build awareness and increase understanding of sanctuary resources, research, and

ecosystem protection issues (e.g., lecture series, docent-led visitor center tours, family and youth-focused programs), and instill bilingual materials where possible.

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* week, 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, NOAA 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 and increase student, partner organization, and volunteer engagement 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 sanctuary 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 ONMS will be the development and implementation of a 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., the 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 the 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 → Resource Protection Activities RP-15.2, 17.2
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	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

Strategy Title	Desired Outcome	Measure	Who Measures	Timeline
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 Title	Desired Outcome	Measure	Who Measures	Timeline
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
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

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 the United States Coast Guard, California's Department of Fish and Game, and partners to determine that there is no substantial oil threat from *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

NOAA 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

NOAA is 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, NOAA 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. NOAA 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 campaigns focused on how to deal with artifacts and historic resources inadvertently brought to the surface (e.g., traditional fishing resources, anchor lines).

Strategy MH-3: Protect and manage submerged archaeological resources

As part of the NEPA compliance process, NOAA 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. NOAA 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 campaigns 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, ONMS 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. ONMS 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, ONMS needs to maintain basic staffing, infrastructure, and administrative functions at the site. This action plan addresses these operational needs and details ONMS' 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 this management plan.

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. Sanctuary staff 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. NOAA ONMS 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. NOAA ONMS 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. NOAA 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 is 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 advisory council for MBNMS in 1994. The council functions in an advisory capacity to MBNMS's superintendent to:

A. Help strengthen and provide support for the growth of programs at MBNMS;
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 Sanctuary Advisory Council assists in carrying out the goals and objectives of the MBNMS management plan. ONMS 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 Sanctuary 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 the advisory councils of Monterey Bay and Greater Farallones national marine sanctuaries. To ensure integration on issues and opportunities for MBNMS' 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 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. NOAA will continue to work with each working group to refine membership and decision-making protocols.

Strategy OA-4: Support staff and facilities

The 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). ONMS staff at MBNMS purchase, maintain, and implement policy, standardization, and assessment of most IT systems for those offices.

Activity 4.1: Coordinate and oversee acquisition (retention) of sanctuary offices, visitor facilities, marine operations, and vessel slips. Provide operational support for facility maintenance, inspections, and contract work to ensure uninterrupted use of facilities. Outlining the annual requirements for each facility allows staff to address maintenance needs and develop long-term life-cycle plans.

Activity 4.2: Ensure safety and security at all sites. Outline safety plans for all facilities per Federal Protective Service' Facility Security Assessments.

Activity 4.3: 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. Oversee IT policy compliance

Activity 4.4: Administer and enhance MBNMS website and social media.

Strategy OA-5: 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 5.1: 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 5.2: 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. NOAA is committed to maintaining the highest level of safety for staff, observers, and research partners.

To conduct safe field operations, NOAA 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, NOAA 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 5.3: Identify needs for diving operations from the MBNMS management plan. ONMS will develop a dive operations plan articulating the needs of a diving program, including the projected needs as indicated in other action plans.

Activity 5.4: Implement small boat operations to address activities identified in the management plan. Staff will develop a small boat operation plan articulating the use of a new small boat, which will be operated in adherence to all NOAA safety guidelines and ONMS best management practices currently in place.

Strategy OA-6: Support diversity, equity, and inclusion

NOAA is firmly committed to increasing the diversity within its workforce and creating inclusive work environments where everyone feels valued and experiences a true sense of belonging. NOAA will continue to take direct steps to increase the diversity of its workforce, as well as provide an equitable and inclusive work environment. NOAA is also working to build internal capacity to improve engagement and collaboration with Indigenous communities adjacent to, and associated with, sanctuaries to improve understanding and recognize their rights, responsibilities, knowledge, values and connections to places and resources that are part of national marine sanctuaries. These connections to place are central to the identities and cultures of Indigenous peoples, and working with Indigenous communities is essential to fulfilling NOAA's mission to protect these nationally significant places for current and future generations.

Activity 6.1: Coordinate with NOAA staff on implementation of NOAA's Diversity and Inclusion Strategic Plan.

Activity 6.2: Participate in ONMS Diversity and Inclusion strategic working groups.

Activity 6.3: Identify and explore opportunities to increase diversity in the MBNMS workforce and advisory council.

Activity 6.4: Develop and initiate an Indigenous Engagement strategy.

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-5: 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

Strategy Title	Desired Outcome (Objective)	Output Measure	Who Measures	Timeline
		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-6: Support Diversity, Equity and Inclusion	Creation of a working environment better reflecting sanctuary communities on the Central California coast	Increase in the diversity of the sanctuary's workforce	Superintendent	Ongoing
		Participation in regional and national strategic planning efforts related to diversity, equity and inclusion	Deputy Superintendent	Ongoing
	Increased engagement with Indigenous communities	Indigenous Engagement Strategy completed	Superintendent	Ongoing

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 national marine sanctuaries. The general approach of the sanctuary's 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. In particular, MBNMS site staff will continue to be leaders for several West Coast-wide or national initiatives and programs of significance. 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.

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. ONMS has technical reports (MBNMS, 2019) and a series of maps (e.g., those available on SIMoN) 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 with developing and characterizing a known species inventory/list of the sanctuary. Staff will also continue, pending ship time availability, characterization of the Big Sur nearshore habitats through the 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 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.

Activity 1.4: 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, sanctuary staff contribute to national efforts at improving the reports, such as adding confidence levels to assessments and including socioeconomic indicators. Expertise from the site will be shared with other sites as they develop condition reports.

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 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 for the four West Coast sanctuaries in the national marine sanctuaries system. 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. NOAA 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. The website work entails coding for database integration and web tool development and technical support for all five sanctuaries on the west coast.

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. The needs also extend to sharing expertise, knowledge, and costs across the five west coast sanctuaries and with other sanctuaries throughout the system.

Activity 3.1: Maintain an annotated list of applied research needs for management of the sanctuary. Maintain and update 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., NOAA Ship *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 inventories; 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 the sanctuary's 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 operating the ONMS vessels. In addition, develop cross-site funding opportunities and ship time proposals for use of larger research vessels and associated remotely operated vehicles. For example, coordinate proposal submission, cruise planning, and cruise implementation with NOAA and Ocean Exploration Trust for use of the assets of the E/V *Nautilus*.

Activity 3.8: Provide scuba diving expertise and related ecological knowledge to science collaborations. ONMS has an active dive program at MBNMS, including a dive unit supervisor serving NOAA divers at other organizational units. Divers at the site 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 research and monitoring needs of the sanctuary.

Activity 3.9: Conduct research and monitoring when support is available and staff expertise is the most effective way to address management needs. 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 the sanctuary site 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. ONMS 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: 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 5.1: 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 5.2: 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 5.3: 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 5.4: Provide information to the Sanctuary Advisory Council through the Research Activity Panel and direct staff reports. Regularly present research needs and results to the Research Activity Panel, and Sanctuary Advisory Council as part of informing management and policy.

Activity 5.5: 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 5.6: 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 5.7: 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 → Resource Protection Activity RP-12.1
Strategy RM-1 → Resource Protection Activity RP-17.3
Strategy RM-2 → Resource Protection Activity RP-12.1
Strategy RM-2 → Resource Protection Activity RP-17.3
Strategy RM-2 → Introduced Species Strategy IS-4
Strategy RM-3 → Coastal Erosion and Sediment Management Activity CESM-7.3
Strategy RM-5 → Resource Protection Activity RP-12.2

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
		Publish condition report	Research Coordinator	Year 8
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	Sanctuary 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

Strategy Title	Desired Outcome (Objective)	Output Measure	Who Measures	Timeline
	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-5: 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 ONMS's resource protection programs is to protect and restore the biological, historical, and cultural resources in the sanctuary.

The general approach of the resource protection program is to collaborate on management efforts with local stakeholders to identify and directly reduce impacts to wildlife and other protected resources, as well as to balance the protection of sanctuary resources and improving scientific understanding. This action plan aims to improve resource protection and management on select site-specific issues through the application of marine spatial planning (MSP) principles. Marine spatial planning involves 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. 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 ONMS'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; vessel traffic; collaboration with fisheries managers; recreation; low flying aircraft; alternative energy; conservation practices (MPAs); and emergency response and restoration. In addition, sanctuary staff will continue to be leaders for several west coast-wide or national initiatives and programs of significance in 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

ONMS 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 four additional collaborative resource protection programs.

Activity 1.1: Continue collaborations 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 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. NOAA 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).

Activity 1.5: Continue to contribute to documents outlining sanctuary resource protection priority needs. Develop cross-site funding opportunities and proposals for priority programs and projects (e.g., climate vulnerability assessments).

Strategy RP-2: Enhance socioeconomic program

Up-to-date socioeconomic data are needed to support the conservation and management goals for the sanctuary (strengthen and improve conservation of marine wildlife, including whales, pinnipeds, sea otters, and seabirds) 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 NOAA/ONMS 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, NOAA 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 Pollutant 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 the 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 an 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 use of desalination pipelines, flights in NOAA restricted overflight zones, placement of objects on the seafloor, fireworks displays, and submarine cables.

Strategy RP-4: Review projects, plans, and permits of other agencies

NOAA conducts interagency program reviews on a variety of marine policy issues in order to provide policy guidance to federal and state agencies regarding sanctuary policies and regulations. This would include activities in federal, state, and local jurisdictions and includes actions by NOAA 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 interagency and 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 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 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) with the state of California.

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 and the sanctuary's cruise ship regulation, 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, marine debris, 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: 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 8.1: 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 8.2: Continue to participate and train staff during tabletop and other emergency response drills.

Activity 8.3: 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-9: 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 9.1: Coordinate with other NOAA programs and other pertinent agencies to implement approved restoration plans to restore sanctuary wildlife and habitats.

Activity 9.2: Participate in black abalone recovery efforts in partnership with NMFS, CDFW, and UCSC.

Strategy RP-10: 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, NOAA 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 NOAA NMFS 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, NOAA ONMS 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.

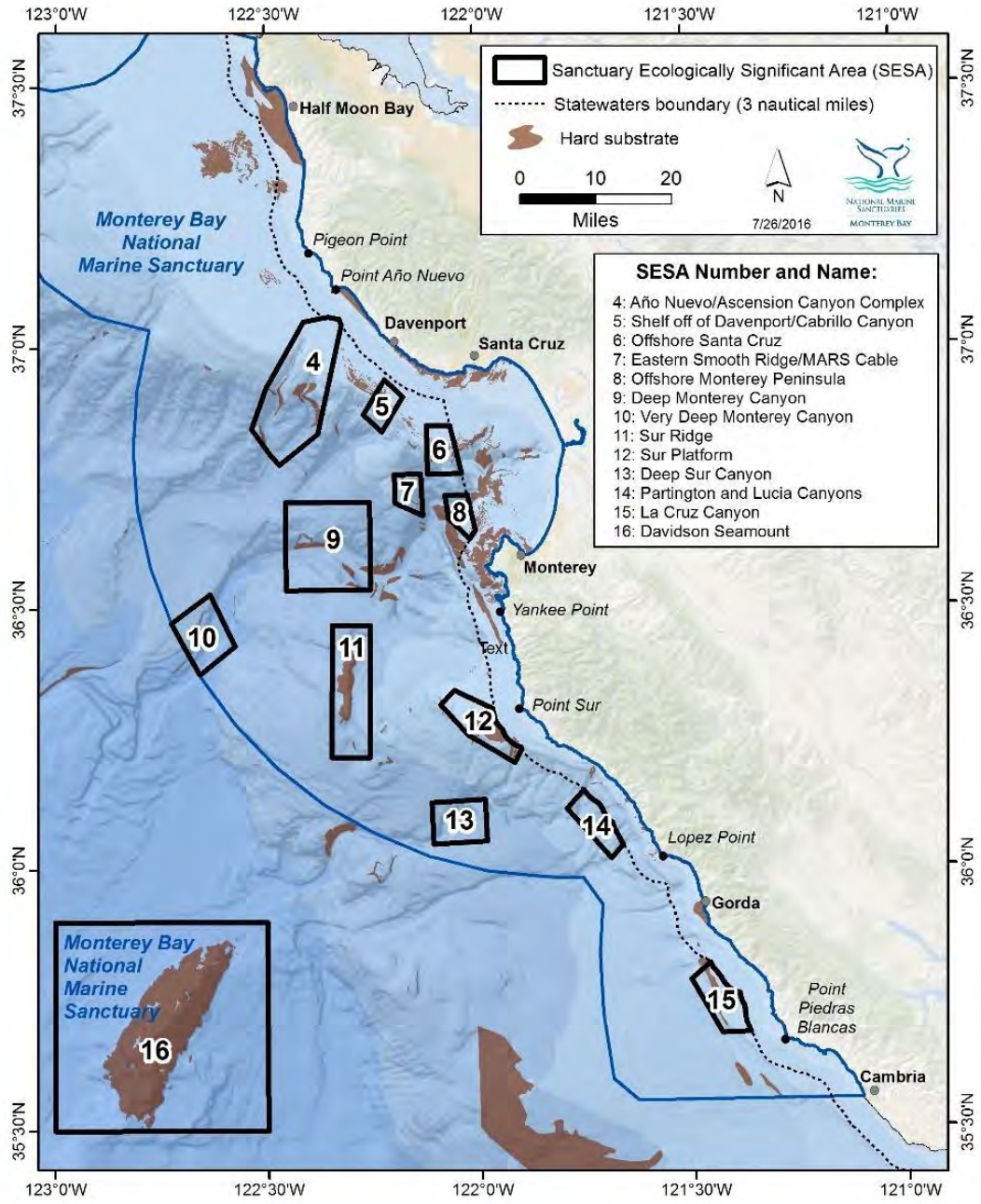

Figure RP-1. Sanctuary Ecologically Significant Areas (SESA) Image: NOAA

Activity 10.1: 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 10.2: Complete a SESA technical report to describe the methods applied for the identification of SESAs.

Activity 10.3: Continue to use SESA data in ecosystem management decisions (i.e., contribute data and information to state and federal fishery management agencies as needed.)

Strategy RP-11: 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, NOAA has periodically analyzed compliance and published reports. (MBNMS, 2014).

Activity 11.1: Continue to track and monitor container ships, bulk freighters, and vessels carrying hazardous materials for compliance with IMO recommended tracks.

Activity 11.2: 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 11.3: 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 RP-12: Collaborate on fishery management issues

NOAA ONMS 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 12.1: Coordinate research on EFH areas with NMFS.

Activity 12.2: 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 RP-13: Assess motorized personal watercraft (MPWC) zones

Sanctuary 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 13.1: 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 13.2: Develop an outreach strategy to address any alteration to MPWC zoning.

Strategy RP-14: 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. ONMS 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 15 national marine sanctuaries and Papahānaumokuākea and Rose Atoll marine national monuments.

Activity 14.1: Collaborate with the 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 14.2: 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).

Strategy RP-15: Maintain NOAA regulated overflight zones

NOAA 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 15.1: 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 15.2: Provide outreach on overflight zone restrictions including use of Unmanned Aerial Systems or 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 RP-16: 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 patterns 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 NOAA's regulations for MBNMS do not explicitly restrict wind turbine installation or operation within MBNMS, 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. There are currently no leasable offshore tracts within MBNMS. NOAA is assessing the potential impacts to resources and the socioeconomics posed by offshore wind energy development. Any consideration regarding offshore wind energy development in the sanctuary would involve an extensive public process and stakeholder engagement.

Activity 16.1: 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 16.2: Outline proposed guidelines for siting constraints of offshore wind and wave energy activities.

Activity 16.3: Develop a baseline information, research, and monitoring program for proposed areas.

Activity 16.4: Develop regulatory response strategies (including special use permit options) for proposed projects sited outside and/or inside MBNMS boundaries.

Activity 16.5: Assess non-market value of habitat loss due to installation.

Activity 16.6: Explore decommissioning guideline options.

Strategy RP-17: 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, NOAA will 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 17.1: Track progress of the state's artificial reef policy development.

Activity 17.2: Share relevant information with the state of California artificial reef team.

Activity 17.3: Assess the current regulatory, funding, and liability conditions for existing artificial reefs used for diving.

Activity 17.4: Develop baseline information, as needed, for proposed sites.

Activity 17.5: Assess non-market value of habitat loss due to installation.

Relevant strategies/activities located elsewhere within this management plan:

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-10.1 → Research & Monitoring Strategies RM-1, 2
Activity RP-10.2 → Research & Monitoring Strategy RM-5
Activity RP-13.2 → Education, Outreach, and Communications Activity EOC-5.4
Activity RP-15.2 → Education, Outreach, and Communications Activity EOC-5.4
Activity RP-16.3 → Research & Monitoring Strategies RM-1, 2

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; NOAA 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: 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 permitted	Resource Protection Coordinator	Annually
Strategy RP-2: Enhance socioeconomic program	Current socioeconomic data to support conservation and management goals of the sanctuary 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
Strategy RP-5: Implement enforcement programs	Implement an effective enforcement program	Annual enforcement priorities for NOAA Joint Enforcement Agreement developed	Regulatory Coordinator	Annually

Strategy Title	Desired Outcome (Objective)	Output Measure	Who Measures	Timeline
		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-8: Review and revise the sanctuary's spill response plan and emergency response information in order to be prepared to respond to an incident	NOAA is 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
Strategy RP-10: 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 RP-11: Track and monitor vessel traffic compliance	Container ships compliant with regulations	Ships tracked and monitored for zone use	Resource Protection Team	Ongoing
Strategy RP-12: 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 RP-13: Assess Motorized personal watercraft (MPWC) zones	Improved MPWC Zone demarcation	Completed MPWC Zone use study & marker buoy impacts.	Regulatory Coordinator	Year 2
		MPWC Zone relevance report	Regulatory Coordinator	Year 3

Strategy Title	Desired Outcome (Objective)	Output Measure	Who Measures	Timeline
Strategy RP-1715: Maintain NOAA regulated 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 RP-16: 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 RP-17: 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

References

Abeles, A., Grimmer K., Papendick H. 2011. *Preparing for the Future: Climate Change and the Monterey Bay Shoreline.* https://woodsinstitute.stanford.edu/system/files/publications/ClimateChangeMontereyWorkshopReport.pdf

California Department of Food and Agriculture. 2017. *California Agricultural Statistics Review 2016-2017.* https://www.cdfa.ca.gov/Statistics/PDFs/2016-17AgReport.pdf

California Water Boards. 2018. *Central Coast Region - Clean Water Act Section 303(d) List of Water Quality Limited Segments (the 303(d) List).* https://www.waterboards.ca.gov/centralcoast/water_issues/programs/tmdl/303d_list.html#New_link

Cohen, A.N. and Carlton, J.T. 1998. *Accelerating Invasion Rate in a Highly Invaded Estuary. Science*, vol. 279:555-558.

Crooks, J. A., & Khim, H. S. 1999. Architectural vs. Biological Effects of a Habitat-Altering, Exotic Mussel, *Musculista senhousia*. *Journal of Experimental Marine Biology and Ecology*, 240(1), 53–75. doi: 10.1016/s0022-0981(99)00041-6

Dean Runyan and Associates. 2019. *California Travel Impacts 2010-2018p.* http://www.deanrunyan.com/doc_library/CAImp.pdf

DeBeukelaer, S., Miller, C., Moore, T., Kathey, S., Grimmer, K. 2014. *Monterey Bay National Marine Sanctuary (MBNMS) Vessel Traffic Analysis 2009-2012.* https://nmsmontereybay.blob.core.windows.net/montereybay-prod/media/resourcepro/reports/140127mbnms-ais_report.pdf

ESA PWA. 2012. *Evaluation of Erosion Mitigation Alternatives for Southern Monterey Bay.* http://montereybay.noaa.gov/new/2012/erosion.pdf

Horner, Scott. 2005 Intercept Survey, Monterey Bay National Marine Sanctuary Exploration Center, Conceptual Design Phase 1. [Unpublished.] BIOS, LLC.

Lott, D., Bowlby, E., Howard, D., Higgason, K., Grimmer, K., Francis, L., Krop, L., Feely R., Jewett, L. 2011. *National Marine Sanctuaries of the West Coast Ocean Acidification Action Plan.* https://nmssanctuaries.blob.core.windows.net/sanctuaries-prod/media/archive/about/pdfs/wc_onms_plan.pdf

Monterey Bay National Marine Sanctuary. 1996. *MBNMS Site Characterization.* https://montereybay.noaa.gov/sitechar/welcome.html

Monterey Bay National Marine Sanctuary. 2014. *Monterey Bay National Marine Sanctuary Vessel Traffic Analysis: 2009-2012* https://montereybay.noaa.gov/resourcepro/resmanissues/vessels.html

Monterey Bay National Marine Sanctuary. 2015. *MBNMS Summary of Scoping Comments.* https://montereybay.noaa.gov/intro/mp/2015review/documents.html

Monterey Bay National Marine Sanctuary. 2016. *Advisory Council Prioritization Exercises 1 & 3: prioritization of public scoping issues*. https://nmsmontereybay.blob.core.windows.net/montereybay-prod/media/intro/mp/2015review/pdf/160208mpr2015_sac-priorities1.pdf

Monterey Bay National Marine Sanctuary. 1992. Sanctuary Laws & Regulations. Section 922.132. Retrieved from https://montereybay.noaa.gov/intro/mp/regs.html#s922.132

Monterey Bay National Marine Sanctuary. 2019. Technical reports. https://montereybay.noaa.gov/research/techreports/tronms2015.html

Monterey County Agricultural Commissioner's Office. 2017. *Monterey County 2016 Crop Report*. https://www.co.monterey.ca.us/Home/ShowDocument?id=27601

National Marine Sanctuaries Act. 16 U.S.C. §§ 1445b. 2000. *Enhancing Support for National Marine Sanctuaries*. https://nmssanctuaries.blob.core.windows.net/sanctuaries-prod/media/archive/library/national/nmsa.pdf

Preisler, R. K., Wasson, K., Wolff, W. J., & Tyrrell, M. C. 2009. Invasions of Estuaries vs the Adjacent Open Coast: A Global Perspective. *Biological Invasions in Marine Ecosystems Ecological Studies,* 587–617. doi: 10.1007/978-3-540-79236-9_33

Rawls, J. 1984. Indians of California. Norman: University of Oklahoma Press.

Ricketts, E. F., Calvin, J., & Hedgpeth, J. W. 1988. *Between Pacific Tides*. Stanford University Press.

Smith, S.O., Hunter, J. 2003. *Monterey Bay National Marine Sanctuary Submerged Cultural Resources Study: 2001*. https://montereybay.noaa.gov/research/techreports/trsmith2003.html

Section 4:
Appendices

Waves crash near San Simeon. Photo: Robert Schwemmer/NOAA

- Acronyms
- Jurisdictional Authorities
- Management Plan/Condition Report Connections
- Prohibitions, Permitting, and Exceptions

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
CRSMP	Coastal Regional Sediment Management Plan
CSCAPE Ecosystem	West Coast Collaborative Survey of Cetacean Abundance and the Pelagic
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
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	Uncrewed 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

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. Sanctuary staff at MBNMS work 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 resources.

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 nonpoint-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 non-tidal 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 California Coastal Commission (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)

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

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 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 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 the release of hazardous substances.

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 non-indigenous 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 greywater (wastewater that comes from sinks, washing machines, bathtubs, showers, etc.) 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 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.

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:

▲[4] 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/ Distribution	9. Biodiversity	15. Integrity
2. Eutrophic Condition	6. Biologically Structured	11.* Non-Indigenous Species Status	16. Threat to Environment
3. Human Health	7. Contaminants	12. Key Species Status	17. Human Activities
4. Human Activities	8. Human Impacts	13. Key Species Condition	
		14. Human Activities	

*There is no number 10 in the 2015 condition report update

Environment Type	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									▼[2]							
COASTAL EROSION & SEDIMENT MANAGEMENT																
Strategy 1: Track progress on coastal sediment management plans for MBNMS																
Activity CESM-1.3		–[5]				▼[5]										
Strategy 2: **Collaborate on land management plan for CEMEX site**																
Activity CESM-2.1						▼[5]										
Strategy 3: Implement site-specific beach nourishment programs																
Activity CESM-3.1		–[5]				▼[5]										
Activity CESM-3.2		–[5]				▼[5]										
Activity CESM-3.3		–[5]				▼[5]										
Strategy 4: **Safeguard MBNMS from contaminated dredge disposal**																

Environment Type	Estuarine				Nearshore				Offshore				Davidson Seamount			
Activity CESM-4.2		▼[7]				▼[7]										
Strategy 5: Reduce coastal armoring																
Activity CESM-5.2		– [5]				▼[5]										
Strategy 6: Reduce impacts to sanctuary resources due to landslides and subsequent emergency responses																
Activity CESM-6.3		– [5]				▼[5]										
DAVIDSON SEAMOUNT																
Strategy DS-1: Conduct site characterization																
Activity DS-1.1															▲[12]	
Activity DS-1.2															▲[12]	
Activity DS-1.4															? [14]	
Activity DS-1.5														? [7]		
Strategy DS-2: Conduct ecological processes investigations																
Activity DS-2.2															▲[12]	
Activity DS-2.3															▲[12]	
Activity DS-2.4															▲[12]	
INTRODUCED SPECIES																
Strategy IS-1: Manage pathways and promote prevention																
Activity IS-1.1			- [11]				▼[11]				– [11]				– [11]	
Strategy IS-2: Promote early detection and rapid response																
Activity IS-2.1			– [11]				▼[11]				– [11]				– [11]	

Environment Type	Estuarine				Nearshore				Offshore				Davidson Seamount			
Activity IS-2.2			– [11]				▼ [11]				– [11]				– [11]	
Strategy IS-3: Implement eradication or control																
Activity IS-3.1			– [11]				▼ [11]				– [11]				– [11]	
Activity IS-3.2			– [11]				▼ [11]				– [11]				– [11]	
Activity IS-3.3			– [11]				▼ [11]				– [11]				– [11]	
Strategy IS-5: Implement restoration																
Activity IS-5.1			– [9]				– [9]				– [9]				? [9]	
Activity IS-5.2			– [9]				– [9]				– [9]				? [9]	
MARINE DEBRIS																
Strategy MD 1: Assess scope and scale of marine debris																
Activity MD-1.1						▼ [5]				▲ [5]						
Activity MD-1.3						▼ [5]				▲ [5]						
Strategy MD 2: Foster public participation and support policies leading to reduced marine debris focused on plastic pollution																
Activity MD-2.3						▼ [5]				▲ [5]						
Strategy MD 3: Reduce marine debris threats by removing the debris and preventing point source inputs																
Activity MD-3.1						? [8]				▲ [8]						
Activity MD-3.5						▼ [5]				▲ [5]						
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 Type	Estuarine				Nearshore				Offshore				Davidson Seamount			
Activity WQ-1.1	? [3]				▲ [4]											
Activity WQ-1.2	? [3]		? [14]		▲ [4]		▼ [14]		▲ [4]							
Activity WQ-1.4	? [3]				▲ [4]		▼ [14]									
Activity WQ-1.5	? [3]				▲ [4]											
Activity WQ-1.6	? [3]		? [14]		▲ [4]		▼ [14]									
Activity WQ-1.8					▲ [4]				▲ [4]							
Strategy WQ-2: Understand the land-sea connection																
Activity WQ-2.1	? [3]	▲ [8]	? [14]		▲ [4]	▼										
Activity WQ-2.2	? [3]		? [14]		▲ [4]		▼ [14]		▲ [4]							
Activity WQ-2.3	? [3]		? [14]		▲ [4]		▼ [14]		▲ [4]							
Activity WQ-2.4					▲ [4]				▲ [4]							
Activity WQ-2.5					▲ [4]				▲ [4]							
Strategy WQ-3: Quantify effectiveness of management practices																
Activity WQ-3.1	? [3]		? [14]		▲ [4]		▼ [14]									
Activity WQ-3.2	? [3]		? [14]		▲ [4]		▼ [14]									
Activity WQ-3.3	? [3]		? [14]		▲ [4]		▼ [14]									
Strategy WQ-4: Monitor and reduce pollutant loads flowing into MBNMS																
Activity WQ-4.1					▲ [4]											
Activity WQ-4.2					▲ [4]											
Activity WQ-4.4	? [3]		? [14]		▲ [4]		▼ [14]		▲ [4]							

Environment Type	Estuarine				Nearshore				Offshore				Davidson Seamount			
Strategy WQ-5: Promote public engagement and stewardship through citizen science monitoring programs and other WQPP efforts																
Activity WQ-5.1	? [3]				▲ [4]											
Activity WQ-5.2					▲ [4]											
Activity WQ-5.3	? [3]		? [14]		▲ [4]		▼ [14]									
Activity WQ-5.4					▲ [4]				▲ [4]							
Strategy WQ-6: Communicate findings of projects and monitoring conducted by the WQPP																
Activity WQ-6.1	? [3]				▲ [4]											
Activity WQ-6.2					▲ [4]				▲ [4]							
Activity WQ-6.3	? [3]				▲ [4]											
Activity WQ-6.4	? [3]				▲ [4]											
Activity WQ-6.5	? [3]				▲ [4]											
Activity WQ-6.6					▲ [4]											
Activity WQ-6.7					▲ [4]				▲ [4]							
WILDLIFE DISTURBANCE																
Strategy WD-1: Mitigate wildlife disturbance from marine vessels and shore-based activities																
Activity WD-1.1			? [14]				▼ [14]				— [14]					
Activity WD-1.2			? [14]				▼ [14]				— [14]					
Activity WD-1.3			? [14]				▼ [14]									
Activity WD-1.4											— [14]					
Activity WD-1.5			? [14]				▼ [14]				— [14]					

Environment Type	Estuarine				Nearshore				Offshore				Davidson Seamount			
Activity WD-1.6							▼[14]				–[14]					
Activity WD-1.8											–[14]					
Activity WD-1.10							▼[14]									
Strategy WD-2: Mitigate wildlife disturbance from aircraft																
Activity WD-2.2			?[14]				▼[14]				–[14]					
Activity WD-2.3			?[14]				▼[14]									
Activity WD-2.4							▼[14]									
Strategy WD-3: Develop acoustic baseline profiles within MBNMS																
Activity WD-3.2							▼[14]				–[14]				?[14]	
Strategy WD-4: Reduce underwater low-frequency mechanical sound emissions																
Activity WD-4.1							▼[14]				–[14]					
Activity WD-4.2							▼[14]				–[14]				?[14]	
Activity WD-4.3							▼[14]				–[14]					
Strategy WD-5: Use administrative methods to reduce wildlife disturbance																
Activity WD-5.2			?[14]				▼[14]				–[14]					
Strategy WD-6: Use law enforcement resources to reduce wildlife disturbance																
Activity WD-6.1			?[14]				▼[14]				–[14]					
Activity WD-6.2			?[14]				▼[14]				–[14]					
Activity WD-6.4										▲[8]	–[14]				?[14]	
Strategy WD-7: Reduce the risk of wildlife entanglement in fishing gear (working on language with state Dungeness crab working group)																

Environment Type	Estuarine				Nearshore				Offshore				Davidson Seamount			
Activity WD-7.1							▼ 14									
Activity WD-7.3							▼ 14				_ 14					
Activity WD-7.4							▼ 14				_ 14				? 14	
Strategy WD-8: Respond to wildlife entangled in fishing gear																
Activity WD-8.2							▼ 14				_ 14					
PROGRAM BASED ACTION PLANS																
MARITIME HERITAGE																
Strategy MH-1: Inventory and assess submerged sites																
Activity MH-1.1				? 15				? 15				? 15				
Activity MH-1.2				? 15				? 15				? 15				
Activity MH-1.4				? 15				? 15				? 15				
Strategy MH-2: Threat assessment for shipwrecks and submerged structures																
Activity MH-2.1				_ 16				▼ 16				▼ 16				
Activity MH-2.2				_ 16				▼ 16				▼ 16				
Strategy MH-3: Protect and manage submerged archaeological resources																
Activity MH-3.1				_ 17				? 17				? 17				
Activity MH-3.3				_ 16				▼ 16				▼ 16				
RESEARCH & MONITORING																
Strategy RM-1: Characterize biological and physical features in MBNMS																
Activity RM-1.1	? 3	▲ 8	▲ 12		▼ 1	▼ 5			▼ 1	▼ 7			? 1	_ 5		

Environment Type	Estuarine				Nearshore				Offshore				Davidson Seamount			
Activity RM-1.2									▼[1]	▼[7]	_[14]					
Strategy RM-2: Maintain and expand the Sanctuary Integrated Monitoring Network (SIMoN)																
Activity RM-2.1	?[3]	▲[8]	▲[12]		▼[1]	▼[5]	▼[14]		▼[1]	▼[7]	_[14]		?[1]	_[5]	_[13]	
Strategy RM-3: Support science focused on priority sanctuary needs																
Activity RM-3.1	?[3]	▲[8]	▲[12]		▼[1]	▼[5]	▼[14]		▼[1]	▼[7]	_[14]		?[1]	_[5]	_[13]	
Activity RM-3.3													?[1]	_[5]	_[13]	
Activity RM-3.4	?[3]	▲[8]	▲[12]			▼[5]	▼[14]		▼[1]	▼[7]	_[14]		?[1]	_[5]	_[13]	
Activity RM-3.5						▼[5]	▼[14]			▼[7]	_[14]		?[1]	_[5]	_[13]	
Activity RM-3.6		▲[8]	▲[12]			▼[5]	▼[14]			▼[7]	_[14]					
Activity RM-3.7						▼[5]	▼[14]		▼[1]	▼[7]	_[14]					
Activity RM-3.8						▼[5]	▼[14]									
Activity RM-3.9		▲[8]	▲[12]			▼[5]	▼[14]			▼[7]	_[14]		?[1]	_[5]	_[13]	
Strategy RM-4: Facilitate the flow of science information among academic institutions, government agencies, and other institutions																
Activity RM-4.4		▲[8]	▲[12]			▼[5]	▼[14]									
Strategy RM-5: Interpret select technical science information																
Activity RM-5.2									▼[1]	▼[7]	_[14]					
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						?[8]	▼[14]			▲[4]	_[14]			_[5]	?[9]	

Environment Type	Estuarine				Nearshore				Offshore				Davidson Seamount			
Activity RP-1.2						? [8]	▼ [14]			▲ [4]	– [14]			– [5]	? [9]	
Activity RP-1.3	▲ [4]	▲ [8]	? [14]	– [17]	▲ [4]	? [8]	▼ [14]	? [17]	▲ [4]	▲ [4]	– [14]	? [17]	? [4]	? [8]	? [14]	N/A
Activity RP-1.4											– [14]					
Activity RP-1.5						? [8]										
Strategy RP-3: Maintain and enhance permitting and environmental review program																
Activity RP-3.1	▲ [4]	▲ [8]			▲ [4]	? [8]				▲ [4]	– [8]					
Activity RP-3.2	▲ [4]	▲ [8]			▲ [4]	? [8]				▲ [4]	– [8]					
Activity RP-3.4	▲ [4]	▲ [8]			▲ [4]	? [8]				▲ [4]	– [8]					
Activity RP-3.6	▲ [4]	▲ [8]			▲ [4]	? [8]				▲ [4]	– [8]					
Strategy RP-5: Implement enforcement programs																
Activity RP-5.1		▲ [8]	? [14]			? [8]	▼ [14]			▲ [4]	– [14]					
Activity RP-5.5					▲ [4]					▲ [4]						
Strategy RP-7: Coordinate resource protection programs, including interpretive enforcement and citizen science programs																
Activity RP-7.1	▼ [1]		? [14]		▼ [1]		▼ [14]									
Strategy RP-9: Develop and implement restoration and recovery plans to address habitat damages and endangered species																
Activity RP-9.2							▼ [12]									

NATIONAL MARINE
SANCTUARIES

AMERICA'S UNDERWATER TREASURES