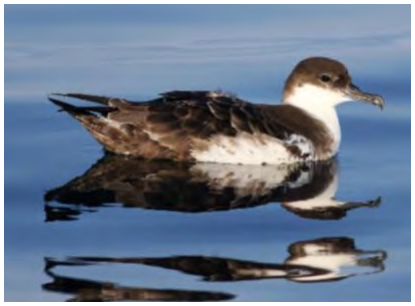
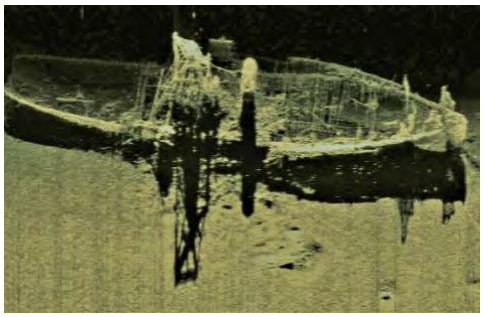
Office of National Marine Sanctuaries
National Oceanic and Atmospheric Administration

Stellwagen Bank National Marine Sanctuary
Draft Management Plan and
Environmental Assessment



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Cover photos (left to right, top to bottom):
A great shearwater sits on the surface of Stellwagen Bank National Marine Sanctuary. Photo: Peter Flood
Passengers on board a commercial whale watch view two humpback whales that surfaced close to the vessel. Photo: Anne Smrcina/NOAA
Two Atlantic white-sided dolphins actively move through and over sanctuary waters. Photo: Keith Ellenbogen
Water falls off the tail of a humpback whale as it dives to depths to feed on small fish in the sanctuary. Photo: Keith Ellenbogen
A blue shark in Stellwagen Bank National Marine Sanctuary feeds on smaller prey but also eats carrion. Photo: Keith Ellenbogen
A side scan image shows the entirety of the wreck of the passenger steamship *Portland*. Photo: Courtesy of MIND Technologies, Inc.
A fisher practices reeling-in technique on board a charter fishing vessel in the sanctuary. Photo: Anne-Marie Runfola/NOAA

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List of Acronyms

ACHP – Advisory Council on Historic Preservation
AIS – automatic identification system
APE – area of potential effect
AUV – autonomous underwater vehicle
BOWW – Boater Outreach for Whale Watching
CCS – Center for Coastal Studies
CEC – contaminants of emerging concern
CEQ – Council on Environmental Quality
CFR – Code of Federal Regulations
DHRA – dedicated habitat research area
DPS – distinct population segment
EFH – essential fish habitat
E.O. – Executive Order
ESA – Endangered Species Act
GARFO – NMFS Greater Atlantic Regional Field Office
GIS – geographic information system
HAB – harmful algal bloom
HAPC – Habitat Area of Potential Concern
LNG – liquefied natural gas
MADMF – Massachusetts Division of Marine Fisheries
MAFMC – Mid-Atlantic Fisheries Management Council
MBDS – Massachusetts Bay Disposal site
MBTA – Migratory Bird Treaty Act
MCZM – Massachusetts Office of Coastal Zone Management
MCL – Maritime Cultural Landscape
MEP – Massachusetts Environmental Police
MHC – Maritime Heritage Coordinator
MHP – Maritime Heritage Program
MMPA – Marine Mammal Protection Act
MOA – Memorandum of Agreement
MOU - Memorandum of Understanding
MSA – Magnuson–Stevens Fishery Conservation and Management Act
MWRA – Massachusetts Water Resources Authority
NARW – North Atlantic right whale
NEFMC – New England Fishery Management Council
NEFSC – NOAA Northeast Fisheries Science Center
NEPA – National Environmental Policy Act
NERACOOS – Northeastern Regional Association of Coastal Ocean Observing Systems
NGO – nongovernmental organization
NHPA – National Historic Preservation Act
NRHP– National Register of Historic Places
NMFS – NOAA National Marine Fisheries Service (NOAA Fisheries)
NMSA – National Marine Sanctuaries Act
NOAA – National Oceanic and Atmospheric Administration
OCM – NOAA Office for Coastal Management
OLE – NOAA Office of Law Enforcement
ONMS – Office of National Marine Sanctuaries
PFAS – Per- and polyfluoroalkyl substances
PTT – Platform Transmitting Terminal

R/V – research vessel
ROV – remotely operated vehicle
S4 – Stellwagen Sanctuary Seabird Stewards
SAC – Sanctuary Advisory Council
SAP – Shipwreck Avoidance Program
SBNMS – Stellwagen Bank National Marine Sanctuary
SHPO – State Historic Preservation Officer
STEM – science, technology, engineering and math
TSS – transportation separation scheme
UAS – unmanned aerial system
URI – University of Rhode Island
USC – United States Code
USCG – U.S. Coast Guard
USEPA – U.S. Environmental Protection Agency
USFWS – U.S. Fish and Wildlife Service
VMS – vessel monitoring system
VTR – vessel trip report
WHOI – Woods Hole Oceanographic Institution

Executive Summary

Introduction

The National Oceanic and Atmospheric Administration's (NOAA's) Office of National Marine Sanctuaries (ONMS) proposes to issue a revised management plan for Stellwagen Bank National Marine Sanctuary (SBNMS or sanctuary). The National Marine Sanctuaries Act (NMSA) directs NOAA to manage national marine sanctuaries and requires the agency to develop and periodically review management plans to guide sanctuary programs to better understand and protect sanctuary resources, and educate the public about the importance of these special places. This draft management plan revises the sanctuary's 2010 management plan and includes 15 action plans to: a) streamline and focus sanctuary management actions, b) align with the goals and objectives in the ONMS Strategic Plan, and c) address emerging issues, like climate change. It also includes an environmental assessment evaluating the potential environmental consequences of implementing a revised sanctuary management plan for SBNMS and conducting field activities to manage the sanctuary over the next five to 10 years.

Stellwagen Bank National Marine Sanctuary

SBNMS is one of the most biologically diverse and productive zones in the Gulf of Maine, and extends from Cape Ann to Cape Cod, encompassing 842 square miles. SBNMS ranges in depth from 65 to 600 feet. The underwater landscape of the sanctuary is a patchwork of banks, basins, and biological features. Within these landscapes are habitats including deep-sea corals, boulder reefs, and shipwrecks. These habitats support over 575 species of invertebrates, fish, seabirds, sea turtles, and marine mammals. This diversity of habitats and marine life is important to local and regional economies as it supports a variety of commercial, recreational, scientific, and educational activities. These activities bring income, jobs, and economic output to the 14 coastal communities adjacent to the sanctuary.

Management Plan Review

This draft management plan for SBNMS was developed as part of a community-based management plan review process that provided numerous opportunities for public input. The review process examined current issues and threats to sanctuary resources and evaluated the extent to which the 2010 management plan met the sanctuary's goals and objectives. The need for this review was based on the several emerging threats to marine resources within SBNMS. Prior to the development of this draft management plan, NOAA completed a report in 2020 that assessed the condition and trends of resources and activities in SBNMS, which concluded that human activities impact habitat, living resources, and maritime heritage resources in the sanctuary in various ways. The condition report also indicated that climate change is impacting all sanctuary resources. The results from the condition report have guided the development of this draft management plan.

Public Scoping

Public scoping for the management plan review yielded feedback that was largely aligned with the 2020 condition report findings. Comments primarily focused on NOAA's need to monitor

and address potential emerging issues such as climate change, changes to water quality, continue and expand protections for sanctuary resources, and to maintain core sanctuary research. Scoping comments also called for enhanced education and outreach efforts and increased capacity to administer sanctuary programs.

All issues identified during the public scoping process have been addressed in this draft management plan.

Opportunity for Input on Draft Management Plan and Environmental Assessment

NOAA will ensure a wide circulation of this draft management plan and environmental assessment to solicit public comments. NOAA will also review comments from federal, state, and local agencies, from organizations, and from interested individuals and include corresponding responses in the final environmental assessment.

Action Plans

This draft management plan contains 15 Action Plans. Below is a brief summary of each Action Plan.

Marine Mammal Protection Action Plan: For 22 species of marine mammals, sanctuary waters serve as the primary habitat for critical activities including feeding and nursing. The sanctuary is also a high-use area for commercial and recreational vessel traffic that can cause disturbance to marine mammals. The goal of this plan is to expand our understanding of the vulnerability of marine mammals to human activities and develop and implement strategies to mitigate and lessen impacts.

Seabird Research Action Plan: The sanctuary's rich waters provide abundant prey, a feeding area, and a migratory passage for many seabird species. Coastal development, predation by humans and other animals, removal of prey through fisheries activity, and marine environment pollution threaten the seabirds in the sanctuary. The goal of this plan is to understand the abundance, distribution, habitat use, bycatch, contaminant load, and foraging ecology of seabirds, and how SBNMS relates to the wider Gulf of Maine and Atlantic ecosystems.

Vessel Traffic Action Plan: SBNMS sits at the entrance of Massachusetts Bay, which experiences commercial vessel traffic traveling to and from the growing Port of Boston. ONMS staff work to mitigate the impacts of the large volume of vessel traffic through technology, reporting, and warnings to the shipping industry. The goal of this plan is to monitor vessel traffic and mitigate negative effects on sanctuary resources.

Maritime Heritage and Cultural Landscapes Action Plan: The sanctuary serves as an underwater museum to maritime history through the protection and interpretation of numerous shipwrecks on the seafloor. The sanctuary's efforts to assess local maritime cultural landscapes through research and management help us understand the relationships between the people and the sea in the past and present. The goal of this plan is to understand the broader context of past and present uses of the sanctuary while assessing and protecting maritime heritage resources in the sanctuary.

Compatible Uses Action Plan: Evolving commercial and recreational uses of the sanctuary impact key elements of the sanctuary's resources and overall landscape. With the tools and resources to assess compatibility, rational management decisions can be made to facilitate long-term resource protection. The goal of this plan is to enhance transparency regarding how current and emerging activities are assessed for compatibility while managing sanctuary resources.

Climate Change Action Plan: Regional impacts of climate change including ocean warming, sea-level rise, changing patterns of precipitation, and increased stormwater runoff are causing a variety of biotic responses with the sanctuary and expected to worsen over the coming decades. Various strategies and efforts for enhanced understanding of climate impacts and synergies will inform decisions on a wide range of sanctuary management, including resource protection, education, and operations. The goal of this plan is to evaluate climate change impacts on sanctuary resources and incorporate changing conditions in management decisions.

Education and Outreach Action Plan: Education is essential to sanctuary management as it is key in facilitating behavior change that directly impacts the state of the resources. A variety of education and outreach programs, tools, and techniques are employed to bring sanctuary information and research to the widest audiences. The goal of this plan is to increase public awareness and understanding of the sanctuary and encourage responsible use and stewardship of its resources.

Interagency/Intergovernmental Coordination Action Plan: NOAA relies on partnerships with other federal, state, regional and local agencies as well as collaborations with non-profit, community, research/academic, and many others, for effective management. Management plan implementation and efficiency will benefit from proactively engaging partners in a directed manner. The goal of this plan is to promote improved management through coordinated partnering with local, state, regional, tribal, and federal partners.

Sanctuary Advisory Council Action Plan: Public involvement is vital to effective sanctuary management. The Sanctuary Advisory Council (SAC) brings together valuable insight from across a diversity of stakeholder groups to develop advice and recommendations to the sanctuary's management on specific management issues affecting the sanctuary. The goal of this plan is to facilitate an active and engaged community of SAC members to advise the superintendent in carrying out the sanctuary's mission.

Research and Monitoring Action Plan: The sanctuary conducts a robust science program to provide vital information to support management needs. The goal of this plan is to support, promote, and coordinate scientific research, characterization, and long-term monitoring to enhance the understanding of the sanctuary environment and processes, and improve management decision-making for optimal resource management and protection.

Soundscape Action Plan: The sanctuary has an extensive acoustics research program that provides opportunities for partnership and leadership in the development of regional, national, and international policies for managing noise impacts on marine life. The goal of this plan is to maintain the role of SBNMS as a sentinel site for passive acoustic monitoring in the Gulf of

Maine, and as a testbed for applying these data to both long-term monitoring of ecosystems and the design of methods to reduce impacts from human activities.

Water Quality Monitoring Action Plan: The exceptional diversity of marine life in the sanctuary depends on healthy water quality. Long-term monitoring is important to assess the long-term trends and various stressors that exist on sanctuary water quality. The goal of this plan is to collaborate on water quality monitoring and research to determine whether the sanctuary can continue to maintain healthy resources.

Habitat Action Plan: Habitat quality in the sanctuary over the last decade has shown changes from both direct interactions, like bottom-contact fishing, and indirect interactions, such as trophic and competitive shifts in population. The goal of this plan is to develop an improved understanding of the condition of major habitat types within the sanctuary to understand their productivity and biodiversity.

Ecosystem Services Action Plan: Sanctuary resources support nearby coastal communities in a variety of ways. It is important to better understand and quantify the economic and intrinsic values of the sanctuary to natural and human systems. The goal of this plan is to explore the dynamic connections between sanctuary resources and ecosystem services to better inform management decisions.

Administration and Infrastructure Capacity Action Plan: Operational needs like resources, staff, funding, facilities, vessels, vehicles, information technology, and compliance with protection measures are needed to make sure the action plans can be supported. The goal of this plan is to provide staff and resources to implement the management plan.

Prioritized Action Plan Implementation

The action plans and strategies in this management plan comprise a body of work, which if fully implemented, requires resources beyond what is currently available to NOAA. Implementation of some action plans depends on a variety of funding scenarios such as grant awards, funding priorities of outside parties, or reliance on partner participation, in addition to federal appropriations. The implementation of various action plans in the management plan may therefore occur at different stages based on a systematic prioritization scheme that assesses urgency, benefit to sanctuary resources, feasibility of implementation and resource availability. This prioritization scheme will be informed by staff input along with input from the Sanctuary Advisory Council, a community-based body that advises the sanctuary superintendent on issues relevant to the effective implementation of the management plan.

Chapter 1: Introduction

The National Oceanic and Atmospheric Administration's (NOAA's) Office of National Marine Sanctuaries (ONMS) proposes to issue a revised management plan for Stellwagen Bank National Marine Sanctuary (SBNMS or sanctuary). This draft SBNMS management plan is the result of a thorough process of public consultation, guidance from the Sanctuary Advisory Council (SAC), review of relevant scientific and professional reports, and staff input. It serves as an overarching framework for sanctuary management and describes the non-regulatory activities the sanctuary staff will undertake in the next five to 10 years. This proposed management plan is intended to streamline and focus sanctuary management actions, and to align with the goals and objectives in the ONMS Strategic Plan (NOAA Office of National Marine Sanctuaries,2017).

The text in this draft management plan provides the mission, goals, objectives, and proposed priority actions. NOAA will update the final management plan activities following public comment and advisory council input on this draft management plan and for consistency with the current needs at the time the final management plan is completed.

NOAA also prepared an environmental assessment which analyzes the potential environmental consequences of implementing the revised management plan and conducting field activities to manage SBNMS, in accordance with the National Environmental Policy Act (NEPA; 42 United States Code (U.S.C.) §§ 4321 *et seq.*). The environmental assessment is found in Chapter 4 of this document.

Anyone interested in learning more about the management plan, environmental assessment, sanctuary policies, or community-based management processes, is encouraged to visit the sanctuary's website[1] or to call the sanctuary office at (781) 545-8026 to request relevant documents or further information.

1.1 National Marine Sanctuary System

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 manages the national marine sanctuaries pursuant to the National Marine Sanctuaries Act (16 U.S.C. §§ 1431 *et seq.*) and implementing regulations (codified at 15 CFR Part 922).

National marine sanctuaries are nationally significant areas set aside for long-term protection, conservation, and management, and are part of our nation's legacy to future generations. They contain habitats of resplendent marine life, kelp forests, coral reefs, whale migration corridors, deep-sea canyons, historically significant shipwrecks, and other important underwater archaeological sites. Each sanctuary is a unique place worthy of special protection. They serve as natural classrooms, cherished recreational spots, and places for valuable commercial activities. NOAA works with diverse partners and stakeholders to promote responsible, sustainable uses

[1] SBNMS website: https://stellwagen.noaa.gov/welcome.html

that ensure the health of our most valued ocean and Great Lakes places. A healthy ocean and Great Lakes is the basis for thriving recreation, tourism, and commercial activities that drive coastal economies.

NOAA fosters public awareness of marine resources and maritime heritage through scientific research, monitoring, exploration, education, and outreach, and works closely with its many partners and the public to protect and manage sanctuaries. NOAA is a leader in marine management through the protection of living marine resources, environmental quality, and maritime heritage, while maintaining recreational and commercial activities that are sustainable and compatible with long-term preservation.

1.1.1 National Marine Sanctuaries Act of 1972

The National Marine Sanctuaries Act (NMSA) of 1972, as amended (16 U.S.C. §§ 1431 *et seq.*) is the legislation governing the National Marine Sanctuary System. The NMSA authorizes the Secretary of Commerce to designate areas of the marine environment with special national significance due to their conservation, recreational, ecological, historical, scientific, cultural, archeological, educational, or aesthetic qualities as national marine sanctuaries.

NOAA manages and protects resources within all national marine sanctuaries, including SBNMS, in accordance with the findings of the NMSA. The NMSA states that NOAA will "improve the conservation, understanding, management, and wise and sustainable use of marine resources" (16 U.S.C. 1431(a)(4)(A)). The NMSA further recognizes that "while the need to control the effects of particular activities has led to enactment of resource-specific legislation, these laws cannot in all cases provide a coordinated and comprehensive approach to the conservation and management of the marine environment" (16 U.S.C. 1431(a)(3)). As a result, NOAA subscribes to a broad and comprehensive management approach to meet the primary objective of resource protection in the NMSA. Strong partnerships among resource management agencies, the scientific community, stakeholders, and the public at-large are needed to achieve the coordination and program integration called for in the NMSA.

A complete version of the NMSA is available.[2]

1.2 Comprehensive Management of Stellwagen Bank National Marine Sanctuary

Designated by Congress in 1992, SBNMS encompasses one of the most biologically diverse and productive zones in the Gulf of Maine (Figure 1.1). Physical habitat and associated factors such as temperature, salinity, and nutrients interact with biological organisms on Stellwagen Bank and in the larger Gulf of Maine to create and sustain the ecosystem. Species such as sand lance act as cornerstones of the food web, supporting whales, fishes, seabirds, and humans alike. These resources, in conjunction with the area's rich histories of coastal life, also help fuel the regional economy and attract thousands of visitors to the sanctuary each year to dive, watch for wildlife, or recreationally fish and boat.

[2] https://sanctuaries.noaa.gov/about/legislation/

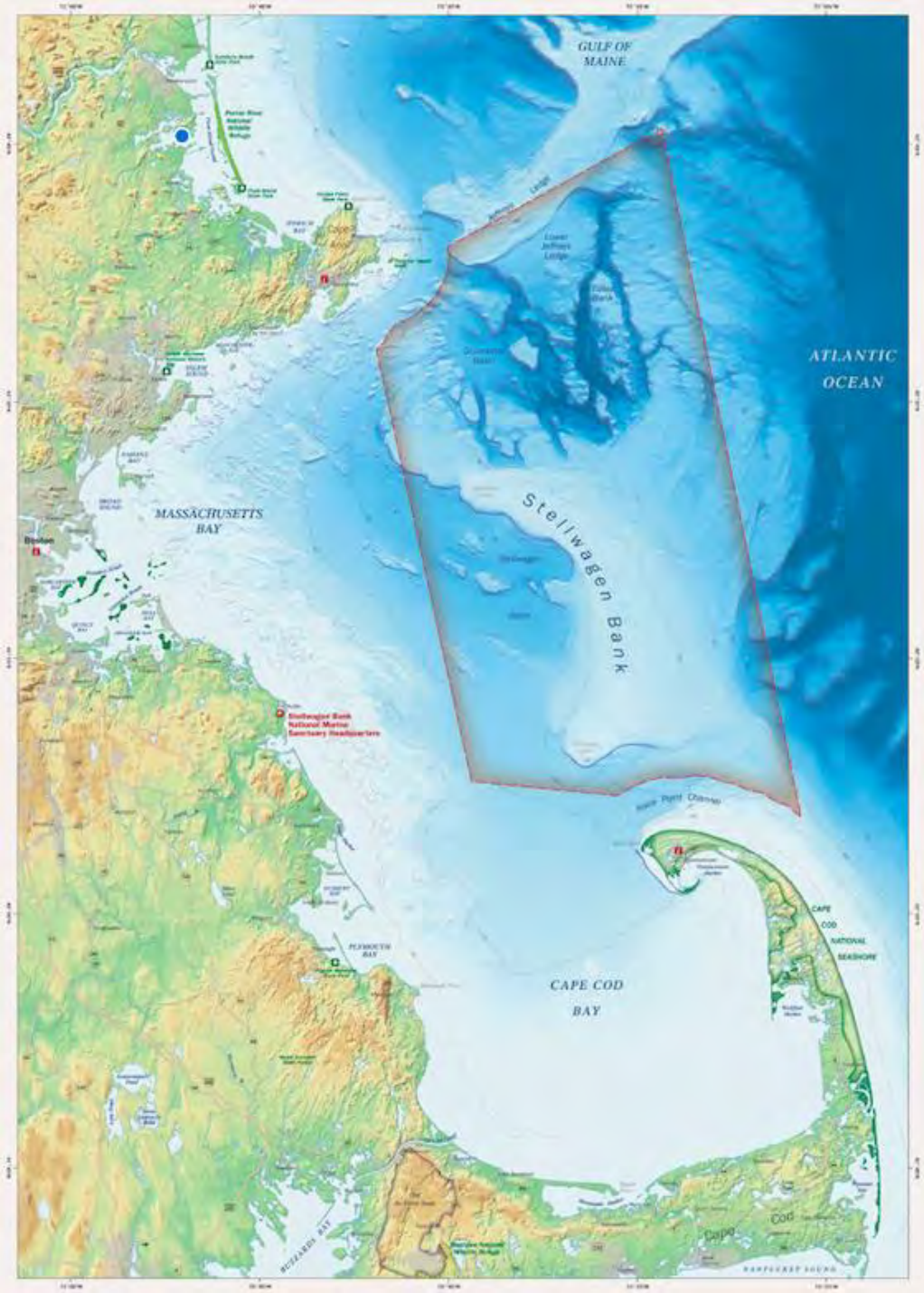

Figure 1.1. Map of Boundary of Stellwagen Bank National Marine Sanctuary

In accordance with NOAA's comprehensive management approach, staff and partners work to conserve, protect, and enhance resources through the issuance of permits, coordination with other local, state, and federal agencies, and strategies and activities related to outreach, education, research, monitoring, resource protection, and enforcement. Field activities can include vessel, aircraft, and scuba diving operations, as well as the deployment of scientific instruments.

The 2010 management plan largely guides current sanctuary programs, however, the need for NOAA to address changing conditions and emerging issues has led to modification of some activities. Specifically, sanctuary staff have adapted their research programs to include seabird tracking and diet studies, long-term acoustics studies, sand lance habitat use, and contaminants of emerging concern. The sanctuary staff have also developed outreach programming for private whale watching and the recreational fishing industry to encourage responsible resource use. Prohibited or otherwise regulated activities in SBNMS are on the sanctuary website or in the Code of Federal Regulations (15 CFR 922, subpart N).[3]

The NMSA requires ONMS to engage in periodic review of management plans to reevaluate site-specific goals and objectives, management techniques, and strategies, and to revise the management plan and regulations as necessary to fulfill the purposes and policies of the NMSA (16 U.S.C. § 1434(e)). NOAA has issued two management plans for SBNMS, one in 1993 and one in 2010. This draft management plan would serve as an update to the sanctuary's 2010 management documents. NOAA's proposed changes to the 2010 SBNMS management plan are based on findings from the Stellwagen Bank National Marine Sanctuary 2020 Condition Report[4] and other relevant literature (NOAA Office of National Marine Sanctuaries (ONMS), 2020).

More information about the sanctuary's background, resources, uses, and management is found on the sanctuary website.

1.2.1 Staff

SBNMS currently has 12 full time staff members, made up of ten federal employees and two contract employees. SBNMS also has several part time employees to staff vessel operations. The superintendent, with assistance from the deputy superintendent, oversees site-specific management functions, including revisions and implementation of the management plan, designating responsibility for implementing specific programs and projects, and maintaining and managing appropriate site facilities and infrastructure. Other staff support program activities in the following areas:

- Management planning
- Resource protection
- Research and monitoring
- Education and outreach
- Site operations and administration
- Vessel operations
- Information technology and data management
- Sanctuary Advisory Council and volunteer coordination

1.2.2 Enforcement

A cooperative mix of officers from federal and state agencies enforce sanctuary regulations. Primary enforcement responsibility rests with the NOAA Office of Law Enforcement (OLE), with

[3] https://stellwagen.noaa.gov/
[4] https://sanctuaries.noaa.gov/science/condition/sbnms/

assistance from U.S. Coast Guard (U.S. Coast Guard), First District, and the Massachusetts Environmental Police (MEP). A NOAA special agent is assigned to the sanctuary as a liaison and is based at the sanctuary's Scituate campus. NOAA's OLE special agents and enforcement officers serve as the primary policing body to enforce sanctuary regulations and to investigate violations of other laws within sanctuary boundaries, including the Magnuson-Stevens Fishery Conservation and Management Act (MSA), the Marine Mammal Protection Act (MMPA), the Endangered Species Act (ESA), and others. The USCG provides on-the-water and aerial surveillance related to maritime safety (including search and rescue), homeland security, national defense and environmental protection (such as fishing, marine mammal harassment, and marine pollution regulations), and also manages the Automatic Identification System (AIS), which has become an integral research tool for the sanctuary. The MEP are cross-deputized to enforce federal environmental laws and sanctuary regulations within the boundaries of the sanctuary even though the entirety of the sanctuary is located outside of Commonwealth waters. A local office of the MEP is co-located within the sanctuary's headquarters in Scituate, Massachusetts.

1.2.3 Permitting

Permits are required in all sanctuaries for conducting activities otherwise prohibited by sanctuary regulations. NOAA may issue permits at SBNMS for activities that will a) have only negligible short-term adverse effects on Sanctuary resources and qualities; b) further research related to Sanctuary resources and qualities; c) further the educational, natural or historical resource value of the Sanctuary; d) further salvage or recovery operations in or near the Sanctuary in connection with a recent air or marine casualty; or e) assist in managing the Sanctuary. To learn more about the permitting process, visit the sanctuary's website[5] or view the sanctuary regulations at 15 CFR § 922.143.

1.2.4 Relationships with Other Agencies and Authorities

NOAA seeks to provide comprehensive and coordinated sanctuary management in ways that complement existing regulatory authorities and shares resources when appropriate. NOAA regularly coordinates actions at SBNMS with other federal agencies such as the National Park Service, the U.S. Geological Survey, the U.S. Coast Guard (USCG), and various regional and state authorities. Cross-agency coordination is particularly important in the context of commercial fishing in New England. The regulation of fishery resources in SBNMS is a collaborative process whereby sanctuary staff work within the framework of the New England and Mid-Atlantic Fishery Management Councils and with NOAA's National Marine Fisheries Service (NMFS) Greater Atlantic Regional Fisheries Office (GARFO) to address sanctuary concerns. To review jurisdictional authorities involved in fisheries management in New England in more detail, view the summary of New England Fisheries management provided in the latest sanctuary condition report.

[5] https://stellwagen.noaa.gov/management/permits.html

1.2.5 Partners

Sanctuary staff regularly collaborate with partners to provide the services and activities necessary to implement the mandates outlined in the NMSA as well as addressing priority management issues of the sanctuary. In addition to federal appropriations, the sanctuary relies on partnerships, appropriate outside funding sources, such as grants and in-kind services, to assist in the implementation of the management plan. These other sources include: the National Marine Sanctuary Foundation (Foundation); federal, state, and local agencies; and nonprofit organizations and private institutions. Partnerships not only facilitate implementation of sanctuary programs and goals, but also help strengthen the community.

1.2.6 Public Participation and the Sanctuary Advisory Council (SAC)

In addition to cooperation with relevant authorities and partners, public involvement in sanctuary management and operations is vitally important and occurs through multiple avenues. Volunteers, citizen scientists, and visitors all help shape sanctuary goals and can facilitate ongoing work. In addition, constituents with an interest in sanctuary management or those who use sanctuary space can get involved in management decisions by participating in the SAC, which holds regular public meetings to advise staff on issues of concern relating to sanctuary management. The SAC's broad expertise and diverse representation helps ensure that a wide range of viewpoints are considered for management decisions.

The charter for the SBNMS SAC was adopted in 2001 and revised in 2007. The council membership consists of 17 non-governmental voting members, 17 alternates, two non-voting youth members, and six governmental ex-officio (non-voting) members. In order to better understand and address specific management issues and broaden public involvement, the SAC may also form a variety of working groups and subcommittees. The full SAC then evaluates the working group and subcommittee recommendations and, in turn, makes their recommendations to the sanctuary superintendent. A list of current and former advisory council members are available.[6]

[6] https://stellwagen.noaa.gov/management/sac/member.html

Chapter 2:
Management Plan Review Process

NOAA developed this draft management plan based on the professional expertise of NOAA staff, public input during the scoping period, and SAC recommendations. In particular, NOAA developed the draft action plans based on SAC recommendations presented at the October 2020 meeting, which included the work of three advisory council subcommittees and one working group.

NOAA's publication of the 2020 SBNMS Condition Report, which frames the notice of intent[7] to conduct management plan review, was the initial step in the management plan review process. Prior to publishing the notice of intent, SBNMS completed an internal review of the 2010 Management Plan by evaluating the status and effectiveness of the existing action plans, and also reviewed the regulations to determine whether any changes were required.

2.1 Purpose of Revising the Management Plan

The purpose of revising the SBNMS management plan is to fulfill the purposes and policies outlined in Section 301(b) of the NMSA (16 U.S.C. § 1431(b)) in order to protect and manage the resources of the sanctuary. As required by Section 304(e) of the NMSA, this management plan review enables NOAA to evaluate the substantive progress toward implementing the current management plan and accomplishing sanctuary goals. This review process also allows NOAA to revise the management plan and regulations as necessary to fulfill the purposes and policies of the NMSA.

A revised sanctuary management plan would enable NOAA staff to utilize best available science and technology to address sanctuary challenges and opportunities. Additionally, a revised management plan would allow NOAA to better articulate its efforts to respond to key findings of the latest sanctuary condition report,[8] to implement new tools to safeguard maritime heritage resources, and to explore innovative management practices to respond to emerging issues in SBNMS, such as climate change.

2.2 Need for the Revising the Management Plan

The need for revising the SBNMS management plan is based on ongoing and emerging threats to marine resources and NOAA trust resources within the sanctuary. The action plans in the 2010 management plan are no longer sufficient to ensure long-term resource protection and ecosystem function into the future because a large percent of the actions identified in the management plan have been completed while new issues and threats have since emerged. This determination of need is based on staff and public input on the current management plan, as well as the findings in the 2020 condition report.

[7] https://www.federalregister.gov/documents/2020/02/13/2020-02832/initiation-of-review-of-management-plan-for-stellwagen-bank-national-marine-sanctuary-intent-to
[8] SBNMS 2020 Condition Report: https://nmssanctuaries.blob.core.windows.net/sanctuaries-prod/media/docs/2020-stellwagen-condition-report.pdf

The 2020 condition report concluded that water quality in the sanctuary is fairly good, but human activities, such as shipping traffic and commercial and recreational fishing, continue to impact habitat, living resources, and maritime heritage resources in the sanctuary in various ways. Data suggest measurable degradation of habitat quality over the past ten years, primarily due to direct impacts of commercial fishing, but also as a result of increasing noise levels that interrupt behavior and communication of many marine species. Degradation of acoustic habitat is of particular concern for focal species in the sanctuary such as humpback whales and the critically endangered North Atlantic right whales (NARW), which already face threats from entanglement and being struck by vessels. In addition to adverse impacts on whales and other important focal species, incidental contact from fishing gear has impacted nearly every maritime heritage resource in SBNMS, reducing their historical, archaeological, scientific, or educational value.

The 2020 condition report identified climate change impacts in SBNMS as a cross-cutting issue for sanctuary resources. More robust monitoring of climate change effects and ocean acidification conditions in SBNMS is necessary to understand local and regional trends, seasonal fluctuations, and the possible ramifications for food web dynamics, water quality, shell-forming invertebrates, coastal communities, and the larger ecosystem. More detailed information about the status of sanctuary resources and pressures is in the latest condition report.

Public scoping for the management plan review yielded feedback that was largely aligned with the 2020 condition report findings. Comments primarily focused on the need to monitor and address potential emerging issues such as climate change and changes to water quality, to continue and expand living and non-living resource protection, and to maintain core sanctuary research. Scoping comments also called for enhanced education and outreach efforts and increased capacity to administer sanctuary programs.

An updated management plan is necessary to address these new issues and threats and identified in the 2020 condition report and through the public scoping process. A revised management plan will more accurately reflect current strategies for management decisions, address site specific needs, and ensure continued research, exploration, restoration, and education related to the nationally significant ocean resources in the sanctuary. This work is critical for assessing changes occurring in the environment, fostering a stewardship ethic, and developing a better understanding of the ecosystem services sanctuary resources provide for communities throughout New England.

2.2.1 What We have Learned Since the Condition Report

Although the latest sanctuary condition report was published in 2020, the content was largely based on data from 2018 and earlier, due to the extensive timeline for compilation, peer-review and final preparation. Therefore, there is a substantial body of new work by sanctuary staff and colleagues across the region which has significantly increased our understanding of the sanctuary ecosystem. A summary of this research is provided in State of the Science Report: An Addendum to the Stellwagen Bank National Marine Sanctuary 2020 Condition Report (Silva, 2021). Some of the more pertinent findings from this recent research are as follows:

- Climate change: Climate driven changes are rapidly restructuring the Gulf of Maine ecosystem, with extensive changes expected by 2050 (Pershing et al., 2019). Increasing temperatures and associated changes in oceanography, species distributions and ranges, and community structure suggest that the Gulf of Maine is shifting from a subarctic temperate system to a warm temperate system (Pershing et al., 2019; Friedland et al., 2020).
- Sand lance: Work by Suca et al. (2021) suggests projected decreases in the zooplankton *Calanus finmarchicus* availability in the Gulf of Maine may negatively impact sand lance body condition and reproduction which may have important implications for predators and ecosystem structure in SBNMS.
- Forage fish: Modeling projections suggest that the Northeast Shelf ecosystem will be in a state of low adult abundances of the two most dominant lipid forage fish (sand lance and herring) for much of the 21st century which would result in major changes to the forage fish complex and food web of the Northeast Shelf.
- Zooplankton: Increased winter and spring abundance of *Calanus finmarchicus* in the Western Gulf of Maine continues to buffer against general declines in the rest of the Gulf particularly in the eastern portion.
- Right whales: Entanglements and vessel strikes are reducing NARW reproductive success (Moore et al., 2021). Work by Pace et al. (2020) on cryptic or unobserved mortality of NARW suggests that entanglement mortality is widely underestimated which has implications for the population trajectory and should be considered in management strategies.
- Humpback whales: While the population in the Gulf of Maine has been slowly increasing since 2009, a study by Hill et al. (2017) indicate prevalent vessel-related injuries to humpbacks in and around SBNMS with 14.7% of individuals showing injuries consistent with one or more vessel strikes. This work suggests that current surveillance and enforcement in SBNMS are inadequate to protect humpback whales from vessel strikes and supports the need for increased on-the-water education such as through SBNMS's Boater Outreach for Whale Watching (BOWW) program.
- Noise: Haver et al. (2019) provide baseline soundscape information and comparisons for three U.S. National Parks and SBNMS using acoustic data collected as part of the Noise Reference Station Network (Haver et al.' 2018). SBNMS had the highest sound levels of all sites, mainly attributable to year-round vessel traffic and seasonal weather patterns, with increased sound levels in winter and spring due to wind and storms.

2.3 Public Scoping

NOAA published a notice of intent to conduct scoping and prepare an environmental analysis (85 FR 8213[9]) on February 13, 2020. NOAA planned to hold three public comment meetings, but had to cancel them due to the Covid-19 pandemic, and instead hosted a virtual public comment meeting on March 31, 2020. Members of the public or organizations submitted

[9] See Federal Register website: https://www.federalregister.gov/documents/2020/02/13/2020-02832/initiation-of-review-of-management-plan-for-stellwagen-bank-national-marine-sanctuary-intent-to

scoping comments on the SBNMS management plan review at the scoping meeting or electronically online via the e-Rulemaking web portal at www.regulations.gov[10] (Docket ID NOAA-NOS-2020-0003). NOAA posted any comments not received electronically to the e-Rulemaking portal, thereby assembling all the scoping comments into the electronic docket for public viewing. NOAA received 33 comments, of which 4 comments were either clear duplicates (100%) or near duplicates (80%), rendering the total amount of individual comments as 29 comments. The majority (20) of comments were submitted by private citizens; others were submitted by government partners (five), user groups (one), and conservation groups (three).

Input from the public scoping process identified 13 topic categories that NOAA should address in the revised management plan, including:

1. Education and Outreach
2. Science, including citizen science
3. Administration and Operations
4. Noise: Better understanding and monitoring of sanctuary soundscape
5. Maritime Heritage: Increase management, e.g., mitigate fishing and diving impacts.
6. Interagency Cooperation: Increase engagement with NMFS and other partners in fisheries management process.
7. Water Quality: Increase protection, e.g., no dumping zone, monitoring, and emerging contaminants.
8. Climate Change: Increase characterization, monitoring and research to understand impacts.
9. Compatible Uses: Better define compatibility and manage uses, e.g., offshore wind
10. Living Resources: Manage and protect living resources, including marine mammals, sea birds, and other marine life.
11. Regional Role: Increase engagement in regional (i.e., Gulf of Maine) conservation
12. Vessel Traffic: Mitigate interactions with marine life.
13. Ecosystem Services: Improve understanding of ecosystem services, e.g., consumptive recreation.

2.4 Identification of Consulting Parties Under Section 106 of the National Historic Preservation Act

NOAA utilized the NEPA scoping process to identify consulting parties and solicit public comment to inform its consultation under Section 106 of the National Historic Preservation Act (NHPA).

In response to the February 13, 2020, notice of intent, NOAA received one comment specific to Section 106 from the Naval History and Heritage Command expressing their interest in ongoing collaboration with NOAA regarding maritime heritage resources and interest in further consultation regarding any sunken military craft that may be located within the boundaries of SBNMS. NOAA will continue to include the Naval History and Heritage Command as a consulting party.

[10] E-Rulemaking website: https://www.regulations.gov/

NOAA has initiated consultation with the Massachusetts Historical Commission (MHC) and provided notification to the MHC and Advisory Council on Historic Preservation (ACHP) that it intends to use the NEPA process to fulfill its NHPA Section 106 review obligations in lieu of the procedures set forth in 36 CFR 800.3 through 800.6, as allowed under the regulations at 800.8. NOAA will additionally invite federally recognized tribes to participate as consulting parties.

NOAA will continue to solicit public comment through issuance of the notice of availability for the draft management plan and environmental assessment which includes proposed conditions to avoid any adverse effects of the undertaking on historic properties, as described in this environmental assessment.

2.5 Identifying Issues and Topics for Draft Action Plans

ONMS staff used the input from the scoping meetings, along with a review of the status of activities from the 2010 sanctuary management plan, data gaps identified in the latest condition report, staff input regarding ongoing projects and new priorities, to develop a list of 17 potential action plans. The SBNMS SAC then provided recommendations to the sanctuary superintendent on proposed activities to include in the revised management plan.

The SAC established three subcommittees and one working group to review specific issue areas (Research and Monitoring, Education and Outreach, Interagency Coordination, and Maritime Heritage) and provide recommendations on strategies to include in the revised management plan. Each subcommittee/working group met multiple times over two months, and presented their recommendations at the SBNMS SAC meeting on October 21, 2020. ONMS staff used the SAC recommendations to draft full action plans. They also combined several recommendations to facilitate improved focus on priorities and reduce duplication, resulting in the current 15 action plans in the draft management plans. After sanctuary staff incorporated SAC input into draft Action Plans, the subcommittees and working group each reviewed and provided feedback on the draft Action Plans.

The content and structure of the draft management plan reflect the structure and priorities identified in the 2017 ONMS Strategic Plan. This highlights the clear connections between SBNMS priorities and those of ONMS and NOAA, specifically

- Ensuring a thriving sanctuary
- Increasing support for the sanctuary
- Deepen our understanding of SBNMS; and
- Ensuring coordinated support for sanctuary infrastructure, staff, and field operations.

NOAA staff considered the following list of questions when evaluating what to include in the revised management plan:

- Does ONMS have the institutional responsibility and/or authority to address this issue pursuant to the NMSA? What is the best agency to address this issue?
- Does addressing this issue have positive site benefits to natural resources/ecosystem, cultural resources, habitat protection, protection of biodiversity, or resolving user conflicts of the sanctuary?

- What is the urgency of this issue/problem?
- What is the feasibility of addressing the issue, in terms of labor, funding, etc.
- Would the action meet the purpose and need of the proposed action?
- What issues were identified in the 2020 condition report that can be addressed through strategies and actions in the draft management plan?

NOAA identified the following new environmental concerns, which are not addressed in the current sanctuary management plan, and need to be addressed in new action plans in the revised sanctuary management plan:

- shifting species use of habitats in response to climate change
- evaluating emerging issues including offshore wind energy
- better characterization of sanctuary soundscape
- seabird research and monitoring
- improved understanding of the role of sanctuary in regional ecosystem services.

NOAA also identified the following environmental concerns and management topics to address through revisions to existing action plans in the current sanctuary management plan:

- improved water quality monitoring
- developing and implementing new outreach programs
- implementing new programs to reduce impacts to maritime heritage resources
- improve coordination and collaboration with agencies and other partners
- ongoing research into marine mammal behavior and use of the sanctuary

NOAA designed each new or revised action plan to address a priority management issue identified during the public input phase and NOAA's internal analysis of management priorities and progress toward implementing the current sanctuary management plan. All of the topics identified through public scoping are addressed in some manner in the draft revised sanctuary management plan. NOAA is not proposing any changes to the current regulatory regime for the SBNMS at this time because the present management of the sanctuary and its resources do not warrant specific regulatory changes. However, NOAA will consider adding or modifying regulations in the future if doing so would enhance the protection and management of the sanctuary. NOAA would undertake any regulatory changes through a formal rulemaking process that includes public input and development of appropriate NEPA documentation.

2.6 Opportunity for Input on Draft Management Plan and Environmental Assessment

To gather public comments, NOAA will post[11] the draft management plan and environmental assessment, distribute copies of the documents to stakeholders and other interested parties, and publish a Notice of Availability in the Federal Register to invite comment. NOAA will accept comments electronically through the e-Rulemaking web portal,[12] by mail, and during public

[11] https://stellwagen.noaa.gov/management/2020-management-plan-review/
[12] https://www.regulations.gov/

meetings. During the public comment period, NOAA will solicit comments from federal, tribal, state, and local agencies and officials, from organizations, and from interested individuals.

After the public comment period is over, NOAA will review all comments received and will include a summary of these comments and the corresponding responses in the final environmental assessment. As needed, NOAA will update the draft management plan and environmental assessment, based on the public comments received. If NOAA moves forward with a final agency action, NOAA will publish a final management plan, final environmental assessment, and a finding of no significant impact (provided that the final environmental assessment finds no significant impacts from the proposed action).

Chapter 3:
Draft Management Plan

NOAA proposes to implement a revised sanctuary management plan that would serve as an overarching framework for sanctuary management and would outline the activities the sanctuary would undertake in the next five to-10 years. The management plan provides strategic guidance for management actions in alignment with its mission and vision statements.

Mission

We conserve, protect, and enhance the biological diversity, ecosystem services, and cultural legacy of Stellwagen Bank National Marine Sanctuary. Science, innovation, partnerships, and public engagement guide our work.

Vision

We strive for a productive sanctuary that protects nature's diversity and bounty, respects sustainable human activities, and advances ocean stewardship.

Action Plans

As a result of the public scoping process and internal prioritization exercises, NOAA determined that the revised sanctuary management plan would outline actions and activities aiming to accomplish one or more of the following goals:

- Goal 1: Ensuring a thriving sanctuary
- Goal 2: Increasing support for the sanctuary
- Goal 3: Deepen our understanding of SBNMS
- Goal 4: Ensuring coordinated support for sanctuary infrastructure, staff, and field operations

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, and a brief background of the issue, a series of strategies articulating what needs to be implemented, and the various steps (activities) in the program or project.

This draft management plan consists of 15 action plans describing 76 strategies. Because of the interrelated nature of sanctuary management, many of the activities are referenced in more than one action plan (e.g., science to support sanctuary management is part of strategies MP-4, SR-1, RM-1, IC-5, and CC-3); a list at the end of each action plan identifies these major connections.

GOAL 1: ENSURE A THRIVING SANCTUARY

Effective management is essential to protecting marine ecosystems, cultural resources, and the benefits each provides to this and future generations. SBNMS faces a range of ongoing and emerging challenges and the action plans in this goal are intended to continue and increase our capacity to protect and manage sanctuary resources.

Objective 1.1: Reduce threats to key species and marine habitats

Marine Mammal Protection Action Plan

Action Plan Goal: Understand the vulnerability of marine mammals to human activity, and if needed, develop and implement mitigation activities.

Background: The marine mammal fauna of SBNMS are diverse and have significant ecological, aesthetic, and economic value to the communities of New England. There are 22 species of marine mammals in the sanctuary (NOAA Office of National Marine Sanctuaries, 2010). For many of these species, some of which are threatened or highly endangered, waters of the sanctuary serve as primary habitat for critical activities that include feeding and nursing. The sanctuary is a high-use area for commercial and recreational vessel traffic that can cause disturbance to or collide with whales, and some gears used in commercial fisheries in the sanctuary present entanglement risks.

Findings from the 2020 condition report provide strong rationale for proactive management of marine mammals in the sanctuary. Fishing effort reduction and gear modifications have been implemented to reduce bycatch of small marine mammals and to attempt to reduce serious injury and mortality of large whales. Increasing noise levels and associated impacts to some marine mammals have been documented in the sanctuary. Efforts to mitigate noise impacts and ship strikes are underway.

The strategies in this draft management plan continue and enhance the support of monitoring, mitigating, and preventing ship strikes, entanglement, and noise disturbance. These strategies will maintain, build, and expand current projects and partnerships. The goal of this plan is to expand our understanding of the vulnerability of marine mammals to anthropogenic activity, and develop and implement mitigation activities.

Figure 3.1. A gray seal peeks its head out of the water in Stellwagen Bank National Marine Sanctuary. Photo: Matt McIntosh/NOAA

Figure 3.2. Humpback whale bursts through the surface with its mouth open while feeding in Stellwagen Bank National Marine Sanctuary. Photo: NOAA

Strategy MP – 1: Continue projects to inform ship strike, entanglement, and response to noise

- Activity MP 1.1: Continue investigations into the underwater behavior of whales via acoustic and video tagging programs.
- Activity MP 1.2: Expand marine mammal species being investigated via acoustic and video tagging programs.
- Activity MP 1.3: Continue Right Whale Corporate Responsibility project (see Strategy VT-2).
- Activity MP 1.4: Map shipping activity in SBNMS.
- Activity MP 1.5: Continue Sanctuary Sound (SanctSound) monitoring project.
- Activity MP 1.6: Continue and expand Whale Alert software application (see Strategy VT-1).
- Activity MP 1.7: Acquire a small, twin-engine boat equipped for large whale tagging activities and to support other sanctuary missions (see MP 5.2).

Strategy MP – 2: Support research into entanglement prevention

- Activity MP 2.1: Develop methods to identify when and where entanglements occur.
- Activity MP 2.2: Collaborate with NOAA Northeast Fisheries Science Center (NEFSC) to identify bycatch of protected whales, seabirds, turtles, and fish.
- Activity MP 2.3: Collaborate with NMFS, the fishing industry, and non-governmental organizations (NGOs) to develop, test, and evaluate buoyless gear and showcase examples of successful gear adaptation.
- Activity MP 2.4: Collaborate with the Center for Coastal Studies to investigate the use of seabirds (great shearwaters) to dynamically identify areas of entanglement risk to humpback whales.
- Activity MP 2.5: Partner with the commercial fishing industry and advocate for the development of fishing equipment and techniques that reduce derelict gear.
- Activity MP 2.6: Develop a program for the removal of marine debris on shipwrecks that pose an entanglement danger to marine mammals.

Strategy MP – 3: Continue to provide guidance to, and involvement with, federal and state agencies designed to reduce entanglement and whale strikes

- Activity MP 3.1: Maintain appointment to the U.S. Right Whale Recovery Team's Northeast Implementation Team.
- Activity MP 3.2: Maintain appointment to the Atlantic Large Whale Take Reduction Team.
- Activity MP 3.3: Maintain appointment to the Harbor Porpoise Take Reduction Team.
- Activity MP 3.4: Participate in other whale conservation teams as appropriate.

Strategy MP – 4: Continue and expand projects designed to understand top predator ecology, including drivers of abundance and distribution of marine mammals

- Activity MP 4.1: Continue and expand programs to investigate relevant forage species.
- Activity MP 4.2: Expand the use of acoustic and imaging technologies to understand distribution.
- Activity MP 4.3: Continue and expand programs to understand oceanographic aspects of top predator ecology.

Strategy MP – 5: Expand Boater Outreach for Whale Watching program to reach more private boaters

- Activity MP 5.1: Secure adequate funding to train personnel and increase the number of BOWW trips.
- Activity MP 5.2: Obtain smaller vessel to use for BOWW program.
- Activity MP 5.3: Explore potential coordination with boating insurance companies.
- Activity MP 5.4: Explore potential coordination with harbormaster organizations.

Related strategies from other action plans

- Interagency/Intergovernmental Coordination IC-1: Promote high-level consistent regional coordination
- Seabird Research SR-4: Investigate seabirds as tool for dynamic ocean management
- Vessel Traffic VT-1: Maintain and update WhaleAlert
- Vessel Traffic VT-2: Continue Right Whale Corporate Responsibility project
- Vessel Traffic VT-3: Continue modeling vessel speed
- Maritime Heritage and Cultural Landscapes MH-2: Shipwreck Avoidance Program
- Research and Monitoring RM-3: Characterize the sanctuary's biological and physical features

Potential Partners

Syracuse University, University of California-Santa Cruz, Stanford University, Griffith University (Australia), University of Denmark, National Marine Fisheries Service, Massachusetts Division of Marine Fisheries, Massachusetts Lobstermen's Association, New England Fishery Management Council, Center for Coastal Studies, Oregon State University, Woods Hole Oceanographic Institution, Moss Landing Marine Laboratory, Whale Center of New England, Ocean Alliance, International Fund for Animal Welfare, The Volgenau Foundation.

Seabird Research Action Plan

Action Plan Goal: Understand the abundance, distribution, habitat use, and foraging ecology of seabirds, and their connection with the wider Gulf of Maine and Atlantic ecosystems.

Background: SBNMS supports foraging activity for 53 species of seabirds, dominated by gulls, terns, storm petrels, gannets, auks (alcids), sea ducks, and shearwaters. SBNMS is named an Important Bird Area by Massachusetts Audubon in concert with BirdLife International. The

sanctuary's rich waters provide abundant prey for many species and serve as a feeding area for gulls, terns, storm petrels, auks, and shearwaters and a migratory passage area for gannets, jaegers, and sea ducks. The main threats to seabirds are coastal development, predation by humans and other animals, removal of prey through fisheries activity, and marine environment pollution.

Seabirds are top ocean predators and demonstrated ecological indicators; their unique life history characteristics position them as valuable sentinels for monitoring changes in the marine environment. Their highly mobile nature enables them to respond quickly to changing environmental conditions over large spatial scales and their top position in food webs means their location may indicate areas of high ocean productivity.

NOAA has been studying seabird ecology since 2012, with most effort focused on the great shearwater. Research to date has focused on great shearwater habitat use, foraging ecology, contaminant levels, and bycatch, and involves at-sea captures of birds, sampling, tagging, as well as necropsy of bycaught and stranded birds. A combination of satellite telemetry, diet information (fecal samples), and demographic information (molt scores, gonadal development) shows that great shearwater habitat use overlaps with sand lance habitat, sand lance are the primary prey in the Gulf of Maine, and that SBNMS and the Gulf of Maine serve as a winter "nursery" for juvenile great shearwaters (Powers et al., 2017; 2020). Additional research has demonstrated successful use of stable isotopes to examine great shearwater diet (Hong et al., 2019) and documented contaminant loads in bycaught birds (Robuck et al., 2020). Further, satellite telemetry data has been used to identify areas of high bycatch risk (Hatch et al., 2015).

Due to the high occurrence of great shearwaters in SBNMS, continued monitoring of their ecology is important for tracking changes in the environment and sanctuary ecosystem over time. There is also a need to answer unknown questions about migration patterns and timing, habitat use and foraging ecology of adult great shearwaters, and bycatch risk reduction. The use of tagged great shearwaters is a potential tool for dynamic ocean management (management that changes over space and time in response to near real time data). Further, great shearwaters are one of four shearwater species that use SBNMS and NOAA lacks data on all other species.

The goal of this plan is to understand the abundance, distribution, habitat use, bycatch, contaminant load, and foraging ecology of seabirds, and how SBNMS relates to the wider Gulf of Maine and Atlantic ecosystems. The strategies within this action plan continue, strengthen, and investigate research in those areas.

Figure 3.3. Common eiders fly together over the ocean in Stellwagen Bank National Marine Sanctuary. Photo: Peter Flood/NOAA

Strategy SR – 1: Identify habitat use of seabirds

- Activity SR 1.1: Conduct monthly standardized surveys using Stellwagen Sanctuary Seabird Stewards (S4) methodology.
- Activity SR 1.2: Maintain and expand vessel of opportunity sightings program.
- Activity SR 1.3: Maintain great shearwater Platform Transmitting Terminal (PTT) or "satellite tag" program.
- Activity SR 1.4: Expand PTT program to include additional species.
- Activity SR 1.5: Examine seabird habitat use patterns relative to changing environmental conditions.
- Activity SR 1.6: Use PTT data to investigate age related differences in habitat use.

Strategy SR – 2: Understand foraging ecology of seabirds

- Activity SR 2.1: Continue to capture shearwaters for stable isotope and fecal analysis of food habits.
- Activity SR 2.2: Expand species captured for stable isotope and fecal analysis of food habits.
- Activity SR 2.3: Survey the abundance, distribution, and nutritional quality of prey species.
- Activity SR 2.4: Examine how changes in prey base impact seabirds relative to changing environmental conditions.

Strategy SR – 3: Understand contaminant loads in seabirds and marine mammals

- Activity SR 3.1: Use bycaught seabirds obtained from NMFS for tissue analysis of contaminants and to investigate plastics ingestion.
- Activity SR 3.2: Investigate the contaminant loads in marine mammals.

Strategy SR – 4: Investigate the use of seabirds as a tool for dynamic ocean management (management that changes in space and time based on near real-time data)

- Activity SR 4.1: Collaborate with Center for Coastal Studies in Provincetown, Massachusetts to combine great shearwater and humpback whale data sets to investigate spatial and temporal co-occurrence.

Strategy SR – 5: Investigate seabird bycatch to better understand population dynamics and commercial fisheries interactions

- Activity SR 5.1: Use NMFS observer database to quantify seabird bycatch.
- Activity SR 5.2: Combine PTT data and fishery dependent data to identify areas of increased risk for seabird bycatch.
- Activity SR 5.3: Leverage research findings to work with partners and the NEFMC (and Mid-Atlantic Fisheries Management Council (MAFMC) and Atlantic States Marine Fisheries Commission as appropriate) to address bycatch.

Strategy SR – 6: Understand seabird use of SBNMS relative to wider Gulf of Maine and Atlantic Ecosystems

- Activity SR 6.1: Use PTT data from the great shearwater and other seabird species to understand how individuals in and around SBNMS use the Gulf of Maine and other ocean areas.
- Activity SR 6.2: Collaborate with other scientists throughout the Gulf of Maine and Atlantic Ocean on seabird habitat use and ecology.

Related strategies from other action plans

- RM-1: Support science focused on priority sanctuary needs
- RM-2: Implement coordinated data management
- RM-3: Characterize the sanctuary's biological and physical features
- WQ-1: Support ongoing long-term water quality monitoring
- IC-1: Promote high-level, consistent regional coordination
- MP-3: Continue to provide guidance to reduce entanglements and whale strikes

Potential Partners

Boston University, University of Rhode Island, Long Island University, National Marine Fisheries Service, U.S. Fish and Wildlife Service, U.S. Geological Survey, Bureau of Ocean Energy Management, Center for Coastal Studies, Cornell University, commercial whale watching vessels, The Volgenau Foundation, and the NOAA National Seabird Program.

Vessel Traffic Action Plan

Action Plan Goal: Monitor vessel traffic and mitigate negative effects on sanctuary resources.

Background: SBNMS sits at the entrance to Massachusetts Bay, which experiences commercial vessel traffic traveling to and from the Port of Boston. Growth in the Port of Boston continues to be accompanied by increases in large vessel traffic transiting through the sanctuary. The designated Transportation Separation Scheme (TSS; an area that is highly regulated in terms of ship navigation) for Boston passes through SBNMS in a roughly east-west direction. Numerous types of domestic and foreign-flagged vessels use these designated shipping lanes, including container ships (some with hazardous materials), liquefied natural gas and oil tankers, and barges, as well as an increasing number of cruise liners. AIS ship traffic data indicate that many vessels comply with the use of designated shipping lanes; however, such compliance is not mandatory. Therefore, commercial vessel traffic occurs throughout the sanctuary, especially coastal traffic not heading into the Port of Boston. In addition to vessels headed to ports, there are several other sources of vessel traffic throughout the sanctuary, including commercial and recreational fishing, research, military, seasonal whale watching, and recreational boating.

The large volume of vessel traffic has several potential impacts to the sanctuary, including discharges of pollutants, introduction of invasive species via bilge water discharges, noise impacts to marine mammals and fish, and increased risk of ship strikes in the sanctuary. Despite these concerns, the condition report indicates that water quality is good. Mitigation measures created by NOAA include WhaleAlert, an app that helps reduce the chance of fatal ship strikes by large vessels by displaying active whale management areas, required reporting areas, recommended routes, and near real-time warnings in shipping lanes along both coasts of the United States. This information allows vessel operators to avoid collision with whales by slowing down and heightening their visual awareness. The Right Whale Corporate Responsibility program also tracks compliance with slow speed (<10 knots) seasonal management areas and acknowledges top performers. The strategies within this action plan monitor the vessel traffic and associated consequences within the sanctuary.

Figure 3.4. Pod of humpback whales surfacing near a cargo ship. Photo: NOAA, under NOAA Fisheries Permit #981-1707-00

Strategy VT – 1: Maintain and update Whale Alert data, technology, and infrastructure

- Activity VT 1.1: Develop long term maintenance plan for the acoustic buoy monitoring system in the Boston TSS with Excelerate Energy and other partners.
- Activity VT 1.2: Transition Whale Alert from innovation to enterprise operation by fully funding program management, information, and software updates along with addressing data management issues.

Strategy VT – 2: Continue Right Whale Corporate Responsibility program

- Activity VT 2.1: Use AIS and geographic information system (GIS) technologies to evaluate mariner compliance with seasonal management areas in the sanctuary and provide report cards to ships and companies transiting the areas.
- Activity VT 2.2: Provide certificates of corporate responsibility to ships and companies whose commitment levels were evaluated to be A+ or A.

Strategy VT – 3: Continue modeling vessel speed and lethality and analyzing ship strikes

- Activity VT 3.1: Model vessel use and whale behavior to provide peer-reviewed scientific guidance to NOAA about ways to alter vessel use to better protect whales and minimize ship strikes.

Strategy VT – 4: Monitor impacts to the sanctuary from vessels and associated uses to provide project-specific mitigation recommendations and support international shipping noise reduction efforts

- Activity VT 4.1: Coordinate with relevant agencies and industry partners to design and implement vessel monitoring projects.

Strategy VT – 5: Monitor vessel traffic using all available data (i.e., AIS, vessel monitoring system (VMS), vessel traffic report (VTR)) in order to understand patterns of use and potential impacts on resources

- Activity VT 5.1: Acquire, process, and evaluate vessel traffic each year from multiple federal and state partners (USCG, U.S. Department of Transportation, NMFS, and MADMF), building on existing data processing efforts where possible.

Related strategies from other action plans

- MP-1: Continue projects to inform ship strike, entanglement and response to noise
- SR-1: Identify habitat use of seabirds
- RM-2: Implement coordinated data management
- RM-3: Characterize the sanctuary's biological/physical features
- SS-1: Maintain low frequency monitoring station
- SS-2: Maintain three "SanctSound" stations
- SS-4: Use status and trend information to monitor indicators of human-induced noise influence
- WQ-1: Support ongoing long-term water quality monitoring efforts
- WQ-7: Monitor major sources of contaminant discharge into or near sanctuary water
- AD-8: Maintain an effective enforcement program

Potential Partners

Bay of Fundy Tidal Energy, Boston Harbor Pilots Association, Channel Islands Cetacean Research Unit, Cornell University, University of New Hampshire/Center for Coastal and Ocean Mapping, Conserve IO, U.S. Department of Transportation, Excelerate Energy, EOM Offshore, Green Marine, International Fund for Animal Welfare, Marine Mammal Commission, Massachusetts Port Authority, Massachusetts Division of Marine Fisheries, Massachusetts Environmental Police, National Park Service, New England Aquarium, NOAA Office of Law Enforcement, National Marine Fisheries Service, Ørsted, ProtectedSeas, Point Blue Conservation Science, University of Massachusetts School of Marine Science and Technology, U.S. Coast Guard, Woods Hole Oceanographic Institution, commercial fishing/shipping industry.

Objective 1.2: Protect significant maritime heritage resources

Maritime Heritage and Cultural Landscapes Action Plan

Action Plan Goal: Understand the broader context of past and present uses of the sanctuary and inventory, assess, protect, manage, and interpret maritime heritage resources in the sanctuary.

Background: Findings from the 2020 condition report provides strong rationale for proactive management of maritime heritage resources. The report revealed several findings related to maritime heritage resources, primarily shipwrecks:

1. Historic shipwrecks are non-renewable and serve as time capsules of our past.
2. Most documented shipwrecks are impacted or damaged by fishing gear. (A survey of the steamship *Portland* in 2019 revealed that a relatively new trawl net (post-2009) is draped over the port bow section).

The activities in this plan aim to better understand the broader context of past and present uses of the sanctuary and to inventory, assess, protect, manage, and interpret maritime heritage resources in the sanctuary.

Consideration of the maritime cultural landscapes is a new focus of this management plan. Maritime cultural landscapes (MCL) help NOAA understand the complex, dynamic, and evolving relationships of people and the sea. Beyond shipwrecks, NOAA can investigate the roles of class, race, and culture, as well as colonization, defense, and industry. NOAA can see how people have shaped the environment and, in turn, how the environment has shaped human society. MCLs explore the diversity of human experiences, behaviors, and interactions with the waterways that form the maritime system, from ancient times to the present, and far inland to across the global ocean.

The sanctuary is fished year-round by bottom-tending mobile gear which present the greatest threat to the integrity of historic shipwrecks. The majority of the shipwrecks that have been investigated by sanctuary archaeologists show signs of moderate to severe impacts from various types of mobile and fixed gear (NOAA, 2010) (see Figure 3.5).

As a result of the high degree of overlap between commercial fishing areas and historic shipwreck locations (Figure 3.6), most of the shipwrecks in the sanctuary are at moderate to high risk of adverse impacts from commercial fishing gear, particularly scallop dredges and bottom trawls. The diminished condition of historic shipwrecks has reduced their aesthetic, cultural, historical, archaeological, scientific, or educational value, and affect the eligibility of some sites for listing in the National Register of Historic Places (NRHP).

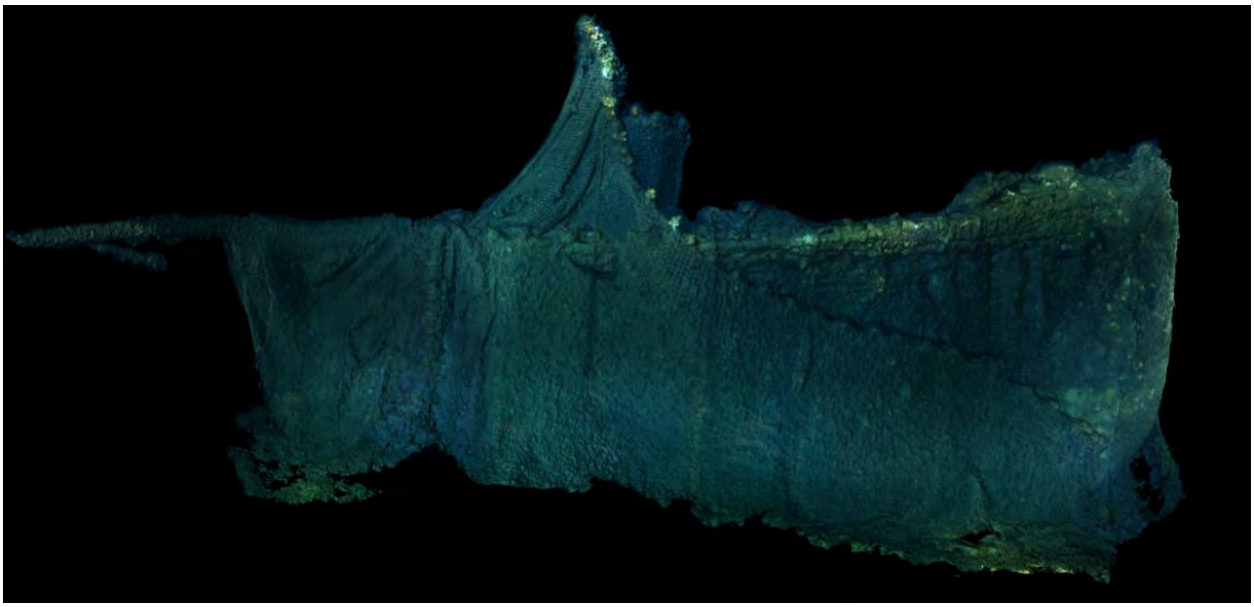

Figure 3.5. Photomosaic image of a trawl net draped across the starboard bow of the steamship *Portland.* This image was created by stitching together thousands of digital photos taken from a remotely operated vehicle in 2020. The date of entanglement and owner of the net are unknown but the net was observed on the first exploration of the *Portland* in 2002. Image courtesy of WHOI/Marine Imaging Technologies

In 2017, intensive fishing effort for scallops on the northwest corner of Stellwagen Bank placed several historic shipwreck sites at risk of damage and, in fact, a modern shipwreck site (fishing vessel *North Star*) was severely damaged. This event precipitated NOAA taking action in 2018 to mitigate potential damage during the 2018 scallop fishing season by initiating a pilot project, known as the Shipwreck Avoidance Program (SAP). The SAP discloses the locations of historic and modern shipwrecks at high risk of damage from commercial scallop dredge gear and requested that fishermen voluntarily avoid these sites. Because this action of publicly disclosing four historic sites constituted an undertaking under Section 106 of the NHPA, per 800.3(a), NOAA consulted with the State Historic Preservation Officer (SHPO) and received concurrence for the action. The SAP was continued in 2019 through 2021. Each year the commercial fishing fleet was provided notice to voluntarily avoid the sites at risk through a Fishery Bulletin[13] (which provided coordinates) issued by NMFS prior to the fishing season. Additional outreach also occurred by:

- Working with groundfish sector managers to inform them of the program;
- Providing public notification at appropriate meetings such as the New England Fishery Management Council; and
- Establishing an automatic message notification using the existing vessel monitoring system to create a virtual "geofence" buffer area to notify the fishing vessel to avoid the wreck sites.

[13] https://www.fisheries.noaa.gov/bulletin/historic-shipwreck-avoidance-stellwagen-bank

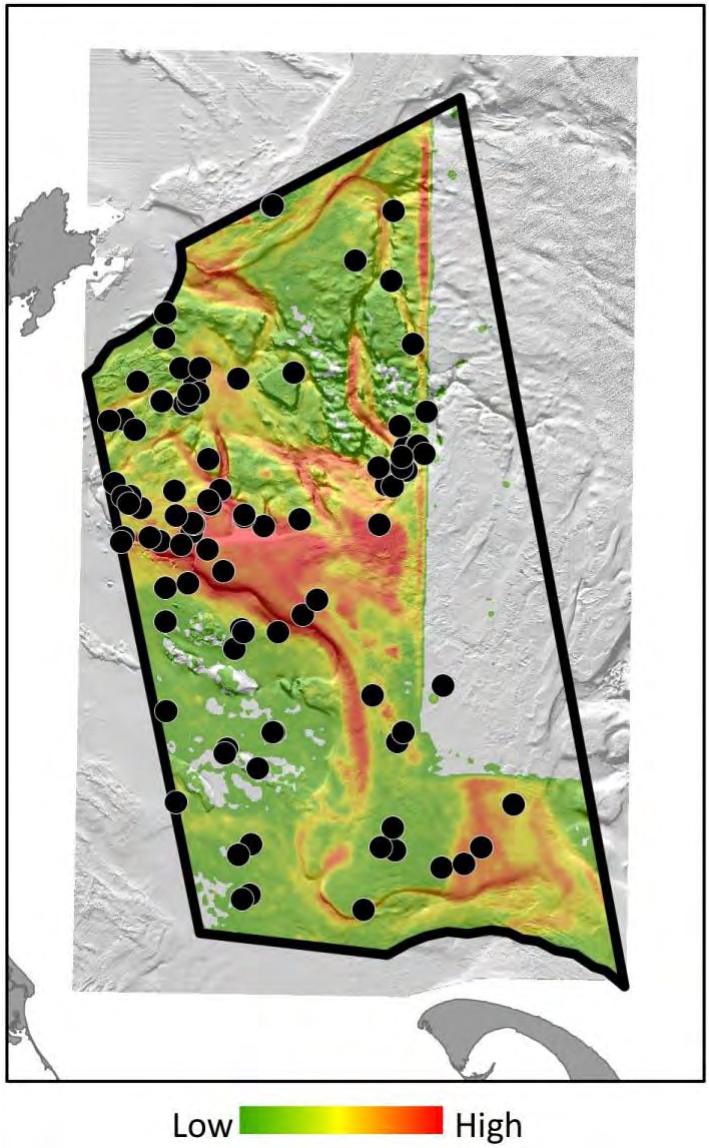

Figure 3.6. This map depicts the high degree of overlap between the approximate location of known shipwrecks (black dots) with the intensity of commercial fishing activity (colored background). The background of fishing gear intensity represents the distribution of all commercial fishing gear types in SBNMS based on vessel monitoring system data provided by NMFS between 2008-2016 (red colors indicate higher intensity, green colors indicate the least). Image: NOAA

During this pilot phase of the SAP, NOAA evaluated its effectiveness in mitigating impacts from commercial fishing using three methods:

- Mapping vessel tracks before and after the fishing season to determine if any vessels appeared to have intersected with the shipwreck sites.
- Conducting side scan sonar surveys of the shipwreck sites both pre- and post-season to determine if the wrecks were damaged.
- Conducting interviews of fishing captains after the season to determine if they were aware of the shipwreck avoidance program and their attitudes regarding shipwreck protection.

Figure 3.7. *Pixel*, a remotely operated vehicle, shines its lights on a shipwreck. Photo: Marine Imaging Technologies/NOAA

Strategy MH – 1: Conduct surveys using state-of-the-art mapping technology to map 100% of the seafloor within SBNMS to identify and characterize cultural, biological, and geological resources

- Activity MH 1.1: Identify priority areas for mapping.
- Activity MH 1.2: Leverage existing NOAA mapping initiatives.
- Activity MH 1.3: Seek public-private partnerships to conduct mapping, such as with the Center for Coastal and Ocean Mapping at the University of New Hampshire.
- Activity MH 1.4: In consultation with tribal interests, identify archaeologically sensitive inundated paleo landscapes and submerged cultural resource sites.

Strategy MH – 2: Continue implementing and expanding the Shipwreck Avoidance Program to facilitate protection of historic resources and reduce damage to shipwrecks resulting from contact with fishing gear

- Activity MH 2.1: Conduct outreach about current location disclosures, and survey users to determine whether they received notifications.
- Activity MH 2.2: Monitor the status of disclosed shipwrecks to determine effectiveness of disclosure efforts.
- Activity MH 2.3: Assess additional shipwreck sites to identify any that may be appropriate for location disclosure and conduct consultations.
- Activity MH 2.4: Consider executing a programmatic agreement with the SHPO, ACHP, and other parties, as appropriate, to establish a consistent process and procedures for review of sanctuary undertakings under Section 106 of the NHPA.

Strategy MH – 3: Continue to inventory and characterize historical resources

- Activity MH 3.1: Characterize historic use patterns to assist with the location of historical resources through the identification and collection of historical, archaeological, and anthropological documentation.
- Activity MH 3.2: Identify "areas of interest" from surveys, and characterize and inventory them either from remote sensing data or from subsequent investigation with side scan, remotely operated vehicles (ROV)/autonomous underwater vehicle (AUV), or diving.
- Activity MH 3.3: Continue to curate a spatial, relational database of inventoried known or possible historic sites and other targets of interest.
- Activity MH 3.4: Develop photogrammetric models of shipwrecks which can serve as site maps and to document patterns of colonization by invertebrates and use as habitats by other species.

Strategy MH – 4: Categorize and assess newly inventoried sites

- Activity MH 4.1: Categorize newly inventoried sites as either historic (e.g., >50 years) or non-historic.
- Activity MH 4.2: Assess the eligibility of known historic sites for listing on the NRHP.
- Activity MH 4.3: Nominate sites to the NRHP (e.g., mystery collier shipwreck).
- Activity MH 4.4: Retrieve and conserve diagnostic and/or vulnerable artifacts when necessary.

Strategy MH – 5: Conduct a long-term maritime cultural landscape analysis to document the historical context of the sanctuary and its resources

- Activity MH 5.1: Identify research, historiography, and models that can inform, impact, and influence the MCL analysis.
- Activity MH 5.2: Develop a strategic vision for MCL including identifying the cultures, subcultures, groups, and stakeholders who NOAA will engage in the study. NOAA will invite regional tribes to participate in the development of the strategic vision.
- Activity MH 5.3: Plan and design methods and tools to engage select stakeholders to ensure their voices are heard and recorded.
- Activity MH 5.4: Research pre- and post-European contact patterns of human activity in the sanctuary and surrounding region.

Strategy MH – 6: Continue partnerships to harness best available technologies to characterize shipwrecks and to share findings with the public

- Activity MH 6.1: Include passive acoustic recordings around wreck sites to live broadcasts as an additional outreach offering and scientific inquiry.
- Activity MH 6.2: Create virtual reality models of shipwrecks to facilitate access by the non-diving members of the public.

- Activity MH 6.3 Provide live ship-to-shore broadcasts during research expeditions with partner organizations to document shipwrecks and share findings with the public.

Strategy MH – 7: Engage public audiences in maritime heritage research and discovery through outreach, tourism, education, and the development of citizen science programs

- Activity MH 7.1: Partner with the dive community and develop programs to leverage resources and skills of divers.
- Activity MH 7.2: Develop opportunities for citizen science field activities or competitions modelled on other events such as the Great American Fish Count and City Nature Challenge.
- Activity MH 7.3: Explore options for stewardship recognition programs, such as Whale Sense and Blue Star.
- Activity MH 7.4: Develop Nautical Archaeology Society training opportunities in the sanctuary.
- Activity MH 7.5: Conduct outreach with various interested communities to share stories on the exploration and inventory of sanctuary shipwrecks, both modern and historic, and the need for management.

Strategy MH – 8: Facilitate sustainable public access to shipwrecks

- Activity MH 8.1: Publish information on the SBNMS website about shipwrecks in a way that is easily accessible and protective of the resource.
- Activity MH 8.2: Develop a process for the public to request information about shipwreck sites that gives access to archival information, data, imagery, and precise location information.
- Activity MH 8.3: Install and maintain mooring systems for recreational diving where possible and collaborate with commercial dive boats to develop site-specific access methods when moorings are not feasible.
- Activity MH 8.4: Engage with dive industry and organizations through targeted education and outreach campaigns.

Related strategies from other action plans:

- EO-1: Increase capacity to reach members of the public
- EO-2: Increase engagement by making information about sanctuary resources, research, and management applications accessible
- IC-1: Promote high-level, consistent regional coordination
- CU-3: Collaborate with relevant agencies, NGOs, and commercial/recreational industries to develop voluntary business recognition programs
- RM-2: Implement coordinated data management
- HB-3: Evaluate the habitat that develops on shipwrecks
- ES-2: Expand socioeconomic research on ecosystem services
- AD-8: Maintain an effective enforcement program

Potential Partners

National Marine Fisheries Service, Woods Hole Oceanographic Institution, dive community, commercial fishing industry, historical societies, University of New Hampshire Center for Coastal and Ocean Mapping, Society for Historical Archaeology, Nautical Archaeology Society, New England Fishery Management Council.

Objective 1.3: Promote responsible human uses

Compatible Uses Action Plan

Action Plan Goal: Enhance transparency regarding how current and emerging activities are assessed for compatibility with the sanctuary's primary objective of resource protection.

Background: The NMSA directs sanctuaries to facilitate all public and private resource uses compatible with the primary objective of resource protection. However, compatibility is not a static concept, meaning that NOAA assesses proposed activities in the sanctuary on a case-by-case basis using the best available knowledge, to determine if they should be allowed to occur, and if so, under what conditions, in the sanctuary. Additionally, as environmental conditions within the sanctuary change over time due to local or regional pressures, NOAA may reassess the compatibility of different activities, as needed. NOAA works in collaboration with other regional authorities to address evolving commercial and recreational uses and understand how these uses impact key elements of the sanctuary landscape, such as the acoustic environment and historic shipwrecks. The importance of these collaborations are described in more detail in the Interagency/Intergovernmental Coordination Action Plan, which describes the many ways that the sanctuary staff work with other federal, state, and local agencies, as well as other organizations to implement management priorities.

Currently, ONMS uses several tools to assess compatibility, including regulations, permitting, consultations, and environmental reviews. The NMSA, the SBNMS terms of designation, and SBNMS regulations are the primary tools to determine which activities are compatible with the purposes of the sanctuary. NOAA may issue permits for certain activities prohibited by regulations after an assessment of their potential impacts and benefits. Also, SBNMS regulations provide the authority to consult with other agencies on proposed activities which may impact sanctuary resources. Using SBNMS consultation authorities, NOAA can make recommendations to federal agencies to modify or mitigate activities. In addition, NOAA conducts environmental compliance under NEPA to assess the potential impacts and benefits of its own management, research, and education activities.

The purpose of this action plan is to assess the tools for determining compatibility of resource uses in the sanctuary, to develop tools to provide the public with a transparent rationale for management decisions, and to enhance existing efforts to facilitate compatible use within SBNMS. This plan proposes to address current uses, new uses, the scale of use, and the cumulative impacts of multiple uses.

Figure 3.8. SBNMS will identify, evaluate, and track potential compatible uses, such as offshore wind projects. This photo is of Block Island Wind Farm off Rhode Island. Photo: Rhode Island Sea Grant

Strategy CU – 1: Refine tools for assessing compatibility of activities in the sanctuary

- Activity CU 1.1: Develop protocols to assess overlap among resource uses and prevent and/or mitigate user/stakeholder conflicts.
- Activity CU 1.2: Develop protocols to determine when to reassess compatibility as conditions change or new information becomes available.

Strategy CU – 2: Identify, evaluate, track, and respond to emerging activities and potential threats to sanctuary resources (e.g., offshore wind, aquaculture, submarine cables, etc.)

- Activity CU 2.1: Evaluate emerging issues and their potential impacts using compatibility determination tools and adjust management priorities if needed.
- Activity CU 2.2: Collect relevant data to help staff and partner agencies evaluate potential impacts of emerging issues on sanctuary resources, including offshore wind, aquaculture, submarine cables, etc.
- Activity CU 2.3: Identify and recommend monitoring approaches that partner agencies and project developers can employ or enhance to detect effects on sanctuary resources and monitor impacts over time.
- Activity CU 2.4: Develop a workflow/protocol to consult with action agencies on both an ongoing basis and in relation to specific projects, and to reassess compatibility as conditions change or when specific triggers are reached.

Strategy CU – 3: Collaborate with relevant agencies, NGOs, and commercial/recreational industries to develop voluntary business recognition programs

- Activity CU 3.1: Create incentive program for fishing entities, similar to the Blue Star program in Florida Keys National Marine Sanctuary, when guidance from headquarters is promulgated.

Strategy CU – 4: Promote the sanctuary as a testing ground for innovative methods and technology to manage multiple resource uses

- Activity CU 4.1: Seek partnerships with local, state, and federal agencies, academic institutions, NGOs, and industry partners to co-develop and test resource protection tools.

Strategy CU – 5: Issue permits and conduct consultations to ensure sanctuary use is compatible with SBNMS mission and regulations

- Activity CU 5.1: Review and issue permits in accordance with regulations.
- Activity CU 5.2: Conduct consultations with other agencies to ensure compliance with NMSA regulations and NOAA Environmental Compliance guidance.

Strategy CU – 6: Conduct baseline assessment of visitor use (number, origin, and types of users, and their activities in the sanctuary) to facilitate long-term evaluation of resource impacts and potential compatibility conflicts

- Activity CU 6.1: Develop a plan for visitor use assessment in conjunction with ONMS economists and other partners.
- Activity CU 6.2: Implement plan for developing visitor use profiles.

Related strategies from other action plans

- MH-2: Implement and expand shipwreck avoidance program
- RM-1: Support science focused on priority sanctuary needs
- RM-3: Characterize the sanctuary's biological/physical features
- EO-2: Increase engagement by making information about sanctuary resources, research, and management applications accessible
- IC-1: Promote high-level, consistent regional coordination

Potential Partners

Boston University Marine Program, Bureau of Ocean Energy Management, National Marine Fisheries Service , Massachusetts Division of Fish and Wildlife, New England Fishery Management Council, Northeastern Regional Association of Coastal Ocean Observing Systems, U.S. Army Corps of Engineers, U.S. Coast Guard, Environmental Protection Agency, U.S. Geological Survey, Department of Defense/U.S. Navy, Northeast Regional Ocean Council,

Massachusetts Office of Coastal Zone Management, Massachusetts Environmental Police, commercial and recreational fishing industry.

Objective 1.4: Promote resilience and adaptation

Climate Change Action Plan

Action Plan Goal: Evaluate climate change impacts on sanctuary resources and incorporate changing conditions in management decisions.

Background: The Gulf of Maine has experienced dramatic warming in the last decade (0.23 degrees Celsius per year) and was identified as one of the fastest warming areas in the global ocean (Pershing et al., 2015). Global and regional impacts of climate change include sea-level rise and coastal erosion, increased coastal flooding, altered patterns of precipitation and runoff, increased storm frequency and intensity, changing currents, higher surface and deep-water temperatures, and increased carbon dioxide inputs that result in ocean acidification. Because biological processes in the ocean are closely tied to physical properties, climate change is causing a variety of biotic responses within ocean and coastal ecosystems, including changes in the ability to sustain biodiversity and traditional species assemblages. Changes in species range, distribution, and phenology (timing of natural events) are strongly predicted to lead to increases in resource mismatches (changes in the timing and availability of food and habitat resources available to individual species) and other ecological disruptions. As individual species seek out optimal environmental conditions for their livelihood, climate related changes in ocean conditions may result in new, displaced or transient species and communities occupying the sanctuary, including non-native and invasive species (Reidmiller et al., 2018; Grieve et al., 2016; Sorte, 2014), potentially altering community structure and ecosystem functions (Dupigny-Giroux et al., 2018). The sanctuary can play an important role as a sentinel site, promoting monitoring and maintenance of longer term datasets that will all help managers and stakeholders better understand and adapt to a changing environment.

Long-term planning for climate change impacts is vital to NOAA's ability to fulfill the resource protection goals outlined in the NMSA. The purpose of this action plan is to evaluate climate change impacts on sanctuary resources and incorporate changing conditions into management decisions. NOAA will address climate change not only through this action plan but also through strategies in multiple action plans that would enhance the ability of the sanctuary to coordinate climate change research and monitoring efforts across agencies and research partners. This enhanced understanding of climate impacts and synergies will inform decisions on a wide range of sanctuary management, including resource protection, education and operations. The strategies in this action plan increase our understanding of the impacts of climate change on the sanctuary by collecting and sharing data, communicating results, assessing the impacts on living resources and the sanctuary ecosystem, exploring the impacts on human use and cultural services, and assessing how maritime heritage is impacted.

Figure 3.9. An endangered North Atlantic right whale, one of the many species threatened by climate change, feeds in Stellwagen Bank National Marine Sanctuary. Photo: Michael Thompson/NOAA

Strategy CC – 1: Establish the sanctuary as a sentinel site for understanding the impacts of climate change on the sanctuary ecosystem

- Activity CC 1.1: Integrate monitoring data on the distribution and habitat use of large whales, seabirds, fish species, and forage species to detect shifts in time and space.
- Activity CC 1.2: Develop a monitoring plan for collecting and disseminating oceanographic data related to ocean acidification, temperature, and stratification.
- Activity CC 1.3: Develop and maintain citizen science programs (e.g., Stellwagen Sanctuary Seabird Stewards) for integration into climate change data sets and analysis.
- Activity CC 1.4: Evaluate climate change impacts on sanctuary resources and incorporate changing conditions in management decisions.
- Activity CC 1.5: Continue ongoing research into seabird, marine mammal, and forage fish habitat use, behavior, and movements to create long-term data sets sufficient to accomplish Activity CC 1.1.
- Activity CC 1.6: Continue serving on the oversight committee of the Integrated Sentinel Monitoring Network and continue to engage with the Northeast Regional Association of Coastal Observing Systems.

Strategy CC – 2: Conduct a vulnerability assessment to identify the greatest climate-related risks to sanctuary resources, including biological and cultural resources, as well as patterns of human use and cultural services

- Activity CC 2.1: Conduct a climate vulnerability assessment expert workshop. SBNMS staff will convene a workshop of experts to identify how and why focal resources (habitats, species, and ecosystem services) in SBNMS are likely to be affected by future climate and ocean conditions.
- Activity CC 2.2: Develop an interactive, online climate vulnerability assessment tool to disseminate results to stakeholders and the public. Using the findings from the expert workshop, SBNMS will develop an interactive, online tool to allow stakeholders and the public to understand the findings from the workshop and explore the underlying data. The tool will enable marine resource managers and stakeholders to respond to, plan, and manage for the impacts of climate change to habitats, species, and ecosystem services.

Strategy CC – 3: Share data and communicate results of monitoring studies and how they inform our understanding of climate change

- Activity CC 3.1: Create a communication plan to disseminate the results of climate change monitoring.

Related strategies from other action plans

- MP-4: Continue and expand projects designed to understand top predator ecology
- SR-1: Identify habitat use of seabirds
- MH-3: Categorize and assess newly inventoried sites.
- RM-3: Characterize the sanctuary's biological/physical features
- WQ-2: Establish the sanctuary as a sentinel site for water quality monitoring in the Gulf of Maine
- EO-1: Increase capacity to reach members of the public
- EO-2: Increase engagement by making information about sanctuary resources, research, and management applications accessible
- IC-1: Promote high-level, consistent regional coordination
- ES-2: Expand socioeconomic research on ecosystem services.
- SS-4: Use status and trend information to monitor indicators of human-induced noise influence

Potential Partners

National Marine Fisheries Service, Environmental Protection Agency, Integrated Sentinel Monitoring Network, Bureau of Ocean Energy Management, U.S. Coast Guard, U.S. Geological Survey, New England Fishery Management Council, Northeastern Regional Association of Coastal Ocean Observing Systems, Northeast Coastal Acidification Network, Northeast Regional Ocean Council, Massachusetts Office of Coastal Zone Management, citizen science programs.

GOAL 2: INCREASE SUPPORT FOR SBNMS

Sanctuaries rely heavily upon collaborative management and public support to implement effective protection, sustainable use, and enjoyment of sanctuaries. The action plans below address those activities and partners (education and outreach, interagency/intergovernmental coordination, and management of our advisory council) that play an essential role in implementing management.

Objective 2.1: Expand recognition of national marine sanctuaries

Education and Outreach Action Plan

Action Plan Goal: To increase public awareness and understanding of the sanctuary, and encourage responsible use and stewardship of its resources.

Background: Education and outreach are key components of sanctuary management. It is essential to achieving many of the sanctuary's management objectives and will be used within the framework of other action plans to motivate behavioral change that directly impacts the state of the resources. NOAA's education and outreach products and services are focused on helping people deepen their relationship with the sanctuary, including awareness, understanding, appreciation, respect, and stewardship.

Education and outreach programs must utilize a variety of tools and techniques, from traditional printed documents to the latest forms of electronic communication, to bring sanctuary information to the public to reach the widest possible audience. In addition, sanctuary programs will expand messaging into other languages to reach stakeholders where English is a second language. Sanctuary research findings can help energize science, technology, engineering and mathematics (STEM) education programs and outreach products can raise awareness about the sanctuary to resource users.

Education and outreach programs are key factors in building a science-literate public that understands the issues confronting natural and heritage resources in the sanctuary, and can therefore foster their support for protection and restoration efforts. Sanctuary-led programs start with young children and their families and extend to graduate students, stakeholders, and lifelong learners of all ages, and includes reaching audiences of all demographics in sanctuary communities. In addition, NOAA supports, when possible, education projects created by individuals and organizations outside the sanctuary system. Sanctuary staff have interacted with thousands of members of the public through community programs, science and career fairs, local festivals, recreational fishing and boating shows, and numerous online events.

The strategies in this plan support building capacity to further advance the awareness of the sanctuary, increase engagement with sanctuary informational resources, and build partnerships to strengthen education and outreach programming.

Figure 3.10. A child looks over the side of a whale watching vessel in search of whales in Stellwagen Bank National Marine Sanctuary. Photo: Matt McIntosh/NOAA

Strategy EO – 1: Increase capacity to reach members of the public to advance awareness, foster support for solutions, and inspire stewardship to ensure a thriving sanctuary

- Activity EO 1.1: Develop strategic plans for formal and informal education, and communications/outreach, to identify and implement priority activities and assess progress towards sanctuary goals.
- Activity EO 1.2: Create a standing SAC working group for education and outreach to help implement programs.
- Activity EO 1.3: Develop a network that includes affiliate organizations and volunteers to build partnerships and leverage capacity for outreach activities.
- Activity EO 1.4: Develop communication tools and products to advance sanctuary outreach and visibility on a national basis.
- Activity EO 1.5: Increase use of virtual tools (e.g., website, distance learning, social media) and new technologies to expand the audience base and make products easily updatable and adaptable, but continue to produce hard copies of publications that serve the needs of stakeholder groups.
- Activity EO 1.6: Develop in-person and virtual visitor centers and exhibits throughout the region to increase site visibility and understanding of sanctuary resources, research, and resource protection issues.

Strategy EO – 2: Make the sanctuary a hub for regional marine resources and resource management to increase public engagement

- Activity EO 2.1: Analyze the informational resource needs of our communities.
- Activity EO 2.2: Conduct valuation studies to characterize the impact of formal and informal education and citizen science programs.
- Activity EO 2.3: Build relationships, including regular communication and opportunities for direct involvement with sanctuary missions, with key regional media outlets to increase sanctuary visibility. Make media connections a part of all mission planning.
- Activity EO 2.4: Support formal education (i.e., K-12, undergraduate, and graduate) products and programs.
- Activity EO 2.5: Develop informal education and outreach products and programs for the general public and stakeholder groups that increase awareness of sanctuary resources and research, build stewardship, and support citizen science.

Strategy EO – 3: Increase support for SBNMS by building partnerships that facilitate cooperation in offering creative solutions for sanctuary education and outreach in a changing world

- Activity EO 3.1: Articulate the importance of the sanctuary in a changing world in all education and outreach products in terms of both ecological climate impacts and societal changes.
- Activity EO 3.2: Coordinate with the Foundation and NOAA Office of Legislative and Intergovernmental Affairs (via ONMS) to keep legislators informed of sanctuary issues and programs.
- Activity EO 3.3: Cultivate new and build upon existing partnerships with marine conservation organizations to raise the regional and national visibility of the sanctuary.
- Activity EO 3.4: Work with chambers of commerce and tourism centers to promote the sanctuary along with best practices for visitation.
- Activity EO 3.5: Enhance social media and other education/outreach programs by building memoranda of agreement (MOAs) and memoranda of understanding (MOUs) with partner institutions to increase the reach and speed of sanctuary message dissemination.

Related strategies from other action plans

- IC-3: Create an engagement plan that capitalizes on connections through current SAC members to strengthen interagency relationships
- RM-1: Support science focused on priority sanctuary needs
- CC-1: Establish the sanctuary as a sentinel site for understanding the impacts of climate change on the sanctuary ecosystem.
- CC-2: Share data and communicate results of monitoring studies and how they inform our understanding of climate change
- SAC-1: Coordinate and support SAC operations

Potential Partners

Hispanic Access Foundation, Massachusetts Marine Educators, National Marine Educators Association, New England Aquarium, Mystic Aquarium, The Maritime Aquarium in Norwalk, Boston Museum of Science, Harvard Museum of Natural History, Cape Cod Museum of Natural History, Maritime Gloucester, Center for Coastal Studies, Cape Cod National Seashore, National Marine Fisheries Service, Woods Hole Oceanographic Institution and WHOI Sea Grant, Mashpee Wampanoag, local school districts, recreational dive community, such as Boston Sea Rovers, recreational fishing community, such as Stellwagen Bank Charter Boat Association, whale watch industry, Massachusetts Audubon, Salem National Historic Site, Sea Education Association, Maine Historical Society, and The Nature Conservancy.

Objective 2.2: Increase sanctuary engagement

Interagency/Intergovernmental Coordination Action Plan

Action Plan Goal: Promote improved management through coordinated partnering with local, state, regional, tribal, and federal partners.

Background: NOAA relies heavily on partnerships with other federal, state, and local agencies, as well as research and outreach collaborations with non-profit, community, research/academic institutions, and many others, for effective management of sanctuaries. Some of these partnerships are articulated in official partnership agreements (MOA/MOUs), but many long-term relationships with regional entities are less formal. Numerous agencies operate pursuant to federal statutes (e.g., Marine Mammal Protection Act, Endangered Species Act, Outer Continental Shelf Lands Act, Magnuson-Stevens Fishery Conservation and Management Act, Clean Water Act, etc.) that have jurisdiction that spatially overlaps sanctuary boundaries (see Section 1.2). It is expected that agencies that have overlapping management authority with SBNMS will cooperate and collaborate to protect sanctuary resources while achieving their respective missions.

To increase the effectiveness and efficiency of management plan implementation, NOAA needs to more proactively engage both long-standing and new partners in a directed manner, which will benefit not only management of sanctuary resources, but also the management and understanding of resources throughout the region. The goal of this action plan is to improve sanctuary management through partnerships locally, regionally, and nationally by making recommendations to clarify agency responsibilities that overlap those of SBNMS and to improve interagency and intergovernmental coordination and effectiveness. One of the goals is also to fulfill the requirements of Executive Order (E.O.) 13175, "Consultation and Coordination with Indian Tribal Governments" implemented in 2000 and Section 106 of the NHPA to identify, engage and consult with tribes that may be impacted by this revised management plan.

The strategies in this action plan will support regional coordination to share information and increase capacity, evaluate the effectiveness of relationships, strengthen SAC relationships with partners, and engage with international groups, tribal nations, and Indigenous organizations.

Figure 3.11. Sanctuary Advisory Council members stand with “Salt,” the wheelchair accessible inflatable humpback whale, at the New England Boat Show for one of the biggest outreach events of the year. SAC members are key to building relationships and providing support for the sanctuary's success. Photo: Anne-Marie Runfola/NOAA

Strategy IC – 1: Promote consistent regional coordination among relevant agencies to share information, increase agency capacity to manage resources effectively, and create incentives for coordination

- Activity IC 1.1: Maintain and strengthen existing relationships with agencies represented on the SAC.
- Activity IC 1.2: Leverage agency partnerships to remove barriers to sanctuary research and management objectives.
- Activity IC 1.3: Collaborate with relevant agencies to develop clear pathways for permit review and consultation.
- Activity IC 1.4: Cultivate productive relationships with key agencies related to urgent or emerging issues in the sanctuary.
- Activity IC 1.5: Export successful policies/practices to improve regional ocean management (e.g., integration of research and policy that led to movement of shipping lane).

Strategy IC – 2: Promote intergovernmental collaboration with regional Indigenous tribes, nations, and organizations with cultural ties to the sanctuary

- Activity IC 2.1: Identify and initiate engagement with appropriate Indigenous tribes, nations, and organizations.
- Activity IC 2.2: Develop pathways of communication, learning, and potential collaboration.

- Activity IC 2.3: Pursue opportunities to provide internships and youth programs for Indigenous tribes, nations, and organizations with an interest in SBNMS and marine resource conservation.

Strategy IC – 3: Regularly evaluate the goals and effectiveness of institutional relationships

- Activity IC 3.1: Evaluate existing formal agreements with agencies and revise as necessary.
- Activity IC 3.2: Identify and prioritize agencies relevant to the management needs of SBNMS.
- Activity IC 3.3: Develop new agreements with priority agencies and partners as needed.

Strategy IC – 4: Create an engagement plan that capitalizes on existing connections with other agencies and partners through current SAC members to facilitate information sharing and strengthen interagency relationships

- Activity IC 4.1: Identify SAC members as liaisons to identified groups and organizations when staff resources are insufficient. Identify where direct (staff) and indirect (e.g., SAC members and volunteers) engagement is appropriate.

Strategy IC – 5: Promote international collaboration to achieve research and management objectives

- Activity IC 5.1: Maintain and expand the Sister Sanctuary Program by renewing MOAs and updating work plans with the existing four countries, and consider agreements with additional countries that share sanctuary resources.
- Activity IC 5.2: Participate in international initiatives as appropriate.

Related strategies from other action plans

- EO-3: Increase support through partnerships and MOUs and MOAs to facilitate cooperation
- CU-5: Issue permits and conduct consultations to ensure sanctuary use is compatible with SBNMS mission and regulations
- RM-2: Implement coordinated data management
- AD-8: Maintain an effective enforcement program
- SAC-2: Enhance SAC engagement
- ES-2: Expand socioeconomic research on ecosystem services
- MH-3: Document the ecology of shipwrecks

Potential Partners

National Marine Fisheries Service, Environmental Protection Agency, Bureau of Ocean Energy Management, U.S. Coast Guard, U.S. Geological Survey, U.S. Army Corps of Engineers, Department of Defense/U.S. Navy, Advisory Council on Historic Properties, New England and

Mid-Atlantic Fishery Management Councils, Atlantic States Marine Fisheries Commission, Northeastern Regional Association of Coastal Ocean Observing Systems, Northeast Coastal Acidification Network, Northeast Regional Ocean Council, Gulf of Maine Council on the Marine Environment, Massachusetts Office of Coastal Zone Management, Massachusetts Environmental Police, Massachusetts Division of Marine Fisheries, Massachusetts Historical Commission, regional tribal nations.

Sanctuary Advisory Council (SAC) Action Plan

Action Plan Goal: Facilitate an active and engaged community of SAC members to advise the superintendent in carrying out the sanctuary's mission.

Background: Public advocacy to protect the special resources of Stellwagen Bank was central to the designation of SBNMS in 1992, and public involvement in the sanctuary remains vitally important to management today. Section 315 of the NMSA authorizes the Secretary of Commerce to establish SACs. NOAA established the SBNMS advisory council on October 3, 2001. The Stellwagen Bank SAC is among the largest in the national system and is distinguished by its representation from multiple states. The council is a community-based body that advises the sanctuary superintendent on issues relevant to the effective implementation of the sanctuary management plan. The council is the formal organizational link to the sanctuary's user community and others interested in the management of the sanctuary. Council membership consists of 17 non-governmental voting members, one non-voting youth member, and six governmental ex-officio members (non-voting). In order to better understand and address specific management issues and broaden public involvement, the SAC extends its capacities by forming a variety of working groups. Working groups invite additional community members and experts to participate in the development of sound management advice for the sanctuary. Working groups are temporary and chaired by an advisory council member.

The focus of this action plan is to leverage SAC member expertise and community connections to help achieve the mission of the sanctuary. The strategies include coordinating and supporting members, enhancing engagement, and maintaining communication.

Strategy SAC – 1: Coordinate and support SAC operations

- Activity SAC 1.1: Facilitate implementation of the SAC work plan.
- Activity SAC 1.2: Periodically review and update the SAC charter and membership.
- Activity SAC 1.3: Support standing working groups and/or subcommittees of the SAC with staff expertise and meeting logistics.
- Activity SAC 1.4: Update SAC work plan.

Strategy SAC – 2: Enhance SAC engagement

- Activity SAC 2.1: Encourage stronger connections between the SAC members and local communities by developing tools and outlets for member outreach.
- Activity SAC 2.2: Actively involve the SAC in achieving management goals by identifying strategies in the management plan that particular members, due to their skills and interests, could help implement.

- Activity SAC 2.3: Expand SAC involvement with research and monitoring projects to facilitate better integration of research into management decisions.
- Activity SAC 2.4: Leverage SAC connections to cultivate new funding opportunities and partnerships.

Strategy SAC – 3: Communicate with SAC regarding staff and management updates

- Activity SAC 3.1: Implement annual status report presentations to keep SAC up to date with ongoing projects and sanctuary needs.
- Activity SAC 3.2: Continue to regularly evaluate communication between SAC members and staff and adjust practices as needed.
- Activity SAC 3.3: Provide an annual update on the status of management plan implementation and publish updates on SBNMS website.

Related strategies from other action plans

- IC-1: Promote high-level, consistent regional coordination

Potential Partners

Stellwagen Bank National Marine Sanctuary Advisory Council membership.

GOAL 3: DEEPEN OUR UNDERSTANDING OF SANCTUARY RESOURCES

Sound science is critical to improving the conservation, management, and sustainable use of marine resources and inspiring ocean stewardship. Coordinated research and monitoring, and continued investigation of sanctuary soundscape, water quality, and habitats along with a comprehensive understanding of the value of ecosystem services are key activities to ensure a comprehensive understanding of sanctuary resources.

Objective 3.1: Learn more about our sanctuaries

Research and Monitoring Action Plan

Action Plan Goal: Support, promote, and coordinate scientific research, characterization, and long-term monitoring to enhance the understanding of the sanctuary environment and processes, and improve management decision-making for optimal resource management and protection.

Background: NOAA conducts a robust science program in SBNMS focused on providing information to support key management needs. Science comprises both research and monitoring activities. NOAA relies on partnerships with other organizations that have the specialized knowledge and/or technical capability to conduct the science essential to answer management questions.

This management plan identifies a wide variety of research and monitoring needs. NOAA can address these needs through staff-directed research and monitoring, developing collaborations with external investigators, and encouraging independent research.

The activities included in this action plan are ambitious, and NOAA's success in implementing them will, in large part, depend upon receipt of substantial external funds and ongoing collaboration and support from partners and other agencies. NOAA also hopes that publishing a broad and comprehensive framework for research in the sanctuary might encourage other agencies, organizations and academic institutions to develop and fund research projects that NOAA is unable to support, and also to recognize the science priorities of the sanctuary. Activities that NOAA cannot fund with appropriated funds are purposely included because research and monitoring programs are highly dependent on partnerships and external funding. In response to the pressures identified in the 2020 condition report, there is a need for scientific research and monitoring of pressures and current state of the sanctuary, sanctuary resources, and ecosystem services. There remains a great deal of primary research and monitoring that is required to understand the current conditions in the SBNMS.

The strategies in this action plan will prioritize sanctuary needs, coordinate data management and information flow, build an understanding of the biological and physical resources, and further understand the interconnectedness of humans and the ecosystem.

Figure 3.12. A team of NOAA scientists observe a breaching humpback whale. The scientists were on a mission to tag humpback whales in Stellwagen Bank National Marine Sanctuary. Photo: NOAA, under NOAA Fisheries Permit #14245

Strategy RM – 1: Support science focused on priority sanctuary needs

- Activity RM 1.1: Develop and maintain an annotated list of basic and applied research needs for sanctuary management, and update and maintain SBNMS science needs assessment documents[14] including background and science products needed for effective resource characterization and management.

[14] https://sanctuaries.noaa.gov/science/assessment/

- Activity RM 1.2: Pursue additional NOAA support to augment SBNMS focused applied science including NOAA ship time and other NOAA research and monitoring funding opportunities.
- Activity RM 1.3: Develop and partner on research proposals for outside funds to implement research priorities.
- Activity RM 1.4: Promote sanctuary science by competing for funding from ONMS, including: Nancy Foster and Hollings Scholars; mitigation funds to characterize the sanctuary soundscape; and integrated funds for ocean observatory program development.
- Activity RM 1.5: Actively foster research partnerships and leverage connections through the Sanctuary Advisory Council to facilitate ongoing and new research in the sanctuary.
- Activity RM 1.6: Continue coordination with relevant agencies to create clear pathways for project collaboration and consultation.
- Activity RM 1.7: Provide expertise to students and early career scientists by serving on thesis and dissertation committees at regional academic institutions for projects specific to addressing SBNMS research needs, and supervising interns, scholars, and fellows working on science projects related to sanctuary resources.
- Activity RM 1.8: Promote the use of sanctuary vessels and resources by academic and other institutions to further sanctuary science.
- Activity RM 1.9: Maintain NOAA approved scuba diving program in order to conduct research, monitoring, and characterization and to provide assistance to other organizations when appropriate.

Strategy RM – 2: Implement coordinated data management and facilitate the flow of science information among academic institutions, government agencies, and other institutions

- Activity RM 2.1: Participate in formal research agreements with academic institutions to integrate sanctuary research needs into the goals and objectives of these institutions.
- Activity RM 2.2: Support condition report needs for monitoring information through integration of data sources and work with partners to collect relevant information.
- Activity RM 2.3: Participate in the development of external web portals or collaborate with existing portals, e.g., Northeast Data Portal, to share information supporting resource management data needs.
- Activity RM 2.4*:* Identify and assess data needs to help answer priority sanctuary questions.
- Activity RM 2.5*:* Manage data processing and storage in accordance with recognized best practices to maintain high quality data records and ensure long-term preservation of datasets.
- Activity RM 2.6*:* Provide easy and timely access to data collected or managed by SBNMS in accordance with federal data sharing guidelines.

- Activity RM 2.7*:* Actively promote the use of sanctuary data to support private and academic research to inform local, state, and federal public policy, and to enhance regional education efforts.
- Activity RM 2.8*:* Collaborate with partners to connect sanctuary work to other relevant ocean and coastal data information system initiatives, e.g., Northeastern Regional Association of Coastal Ocean Observing Systems (NERACOOS) and NEFSC.

Strategy RM – 3: Characterize the sanctuary's biological and physical features to better understand relationships among ecosystem components, biodiversity, and system productivity

- Activity RM 3.1: Use existing sanctuary-focused data sets to examine ecosystem components and connections.
- Activity RM 3.2: Expand current sanctuary-focused datasets to include more species and connections, including use of sanctuary resources by highly migratory species and sea turtles.
- Activity RM 3.3: Analyze vessel trip report and vessel monitoring system data to characterize vessel behavior and the footprints of fisheries activity to better understand impacts on habitat.
- Activity RM 3.4: Initiate a citizen science program collecting conductivity, temperature, and depth data from vessels of opportunity (e.g., whale watching vessels).
- Activity RM 3.5: Expand research collaborations with NEFSC, universities, and stakeholders.
- Activity RM 3.6: Expand use of commercial fishing vessels as a research platform.
- Activity RM 3.7: Continue to increase our understanding of spawning locations and time periods for commercially and recreationally important groundfish populations in and close to sanctuary boundaries using passive acoustics and telemetry, and continue to evaluate fishery management actions that protect spawning areas.
- Activity RM 3.8: Increase understanding of connections between SBNMS, Gulf of Maine, North Atlantic, and other marine protected areas.
- Activity RM 3.9: Utilize environmental DNA (eDNA) methods to characterize the temporal and spatial distribution of sanctuary resources and understand the connectivity between ecosystem components.
- Activity RM 3.10: Outfit the R/V *Auk* with a multibeam sonar system (or an advanced fishfinder) to collect data on seafloor habitats and features and biological communities while underway.

Strategy RM – 4: Understand SBNMS as a coupled human-ecological system

- Activity RM 4.1: Expand the use of social science to understand the ecosystem services that SBNMS provides and how sanctuary resources support coastal communities.
- Activity RM 4.2: Investigate and measure non-material ecosystem services of the sanctuary (e.g., sense of place).

- Activity RM 4.3: Utilize stakeholders, volunteers, and citizen scientists to understand ecosystem services.

Related strategies from other action plans

- MP-4: Continue and expand projects designed to understand top predator ecology
- SR-1: Identify habitat use of seabirds
- SR-2: Understand foraging ecology of seabirds
- MH-1: Conduct surveys using state-of-the-art mapping technology to map 100% of the seafloor within SBNMS
- ES-1: Model ecosystem service dynamics using innovative technology and best practices
- ES-2: Expand socioeconomic research on ecosystem services
- EO-2: Increase engagement by making information about sanctuary resources, research, and management applications accessible
- SAC-2: Enhance SAC engagement
- IC-1: Promote high-level, consistent regional coordination
- IC-3: Create an engagement plan that capitalizes on connections through current SAC members to strengthen interagency relationships
- WQ-2: Establish the sanctuary as a sentinel site for water quality monitoring in the Gulf of Maine

Potential Partners

Boston University, University of Connecticut, Mystic Aquarium, University of Rhode Island, Long Island University, National Marine Fisheries Service, U.S. Fish and Wildlife Service, U.S. Geological Survey, Bureau of Ocean Energy Management, Center for Coastal Studies, Cornell University, commercial whale watch industry, Syracuse University, University of California Santa Cruz, Stanford University, Griffith University (Australia), University of Denmark, Massachusetts Lobstermen's Association, New England Fishery Management Council, Center for Coastal Studies, Oregon State University, Woods Hole Oceanographic Institution, Bay of Fundy Tidal Energy, Boston Harbor Pilots Association, Channel Islands Cetacean Research Unit, University of New Hampshire Center for Coastal and Ocean Mapping, Conserve IO, U.S. Department of Transportation, Excelerate Energy, EOM Offshore, Green Marine, International Fund for Animal Welfare, Marine Mammal Commission, Massachusetts Port Authority, Massachusetts Division of Marine Fisheries, commercial and recreational fishing industry, The Volgenau Foundation, and the International Fund for Animal Welfare.

Objective 3.2: Track and predict conditions and trends

Soundscape Action Plan

Action Plan Goal: Maintain the role of SBNMS as a sentinel site for passive acoustic monitoring in the Gulf of Maine, and as a test bed for applying these data to both long term monitoring of ecosystems and the design of methods to reduce impacts from human activities.

Background: Meeting marine resource protection and management objectives in SBNMS necessitates understanding the relative inputs of sound sources within the sanctuary and the possible effects of these sounds on marine animal behavior. The SBNMS acoustic research

program has provided opportunities for partnership and leadership in the development of regional, national, and international policies for managing noise impacts on marine life. NOAA has developed standardized data collection methods, such as passive acoustic monitoring and acoustic tagging, to help characterize the acoustic environment and understand animal behavior in the sanctuary. NOAA can use these data to compare acoustic habitat across sanctuary sites and other marine environments.

NOAA has an extensive large whale passive acoustics program and leads an ongoing program to tag humpback and other large whales with synchronous motion, acoustic recording, and video recording tags to understand underwater behavior as it relates to mitigating ship strikes and entanglement. Beginning in 2016, ONMS and NEFSC acoustic researchers developed and implemented a program to conduct coordinated acoustic monitoring in relatively shallow water sanctuaries on the east coast and in the Gulf of Mexico, including Stellwagen Bank, Gray's Reef, Florida Keys, and Flower Garden Banks national marine sanctuaries. Researchers coordinated these deployments in order to provide comparable data among sanctuaries. In the future, staff will focus analyses on how to extract new metrics from long-term soundscape datasets that may reflect important ecological thresholds for management consideration.

The strategies in this plan will maintain the role of SBNMS as a sentinel site for passive acoustic monitoring in the Gulf of Maine, and a test bed for applying these data to both long term monitoring of ecosystems and the design of methods to reduce impacts from human activities offshore.

Figure 3.13. Researchers in Stellwagen Bank National Marine Sanctuary attach an acoustic recording suction tag to learn where whales are going, how they're moving, and the noises they're making and hearing. With this data, NOAA can better understand whale behavior and learn how to best protect them from threats like ship strikes. Photo: NOAA, under NOAA Fisheries Permit #775-1600-10

Strategy SS – 1: Maintain low frequency monitoring station (Noise Reference Station) to assess changes over time in acoustic contributions from vessels, linked to shifts in calling baleen whales and fish, and compare to regional and national trends

- Activity SS 1.1*:* Continue to evaluate low frequency sound information in SBNMS, collected continuously since 2014, in relation to levels of human, biological, and geophysical influence collected across the 12 unit array, deployed throughout U.S. waters.

Strategy SS – 2: Maintain broadband soundscape monitoring stations (i.e., "SanctSound"), which have collected seasonal data from 2016-18, and continuous data since 2018; assess changes over time in ambient levels and contributions from marine mammals, fish, and vessels as part of regional and national ocean observing arrays

- Activity SS 2.1*:* Continue to derive standardized soundscape metrics from broader band recorders deployed in SBNMS as part of a Gulf of Maine scale array with NEFSC and University of New Hampshire, supporting evaluation of regional-scale patterns in marine animals and human activities, and enabling integration of these metrics with other NERACOOS supported ocean observations.

Strategy SS – 3: Conduct seasonal passive acoustic and telemetry enabled glider surveys to better understand distribution and behavior of target sound-producing species in particular areas and time periods

- Activity SS 3.1: Continue to partner with NEFSC and Woods Hole Oceanographic Institution (WHOI) to operate gliders in and around the sanctuary to support higher resolution studies of the timing or spatial distribution of sound-producing marine animals, and to support mobile telemetry reception for tagged animals.
- Activity SS 3.2: Continue to monitor real-time presence of calling endangered whales using gliders and auto detection buoys, and continue to integrate acoustics in dynamic management methods to reduce vessel whale interactions.

Strategy SS – 4: Use status and trend information and more detailed knowledge of overlap in biological and anthropogenic sources to monitor indicators of human-induced noise influence

- Activity SS 4.1: Continue to evaluate variation in human-induced noise within frequencies, time periods, and places in the sanctuary that are biologically important for communication, supporting consideration of management tools that take into account relative contributions among noise-producing activities and trends over time.

Strategy SS – 5: Add an acoustic monitoring station to shipwrecks to deepen understanding of the role of wrecks in supporting sanctuary biodiversity

- Activity SS 5.1: Deploy pilot recorder on wrecks to evaluate efficacy of longer-term plan to use sound to monitor the relative abundance and biodiversity of sound-producing animals in proximity to shipwrecks, compared with other habitat structures in the sanctuary.
- Activity SS 5.2: Deploy pilot recorder on boulder reefs to evaluate efficacy of longer-term plan to use sound to monitor the relative abundance and biodiversity of sound-producing animals in comparison to wrecks.

Related strategies from other action plans:

- MP-4: Continue and expand projects designed to understand top predator ecology
- SR-1: Identify habitat use of seabirds
- SR-2: Understand foraging ecology of seabirds
- CC-3: Explore the impacts of climate change on patterns of human use and cultural services
- HB-3: Continue to harness best available technologies to characterize shipwrecks and share findings with the public

Potential Partners

National Marine Fisheries Service, NOAA National Centers for Environmental Information, Woods Hole Oceanographic Institution, University of New Hampshire, Northeastern Regional Association of Coastal Ocean Observing Systems, U.S. Navy.

Water Quality Monitoring Action Plan

Action Plan Goal: Collaborate on water quality monitoring and research in the sanctuary to determine whether it can continue to maintain healthy resources.

Background: The water column in SBNMS is an important habitat for numerous organisms, from plankton and fish to seabirds and marine mammals. This exceptional diversity of marine life in the sanctuary depends on good water quality, and findings in the 2020 condition report indicate that despite several potential stressors, sanctuary water quality does not currently appear to be adversely impacted by human activities.

However, numerous threats continue to pose potential harm to water quality. Anthropogenic contaminants, wastewater discharges, and vessel discharges are stressors of particular relevance that may impact water quality within the sanctuary. Climate change is influencing the primary production cycle in the region, and has the demonstrated capacity to produce cascading effects within the ecosystem. Additional changes in water temperature, dissolved oxygen, stratification, sea level, precipitation, and storm activity have been documented or modeled and it is unclear how the inundation of coastal areas combined with more frequent and severe storms may change sediment sources/transport and impact offshore environments in Massachusetts Bay. More robust monitoring incorporating sea surface, bottom, and water column measurements is

necessary across SBNMS and the wider region to understand acidification trends, seasonal fluctuations, and possible ramifications for shellfish and the larger ecosystem. Ongoing contaminant monitoring has focused on a handful of legacy contaminants, leaving the majority of emerging organic contaminants unmeasured. While large commercial and cruise ship discharges have the potential to adversely influence water quality in the sanctuary, there is no data available on the levels of discharges that may be occurring in the sanctuary.

Despite the importance of water quality to maintaining sanctuary resources, NOAA has never undertaken its own SBNMS water quality monitoring program, but has relied on data and partnerships with other regional efforts, primarily that of the Massachusetts Water Resources Authority (MWRA) and NERACOOS. These current and historical data sources provide an excellent platform from which to identify and infer long-term water quality trends within and around SBNMS. Continued water quality monitoring efforts provide important baseline data that NOAA can use to understand changes to sanctuary water quality and ecosystem function over time. Through these monitoring efforts and the creation of long-term datasets, NOAA will work to establish SBNMS as a sentinel site in the Gulf of Maine and foster regional collaboration to better protect sanctuary habitat and maintain the fundamental conditions that allow sanctuary resources to thrive. To meet these objectives, there is an immediate need to develop a well-designed and maintained portal for appropriate datasets generated and owned by sanctuary staff in accordance with federal data management standards.

The activities in this plan will support ongoing water quality monitoring in the sanctuary and continue dissemination of data in order to better understand how changes in water quality impact food web dynamics, particularly of commercially important species. Activities will also increase understanding of emerging contaminants, including microplastics, per- and polyfluoroalkyl substances (PFAS), and their impact on sanctuary resources.

Figure 3.14. A tern dives into the ocean in search of food in Stellwagen Bank National Marine Sanctuary. Plankton and other small sea life that support the food web are directly linked with water quality. Photo: Matt McIntosh/NOAA

Strategy WQ – 1: Support ongoing long-term water quality monitoring efforts in SBNMS

- Activity WQ 1.1: Actively seek out academic and non-academic partnerships to conduct research on water quality, ocean chemistry, harmful algal blooms (HABs), contaminants of emerging concern (CECs), plastics, and connections between water quality parameters and food web dynamics.
- Activity WQ 1.2: Continue collaborative partnership with MWRA.

Strategy WQ – 2: Establish the sanctuary as a sentinel site for water quality monitoring in the Gulf of Maine to better characterize baseline benthic and pelagic oceanographic conditions

- Activity WQ 2.1: Increase the number of water quality sampling sites to better represent offshore conditions.
- Activity WQ 2.2: Use hydrodynamic modeling to estimate existing and predict future concentrations and distributions of water quality parameters (e.g., water column stratification, acidity (pH), HABs, contaminants of emerging concern, and plastics).

Strategy WQ – 3: Assess how changes in water quality may impact food web dynamics and species of commercial importance using data for relevant criteria from in and around the sanctuary including any available historical datasets

- Activity WQ 3.1: Develop water quality standards for sanctuary resources.
- Activity WQ 3.2: Monitor HAB taxa and their toxins to better understand their effects on the ecosystem including biota and the shellfish industry.

Strategy WQ – 4: Develop a program to characterize the status of CECs in sanctuary waters over time

- Activity WQ 4.1: Evaluate CEC levels, especially those known to bioaccumulate and/or biomagnify within food webs, through water column, sediment, and wildlife sampling.
- Activity WQ 4.2: Identify contaminant sources, when possible, using chemical analysis, existing literature, and resources from partners.

Strategy WQ – 5: Identify the occurrence and sources of nano- and macro-plastic debris to better understand their impacts on the ecosystem

- Activity WQ 5.1: Continue collaborative partnerships with Center for Coastal Studies, MADMF, dive charter operations, and commercial/recreational fishing partners to identify and remove derelict fishing gear.
- Activity WQ 5.2: Establish a plan to develop partnerships to identify sources, fate, and effects of nanoplastics on marine life.

Strategy WQ – 6: Assess how changes in water quality may impact maritime heritage resources

- Activity WQ 6.1: Use site data in conjunction with available literature to help characterize risk to historic shipwreck sites.

Strategy WQ – 7: Monitor major sources of contaminant discharge into or near sanctuary waters

- Activity WQ 7.1: Continue to provide representation on the MWRA Outfall Monitoring Science Advisory Panel to track actions that may have impacts on the sanctuary.
- Activity WQ 7.2: Review and comment on all National Pollutant Discharge Elimination System requests for municipal wastewater streams that may impact sanctuary waters, and require sanctuary monitoring and reporting components to those permits.
- Activity WQ 7.3: Investigate rates and volume of wastewater discharge from vessels 300 gross tons or larger to understand potential impacts to sanctuary resources.
- Activity WQ 7.4: Monitor potential impacts of pollution (heavy metals, oils, etc.) from shipwrecks on water quality.
- Activity WQ 7.5: Establish a voluntary program to encourage cruise ships to cease discharging in SBNMS.

Related strategies from other action plans

- RM-1: Support science focused on priority sanctuary needs
- RM-3: Characterize the sanctuary's biological/physical features
- MH-3: Categorize and assess newly inventoried sites

Potential Partners

Environmental Protection Agency, Massachusetts Water Resources Authority, NOAA Office of Response and Restoration U.S. Coast Guard, academic institutions, coastal and marine stakeholders, volunteers.

Habitat Action Plan

Action Plan Goal: Develop an improved understanding of the condition of major habitat types within the sanctuary.

Background: Data suggests measurable changes in habitat quality in the sanctuary over the past ten years, both direct (from disturbance by fishing gear) and indirect (from shifts in trophic and competitive interactions that affect populations of structure-forming species).

The condition of major habitat types and associated biological diversity within the sanctuary is widely affected by human activities, with lower levels of direct impacts in the Western Gulf of Maine Closure Area, which overlaps the sanctuary. Information suggests measurable changes in habitat quality over the past ten years, primarily due to bottom-contact gear used in commercial fishing. Impacts to habitat are both direct (from disturbance by fishing gear) and indirect (from shifts in trophic and competitive interactions that affect populations of structure-forming

species). Fishing effort is not uniform across the sanctuary and is more intensive in certain productive areas. Fishing effort also varies from year to year and across different fishing activities. Overall fishing effort in the sanctuary has decreased since 2009, partly as a result of sector management implementation in 2010 as part of the Northeast Multispecies Fishery Management Plan (see 2020 condition report). There was a significant increase in scallop dredging in the northern end of the sanctuary in 2017, but as a result of NEFMC and GARFO management actions, this effort was significantly reduced in 2018. That activity is expected to increase in 2022 when scallop resources approach harvestable size in many parts of the sanctuary.

The strategies in this plan develop and continue the study of habitats within the sanctuary. NOAA will assess habitats for their productivity and biodiversity, including those used by large whales and great shearwaters, as well as sand, bounder, gravel, mud and even shipwrecks.

Strategy HB – 1: Develop and implement a Dedicated Habitat Research Area (DHRA) research plan in collaboration with NEFMC and GARFO

Strategy HB – 2: Continue studies to assess status and trends in species and community composition, species abundance/relative abundance, and patterns and dynamics of diversity of sand, boulder, gravel, and mud habitats

- Activity HB 2.1: Continue to assess status and trends in sanctuary biological and physical features including spatial distribution and change over time.
- Activity HB 2.2: Utilize project mitigation funding when available to fund long term monitoring programs.
- Activity HB 2.3: Characterize the fish and invertebrate productivity that is supported by the various habitats of SBNMS.
- Activity HB 2.4: Use metrics from long term passive acoustic data to track use of habitat features that vary at the scale of the sanctuary.

Strategy HB – 3: Document the habitat that develops on shipwrecks and characterize the unique biodiversity of the habitat based on the composition of the shipwreck and the location (depth, bottom type, etc.)

- Activity HB 3.1: Compare and contrast the ecology of shipwrecks at different depths as well as with surrounding natural reefs.
- Activity HB 3.2: Use photogrammetric models of shipwrecks (see Activity MH 3.4) as site maps to document patterns of colonization by invertebrates and use as habitats by other species.

Related strategies from other action plans:

- MH-3: Continue to harness best available technologies to characterize shipwrecks and share findings with the public
- RM-1: Support science focused on priority sanctuary needs

- SS-4: Use status and trend information to monitor indicators of human-induced noise influence

Potential Partners

New England Fishery Management Council, National Marine Fisheries Service, Boston University, University of Massachusetts School of Marine Science and Technology, University of Connecticut, Woods Hole Oceanographic Institution, U.S. Geological Survey, Bureau of Ocean Energy Management.

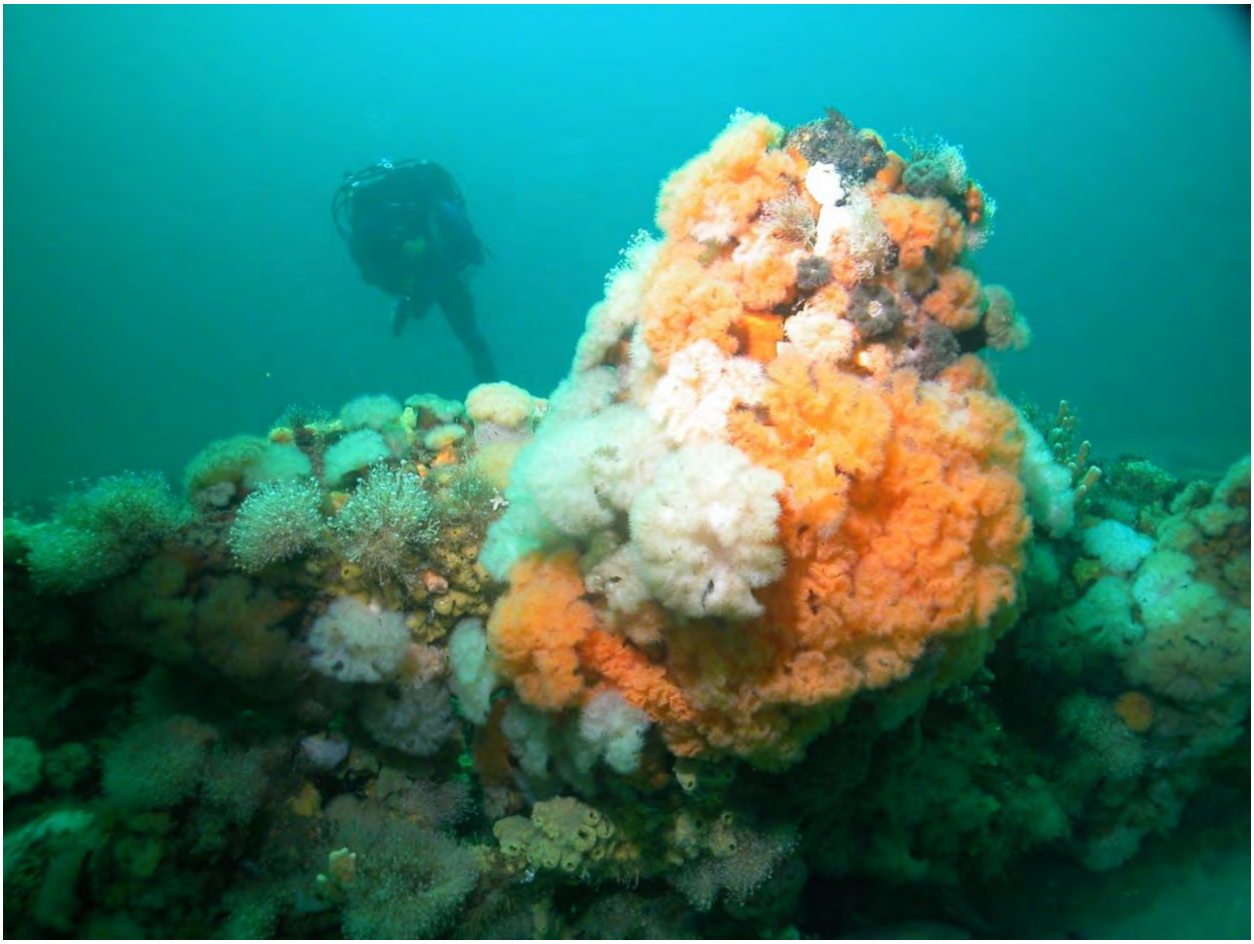

Figure 3.15. A diver looks at anemones and sponges on the schooner Paul Palmer shipwreck. Sponges and anemones and other species turn shipwrecks into important localized habitats in the sanctuary. Photo: Matthew Lawrence/NOAA

Objective 3.3: Understand the value of sanctuaries to our nation

Ecosystem Services Action Plan

Action Plan Goal: Explore the dynamic connections between sanctuary resources and ecosystem services to better inform management decisions. Better understand and quantify the economic and intrinsic values of SBNMS to natural and human systems.

Background: The Ecosystem Services Action Plan was developed to help focus and deepen efforts to understand how sanctuary resources support nearby coastal communities. People have been recognized as an important feature of the Stellwagen Bank landscape for thousands of years, and threats to fundamental ecosystem services such as food supply and sense of place were a driving force in the designation of the sanctuary in 1992.

For the purposes of this management plan, ecosystem services are defined as "benefits that humans desire from the environment" (e.g., recreation or food). They are what link humans to ecosystems, can be goods or services (e.g., food is a good, and coastal protection is a service), are valued by various types of users, and can be regulated directly by the environment, or managed by controlling human activities or ecosystem components (e.g., restoring habitats). Whether or not specific services are rendered can be evaluated directly or indirectly based on attributes of the natural ecosystem that people care about. For example, recreational scuba divers care about water clarity and visibility. These are attributes that can be measured and assigned status and trend ratings, which then allows one to track one or more specific ecosystem services to which they pertain.

Although other action plans also address interactions between people and the marine environment, the lens of ecosystem services provides a valuable framework to assess how the ongoing work of sanctuary staff and new projects may contribute to the ecosystem services outlined in the sanctuary's 2020 condition report: heritage, consumptive recreation, non-consumptive recreation, sense of place, science, education, and food supply.

This plan was developed in recognition of the importance of understanding how sanctuary resources support nearby coastal communities. The strategies in this plan support modeling ecosystem service dynamics, expanding socioeconomic research, and developing partnerships to broaden research projects.

Figure 3.16. Recreational, charter, and commercial fisherman rely on the sanctuary's thriving ecosystem for their livelihoods. Charter fishermen take out customers to fish and opportunistically watch wildlife in Stellwagen Bank National Marine Sanctuary. Photo: Matt McIntosh/NOAA

Strategy ES – 1: Model ecosystem service dynamics using innovative technology and best practices

- Activity ES 1.1: Continue to collaborate on and develop new models and graphic visualizations for ecosystem service flows involving the sanctuary's focal species and major human activities (e.g., Multiscale Integrated Models of Ecosystem Services (MIMES), Marine Integrated Decision Analysis System (MIDAS) and other indicator panels such as the Ocean Health Index).
- Activity ES 1.2: Develop a graphic visualization of the current and ongoing state of key tradeoffs relative to SBNMS management plan goals.
- Activity ES 1.3: Explore the use of ecosystem service metrics to better understand how activities in the sanctuary contribute to the regulation of climate, air quality, carbon, hazard mitigation, and biological controls.

Strategy ES – 2: Expand socioeconomic research on ecosystem services

- Activity ES 2.1: Study the economic impacts of education/outreach efforts.
- Activity ES 2.2: Study cultural services.
- Activity ES 2.3: Examine relationships between ecosystem services and human well-being.
- Activity ES 2.4: Leverage maritime cultural landscape analysis to inform understanding of the sanctuary's cultural ecosystem services.

Strategy ES – 3: Pursue partnerships with external researchers and historical and current resource users to develop and implement ecosystem service research projects

- Activity ES 3.1: Build and strengthen a network of social scientists working on studies associated with SBNMS.
- Activity ES 3.2: Investigate collaborative ecosystem service research in other sanctuaries and/or other marine protected areas.

Related strategies from other action plans

- RM-4: Understand SBNMS as a coupled human-ecological system.

Potential Partners

National Marine Fisheries Service, Massachusetts Division of Fish and Wildlife, New England Fishery Management Council, Massachusetts Office of Coastal Zone Management, Boston University Marine Program, academic institutions, coastal and marine stakeholders.

GOAL 4: ENSURE COORDINATED SUPPORT FOR SANCTUARY INFRASTRUCTURE, STAFF, AND FIELD OPERATIONS

Sanctuary management is dependent on having effective administration, from appropriate staffing, responsible budget and facilities management, to nurturing an extensive volunteer network. Effective enforcement and management plan implementation are also vital to achieving the sanctuary's mission.

Objective 4.1 Responsibly manage facilities, staff, and infrastructure to implement management plan

Administration and Infrastructure Capacity Action Plan

Action Plan Goal: Provide staff and resources to implement this management plan.

Background: The purpose of the Administration and Infrastructure Capacity Action Plan is to ensure that the basic resources for carrying out this management plan are in place. These resources include sufficient staffing, full funding, adequate facilities, functioning vessels and vehicles, and adequate compliance with protection measures. This action plan addresses these operational needs and details NOAA 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 data, carry out administrative duties, and support enforcement efforts. This Administration and Infrastructure Capacity Action Plan supports all other action plans in the management plan, ensuring staffing, provision and maintenance of facilities and equipment, and administrative support that enables effective implementation of research, education, and all other management activities.

Figure 3.17. The Stellwagen Bank National Marine Sanctuary's R/V *Auk* provides a platform for the sanctuary to work with its partners to conduct research, monitoring, resource protection, and education activities. Photo: NOAA

Strategy AD – 1: Recruit, retain, and support staff in order to support ongoing programs and achieve the goals and objectives presented in the management plan

- Activity AD 1.1: Support, maintain, and increase staff capacity as necessary to implement the management plan.
- Activity AD 1.2: Improve training opportunities for staff, prioritizing training that will support management plan implementation.
- Activity AD 1.3: Coordinate with NOAA/ONMS staff on implementation of NOAA's Diversity and Inclusion Strategic Plan; encourage and empower diversity and inclusion principles in all sanctuary programming.

Strategy AD – 2: Manage facilities and site infrastructure, including vessels

- Activity AD 2.1: Develop a plan to transition the SBNMS facility to a net zero energy facility by 2025 and that all operations are net zero by 2050.
- Activity AD 2.2: Repair boathouse and pier pile structures.
- Activity AD 2.3: Renovate boathouse interior and convert into a marine operations center.
- Activity AD 2.4: Develop capability and invest in maintenance and improvements to the R/V *Auk* to ensure its capability to safely perform missions for the next 20 years.
- Activity AD 2.5: Identify reasonable life cycle of R/V *Auk* and begin planning for its replacement.
- Activity AD 2.6: Procure new whale tagging boat that can also conduct other outreach and research missions.
- Activity AD 2.7: Fund construction of planned Provincetown Visitor Center with partners.

Strategy AD – 3: Facilitate field operations

- Activity AD 3.1: Facilitate use of the R/V *Auk* by staff, other agencies, and partners to conduct priority projects that further the SBNMS or NOAA mission.
- Activity AD 3.2: Ensure field operations are conducted in compliance with safety & environmental requirements.

Strategy AD – 4: Formulate and manage SBNMS budget.

- Activity AD 4.1: Prepare, track and fully execute an annual budget for the site, and plan for out-year spending.

Strategy AD – 5: Coordinate with the National Marine Sanctuary Foundation to support implementation of management plan priorities

- Activity AD 5.1: Coordinate the operational aspect of partnered research missions with the Foundation and SBNMS Operations Coordinator.
- Activity AD 5.2: Work with the Foundation to identify and solicit support from outside funders for management priorities.
- Activity AD 5.3: Work with the Foundation on their outreach efforts to enhance the awareness and understanding about sanctuary programs and priorities.

Strategy AD – 6: Support the development of the National Marine Sanctuary System and support ONMS needs as appropriate

- Activity AD 6.1: Provide staff resources to assist with system expansion, other priority management efforts, and programs at other sites.
- Activity AD 6.2: Provide staff resources to assist with designation of new sanctuaries.
- Activity AD 6.3: Provide staff resources to support ONMS, National Ocean Service, and NOAA initiatives, as requested.

Strategy AD – 7: Periodically evaluate the need and feasibility for modifying the sanctuary boundary

- Activity AD 7.1: Use the condition report and management plan review processes, and other resource assessments, as a means to assess whether the existing boundary is adequate to meet the purposes of the sanctuary.

Strategy AD – 8: Maintain an effective enforcement program

- Activity AD 8.1: Update and fully implement the cooperative enforcement agreement between SBNMS and OLE working with the USCG and the MEP to ensure adequate enforcement presence and prosecution regarding the sanctuary.
- Activity AD 8.2: Maintain the existing MOA with MEP delineating its use of the NOAA facility.
- Activity AD 8.3: Routinely meet with OLE, USCG, and MEP to coordinate and plan patrol activity.
- Activity AD 8.4: Use SBNMS as a pilot area for innovative enforcement techniques utilizing new technologies, such as acoustic detection of illegal trawling in closed areas.

Strategy AD – 9: Participate in site and regional contingency planning

- Activity AD 9.1: Maintain coordination with NOAA's Scientific Support Coordinator.
- Activity AD 9.2: Continue participation with the USCG Sector Boston Plymouth to Salisbury Area Committee, develop relationships with USCG Sector Southeastern New England, and ensure SBNMS Annex is included in appropriate Area Response Plans.
- Activity AD 9.3: Attend emergency response exercises and training as appropriate.
- Activity AD 9.4: Maintain ONMS All Hazards Response plan and participate in training.
- Activity AD 9.5: Maintain Continuity of Operations Plan in cooperation with the National Weather Service Norton office.

Strategy AD – 10: Support and expand volunteer program

- Activity AD 10.1: Support existing volunteers through training and engagement.
- Activity AD 10.2: Sustain and diversify the volunteer program by retaining current volunteers, wider recruitment of new volunteers, and development of new volunteer opportunities.
- Activity AD 10.3: Continue the citizen science volunteer programs and offer additional opportunities as appropriate.

Related strategies from other action plans

- IC-1: Promote high-level, consistent regional coordination
- MP-1: Continue projects to inform ship strike, entanglement and response to noise
- IC-1: Promote high-level, consistent regional coordination

Potential Partners

NOAA Office of Law Enforcement, U.S. Coast Guard, Massachusetts Environmental Police, National Marine Fisheries Services, NOAA General Counsel, National Marine Sanctuary Foundation, Provincetown Chamber of Commerce.

Performance Indicators

NOAA has identified measures (Table 3.1) by which each action plan can be evaluated to determine progress toward desired outcomes. Success of this draft management plan will be evaluated through indicator measures like the ones listed below. In addition to members of SBNMS's staff working toward the implementation of each of the action plans, SBNMS will work cooperatively with its partners, including federal, state and local agencies, non-governmental organizations, as well as the Sanctuary Advisory Council and its working groups.

Table 3.1. Performance Indicators for Action Plans

Performance Indicator	Method of Evaluation	Baseline	Timeline	Staff Lead
MP-1: Assessment of large whale vulnerability to human threats	# of research projects conducted to understand large whale vulnerability to human activity; # of journal papers published, and # of presentations delivered; and # of management actions (NOAA and other agencies) informed by SBNMS research projects	2018	ongoing	Research coordinator
SR-1: Develop plan with GARFO, NEFMC, and USFWS to address potential bycatch issues	Bycatch reduction plan developed	Initial bycatch report provided in 2020 condition report	2025	Research coordinator
VT-1: Whale Alert app is 100% funded by appropriated funds and fully integrated into NOAA's Citizen Science Strategy	Percentage of funding for Whale Alert app that is appropriated vs. external	2020 Whale Alert is entirely supported with external funding	2023	Research coordinator
VT-2: Compliance by vessels 300 gross tons or greater with the Seasonal Management Areas	Annual AIS & GIS monitoring conducted	2018 compliance level of 85%	2023 and annually	Research coordinator
MH-1: Incursions into voluntary shipwreck avoidance zones show a decreasing trend	Annual monitoring of select sites through a combination of VMS and/or AIS data, side-scan sonar, and research dives	2021 report on compliance with four voluntary shipwreck avoidance areas	2023	Maritime heritage coordinator
MH-2: NRHP-listed shipwreck sites are not entangled or damaged by fishing gear	Annual monitoring of select sites through a combination of VMS and/or AIS data, side-scan sonar, and research dives	2020 level of entangled gear and demonstrable damage from gear for: *-Portland* *-Paul Palmer* *-Crary/Palmer*	2027	Maritime heritage coordinator

Performance Indicator	Method of Evaluation	Baseline	Timeline	Staff Lead
CU-1: Major sanctuary uses and economic contributions to coastal communities are documented and, if appropriate, quantified	100% of sanctuary activities are quantified for economic impacts	2020: reports on fishing uses and whale watching only	2025	ONMS socioeconomics team and sanctuary staff
CU-2: Level of permitted research activity	# of research permits issued	2020-2021: issued: 4	2025	Permit coordinator
CC-1: SBNMS is recognized as a regional climate change sentinel site	# of deployed assets; # research projects; and # of published papers	Assets: 2 NERACOOS buoys Research projects: 1 Papers: 1	2025	Research coordinator
CC-2: Complete Vulnerability Assessment	% of vulnerability report completed	# of reports: 0	2023	Research marine scientist
EO-1: Increasing trend in teacher and student participation in sanctuary online programming	Education webinars delivered (by SBNMS or in partnership) and participant numbers compiled	2020: 10 (7 telepresence/WHOI, 1 NOAA Live, 2 ONMS)	2025	Education and outreach coordinator
EO-2: Increasing use of the SBNMS website by the public, including media, educators, and students	Google Analytics to assess activity and change over time for individual pages	2021 New website	2022	Education and outreach coordinator
EO-3: Increasing trend in public awareness and visibility in social media platforms	Q-Score, Facebook, and Twitter Analytics (followers, likes, engagement, etc.)	2021: 1950 Twitter followers	2022	Education and outreach coordinator
IC-1: All relevant state, regional, and federal agencies are aware of and engaged with SBNMS	% of meetings affecting SBNMS covered by staff, volunteers, or SAC members	2021: TBD	2023	Superintendent
IC-2: Compliance with E.O. 13175 and NHPA	Identify all Indigenous communities with ties to SBNMS and develop a road map to more effective engagement	2021: 0	2023	Superintendent

Performance Indicator	Method of Evaluation	Baseline	Timeline	Staff Lead
IC-3: Maintain agreements with four sister sanctuary partner countries	# of joint activities with sister sanctuaries	2021: 0	2025	Deputy superintendent
SAC-1: Achieve 80% engagement of SAC members and alternates in SAC work plan activities	3-4 meetings per year; 50%+ participation in subcommittees and working groups; and SAC Work Plan and individual work plan activities fulfilled by members/alternates	2020 SAC Work Plan accomplishments and meeting minutes	Yearly	Advisory council coordinator
RM-1: Appropriate research and monitoring data are publicly accessible through data portals	# of datasets accessible via the web	Level of 2020 access to data through data portals: none	2025	Research coordinator
RM-2: Maintain or increase externally funded research and monitoring projects	Number of projects	2020 projects	2025	Research coordinator
SS-1: Maintain long term passive acoustic monitoring stations and use of short term stationary and mobile listening assets to target additional needs in SBNMS	# of long term stations and # of short term deployments in SBNMS	3-4 long term stations, ~2 targeted short term deployments/year	2027	Marine ecologist
SS-2: Increase archiving and public access for SBNMS passive acoustic raw data and data products	Terabytes of SBNMS-collected raw data and standardized data products federally archived and publicly available	~5 TB (2020)	2027	Marine ecologist
SS-3: Maintain dissemination of results within scientific community and to public	# of reports, scientific papers, media articles, etc. published that synthesize and interpret the relevance and significance of SBNMS acoustic data	~75 (2020)	2027	Marine ecologist

Performance Indicator	Method of Evaluation	Baseline	Timeline	Staff Lead
SS-4: Maintain or increase management applications of SBNMS passive acoustic data	# of SBNMS, national, and international management actions or activities supported by SBNMS acoustic data collection efforts	~15	2032	Marine ecologist
SS-5: Maintain or increase partnerships regionally, nationally, and internationally that relate to the collection and dissemination of SBNMS acoustic data, information, and findings	# of partnerships created or maintained	~15	2032	Marine ecologist
WQ-1: Updated status of contaminants of emerging concerns report	MWRA monitoring data	2019 MWRA Outfall PFAS study	2027	Research coordinator
WQ-2: Develop new or expand existing partnerships to support water quality monitoring in SBNMS	Number of projects	2 (2020)	2025	Research coordinator
HB-1: DHRA research plan	Number of projects conducted in DHRA	2022: 3 projects	2025	Deputy superintendent
HB-2: Assess status of biological diversity inside and outside the DHRA	Camera sled surveys at select sites for functional diversity and key species	2022: 1 project	2032	Research coordinator
HB-3: Comparative study of biodiversity on shipwrecks and natural reefs	Published report/paper based on random point count sampling	2022: 1 project	2025	Maritime heritage coordinator
ES-1: Develop partnerships to support expanded socioeconomic research in the sanctuary	Contracts, MOU, co-publication, shared research platforms/tools; Targeting 2 partners involved in social science research (URI & WHOI) in 2022	2021: 0	2024	Research coordinator

Performance Indicator	Method of Evaluation	Baseline	Timeline	Staff Lead
ES-2: Develop indicators for ecosystem services	% of performance indicators developed for all ecosystem services listed in 2020 condition report	2022: 2 indicators – heritage and sense of place	2023	Maritime heritage coordinator
AD-1: Status of management strategy completion	Annual accomplishments report to SAC	2021 Draft Management Plan	2023, Annually	Deputy superintendent
AD-2: Percentage of workload to hired staff	Compare workload estimates for ongoing activities against current staffing	2022: to be determined	2025	Superintendent
AD-3: Completion of scheduled maintenance	% of scheduled maintenance completed for facilitates and vessels	TBD	2022	Vessel and facility coordinator
AD-4: Compliance with applicable laws and regulations	% of law enforcement contacts (e.g., boardings) that have no violations	2022: to be determined	2025	Deputy superintendent
AD-5: Volunteer program maintained	# of active volunteers per year and # of volunteer hours provided	2021: 75 volunteers, 3600 hours	2023	Volunteer coordinator

Prioritization

The action plans, strategies and activities developed for this management plan were prioritized (see Table 3.2) to serve as a guide for implementation. Each strategy was assessed in the following categories and given a numerical score for:

- Importance – level of urgency for each strategy.
- Impact – how much will this strategy positively impact the health of sanctuary resources and/or the well-being of sanctuary users?
- Feasibility – ability to effectively implement strategy based on support from relevant agencies, public audiences, and ONMS
- Cost – expenses for equipment, maintenance, travel, and labor

Based on the total numerical score from the categories listed above, strategies were assigned a priority of high, medium, or low as indicated in the second column of Table 3.2. It's important to note that those priorities represent a snapshot in time. The prioritization criteria described above can and will be reassessed throughout the life of this management plan to provide a flexible framework to assess priorities as situations change and new challenges arise.

Table 3.2. Strategy prioritization for SBNMS Draft Management Plan

Strategy/Activity	Priority	Ongoing Strategy?	Funded Internally?	Funded Externally?	Comments
Strategy MP – 3: Continue to provide guidance to, and involvement with, federal and state agencies designed to reduce entanglement and whale strikes	H	Y	Y	N	Participate in national and international committees and take reduction teams.
Strategy MP – 4: Continue and expand projects designed to understand top predator ecology, including drivers of abundance and distribution of marine mammals	H	Y	N	Y	Funded by IFAW and The Volgeneau Foundation. Funded through FY21
Strategy MP – 1: Continue projects to inform ship strike, entanglement, and response to noise	M	Y	N	Y	Funded by USN, IFAW, and The Volgeneau Foundation. Funded through FY21
Strategy MP – 5: Expand Boater Outreach for Whale Watching (BOWW) program to reach more private boaters	M	Y	Y	N	Could be more efficiently conducted with whale tag boat.
Strategy MP – 2: Support research into entanglement prevention	L	Y	N	N	Project cut due to FY 21 budget. We support other entities involved in this work.
Strategy SR – 1: Identify habitat use of seabirds	H	Y	N	Y	Seabird research is funded by a grant from the Volgeneau Foundation.
Strategy SR – 2: Understand foraging ecology of seabirds	H	Y	N	Y	Seabird research is funded by a grant from the Volgeneau Foundation.
Strategy SR – 5: Investigate seabird bycatch to better understand population dynamics and commercial fisheries interactions	M	Y	N	Y	Seabird research is funded by a grant from the Volgeneau Foundation.
Strategy SR – 6: Understand seabird use of SBNMS relative to wider Gulf of Maine and Atlantic Ecosystems	M	Y	N	Y	Seabird research is funded by a grant from the Volgeneau Foundation.
Strategy SR – 3: Understand contaminant loads in seabirds and marine mammals	L	Y	N	Y	Seabird research is funded by a grant from the Volgeneau Foundation.

Strategy/Activity	Priority	Ongoing Strategy?	Funded Internally?	Funded Externally?	Comments
Strategy SR – 4: Investigate the use of seabirds as a tool for dynamic ocean management	L	Y	N	Y	Seabird research is funded by a grant from the Volgeneau Foundation.
Strategy VT – 4: Monitor impacts to the sanctuary from vessels and associated uses to provide project-specific mitigation recommendations and support international shipping noise reduction efforts	H	Y	Y	Y	
Strategy VT – 5: Monitor vessel traffic using all available data (e.g., AIS, VMS, VTR) in order to understand patterns of use and potential impacts on resources	H	Y	Y	Y	
Strategy VT – 2: Continue Right Whale Corporate Responsibility program	M	Y	N	Y	
Strategy VT – 1: Maintain and update Whale Alert data, technology, and infrastructure	M	Y	N	Y	
Strategy VT – 3: Continue modeling vessel speed and lethality and analyzing ship strikes	L	Y	N	Y	
Strategy MH – 4: Categorize and assess newly inventoried sites	H	N	N	Y	
Strategy MH – 2: Continue implementing and expanding the Shipwreck Avoidance Program to facilitate protection of historic resources and reduce damage to shipwrecks resulting from contact with fishing gear	H	Y	Y	N	
Strategy MH – 3: Continue to inventory and characterize historical resources	H	N	N	Y	
Strategy MH – 5: Conduct a long-term maritime cultural landscape analysis to document the historical context of the sanctuary and its resources	H	N	N	Y	
Strategy MH – 8: Facilitate sustainable public access to shipwrecks	M	N	N	N	

Strategy/Activity	Priority	Ongoing Strategy?	Funded Internally?	Funded Externally?	Comments
Strategy MH – 7: Engage public audiences in maritime heritage research and discovery through outreach, tourism, education, and the development of citizen science programs	M	N	N	Y	
Strategy MH – 1: Conduct surveys using state-of-the-art mapping technology to map 100% of the seafloor within SBNMS to identify and characterize cultural, biological, and geological resources	M	Y	N	Y	Mapping project with Mind/Klein Marine Systems scheduled to get underway in 2021.
Strategy MH – 6: Continue partnerships to harness best available technologies to characterize shipwrecks and to share findings with the public	L	N	N	Y	2019 and 2020 Telepresence project.
Strategy CU – 5: Issue permits and conduct consultations to ensure sanctuary use is compatible with SBNMS mission and regulations	H	Y	Y	N	Non-discretionary activity.
Strategy CU – 2: Identify, evaluate, track, and respond to emerging activities and potential threats to sanctuary resources (e.g., offshore wind, aquaculture, submarine cables, etc.)	M	Y	Y	N	Non-discretionary activity.
Strategy CU – 4: Promote the sanctuary as a testing ground for innovative methods and technology to manage multiple resource uses	L	N	N	N	
Strategy CU – 6: Conduct baseline assessment of visitor use (number, origin, and types of users, and their activities in the sanctuary) to facilitate long-term evaluation of resource impacts and potential compatibility conflicts	L	N	N	N	Likely to be done in collaboration with ONMS economists.
Strategy CU – 1: Refine tools for assessing compatibility of activities in the sanctuary	L	N	N	N	
Strategy CU – 3: Collaborate with relevant agencies, NGOs, and commercial/recreational industries to develop voluntary business recognition programs	L	N	N	N	Will follow ONMS guidance when developed.

Strategy/Activity	Priority	Ongoing Strategy?	Funded Internally?	Funded Externally?	Comments
Strategy CC – 3: Share data and communicate results of monitoring studies and how they inform our understanding of climate change	H	N	N	Y	SBNMS will reevaluate funding of this entire action plan in terms of staff engagement. No discretionary funds exist for these programs.
Strategy CC – 1: Establish the sanctuary as a sentinel site for understanding the impacts of climate change on the sanctuary ecosystem	H	N	N	Y	
Strategy CC – 2: Conduct a vulnerability assessment to identify the greatest climate-related risks to sanctuary resources, including biological and cultural resources as well as patterns of human use and cultural services	H	N	N	Y	Will be done in collaboration with ONMS climate staff.
Strategy EO – 1: Increase capacity to reach members of the public to advance awareness, foster support for solutions, and inspire stewardship to ensure a thriving sanctuary	M	Y	Y	N	
Strategy EO – 2: Make the sanctuary a hub for regional marine resources and resource management to increase public engagement	M	Y	N	N	
Strategy EO – 3: Increase support for SBNMS by building partnerships that facilitate cooperation in offering creative solutions for sanctuary education and outreach in a changing world	L	Y	Y	N	
Strategy IC – 1: Promote consistent regional coordination among relevant agencies to share information, increase agency capacity to manage resources effectively, and create incentives for coordination	H	N	Y	N	
Strategy IC – 2: Promote intergovernmental collaboration with regional Indigenous tribes, nations, and organizations with cultural ties to the sanctuary	H	N	N	N	Non-discretionary activity. This item will be a top priority upon completion of the management plan revision.

Strategy/Activity	Priority	Ongoing Strategy?	Funded Internally?	Funded Externally?	Comments
Strategy IC – 4: Create an engagement plan that capitalizes on existing connections with other agencies and partners through current SAC members to facilitate information sharing and strengthen interagency relationships	H	Y	Y	N	
Strategy IC – 3: Regularly evaluate the goals and effectiveness of institutional relationships	M	N	N	N	
Strategy IC – 5: Promote international collaboration to achieve research and management objectives	M	N	N	Y	
Strategy SAC – 1: Coordinate and support SAC operations	H	Y	Y	N	Non-discretionary activity.
Strategy SAC – 3: Communicate with SAC regarding staff and management updates	H	Y	Y	N	Non-discretionary activity.
Strategy SAC – 2: Enhance SAC engagement	M	Y	Y	N	Non-discretionary activity.
Strategy RM – 1: Support science focused on priority sanctuary needs	M	Y	N	N	Impossible to focus scientific activities on priority needs due to the lack of appropriated funding. External funds come with shared priorities of the partners that provide it.
Strategy RM – 2: Implement coordinated data management and facilitate the flow of science information among academic institutions, government agencies, and other institutions	L	N	N	N	
Strategy RM – 4: Understand SBNMS as a coupled human-ecological system	L	N	N	N	
Strategy RM – 3: Characterize the sanctuary's biological and physical features to better understand relationships among ecosystem components, biodiversity, and system productivity	L	N	N	N	

Strategy/Activity	Priority	Ongoing Strategy?	Funded Internally?	Funded Externally?	Comments
Strategy SS – 1: Maintain low frequency monitoring station (Noise Reference Station) to assess changes over time in acoustic contributions from vessels, linked to shifts in calling baleen whales and fish and compare to regional and national trends	H	Y	N	Y	This activity is funded by the U.S. Navy through 2022.
Strategy SS – 2: Maintain broadband soundscape monitoring stations (i.e., "SanctSound"), which have collected seasonal data 2016-18, and continuous data since 2018; assess changes over time in ambient levels and contributions from marine mammals, fish, and vessels as part of regional and national ocean observing arrays	H	Y	N	Y	This activity is funded by the U.S. Navy through 2022.
Strategy SS – 4: Use status and trend information and more detailed knowledge of overlap in biological and anthropogenic sources to monitor indicators of human-induced noise influence	H	Y	N	Y	This activity is funded by the U.S. Navy through 2022.
Strategy SS – 3: Conduct seasonal passive acoustic and telemetry enabled glider surveys to better understand distribution and behavior of target sound-producing species in particular areas and time periods	M	Y	N	Y	This activity is funded by the U.S. Navy through 2022.
Strategy SS – 5: Add an acoustic monitoring station to shipwrecks to deepen understanding of the role of wrecks in supporting sanctuary biodiversity	L	N	N	Y	This activity is funded by the U.S. Navy through 2022.
Strategy WQ – 6: Assess how changes in water quality may impact maritime heritage resources	H	N	N	Y	
Strategy WQ – 7: Monitor major sources of contaminant discharge into or near sanctuary waters	M	Y	Y	Y	Research work completed by Nancy Foster Scholar; funding expires in 2021.
Strategy WQ – 1: Support ongoing long-term water quality monitoring efforts in SBNMS	M	N	N	Y	Support MWRA and NERACOOS.
Strategy WQ – 5: Identify the occurrence and sources of nano- and macro-plastic debris to better understand their impacts on the ecosystem	L	N	N	Y	

Strategy/Activity	Priority	Ongoing Strategy?	Funded Internally?	Funded Externally?	Comments
Strategy WQ – 4: Develop a program to characterize the status of contaminants of emerging concern (CECs) in sanctuary waters over time	L	N	N	Y	
Strategy WQ – 2: Establish the sanctuary as a sentinel site for water quality monitoring in the Gulf of Maine to better characterize baseline benthic and pelagic oceanographic conditions	L	N	N	Y	
Strategy WQ – 3: Assess how changes in water quality may impact food web dynamics and species of commercial importance using data for relevant criteria from in and around the sanctuary, including any available historical datasets	L	N	N	Y	
Strategy HB – 1: Develop and implement a Dedicated Habitat Research Area (DHRA) research plan in collaboration with NEFMC and GARFO	H	Y	N	N	A research plan exists but is currently unfunded.
Strategy HB – 2: Continue studies to assess status and trends in species and community composition, species abundance/relative abundance, and patterns and dynamics of diversity of sand, boulder, gravel, and mud habitats	M	Y	N	Y	Sand lance project funding provided by BOEM expires in 2021.
Strategy HB – 3: Document the habitat that develops on shipwrecks and characterize the unique biodiversity of the habitat based on the composition of the shipwreck and the location (depth, bottom type, etc.)	L	N	N	Y	Funding for this work expired in 2020.
Strategy ES – 2: Expand socioeconomic research on ecosystem services	H	N	N	N	Will require collaboration with ONMS and external researchers.
Strategy ES – 3: Pursue partnerships with external researchers and historical and current resource users to develop and implement ecosystem service research projects	M	N	N	N	
Strategy ES – 1: Model ecosystem services dynamics using innovative technology and best practices	L	N	N	N	Will require collaboration with ONMS and external researchers.
Strategy AD – 4: Formulate and manage SBNMS budget	H	Y	Y	N	Non-discretionary activity.

Strategy/Activity	Priority	Ongoing Strategy?	Funded Internally?	Funded Externally?	Comments
Strategy AD – 3: Facilitate field operations	H	Y	Y	Y	Some field operations are funded with appropriated funds, but most major research projects are funded externally.
Strategy AD – 8: Maintain an effective enforcement program	H	N	Y	Y	Non-discretionary activity. Reliant on federal and state partners to conduct enforcement operations.
Strategy AD – 9: Participate in site and regional contingency planning	H	Y	Y	N	Non-discretionary activity.
Strategy AD – 5: Coordinate with the National Marine Sanctuary Foundation to support implementation of management plan priorities	M	Y	Y	N	Non-discretionary activity.
Strategy AD – 2: Manage facilities and site infrastructure, including vessels	M	Y	Y	Y	Non-discretionary activity. We rely on WHOI to provide boat for whale tagging research.
Strategy AD – 1: Recruit, retain, and support staff in order to support ongoing programs and achieve the goals and objectives presented in the management plan	M	Y	Y	Y	Non-discretionary activity. Affiliate staff funded externally are necessary to complete many research programs.
Strategy AD – 10: Support and expand volunteer program	M	Y	Y	N	Non-discretionary activity.
Strategy AD – 6: Support the development of the National Marine Sanctuary System and support ONMS needs as appropriate	L	Y	Y	N	Non-discretionary activity.
Strategy AD – 7: Periodically evaluate the need and feasibility for modifying the sanctuary boundary	L	Y	Y	N	Non-discretionary activity.

Funding

Since priorities are inextricably linked to resources, a brief discussion on funding is appropriate. Sanctuaries are funded by a mix of federal appropriations and external funding from collaborations with other agencies, partnerships with other organizations, and in-kind/volunteer labor and supplies. As part of the prioritization exercise, a cost model for fully funding each strategy over the next 10 years was developed and averaged out to give an annual cost. The results of the model are depicted in Table 3.3 which indicates that to fully fund the action plans in this strategy, NOAA would require an annual budget in excess of $5.5M per year. These costs include additional operating expenses and an increase in staffing of approximately 11.5 full time employees to implement this entire management plan over the next 10 years.

Table 3.3.[15] Estimated annual costs for action plan implementation.

Action Plan	Average Annual Cost	Total Cost for 10 Years
Marine Mammal	$578,500	$5,785,000
Seabird	$459,290	$4,592,900
Vessel Traffic	$270,000	$2,700,000
Maritime Heritage	$264,828	$2,648,280
Compatible Uses	$103,985	$1,039,850
Climate Change	$256,500	$2,565,000
Education and Outreach	$369,150	$3,691,500
Interagency/Intergovernmental Coordination	$241,340	$2,413,400
SAC	$83,500	$835,000
Research and Monitoring	$402,000	$4,020,000
Soundscape	$384,800	$3,848,000
Water Quality Monitoring	$404,500	$4,045,000
Habitat	$421,400	$4,214,000
Ecosystem Services	$202,000	$2,020,000
Administration and Infrastructure	$1,067,360	$10,673,600
Totals	**$5,509,153**	**$55,091,530**

Currently, ONMS has sufficient resources to conduct 44 of the 76 strategies identified in this management plan. Of those 44 ongoing strategies, 25 are funded with appropriated funding.

[15] These estimates do not include the estimated costs for replacing the research vessel R/V *Auk* ($3M), Provincetown Visitor Center Construction ($20M), or renovations to the SBNMS Maritime Operations Center ($10M).

These strategies represent primarily non-discretionary tasks. For example, the strategies in the Administration and Infrastructure Capacity Action Plan, Sanctuary Advisory Council Action Plan, and Compatible Use Action Plan (e.g., permitting) are all non-discretionary tasks as they are required for responsible and effective sanctuary management. Eight ongoing strategies are funded with a mix of appropriated and external funding, and 11 strategies are primarily resourced with external funding. These tasks are primarily research and monitoring activities. Implementation of the remaining 32 strategies in this management plan would require additional resources. Decreases in appropriated funding or the expiration of projects that are externally funded will widen the gap and result in fewer strategies being carried out by ONMS staff and volunteers.

Any increase in appropriated or external funds would necessitate a discussion to determine the next best investment for ONMS. Those investments would be groups of related activities or entire action plans in order to maximize resource allocation. Staff capacity is typically capable of focusing on groups of similar activities (i.e., Maritime Heritage Program (MHP) or Education and Outreach) and it's not efficient or practical to prioritize activities in a linear order jumping from one action plan to the other. A framework for increasing capacity might entail the following investments which are based on the priorities in Table 3.2. The investment framework would depend on several variables and require vetting with ONMS, site staff, and the SAC.

Possible future investments with additional funding:

1. Fund research and monitoring programs and add staff to make SBNMS a sentinel site for climate change (Strategies CC 1-4).
2. Add staff capacity to address issues identified in the Interagency/Intergovernmental Coordination Action Plan (Strategies IC 1-5).
3. Fund paid internships to support initiatives for diversity and inclusion, education, outreach, and community science capacity.
4. Procure a whale tagging boat that can also conduct Boater Outreach for Whale Watching missions (Strategies AD-2, MP-5).
5. Add staff capacity to address maritime heritage action plan priorities and fund a monitoring program for inventoried shipwrecks (Strategies MH 1-8).
6. Add staff capacity for monitoring vessel traffic (Strategies VT 1-5).
7. Add staff capacity for soundscape monitoring (Strategies SS 1-5).
8. Fund water quality research for contaminants of emerging concern and water quality monitoring program (Strategies WQ 1-9).
9. Fund habitat research in the sanctuary (Strategies HB-1, 3, and 4).
10. Staff and fund data management position (Strategy RM-2).

Of course, the source of funding will play an important role as to which priorities are addressed. Appropriated funding provides for great flexibility and adherence to the priorities laid out above and in Table 3.2. Conversely, external funds understandably need to also consider the source of funding availability along with the project partner's priorities in addition to those of ONMS. Decreased funding would require a similar decision making process but going in the opposite direction and must take into account other factors such federal versus affiliate staffing levels. Finally, it's important to point out that increased capacity of sanctuary staff would take time to

develop. Even if full funding for every action plan were immediately provided, ONMS could not immediately begin to implement every strategy in this management plan due to constraints on how fast ONMS can grow as an organization.

Chapter 4:
Environmental Assessment

This chapter serves as an environmental assessment evaluating the potential environmental consequences of NOAA's proposed action to implement a revised sanctuary management plan for SBNMS and conduct field activities to manage the sanctuary. The required components of an environmental assessment are organized as follows:

- Brief discussion of the purpose and need for the proposed action (sections 2.1 and 2.2)
- Alternatives as required by section 102(2)(E) of NEPA, including the no action (Section 4.2)
- Affected environment (Section 4.3)
- Environmental impacts of the proposed action and alternatives (sections 4.5, 4.6, and 4.7)
- List of agencies and persons consulted (Appendix D)

NOAA prepared this environmental assessment in accordance with NEPA (42 U.S.C. §§ 4321 *et seq.*), the Council on Environmental Quality's (CEQ's) Regulations for Implementing the Procedural Provisions of NEPA (40 CFR §§ 1500-1508 (1978)), and NOAA Administrative Order 216-6A and its Companion Manual, "Policy and Procedures for Compliance with the National Environmental Policy Act and Related Authorities."[16]

4.1 Scope of Environmental Review

Broadly, this environmental assessment evaluates the anticipated environmental effects of implementing the proposed action (Alternative 1) and the No Action Alternative on physical and biological resources, cultural and historical resources, marine uses, and socioeconomic resources within the sanctuary. The goal of this assessment is to capture the broad range of anticipated management actions that would occur at the sanctuary within the next five to 10 years with sufficient detail to provide for a meaningful analysis of potential impacts to the human environment, as required by NEPA.

The timeframe for this environmental analysis is approximately the next five to 10 years, the expected time period until the next management plan review process. The geographic scope of the affected environment and analysis of environmental consequences, and the "action area" for the purposes of ESA compliance, is:

- The boundaries of the sanctuary and similar areas adjacent to the sanctuary where research activities (i.e., seabird tagging studies) could occur;
- Vessel transit routes to and from the sanctuary; and

[16] NOAA prepared this environmental assessment using the 1978 CEQ NEPA Regulations. NEPA reviews initiated prior to the effective date of the revised CEQ regulations may be conducted using the 1978 version of the regulations. The effective date of the 2020 CEQ NEPA Regulations was September 14, 2020. This review began on February 13, 2020 when NOAA published a notice of intent to conduct scoping and prepare an environmental analysis (85 FR 8213). Therefore, NOAA proceeded under the 1978 CEQ regulations.

- Onshore at the SBNMS campus and Marine Operations Center where vessel operations, maintenance, education, and outreach activities could occur.

This analysis could be used to support future issuance of a general permit for management of the sanctuary to the SBNMS Superintendent to implement any management activities that would involve an otherwise prohibited activity under SBNMS regulations.

4.1.1 Additional Compliance Requirements and Consultations

In addition to NEPA, NOAA must comply with several related statutes and executive orders. This document contains information to support effect determinations under: the ESA; Migratory Bird Treaty Act (MBTA); MMPA; NHPA; Essential Fish Habitat (EFH) provisions of the MSA; and Executive Order (E.O.) 12898. Appendix E includes additional documentation related to these compliance requirements or consultation processes, as applicable.

4.1.2 Activities Outside the Scope of this Environmental Assessment

In some cases, limitations in available information and uncertainty regarding the timing, location, or scope of future sanctuary management actions prevent a full analysis within this environmental assessment, because a detailed description of the activity and the need for the activity are not yet known. As such, for the following sanctuary management actions, NOAA did not prepare a full analysis of their environmental consequences in this environmental assessment at this time, but would do so at the time of individual project approval:

- Activities that require individual sanctuary permits or authorizations;
- Implementing memorandums of agreement or cooperative agreements with outside groups to conduct activities in the sanctuary;
- Modifications, expansions, or new construction of facilities;[17]
- Implementing cooperative enforcement agreements with Massachusetts Environmental Police, NMFS Office of Law Enforcement; and
- Development of and management of visitors center.

Activities that Require Individual NMSA Permits[18]

NOAA evaluates all NMSA permit applications received on a case-by-case basis. For each permit application received, NOAA evaluates all environmental compliance requirements, including compliance with NEPA and other environmental regulations (e.g., ESA, MMPA, and NHPA). Some future activities that require an NMSA permit may be similar to the activities described in this environmental assessment, such as a private organization conducting research within the

[17] In 2018, NOAA prepared an environmental assessment and a finding of no significant impact (FONSI) evaluating the potential impacts of creating the SBNMS Marine Operations Center. For a copy of these documents, contact stellwagen@noaa.gov.

[18] This does not include activities permitted under SBNMS-2019-001 (effective: 01/01/2019 to 12/31/2023) which authorizes the sanctuary Superintendent and staff to conduct those activities reasonable and necessary to fulfill management responsibilities consistent with the purposes of the sanctuary management plan, the NMSA, and the NMSA regulations. See Section 4.2.1 for the list of permitted activities that are evaluated in this environmental assessment.

sanctuary. The environmental documentation for an individual permit decision may incorporate by reference relevant portions of this environmental assessment, as appropriate.

Analysis of Future Actions

When more details become available about the activities listed above in this section or when new activities arise, NOAA will assess whether their effects are adequately addressed in this environmental assessment. If they are not, NOAA may conduct additional environmental reviews, and develop independent environmental compliance and consultation documentation, as needed. CEQ's NEPA regulations and NOAA NEPA guidance[19] describe various strategies that allow NOAA to build upon the analysis in this environmental assessment when preparing future environmental compliance documentation. These strategies include: "tiering" (40 CFR § 1502.20 (1978)) and "incorporation by reference" (40 CFR § 1502.21 (1978)).

4.2 Description of Proposed Action and Alternatives

This section describes the alternatives NOAA is considering to update management activities conducted in SBNMS that relate to outreach, education, research, monitoring, and resource protection:

Proposed Action (Alternative 1): Implementation of a revised sanctuary management plan and field activities, and continued implementation of existing sanctuary regulations.

No Action Alternative: Continued implementation of the current sanctuary management plan and field activities, and existing sanctuary regulations.

Implementing a new management plan for SBNMS would guide management decision-making and contribute to the attainment of the goals and objectives of the NMSA and the purposes for which the sanctuary was established. Therefore, the Proposed Action (Alternative 1) is NOAA's Preferred Alternative.

NOAA developed a reasonable range of alternatives as required by CEQ's NEPA regulations (40 C.F.R. 1502.14 and 1505.1(e) (1978)) and the NOAA NEPA Companion Manual. In developing the alternatives and identifying the proposed action for analysis in the environmental assessment, NOAA considered possible regulatory changes, changes to the sanctuary management plan, and changes to routine field activities consistent with achieving the goals for SBNMS. Chapter 2 describes in detail the purpose and need for the proposed action and the process NOAA undertook to develop the draft management plan. Each alternative includes the following components: (1) implementing a sanctuary management plan and routine field activities, and (2) implementing sanctuary regulations, as detailed in this section.

4.2.1 Description of the Proposed Action (Alternative 1)

In the proposed action (Alternative 1), NOAA would implement a revised sanctuary management plan and field activities, and continue to implement current sanctuary regulations to support management of the sanctuary.

[19] NOAA's NEPA Companion Manual: https://www.nepa.noaa.gov/

Chapter 3 contains the full action plans that NOAA would implement under the proposed action. Table 4.1 summarizes the goals of the draft management plan and the action plans that would contribute to each goal. The strategies and activities detailed in the draft action plans would serve as an overarching framework for sanctuary management and outline the non-regulatory activities the sanctuary would undertake in the next five to 10 years to further each goal.

Table 4.1. Management plan goals and action plans

Sanctuary Management Plan Goals	Action Plans to support each goal
Goal 1: Ensure a thriving sanctuary	Marine mammal protection Seabird research Vessel traffic Maritime heritage and cultural landscapes Compatible uses Climate change
Goal 2: Increase support	Education and outreach Interagency/Intergovernmental coordination Sanctuary Advisory Council
Goal 3: Deepen our understanding	Research and monitoring Soundscape Water quality monitoring Habitat Ecosystem services
Goal 4: Ensure coordinated support	Administration and infrastructure

As part of implementing these action plans and NOAA's ongoing management responsibilities for the sanctuary, NOAA routinely conducts field activities in sanctuary waters, in similar areas adjacent to the sanctuary, vessel transit routes to and from the sanctuary, and onshore at the SBNMS campus and Marine Operations Center. Field activities aim to further research and resource protection goals, promote stewardship among local stakeholders, and educate the public and research community on the sanctuary. NOAA would undertake the following types of field activities to support implementation of the revised management plan; see summary in Table 4.2.

Sanctuary vessel use and maintenance

General vessel operations support many of the sanctuary's field projects. The small boats are operated according to the NOAA Small Boat Program guidelines. In addition, sanctuary vessels follow standing orders imposed by ONMS management to minimize impacts on sanctuary resources, particularly whales and other marine mammals. These self-imposed standing orders are followed anytime NOAA knows or believes large whales are present in an area of operation, regardless of time of year.

NOAA would conduct vessel operations to support whale tagging to understand their behavior; diving investigations to document habitats and shipwrecks; seabird surveys to characterize seabird abundance and richness; wildlife investigations to study ecology, behavior, and populations; oceanographic investigations to characterize internal waves and impact on wildlife;

water quality investigations to understand water quality conditions; archaeological investigations to characterize historic and prehistoric resources; education partnerships to conduct student programs; vessel transit to transfer vessel to and from SBNMS and between research stations; acoustic investigations to characterize sound; and vessel maintenance and crew training to ensure crew safety.

All of the above mentioned vessel operations and cruises as well as moving the R/V *Auk* from one location to another require round trip transits of varying lengths and duration. Standing Orders dictate the speed and manner in which the R/V *Auk* is operated around whales. The R/V *Auk* always has dedicated trained observers watching for whales, and it follows Northeast Whale Watching Voluntary Guidelines as well as the 500 yard "no approach" rule for right whales. R/V *Auk* home port is Scituate, Massachusetts.

Scuba diving

Scuba operations support many of the sanctuary's field projects including diving investigations to document habitats and shipwrecks; wildlife investigations to study ecology, behavior, and populations; oceanographic investigations to characterize internal waves and impact on wildlife; and archaeological investigations to characterize historic and prehistoric resources.

With support from sanctuary vessel operations, NOAA certified sanctuary divers conduct sporadic scuba dives between May and October to investigate shipwrecks and survey and document habitats and marine life. These missions focus on portions of the sanctuary that are less than 130 feet (40 meters) deep. Divers are deployed off the R/V *Auk* and use cameras and video to document the dive, assess resources, and acquire data. NOAA would typically use a Simrad ES60 narrow single beam echo sounder (operating at 120 kHz) to locate dive sites. The echo sounder is interfaced to the Scientific Computing System for recording the seafloor depth during diving operations.

Deploying buoys and research or monitoring equipment

Deploying equipment on the seafloor includes attaching buoys to seafloor moorings for access to maritime heritage sites, temporary deployments of passive acoustic monitoring equipment, and other temporary deployments of small equipment to support sanctuary research and monitoring efforts (e.g., weighted markers, moorings for temperature, oxygen, and carbon dioxide (CO2) sensors). Scientific equipment is usually deployed for three to 12 months and then retrieved.

Sampling organisms

As part of implementing sanctuary research and long-term monitoring programs, NOAA would collect organisms using sampling equipment such as a small beam trawl or grab sampler. An example of this is using the Seabed Observation and Sampling System (SEABOSS), a technology created by researchers at the U.S. Geological Survey, to image and sample sand lance throughout the sanctuary.

Collecting artifacts

NOAA may move or recover historical or cultural resources or disturb archaeological sites to protect cultural, historical, or archaeological resources from loss, destruction, or injury, consistent with NMSA permit number SBNMS-2019-001 (effective: 01/01/2019 through

12/31/2023). This could involve collecting artifacts using small hand tools and collecting bags. The expected frequency of conducting this activity under emergency situations is once every five years. NOAA would only conduct this activity in emergency situations to prevent resource loss, destruction, or injury. Collection of artifacts for research or conservation purposes or other disturbance of historical or cultural resources or archaeological sites would require a separate NMSA permit and are outside the scope of this environmental review under NEPA.

Removing materials (e.g., marine debris and nets)

As needed to further resource protection, NOAA may remove materials from the sanctuary, in particular lost or derelict fishing gear or marine debris, that pose a threat to sanctuary resources. Removal activities would be conducted by divers using small hand tools and lift bags or by an ROV using cutting tools, and would be supported by a research vessel.

Deploying uncrewed underwater systems (i.e., AUVs, ROVs, drifters) for research and monitoring

Sanctuary staff would deploy ROVs and AUVs for documenting habitats and shipwrecks; wildlife investigations to study ecology, behavior, and populations; oceanographic investigations to characterize internal waves and impact on wildlife; and archaeological investigations to characterize historic and prehistoric resources. These systems would be deployed from a research vessel, and deployment lengths could vary from a few hours to 24 hours a day. ROVs are controlled by an operator onboard the vessel and are connected to the vessel using a cable or tether. AUVs are not tethered and are programmed to operate independently without operator intervention.

Deploying uncrewed aerial systems

Sanctuary staff could deploy uncrewed aerial systems (UAS) to support biological and oceanographic research and monitoring and species observations. The NOAA Uncrewed Aircraft Systems Operations Policy[20] and Handbook[21] provide guidance to NOAA users of UAS and a framework for the safe and efficient operation of UAS operated or sponsored by NOAA.

Deploying active acoustic equipment and towed instrument arrays

NOAA staff would use remote sensing equipment to support diving investigations to document habitats and shipwrecks; wildlife investigations to study ecology, behavior, and populations; oceanographic investigations to characterize internal waves and impact on wildlife; water quality investigations to understand water quality conditions; and archaeological investigations to characterize historic and prehistoric resources. Most commonly NOAA would use a Simrad ES60 narrow single beam echo sounder (operating at 120 kHz) during all operations of R/V *Auk* to locate dive sites and to collect data. Occasionally, NOAA would deploy higher frequency multibeam equipment from a towed instrument or ROV for specific shipwreck investigations or

[20] NOAA Policy 220-1-5 Unmanned Aircraft Systems Operations (December 2019), available at: https://www.omao.noaa.gov/find/media/documents/policy-220-1-5-unmanned-aircraft-systems-uas-operations

[21] NOAA Unmanned Aircraft Systems Handbook (June 2017), available at: https://www.omao.noaa.gov/find/media/documents/noaa-unmanned-aircraft-systems-handbook-june-2017

characterization and seafloor mapping. The sanctuary's multibeam and other active acoustic activities are also being assessed programmatically pursuant to NEPA[22] with those of other National Ocean Service programs, including the Office of Coast Survey who conducts the majority of multibeam mapping surveys for the National Ocean Service. The National Ocean Service intends to initiate consultation under the ESA Section 7 and seek an authorization for incidental take of marine mammals under the MMPA.

Deploying telemetry to track whale and seabird movements

SBNMS Research Coordinator Dr. David Wiley has permission to tag whales to record behavior under NMFS MMPA permits (currently permit No. 18059), using acoustic recording tags (D-TAGs) affixed to a whale's back with suction cups. These remain on the animal for about 24 hours. The tags are deployed from a small inflatable boat driven by a NOAA certified vessel operator. The small inflatable boat is deployed off of a larger NOAA vessel during sanctuary vessel operations. Once the tags are deployed, the whale is tracked throughout the duration of the deployment. When the tag pops off automatically, it is retrieved by the inflatable boat. Current species tagged by sanctuary staff are humpback, fin, sei and minke whales. The permit is specific to the Gulf of Maine and nearby waters (i.e., the Great South Channel area). All research on marine mammals is conducted in accordance with NMFS marine mammal research permits.

Table 4.2. Summary of Estimated Field Activities at SBNMS, by alternative

Category of Activity	**Estimated Activity Level – Proposed Action (Alternative 1)**	**Estimated Activity Level – No Action Alternative *(i.e., maintain current operations)***
Vessel use and maintenance (number of vessels; days at sea/year)	Up to one vessel; up to 50 feet in length. Up to 120 total vessel days at sea/year for research, emergency response, and education/outreach.	Up to one vessel; up to 50 feet in length. Up to 90 total vessel days at sea/year for research, emergency response, and education/outreach.
Scuba diving (dives/year)	Up to 20 dives/year between May and October for documentation of habitat and shipwrecks and support for sanctuary activities.	Up to 10 dives/year between May and October for documentation of habitat and shipwrecks and support for sanctuary activities.
Deploying buoys and research or monitoring equipment (deployments/year)	Up to five buoy deployments/year for maritime heritage management. Up to 20 deployments/year for passive acoustic monitoring. Up to 16 deployments/year of small research and monitoring equipment (i.e., weighted markers, moorings for temperature, oxygen, and CO_2 sensors). Deployments range from three to 12 months.	Up to two buoy deployments/year for maritime heritage management. Up to 10 deployments/year for passive acoustic monitoring. Up to 10 deployments/year of small research and monitoring equipment (i.e., weighted markers, moorings for temperature, oxygen, CO_2 sensors). Deployments range from three to 12 months.
Sampling organisms (deployments/year)	Up to 50 deployments/year of sampling equipment (e.g., small beam trawl) for collecting organisms (e.g., sand lance).	Up to 40 deployments/year of sampling equipment (e.g., small beam trawl) for collecting organisms (e.g., sand lance).

[22] Federal Register: https://www.federalregister.gov/d/2021-13361 86 FR 33663 (June 25, 2021)

Category of Activity	Estimated Activity Level – Proposed Action (Alternative 1)	Estimated Activity Level – No Action Alternative *(i.e., maintain current operations)*
Collecting artifacts for time-sensitive resource protection needs (collections/year)	Up to one collection every five years for time-sensitive emergency situations to protect cultural, historical, or archaeological resources from loss, destruction, or injury.	Up to one collection every five years for time-sensitive emergency situations to protect cultural, historical, or archaeological resources from loss, destruction, or injury.
Removal materials (e.g., marine debris and nets) (removals/year)	Up to four removals/year of materials (e.g., marine debris and nets).	Up to two removals/year of materials (e.g., marine debris and nets).
Deploying uncrewed underwater systems (e.g., AUVs, ROVs, drifters) (deployments/year; estimate of deployment length)	Up to 40 ROV deployments/year for measuring oceanographic and water quality conditions, habitat characterization, and archaeological investigations. Up to 20 AUV deployments/year for passive acoustic and water quality monitoring with each deployment lasting an average of 12 hours. Up to 20 drifter buoy deployments/year.	Up to 10 ROV deployments/year for measuring oceanographic and water quality conditions, habitat characterization, and archaeological investigations. Up to five AUV deployments/year for passive acoustic and water quality monitoring with each deployment lasting an average of 12 hours. Up to five drifter buoy deployments/year.
Deploying uncrewed aerial systems (UAS)	Up to 10 UAS deployments/year for whale research.	Up to three UAS deployments/year for whale research.
Deploying active acoustic equipment and towed instrument arrays	Up to 40 deployments/year for whale research and characterization of seafloor habitats and maritime heritage resources.	Up to five deployments/year for whale research and characterization of seafloor habitats and maritime heritage resources.
Deploying telemetry to track whale and seabird movements	Up to 15 deployments/year for whale and seabird research.	Up to 15 deployments/year for whale and seabird research.

Best Practices for Field Activities

NOAA conducts all field activities in accordance with self-imposed best management practices and standing orders to minimize impacts on sanctuary resources, including living marine resources, seafloor habitat, and cultural and historical resources. The self-imposed measures taken by ONMS to mitigate potential impacts from field activities at SBNMS are:

- Standing Order for Operations around Marine Mammals – This order requires several precautionary measures such as: incorporating whale sighting information in cruise planning, slowing to 10 knots in a Seasonal or Dynamic Management Area, following the Whale Watching Guidelines, maintaining a constant lookout for whales, and following specific procedures if a whale is struck.
- Standing Order for Nighttime Operations – This order encourages that all operations occur during daylight; however, if operations are essential and integral to the mission, the principal investigator must discuss mitigations for avoiding whales and

other objects within the vessel operation corridor and incorporate them into the cruise plan.

- Posting a Dedicated Marine Mammal Observer – In addition to the precautions required in the standing order for operations around marine mammals, SBNMS internal policy is to post one dedicated marine mammal observer on every mission when practicable.
- Annual Whale Sense Training for Vessel Operators – Whale Sense is a training program developed by GARFO and Whale and Dolphin Conservation in conjunction with SBNMS that is designed to increase the awareness of vessel operators about operating safely around whales. SBNMS vessel crew members are required by internal policy to take the training every year.
- Abide by Voluntary Northeast Region Whale Watching Guidelines – The guidelines developed by GARFO in collaboration with the whale watching industry recommend progressively slower speeds as the vessel approaches whales and a limit to the number of vessels viewing whales at close approach (100-300 feet).
- Comply with Seasonal and Dynamic Management Areas – There are two Seasonal Management Areas overlapping SBNMS that require commercial vessels to transit at 10 knots or less. Even though federal vessels and vessels 65 feet or less are exempt, the R/V *Auk* is required via the standing order to comply with speed restrictions in seasonal and dynamic management areas. If a Dynamic Management Area is created by NMFS, the R/V *Auk* will transit at 10 knots or less through it.
- Reduced Speed When Right Whale Listening Buoys Are Activated – There are four listening buoys in the segment of the Boston TSSthat overlaps SBNMS. If right whales are detected, a 5 nm diameter area around the buoy is activated for 24 hours or as long as whales are detected and liquefied natural gas (LNG) carriers are required by NOAA to slow to 10 knots while transiting through these activated areas. Internal policy is that the R/V *Auk* transit through these activated areas at a maximum of 10 knots.
- All Cruise Plans Incorporate Current Whale Sighting Data from Real-time Listening Buoys and other Sources – Every cruise conducted by the R/V *Auk* has a cruise plan that describes the purpose and itinerary, lists the crew and passengers, and provides a risk assessment for the mission. Among the factors included in the risk assessment are whether right whales and other whales are present in the sanctuary. For right whales this presence is determined by consulting the right whale listening buoy network and by communicating with the NEFSC Protected Resources Division. For other baleen whales this is determined by communicating with other researchers and whale watch companies.
- Avoidance of Shipwrecks – For a proposed activity that has the potential to impact a shipwreck, the sanctuary archaeologist consults the shipwreck database to determine if there are any known wrecks in the vicinity. If there are, then the proposed activity site is moved a safe distance away, typically 330 feet (100 meters) away from the known shipwreck. If there are no known wrecks, every effort is made to ensure the proposed site is surveyed either with side scan sonar or with the vessel's Simrad ES60 echosounder to determine if there are any anomalies. If an anomaly is detected the proposed activity site is moved a safe distance away.

In addition to these self-imposed measures, ONMS operates all small boats in accordance with all NOAA Small Boat Program guidelines[23] and complies with all NMFS guidance and regulations regarding interactions with protected species and habitats.

NMSA Permitting Compliance

NMSA regulations at 15 C.F.R. part 922, include a permitting system to allow certain types of activities within national marine sanctuaries that are otherwise prohibited by sanctuary regulations. Conducting some of the routine field activities summarized in this section and in Table 4.2 to support management of the sanctuary would involve activities otherwise prohibited by SBNMS regulations (see 15 C.F.R. §922.142). ONMS issued a permit to the SBNMS Superintendent (Permit Number: SBNMS-2019-001; effective: 01/01/2019 through 12/31/2023) that authorizes sanctuary staff to conduct the below list of otherwise prohibited activities throughout the sanctuary. Sanctuary staff must conduct all activities in accordance with the terms and conditions of the permit. All activities must be those reasonable and necessary to fulfill management responsibilities consistent with the purposes of the sanctuary management plan, the NMSA, and the NMSA regulations.

The permit covers the following activities:

1. Marine mammal, marine reptile, and seabird disturbance for protection and monitoring.
2. Placement of scientific equipment and moorings on the seabed to facilitate monitoring and resource protection.
3. Emergency response, injury assessment, mitigation, restoration, monitoring, and planning (e.g., testing of shoreline protection strategies), as approved by ONMS headquarters, consistent with (where appropriate) NOAA Damage Assessment and Restoration policies and procedures.
4. Participation in permitting activities of other sanctuary users.
5. Alteration of the seabed for research, education, and maritime heritage projects.
6. Movement or recovery of historical or cultural resources or archaeological site disturbance under time-sensitive emergency situations to protect cultural, historical, or archaeological resources from loss, destruction, or injury.
7. Discharge of AUVs/other scientific equipment for research, monitoring, and resource protection.

Implement Current Sanctuary Regulations

Under the proposed action (Alternative 1), NOAA would continue to implement all existing sanctuary regulations for SBNMS, as described at 15 CFR 922, subpart N. NOAA has not amended the sanctuary regulations since they were enacted in 1993 as part of the SBNMS designation. NOAA evaluated the potential impacts of these regulations in a final environmental impact statement for the designation of SBNMS published in July 1993.[24]

[23] ONMS Small Boat Program Guidelines: http://www.sbp.noaa.gov/policy/manual.html
[24] 1993 Final Environmental Impact Statement: https://nmssanctuaries.blob.core.windows.net/sanctuaries-prod/media/archive/library/pdfs/sbnms_fmpfeis_1993.pdf

4.2.2 Description of the Undertaking under Section 106 of the National Historic Preservation Act

NOAA has further determined that the decision to implement a revised sanctuary management plan for SBNMS constitutes an undertaking subject to Section 106 of the NHPA, per 800.3(a). The proposed action includes a suite of foreseeable activities that may occur through implementation of a revised sanctuary management plan, the conduct of routine field activities, and continued implementation of existing sanctuary regulations, as detailed in Section 4.2.1.

Of the activities listed in Section 5.2.1, actions that do not involve scientific equipment coming in contact with the seafloor (e.g., use of towed remote sensing equipment, autonomous systems, or telemetry systems); actions that have no potential for seafloor impacts or disturbance (e.g., vessel operations); and non-invasive activities (e.g., NOAA scientific diving operations for photographic documentation) have *no potential to cause effects* on historic properties, per 800.3(a)(1), and therefore are not considered further under the NHPA review incorporated into this environmental assessment. Additionally, the recovery of artifacts or other materials from an archaeological site under emergency circumstances to protect the site from loss, destruction, or injury is covered under an existing permit ONMS issued to the SBNMS Superintendent (Permit Number: SBNMS-2019-001) and is not considered further under the NHPA review incorporated into this environmental assessment. Any future permits for activities otherwise prohibited within the sanctuary would be considered on a case-by-case basis and under a separate environmental review.

However, certain activities included in the proposed action do involve potential seafloor disturbing activities or potential interaction with historic properties, if present within the area of potential effects (APE) for each activity. These activities include:

- Deploying buoys and research or monitoring equipment,
- Removing materials (e.g., marine debris and nets), and
- Expanded implementation of the shipwreck avoidance program (Strategy MH-2).

Determining the Area of Potential Effects under Section 106 of the National Historic Preservation Act

As defined in the Section 106 regulations at 800.16(d), the APE is the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The APE is influenced by the scale and nature of an undertaking, and may be different for different kinds of effects caused by the undertaking.

The APE for this undertaking is defined as the area of the seabed including the surface and subsurface within the boundaries of SBNMS that could potentially be impacted by any of the bottom disturbing activities described in this section. This includes the deployment of buoys and/or research or monitoring equipment which are anticipated to have a small seabed footprint, but that may include temporary or semi-permanent mooring systems or be installed or attached to selected shipwreck sites within the sanctuary. The APE additionally includes the extent of any historic properties that may be directly impacted through such activities as removal of marine debris (including removal of lost fishing gear from shipwreck sites). The APE

further includes the boundaries of any shipwreck site within SBNMS that may be included under expanded implementation of the Shipwreck Avoidance Program, as described under Strategy MH-2.

4.2.3 Description of the No Action Alternative

Under the No Action Alternative, NOAA would continue to implement the current sanctuary management plan, field activities, and sanctuary regulations to support management of the sanctuary.

The current sanctuary management plan was published in 2010 and is found on the SBNMS website.[25] It is a detailed plan for resource protection, research, education, and administrative services at the sanctuary, with special emphasis on key resource protection issues. The action plans in the current sanctuary management plan are organized around four central themes:

Capacity Building

- Administrative Capacity and Infrastructure Action Plan
- Interagency Cooperation Action Plan
- Public Outreach and Education
- Compatibility Determination

Ecosystem Protection

- Ecosystem-Based Sanctuary Management
- Ecosystem Alteration
- Water Quality

Marine Mammal Protection

- Marine Mammal Behavioral Disturbance
- Marine Mammal Vessel Strike
- Marine Mammal Entanglement

Maritime Heritage Management

- Maritime Heritage Action Plan

Since the publication of the 2010 management plan, NOAA has made significant progress in implementing the strategies associated with these action plans. According to an internal review completed in 2016, almost 70% of strategies across all of the action plans in the 2010 management plan have been completed or are partially complete. This means that most of the action plans contain strategies that were not completed and would benefit from further efforts. This lack of completion does not indicate that the goals and objectives of the management plan are no longer important. Rather, a large number of strategies are ongoing (e.g., monitoring programs, collaborative management, education programs), so while they were successfully implemented, they are not considered "completed."

[25] SBNMS management website: https://stellwagen.noaa.gov/management/

All four themes of the 2010 management plan are still highly relevant, and under the No Action Alternative, NOAA would continue to implement the activities described in detail in the current sanctuary management plan, focusing on the action plans that are not yet completed. Long-term research and monitoring of the sanctuary's living and non-living resources, expanded education and outreach, and enhanced administrative support would remain priorities for NOAA to ensure protection of SBNMS's valuable resources. Implementation of the current sanctuary management plan would involve undertaking the same broad types of management and field activities described for the proposed action, and continued implementation of the current sanctuary regulations (see Section 4.2.1).

4.3 Affected Environment

This section describes the environmental, human, and socioeconomic setting for SBNMS and serves as the affected environment for the purposes of NEPA compliance. The description of the affected environment focuses on the resources that implementing the draft management plan and proposed field activities to manage SBNMS is most likely to affect.

This section follows the general organization of the 2020 condition report[26] and incorporates by reference certain sections of that document, as further described below. The 2020 condition report describes status and trends in water quality, habitat, living resources, and maritime heritage resources in the sanctuary, and the human activities that affect them, from 2007–2018.

4.3.1 Physical Setting

The sanctuary stretches from Cape Ann to Cape Cod and encompasses 842 square miles surrounding Stellwagen Bank, a shallow, glacially deposited underwater plateau and the sanctuary's most prominent bathymetric feature. Nearby features such as Tillies Bank and Basin, and the southern portions of Jeffreys Ledge are also included within sanctuary boundaries. The physical setting of the sanctuary is the structural and dynamic foundation for its biological processes. Through the physical setting and the linkages between its geography, geology and oceanography, regional and large-scale ecosystem processes connect with and directly impact local productivity and biodiversity patterns in the sanctuary.

Oceanographic Circulation

The high productivity that defines the sanctuary as a special place and attracts wildlife and human users is driven by water circulation and its interaction with the seafloor. A key attribute of the sanctuary's physical oceanography is its regional connectivity with other parts of the Gulf of Maine. Located along the western edge of the Gulf of Maine, the southerly flowing Maine Coastal Current heavily influences water circulation in the sanctuary (Figure 4.1).

This current, along with tidal fluctuations, local wind patterns, and long-term climate dynamics, drive a strong seasonal cycle of stratification and nutrient availability. These processes fuel

[26] Sanctuary condition reports provide a summary of resources in national marine sanctuaries, drivers and pressures on those resources, and the current conditions and trends for resources and ecosystem services. Condition reports also describe existing management responses to pressures that threaten the integrity of the marine environment. The SBNMS report is available at: https://sanctuaries.noaa.gov/science/condition/sbnms/

primary production. Once exposed to the shallow, sunlit waters on top of the bank, nutrients become fuel for seasonal plankton blooms that, in turn, become the foundation for a complex food web. The food web and its inherent productivity make SBNMS one of the most important seasonal feeding areas for whales, seabirds, and bluefin tuna in the western North Atlantic. Additionally, circulation patterns are critical in understanding the sanctuary's ecological role in supplying and receiving larval recruits across the region, as well as the paths taken by pollutants and contaminants in relation to the sanctuary.

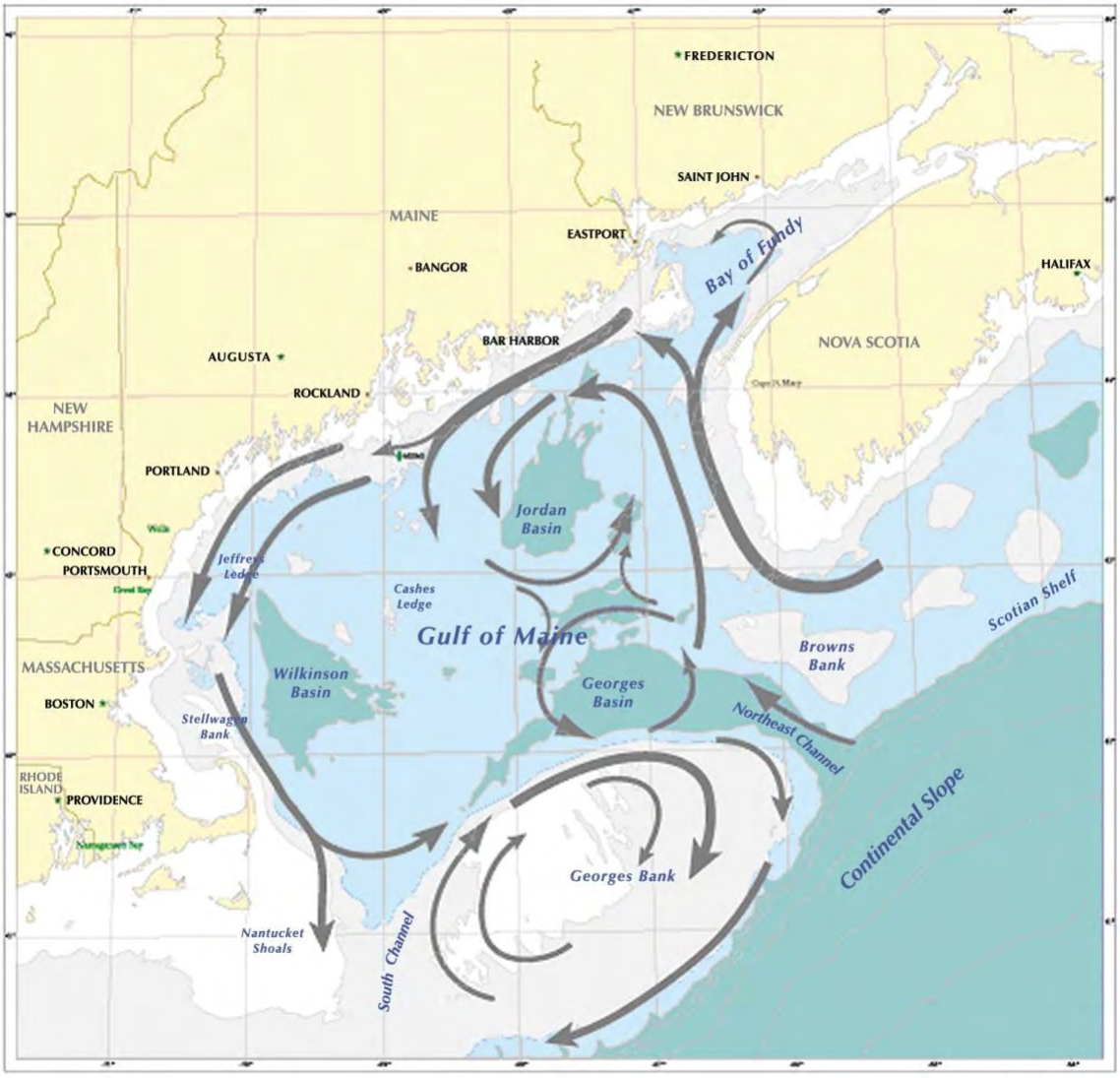

Figure 4.1. Circulation in the Gulf of Maine. Source: Pettigrew et al., 2005

Habitats

The underwater landscape of the sanctuary, which includes Stellwagen Bank, surrounding banks, and basins, is a patchwork of habitats composed of both geologic and biologic features. These features provide shelter from predators and the flow of tidal and storm-generated currents, serve as sites that enhance capture of prey, such as drifting zooplankton or species associated with particular features, and serve as foci for fish spawning activities, including egg-

laying and brooding young. SBNMS contains all of the five major seafloor habitat types found in the Gulf of Maine: mud (38%); gravel, piled boulder, and rocky outcrop (34%); and sand (28%) (NOAA Office of National Marine Sanctuaries, 2010).

Within each habitat type, the combination of water masses, sediments, and inhabiting organisms form many microhabitats. For example, northern cerianthids, a type of tube-building anemone that burrows in mud, serve as important habitat for redfish, hake, and a multitude of invertebrates that live in and around the tubes. In addition, species composition of seafloor communities is highly correlated with grain size of benthic sediments, and as a result, seafloor substrata constitute an important habitat component for many organisms in the sanctuary. Although macroalgae (e.g., seaweeds) once grew on Stellwagen Bank, bottom trawling has virtually removed this marine algae, and it no longer appears to play a substantive role in structuring seafloor habitats in the sanctuary (Cahoon et al., 1993).

In addition to these naturally occurring habitats, sanctuary staff have recently begun assessing the important role that shipwrecks provide as substrate and refugia for invertebrate and fish communities. In particular, shipwrecks that lie in sand or mud plains are isolated from other natural hard-bottom areas and thus provide important localized refugia for fish and other mobile species, as well as hard substrate for sessile invertebrates.

Water Quality

The water column in the sanctuary represents important habitat for numerous planktonic and nektonic organisms as well as many fishes, turtles, seabirds and marine mammals. Despite several potential stressors, findings from the 2020 condition report indicate that sanctuary water quality is fairly good and does not appear to be adversely impacted by human activities. Two main activities present potential water quality threats to SBNMS: the MWRA wastewater outfall, located approximately 12 nautical miles from the western boundary of SBNMS; and the Massachusetts Bay Disposal Site (MBDS), a disposal site for dredged material directly adjacent to the sanctuary's western boundary. Ongoing monitoring suggests that the MWRA outfall is currently not adversely influencing monitored water quality parameters in SBNMS, and no evidence suggests that eutrophication is occurring. Similarly, although the MBDS incorporates the areas of two historic disposal sites containing toxic materials, assessments have not shown any associated contamination of SBNMS. See Section 4.3.4 for additional information about outfall discharges and dump sites.

Limited data exist to thoroughly evaluate potential impacts to water quality from vessel discharge and sediment perturbation by mobile fishing gear.

Soundscape

An increasingly recognized element of sanctuary's physical setting is its acoustic environment. The sanctuary is home to many soniferous species, such as whales, that NOAA manages or protects under multiple statutes, notably the ESA and the MMPA. Additionally, sound production by fishes can serve a variety of purposes including species identity, individual identity, mate location, readiness to spawn, individual size and level of aggressiveness (Lobel, 2002). Due to its location, the sanctuary is also a busy place for commerce and is subjected to high levels of sound-producing activities such as commercial vessel traffic. Characterizing the

status of the sanctuary's acoustic environment and identifying potential threats to sanctuary resources are essential, both to meeting the NMSA objectives for SBNMS and to developing partnerships to implement ecosystem-based management of sanctuary resources. SBNMS has been at the forefront of raising awareness of the potential threat of anthropogenic noise to organisms and has pioneered the use of several advanced passive acoustic monitoring methods and technologies to further the study of ocean noise and its impacts.[27]

4.3.2 Biological Resources

SBNMS supports over 575 species of invertebrates, fish, seabirds, and marine mammals. Several foundational species that serve as prey or biogenic habitat maintain community structure and local stability in SBNMS, including calanoid copepods, Atlantic herring, sand lance, sponges, and anemones. The 2020 condition report evaluated the status and trends of these species and found that they are generally good to fair, though data are limited in some cases, and several species may be particularly vulnerable to climate change (ONMS, 2020). See Section 4.3.3 for a description of protected species and habitats found in the sanctuary.

Fish

Fish are a vital component of the sanctuary's biological diversity and also one of its strongest links to the human population. Over 80 species of fish exist in the sanctuary and this assemblage is generally representative of fish assemblages in the Gulf of Maine region. The diverse seafloor topography and nutrient-rich waters in the sanctuary result in increased primary productivity and large zooplankton populations. In turn, zooplankton support seasonally prolific populations of small schooling species such as sand lance, herring, and mackerel that serve as primary prey for many larger fishes such as Atlantic cod, haddock, silver hake, and various flatfish. Sand lance is a key prey species for marine mammals and seabirds, and data suggest that the abundance and distribution of sand lance at local and/or regional scales influence the abundance and distribution of predators, including humpback whales. Some fish, such as giant bluefin tuna, are annual migrants to the area, while others, such as the Acadian redfish, are likely year-round residents. Declines in recruitment, variability in abundance and distribution, patch characteristics that increase vulnerability to overfishing, and potential climate change impacts are concerns for ecologically and commercially important fish species.

Marine Mammals

The marine mammal fauna of SBNMS are diverse and have significant ecological, aesthetic and economic value to the communities of New England. For many of these species, waters of the sanctuary serve as primary habitat for critical activities that include feeding and nursing. In total, the abundance of preferred prey species attracts 22 marine mammal species observed in SBNMS year-round or seasonally. Seventeen species of cetaceans have been observed in the sanctuary and 10 are known to regularly frequent the sanctuary. Every year, approximately one-third of the critically endangered North Atlantic right whale population utilizes the sanctuary

[27] ONMS sound monitoring website: https://sanctuaries.noaa.gov/science/monitoring/sound/

and nearby waters for feeding and nursing calves. Humpback whales, fin whales, common dolphins, harbor seals, and gray seals are also commonly observed in the sanctuary.

North Atlantic right whales are at risk for extinction, as their population has been in decline since 2010, and only 39 births have been documented since 2017, one of which was struck and killed in 2020 and one was stranded and died in 2021. North Atlantic right whales, along with other marine mammals such as humpback whales, also face threats of entanglement and ship strike. NOAA's ongoing work to understand the role of marine mammals in SBNMS, including the longest and most detailed study of baleen whales in the world, is central to protecting these special organisms and to fulfilling the sanctuary's resource protection goals outlined in the NMSA.

Seabirds

The rich biological environment of the sanctuary attracts a diversity of seabirds that feed on prey spanning from copepods to fish. SBNMS waters provide a vital stopover and seasonal destination for 53 species of migrating seabirds. Frequent visitors include shearwaters and storm petrels, gannets, phalaropes, gulls, terns, jaegers, alcids, and various sea duck species. These species arrive in relatively high numbers, with some species numbering in the tens of thousands. More occasionally, roseate terns, a federally listed species, as well as Arctic and terns, both state listed species, have been observed in the sanctuary. The sanctuary's significance as seabird habitat led to the Massachusetts Audubon Society and BirdLife International designating it as an Important Bird Area. NOAA conducts annual standardized seabird surveys, and the sanctuary's long-term commitment to the project will provide key data about changes to this important living resource.

Sea Turtles

The sanctuary is the seasonal home to two species of endangered sea turtles, the Atlantic or Kemp's ridley and the leatherback. Green and loggerhead sea turtles occur occasionally in the Gulf of Maine. The leatherback is a summer visitor to SBNMS and is the only species of sea turtle that journeys to cold waters for feeding activities. Kemp's ridley sea turtles are observed in waters off Massachusetts as juveniles, having either swam or drifted north in the Gulf Stream from hatching areas off the southern coast of Mexico.

Invertebrates

Every major taxonomic group of invertebrates that occurs in the global marine environment is present in the sanctuary. This includes a diversity of sponges, hydroids, and anemones, bryozoans, bivalves, gastropods, sea stars, sea cucumbers, sand dollars, and tunicates, among others. Invertebrates are an important component of the sanctuary ecosystem and can act as refugia, provide food for other organisms, filter water, and even act as predators on zooplankton and occasionally fish. Molluscs, such as clams, mussels, oysters, and scallops, found in SBNMS are also an important source of seafood for nearby coastal communities.

4.3.3 Protected Species and Habitats

This section provides an overview of the species and habitats that may occur in the sanctuary that are protected under the ESA, the MMPA, the EFH provisions of the MSA and the MBTA.

Endangered Species Act Listed Species and Designated Critical Habitat

The ESA of 1973 (16 U.S.C. §§ 1531, *et seq*.) requires federal agencies to conserve endangered and threatened species and the habitats upon which these species depend. The habitats in SBNMS provide ecosystem services supporting threatened and endangered species migrating through or utilizing these areas.

Species and Habitat Under NMFS Jurisdiction

Table 4.3 provides a list of endangered or threatened species under NMFS jurisdiction, and species using designated critical habitat, that may reside in or migrate through SBNMS.[28]

After evaluating the species' habitat requirements and habitat availability[29] within the action area, ONMS determined that certain activities included in the proposed action could affect ten listed species under NMFS jurisdiction that may occur in the action area, shown in Table 4.3. SBNMS is within Unit 1 of the designated critical habitat for the North Atlantic right whale. The physical and biological features essential to the conservation of the North Atlantic right whale, which provide foraging area functions in Unit 1 are listed in Section 4.5.3.

[28] ONMS used the NMFS Protected Resource Division's Threatened and Endangered Species Directory (October 15, 2021) to develop this table.

[29] Likelihood of occurrence in protected species tables is defined as follows:
Abundant: May be seen daily, in suitable habitat and season, and counted in relatively large numbers;
Common: May be seen daily, in suitable habitat and season, but not in large numbers;
Uncommon: Likely to be seen monthly in appropriate habitat and season. May be locally common;
Occasional: Occurs in the sanctuary at least once every few years, varying in numbers, but not necessarily every year;
Rare: Present, but usually seen only a few times each year.
Source: National Park Service Species Directory https://irma.nps.gov/NPSpecies/Search/SpeciesList

Table 4.3. ESA-listed species under NMFS jurisdiction potentially found in SBNMS.

Common Name	Scientific Name	ESA Status (Listing Notice; Recovery Plan)	Designated Critical Habitat (Listing Notice)	Likelihood of Occurrence in the Action Area
Kemp's ridley sea turtle	*Lepidochelys kempii*	Endangered (35 FR 18319, Dec 2, 1970); Recovery Plan (Mar 6, 2010)	None designated	Occasional, seasonal
Leatherback sea turtle	*Dermochelys coriacea*	Endangered (35 FR 8941, June 3, 1970); Recovery Plan (May 2, 1998)	Not in the action area	Common, seasonal
Loggerhead sea turtle	*Caretta caretta*	Threatened (76 FR 58868, Oct 24, 2011); Recovery Plan (Dec 8, 2008)	Not in the action area	Occasional
Green sea turtle	*Chelonia mydas*	Endangered (81 FR 20057, April 6, 2016); Recovery Plan (May 22, 1998)	Not in the action area	Occasional
Fin or finback whale	*Balaeneptera physalus*	Endangered (35 FR 12222, July 30, 1970); Recovery Plan (Aug 8, 2010)	None designated	Abundant
Sei whale	*Balaenoptera borealis*	Endangered (35 FR 12222, July 30, 1970); Recovery Plan (Dec 1, 2011)	None designated	Common
North Atlantic right whale	*Eubalaena glacialis*	Endangered (73 FR 12024, April 7, 2008); Recovery Plan (June 2, 2005)	Unit 1 (Foraging) overlaps with the action area. 81 FR 4838, Jan 27, 2016.	Abundant; feeding and calving
Atlantic salmon (Gulf of Maine distinct population segment (DPS))	*Salmo salar*	Endangered (74 FR 29343, June 19, 2009)	Not in the action area	Occasional
Atlantic sturgeon (Gulf of Maine DPS)	*Acipenser oxyrinchus oxyrinchus*	Threatened (77 FR 5879, Feb 6, 2012)	Not in the action area	Occasional
Shortnose sturgeon	*Acipenser brevirostrum*	Endangered (32 FR 4001, Mar 11, 1967); Recovery Plan (Dec 1, 1998).	None designated	Occasional

ONMS determined that the following listed species under NMFS jurisdiction would not occur within the action area because suitable habitat for the species does not occur within the action area or because the area is outside of the species' range: sperm whale, blue whale, giant manta ray, oceanic whitetip shark, and hawksbill sea turtle. No proposed or candidate species, or proposed designated critical habitat under NMFS jurisdiction occurs within the action area.

Species and Habitat Under U.S. Fish and Wildlife Service (USFWS) Jurisdiction

Table 4.4 provides a list of endangered or threatened species under USFWS jurisdiction that have the potential to occur in or migrate through SBNMS.[30] No designated critical habitat units under USFWS jurisdiction are found within the action area. No proposed or candidate species, or proposed designated critical habitat under USFWS jurisdiction occur within the action area.

Table 4.4. Listed Species under USFWS Jurisdiction found in the Action Area

Common Name	Scientific Name	ESA Status	Designated Critical Habitat (Listing Notice)	Likelihood of Occurrence in the Action Area
Red knot	*Calidris canutus rufa*	Threatened (79 FR 73705 73748 (December 11, 2014); Recovery Plan (April 9, 2019)	Not in action area	Not in action area unless flying over at high altitude in spring and fall
Roseate tern	*Sterna dougallii dougallii*	Endangered (52 FR 42064 42068 (Nov. 2, 1987)), Recovery Plan (Nov. 5, 1998)	Not in action area	Rare in summer

Species Protected under the Marine Mammal Protection Act

The MMPA prohibits, with certain exceptions, the take of marine mammals in U.S. waters and by U.S. citizens on the high seas, and the importation of marine mammals and marine mammal products into the U.S. (16 U.S.C. § 1372).

Table 4.5 provides a list of marine mammals protected under the MMPA that may reside in or migrate through SBNMS. As identified above, some marine mammals are also protected under the ESA. If a species or population stock is listed as an endangered species or a threatened species under the ESA, NMFS determines that such species or stock is below its optimum sustainable population and it is designated as a depleted stock under the MMPA.

[30] NOAA used the USFWS's Environmental Conservation Online System (ECOS) Information for Planning and Conservation (IPaC) tool to identify the ESA-listed species and designated critical habitat under USFWS jurisdiction that may occur within the action area, shown in Table 4.4 (Consultation code: 05E1NE00-2021-SLI-2976; Species List date: October 15, 2021).

Table 4.5. Listing status of marine mammals protected under the MMPA and likelihood of occurrence in the action area

Common Name	Scientific Name	MMPA Status (Date of stock assessment, stock name)	Likelihood of Occurrence in the Action Area
Atlantic white-sided dolphin	*Lagenorhynchus acutus*	Protected (2019, Western North Atlantic)	Common; most frequent in April-May and August
Fin whale	*Balaenoptera physalus*	Depleted (2019, Western North Atlantic)	Abundant
Gray seal	*Halichoerus grypus atlantica*	Protected (2019, Western North Atlantic)	Common
Harbor porpoise	*Phocoena phocoena*	Protected	Common
Harbor seal	*Phoca vitulina*	Protected (2019, Western North Atlantic)	Common
Humpback whale	*Megaptera novaeangliae*	Protected (2019, Gulf of Maine)	Abundant; foraging
Long-finned pilot whale	*Globicephala melas*	Protected (2019, Western North Atlantic)	Uncommon. Very hard to distinguish short finned and long finned pilot whales at sea.
Minke whale	*Balaenoptera acutorostrata*	Protected (2019, Canadian Eastern Coastal)	Abundant
North Atlantic right whale	*Eubalaena glacialis*	Depleted (2019, Western Stock)	Abundant; feeding and calving
Risso's dolphin	*Grampus griseus*	Protected (2019, Western North Atlantic)	Occasional
Sei whale	*Balaenoptera borealis*	Depleted (2019, Nova Scotia)	Common
Short-beaked common dolphin	*Delphinus delphis*	Protected (2017, Western North Atlantic)	Common
Short-finned pilot whale	*Globicephala macrorhynchus*	Protected (2019, Western North Atlantic)	Uncommon. Very hard to distinguish short finned and long finned pilot whales at sea.
White-beaked dolphin	*Lagenorhynchus albirostris*	Protected (2019, Western North Atlantic)	Rare

In addition to the marine mammals described in the table above, the following species are protected under the MMPA but are highly unlikely to occur in the action area or have not been observed in the area in recent years: Atlantic spotted dolphin, Blainville beaked whale, blue

whale, Bryde's whale, Clymene dolphin, Cuvier's beaked whale, dwarf sperm whale, harp seal, hooded seal, Gervais' beaked whale, killer whale, sperm whale, spinner dolphin, and striped dolphin.

Essential Fish Habitat Found in the Action Area

This section identifies the EFH and Habitat Areas of Particular Concern (HAPCs) that overlap with the action area. The MSA establishes procedures for identifying EFH and requires interagency coordination on any adverse impacts to EFH in order to further the conservation of federally managed fisheries.

EFH is defined as "those waters and substrates necessary to fish for spawning, breeding, feeding, or growth to maturity" (50 CFR § 600.10). The EFH regulations encourage regional Fishery Management Councils to designate HAPCs within areas identified as EFH to focus conservation priorities on specific habitat areas that play a particularly important role in life cycles of federally managed fish species. HAPCs help focus research and conservation efforts on localized areas that are especially important ecologically or are vulnerable to degradation. HAPCs are subsets of the total area necessary to support healthy stocks of fish throughout all of their life stages.

The NEFMC is charged with conserving and managing fishery resources from three to 200 miles off the coasts of Maine, New Hampshire, Massachusetts, Rhode Island, and Connecticut. The NEFMC implements the following nine fishery management plans that apply to 28 marine and one anadromous species: Northeast multispecies (groundfish), sea scallop, monkfish, Atlantic herring, habitat, skates, small-mesh multispecies (whiting), red crab, spiny dogfish, and Atlantic salmon.

A portion of SBNMS is included within the Western Gulf of Maine Essential Fish Habitat Closure Area. In addition, SBNMS overlaps EFH for American plaice, haddock, ocean pout, yellowtail flounder, redfish, Atlantic cod, winter flounder, red hake, Atlantic halibut and Atlantic wolffish, winter skate, thorny skate, monkfish, spiny dogfish, northern shortfin squid, Atlantic mackerel, Atlantic herring, Atlantic sea scallop, basking shark, bluefin tuna, and white shark.

Species Protected under the Migratory Bird Treaty Act

Table 4.6 identifies the migratory bird species protected under the MBTA that may reside in or migrate through the action area.[31]

[31] NOAA used the USFWS's ECOS IPaC tool to search for migratory bird species that may be present in the action area. The USFWS report stated that 36 migratory birds of concern may occur in or near the action area (Consultation code: 05E1NE00-2021-SLI-2976; Species List date: October 15, 2021). NOAA also added three species not identified in the IPaC report, based on staff knowledge of the species observations (red pharalope, Sabine's gull, sooty shearwater). Breeding information for these species is available at https://www.audubon.org/field-guide.

Table 4.6. Listing status of migratory birds protected under the MBTA and likelihood of occurrence in the action area

Common Name	Species Name	Likelihood of Occurrence in the Action Area	Use of the Action Area
Arctic tern	*Sterna paradisaea*	Rare in summer	Foraging
Atlantic puffin	*Fratercula arctica*	Uncommon in winter	Foraging
Black guillemot	*Cepphus grylle*	Rare in winter	Foraging
Black scoter	*Melanitta nigra*	Uncommon in spring and fall	Migrating
Black-legged kittiwake	*Rissa Tridactyla*	Common in winter	Foraging
Bonaparte's gull	*Chroicocephalus philadelphia*	Uncommon in spring and fall	Foraging, migrating
Brown pelican	*Pelecanus occidentalis*	No records	No records
Common eider	*Somateria mollissima*	Uncommon in fall and winter	Migrating
Common loon	*Gavia immer*	Common in fall, winter, and spring	Foraging, migrating
Common murre	*Uria aalge*	Common in winter; uncommon in spring	Foraging
Common tern	*Sterna hirundo*	Common in summer; uncommon in spring and fall	Foraging, migrating
Cory's shearwater	*Calonectris diomedea*	Common in summer and fall	Foraging
Double-crested cormorant	*Phalacrocorax auritus*	Uncommon in spring, summer, and fall	Foraging, migrating
Dovekie	*Alle alle*	Uncommon in winter and spring	Foraging
Great black-backed gull	*Larus marinus*	Abundant year around	Foraging
Great shearwater	*Puffinus gravis*	Common to abundant in summer and fall; rare in winter.	Foraging
Herring gull	*Larus argentatus*	Abundant year round	Foraging
Leach's storm-petrel	*Oceanodroma leucorhoa*	Uncommon in summer	Foraging
Least tern	*Sterna antillarum*	No records	No records
Long-tailed duck	*Clangula hyemalis*	Uncommon in spring and fall	Migrating
Manx shearwater	*Puffinus puffinus*	Uncommon in summer; common in fall	Foraging, migrating

Common Name	Species Name	Likelihood of Occurrence in the Action Area	Use of the Action Area
Northern fulmar	*Fulmarus glacialis*	Uncommon in fall, winter, and spring	Foraging
Northern gannet	*Morus bassanus*	Abundant in spring and fall; uncommon in summer and winter	Foraging, migrating
Parasitic jaeger	*Stercorarius parasiticus*	Uncommon in summer and fall	Foraging, migrating
Pomarine jaeger	*Stercorarius pomarinus*	Uncommon in summer, fall, and winter	Foraging, migrating
Razorbill	*Alca torda*	Abundant in winter; uncommon in spring	Foraging
Red-breasted merganser	*Mergus serrator*	Uncommon in spring and fall	Migrating
Red phalarope	*Phalaropus fulicarius*	Uncommon in fall	Migrating
Red-necked phalarope	*Phalaropus lobatus*	Uncommon in summer and fall	Migrating
Red-throated loon*	*Gavia stellata*	Uncommon in spring and fall	Migrating
Ring-billed gull	*Larus delawarensis*	Uncommon in spring and fall	Foraging
Roseate tern	*Sterna dougallii*	Rare (two records in Aug)	Foraging
Sabine's gull	*Xema sabini*	Rare in fall	Migrating
Sooty shearwater	*Ardenna grisea*	Common in spring, summer, and fall	Foraging
South polar skua	*Stercorarius maccormicki*	Rare (no S4 records but have been seen in summer)	Foraging
Surf scoter	*Melanitta perspicillata*	Uncommon in fall and winter	Migrating
Thick-billed murre	*Uria lomvia*	Rare in winter	Foraging
White-winged scoter	*Melanitta fusca*	Uncommon in fall and winter	Migrating
Wilson's storm-petrel	*Oceanites oceanicus*	Abundant in summer	Foraging

*This species has been identified as a Bird of Conservation Concern (BCC) rangewide. All others listed in this table are non-BCC vulnerable.

4.3.4 Marine Uses and Socioeconomic Setting

Local and Regional Economies

The sanctuary is a prominent, year-round focal point for human activity in New England today and supports a variety of commercial, recreational, scientific, and educational efforts. The sanctuary and its resources generate direct economic benefits such as income, jobs, and economic output that help support growing coastal communities in the 14 counties adjacent to the sanctuary. In 2016, over 127 million people (40% of the nation's population) lived along the U.S. coast (NOAA Office for Coastal Management, 2021).[32] Average annual population growth rates and average annual real per capita income in counties close to the sanctuary are projected to increase by 2030, indicating that many of the sanctuary's uses, such as commercial and recreational fishing, recreational boating, whale watching, and recreational diving, will continue to increase in the foreseeable future (ONMS, 2020). Understanding how regional context shapes human activities on Stellwagen Bank and how consumptive and non-consumptive use, in turn, shapes the sanctuary's resources is essential to fulfilling the goals outlined in the NMSA and achieving the sanctuary's mission of balancing protection and compatible use.

Commercial Shipping

SBNMS sits at the entrance to Massachusetts Bay, which is open to commercial vessel traffic traveling to and from the Port of Boston, one of the most modern and efficient container ports in the United States. Annually, the port handles more than 1.3 million tons of general cargo, 1.5 million tons of non-fuel bulk cargo, and 12.8 million tons of bulk fuel cargo. As the per capita income of the sanctuary region and the United States increases, demand for consumer goods will likely increase the volume of goods shipped and the number of vessels traversing the area. The designated TSS a highly regulated area of vessel navigation) for Boston passes through SBNMS in a roughly east-west direction. Numerous types of domestic and foreign-flagged vessels use these designated shipping lanes, including container ships (some with hazardous materials), liquefied natural gas and oil tankers, and barges, as well as an increasing number of cruise liners.

Commercial Fishing

An active, domestic commercial fishery continues throughout the Gulf of Maine. Although overfishing has contributed to stock collapses and a decline in commercial fishing, SBNMS is an important fishing ground in this region due to its productivity and close proximity to ports around Massachusetts and Cape Cod Bays. Commercial catch from SBNMS is landed at 81 ports, and the estimated value of total landings from species caught in the sanctuary from 2007-2016 was over $194 million. In 2016, the value of landings was about $23.1 million with an economic contribution of $73.7 million in output and $25.7 million in income, which supported 747 full and part-time jobs. Numerous commercial fisheries operate in the sanctuary, including scallops, Northeast multispecies (i.e., groundfish), lobster, and herring.

[32] NOAA Economics and Demographics website: https://coast.noaa.gov/states/fast-facts/economics-and-demographics.html

Whale and Wildlife Viewing

Since the 1970s when the first commercial operator began taking visitors on tours out of Provincetown, Massachusetts, East Coast whale watching has blossomed into an internationally recognized destination to view whales and an economic engine that contributes millions of dollars to coastal communities each year. In 2018, regional tour companies scheduled 3,650 individual whale watching trips, and studies suggest that over 80% of whale watching in New England takes place in SBNMS (Schwarzmann and Shea, 2020).[33] Visitors participating in whale watching activities near SBNMS support roughly 1,400 jobs annually, in addition to $76.1 million in labor income, $107.2 million in value added, and $182.1 million in output (ONMS, 2020). In recent years, operators have been adapting and expanding their visitor experience to incorporate more bird and other marine mammal watching activities, as well as general environmental outreach, during their trips. In addition to the large commercial whale watch vessels, a growing contingent of small recreational boats visits the sanctuary to watch whales, seabirds, and the plethora of wildlife attracted to Stellwagen Bank.

Recreational Diving

Recreational scuba diving in the sanctuary has increased in the past decade. Almost 15% of the sanctuary is less than 130 feet deep, which is within the depth limits of recreational diving, although strong currents and exposed waters create challenging conditions. Several areas on top of Stellwagen Bank, as well as shallow areas on parts of southern Jeffreys Ledge and Sanctuary Hill, make interesting dive sites due to their complex habitat. In addition, recreational divers visit several shipwreck sites in the sanctuary, both historic and modern. An estimated 12 dive charters visit SBNMS wrecks each year, as well as a small number of independent recreational divers.

Recreational Fishing and Boating

The sanctuary is a popular destination for recreational vessels, such as party boats, sailboats, powerboats, and charters. 65 small boat harbors and over 80 boating and yacht clubs along the Massachusetts coast allow for easy access to the sanctuary. Recreational fishing in the sanctuary primarily targets groundfish and pelagic species, and in 2007 the recreational fishing fleet harvested approximately 25% of all Atlantic cod harvested in the Gulf of Maine (NEFMC, 2014). Additionally, a snapshot of private boating activity within SBNMS from 2009 estimated a total of 117,120 person-days of private boat fishing in the sanctuary (Hellin et al., 2011). This activity supported roughly $6 million in spending, $4.6 million in value-added, $2.5 million in income, and approximately 60 jobs in the local economy. While the total number of party boat anglers (people paying individually) and charter boat anglers (people paying per group) declined from 2007 to 2016, the relative stability of private boat registrations from 2005–2015, suggests that the contribution of private boat fishing to the local economy has remained relatively stable (Schwarzmann et al., 2020).

[33] ONMS whale watching report: https://sanctuaries.noaa.gov/science/conservation/2020-stellwagen-bank-whale-watching.html

Submarine Cables and Energy Infrastructure

The GTT-Interoute cable, the only submerged cable in the sanctuary, is a 12,200 kilometer private fiber-optic submarine cable system in the North Atlantic Ocean, connecting Canada, the United States, Ireland, and the United Kingdom. It was installed in 2000. Extensive portions of the fiber-optic cable were exposed immediately following installation (complete burial had been the goal), and 10 years after installation, the trench along the cable pathway was still identifiable in sidescan sonar along most of the route.

Additionally, two deepwater LNG ports are located adjacent to the sanctuary's western boundary, Northeast Gateway and Neptune. In order to mitigate impacts of LNG ports on marine mammals, at the request of SBNMS, the companies installed an array of 10 real-time passive acoustic detection buoys to reduce the risk of right whale ship collisions in the TSS; these buoys will be maintained for the life of the port (25-40 years). Based on a recommendation from SBNMS, the companies also installed additional real-time buoys to listen for right whales during construction activities in order to trigger mitigation action, reducing ensonification and collision risk. The real-time TSS array was deployed in January 2008 and remains in operation in 2021. Northeast Gateway and Neptune initially co-funded the array under the terms of their licenses. In 2018, Neptune indefinitely suspended operations at its port, leaving Northeast Gateway as the only active deepwater port in the Northeast. While that port is still active, the right whale listening buoy array will remain in operation; however, SBNMS is concerned that decommissioning of one or both ports would result in loss of funding for the listening array.

Outfall Discharges and Dump Sites

Municipal Waste Discharges

Massachusetts Bay and Cape Cod Bay have historically received inputs of municipal waste in the form of effluent or sludge from numerous pipes extending from municipal wastewater treatment plants along the coast of Massachusetts. Improved treatment and pre-treatment methods and technologies have helped to dramatically lessen the quantity of pollutants discharged into the Massachusetts Bay and Cape Cod Bay systems (Werme et al., 2017; Libby et al., 2017).

The MWRA wastewater treatment plant on Deer Island, completed in 2000, provides effective, secondary treatment of wastewater and has eliminated the discharge of sludge into coastal waters. The ocean outfall for this facility is located approximately 23.12 kilometers (12.48 nautical miles) from the western boundary of SBNMS. Long-term average flow from the outfall is 350 million gallons per day of treated secondary wastewater (Massachusetts Water Resources Authority, 2021). In a dry year like 2016, annual average flow can drop to 281 million gallons per day (Werme et al., 2017).

Massachusetts Bay Disposal Site

The MBDS receives dredged material that is deemed suitable for open water disposal. It is located directly adjacent to the western boundary of the sanctuary in Stellwagen Basin and encompasses an area of two nautical miles in diameter. Only materials that the U.S. Army Corps of Engineers and the EPA consider relatively free of hazardous substances are eligible for disposal at this site. The MBDS incorporates the areas of two historic disposal sites: the Industrial Waste Site, an area once authorized for the disposal of toxic, hazardous and

radioactive materials in barrels, and the Interim MBDS (also known as the Foul Area Disposal Site), designated only for the disposal of dredged materials. In 1993, EPA and NOAA concluded that the MBDS would not threaten resources within the sanctuary, and subsequent assessments have not shown any contamination (Sturdivant and Carey, 2017; U.S. Army Corps of Engineers, 2015). Maintenance and dredging of Boston Harbor, which began in 2017, has generated over 11 million cubic yards of dredged material suitable for ocean disposal.

4.3.5 Historical and Cultural Setting

For the purpose of this environmental assessment, the affected environment for historical and cultural resources is presented in two broad categories of maritime heritage resources considering Native American cultural resources and historic period resources.

Historical and cultural resources include historic properties, defined under the regulations implementing Section 106 of the NHPA at 36 CFR 800.16(l) as:

> any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the National Register criteria.

The information presented in this section is based on existing and available information, and is not intended to be a complete inventory of historic properties within the affected environment. As noted under the Maritime Heritage and Cultural Landscapes Action Plan (see Chapter 3), SBNMS has not been fully surveyed to identify historic properties and the draft management plan includes efforts to implement a broader understanding of maritime heritage resources that may exist within the sanctuary including consideration of submerged paleo landscape features and maritime cultural landscapes, in accordance with Section 110 of the NHPA.

Native American Cultural Resources

Sea level models suggest that approximately 12,000 years ago Stellwagen Bank was dry land, accessible to the native coastal peoples for a thousand years, although no archaeological evidence of Paleoindian inhabitation has yet been found in the sanctuary. During this time, people likely utilized the bank to hunt for land mammals, as a base for fishing and hunting marine mammals, and for gathering shellfish and vegetation (Barber, 1979). The possibility of finding Paleoindian cultural remains on Stellwagen Bank is supported by the recovery of mastodon skeletal remains by local fishermen. Further geologic study, site modeling, and sampling will be necessary to determine the potential for locating Native American cultural remains in the sanctuary (Bell, 2009; Coleman and McBride, 2008).

Sanctuary staff have never formally or informally consulted with Indigenous tribes and nations that are and are not federal recognized. An informal education program involving the Mashpee Wampanoag tribe was conducted at the Scituate headquarters for SBNMS in 2017 and 2018. One of the goals of this revised management plan is to fulfill the requirements of E.O. 13175 and Section 106 of the NHPA (see strategy IC-4 in the Interagency/Intergovernmental Action Plan)

to identify, engage and consult with Indigenous tribes or nations that may be impacted by this revised management plan.

Maritime Heritage Resources

Hundreds of years of fishing, whaling, and maritime transportation have made the sanctuary a repository for historically significant maritime heritage resources. Several hundred historic vessel losses are recorded within the sanctuary. Since researchers began investigating the sanctuary's maritime heritage in 2000, archaeologists have inventoried 47 shipwreck sites and identified 12 of these shipwrecks by name (Lawrence et al., 2015). The steamship *Portland,* often referred to as the "*Titanic* of New England," is considered the sanctuary's most historically significant wreck and is the most intact nineteenth-century New England coastal steamship located to date. Schooners carrying coal or granite and numerous commercial fishing vessels also rest on the seafloor of SBNMS.

The following seven shipwrecks in SBNMS are listed in the National Register of Historic Places:

- *Edna G.* (fishing vessel)
- *Joffre* (fishing vessel)
- *Lamartine* (schooner)
- *Louise B. Crary* (schooner)
- *Frank A. Palmer* (schooner)
- *Paul Palmer* (schooner)
- *Portland* (steamship)

National Register eligibility has not been determined for the remaining shipwreck sites inventoried to date within the sanctuary.

The condition of the sanctuary's heritage resources varies due to natural deterioration and human impacts, and as non-renewable resources, their decline is irreversible. The shipwrecks also serve as substrate for a diverse community of invertebrate and fish species; these communities may also contribute to resource deterioration, particularly for wooden wrecks, and are likewise at risk from any injury to the shipwrecks. Commercial fishing activity continues to be the greatest source of disturbance to maritime heritage resource integrity. Incidental contact from fishing gear has impacted nearly every maritime heritage resource in SBNMS. Under this revised management plan, NOAA would prioritize enhanced characterization and protection of cultural resources to ensure the long-term survival of these time capsules of New England maritime heritage.

4.3.6 Climate Change

Changes in fundamental ecological processes and habitat within SBNMS and the broader Gulf of Maine due to climate change have the potential to directly and indirectly impact nearly all sanctuary programs. Climate change impacts in SBNMS are measurable, and the threat of climate change to ecological integrity is increasing. The Gulf of Maine is warming faster than 99% of the global ocean; increases in both sea surface and bottom temperatures in SBNMS reflect these trends. The accelerated warming experienced in the Gulf of Maine over the last decade is attributed to a northward shift in the Gulf Stream and associated eddy currents

(Pershing et al., 2015; Dupigny-Giroux et al., 2018). Warming is occurring during all seasons, with the fastest rates occurring in summer (Thomas et al., 2017).

Recent work suggests changes in seasonal temperature dynamics, longer summer seasons, and changes to primary production in and around SBNMS. Because biological processes in the ocean are closely tied to physical properties, climate change is causing a variety of biotic responses within ocean and coastal ecosystems, including shifts in phenology and distributions of plankton, fish, whales, and other organisms in the Gulf of Maine. These changes in the ecosystem structure and function may also interact with and exacerbate the effects of other stressors. Impacts of climate change on important prey (foundation) species like sand lance and the copepod *Calanus finmarchicus* are particularly concerning, as these changes have the potential to drive cascading ecosystem effects and impact abundance, distribution, and health of top predators. Non-native and invasive species are also expected to increase in prevalence (Dupigny-Giroux et al., 2018; Grieve et al., 2016; Sorte, 2014). In addition, climate change is causing impacts on commercial and recreational fisheries, local businesses, and communities.

4.4 Approach to Environmental Consequences Analysis

This section summarizes NOAA's approach to evaluating the anticipated environmental effects on the resource areas described in Section 4.3 from implementing the proposed action (Alternative 1) and the No Action Alternative. NOAA's analysis of the environmental consequences of the alternatives is based on review of existing literature and studies, information provided by experts, and the best professional judgment of NOAA staff.

Potential impacts fall under three types: direct, indirect, and cumulative. These types of impacts are defined in regulations issued by CEQ as follows:

- Direct impact: A known or potential impact which is caused by the action and occurs at the same time or place (40 CFR § 1508.8(a) (1978)).
- Indirect impact: A known or potential impact which is caused by the action and is later in time or farther removed in distance, but is still reasonably foreseeable (40 CFR § 1508.8(b) (1978)).
- Cumulative impact: The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions (40 CFR § 1508.7 (1978)).

4.4.1 Significance of Potential Impacts

To determine whether an impact is significant, the CEQ regulations (40 CFR § 1508.27 (1978)) and NOAA guidance require the consideration of context and intensity of potential impacts.

Context is the setting within which an impact is analyzed, such as the affected region or locality and the affected interests. In this environmental assessment, NOAA evaluated the direct and indirect impacts within a local context, primarily examining how each alternative would affect the human environment within a specified portion of the sanctuary, and whether those effects would be short-term or long-term. The geographic area of interest for cumulative impacts is a

slightly broader regional context in order to consider overlapping and compound effects with other past, present, or reasonably foreseeable future actions.

Level of intensity refers to the severity of the impact and includes consideration of:

- permanence of an impact;
- potential for natural attenuation of an impact;
- uniqueness or irreplaceability of the resource;
- abundance or scarcity of the resource;
- geographic, ecological, or other context of the impact; and
- potential mitigation measures to offset the anticipated impact.

The various levels of impact descriptor used in this analysis are:

- Negligible: Impacts to a resource can barely be detected and are therefore discountable.
- Minor: Impacts to a resource that might be perceptible, but are typically not measurable. Impacts would generally be localized and temporary and would not alter the overall condition of the resource from the status quo. For organisms, individuals may be affected but population-level impacts would not occur.
- Moderate: Impacts to a resource that are more perceptible and, typically, more amenable to quantification or measurement. They can be localized or widespread and could alter the overall, fundamental condition of the resource from status quo. Impacts would not rise to the level of significance as defined below.
- Significant: Impacts resulting in an alteration in the state of a resource. Long-term or permanent impacts or impacts with a high intensity or frequency of alteration to a resource, whether beneficial or adverse, would be considered significant. For organisms, population-level impacts may occur. The significance threshold is evaluated on a case-by-case basis, taking into consideration the context and intensity of each action.

4.4.2 Quality of Potential Impacts

Potential impacts are described as either beneficial or adverse as follows:

- Beneficial impact: Impacts that promote favorable conditions for the resource.
- Adverse impact: Adverse impacts are considered contrary to the goals, objectives, management policies, and practices of NOAA and the public interest or welfare. These impacts are likely to be damaging, harmful, or unfavorable to one or more of the resources.

4.4.3 Guiding Questions and Assumptions for Environmental Consequences Analysis

NOAA considered the following questions when evaluating the impacts on each resource area:

- How do the activities proposed to manage the sanctuary affect the level of protection of the sanctuary's resources and public stewardship of these resources?

- How do the field activities proposed to manage the sanctuary affect the resources, natural environment, and human uses in and around the sanctuary?
- How do the type and amount of regulations to protect sanctuary resources affect the natural environment and human uses in and around the sanctuary?

In evaluating the impacts of the proposed action (Alternative 1), NOAA applied the following assumptions – implementing a revised sanctuary management plan and continued field activities has the potential to result in a:

- Minor increase in on-water research activities as a result of sanctuary activities and collaboration with researchers and other resource management agencies;
- Minor increase in tourism or recreational use of sanctuary waters due to increased sanctuary visibility;
- No change in the frequency or intensity of other marine uses in the area as a result of the sanctuary's proposed action.

4.5 Impacts of the Proposed Action (Alternative 1)

This section describes the beneficial and adverse impacts from implementing the proposed action. Under this alternative, NOAA would implement a revised sanctuary management plan and field activities to respond to current threats to sanctuary resources and increase public involvement and outreach, and continue to implement current sanctuary regulations to support management of SBNMS.

4.5.1 Summary of Impacts of the Proposed Action

Table 4.7 summarizes how implementing each draft action plan would affect the level of protection of the sanctuary's resources, public stewardship and compatible use of the sanctuary, and provision of ecosystem services. These impacts are described in further detail in the remainder of Chapter 4.

Table 4.7. Summary of Impacts of Implementing Draft Action Plans

Action Plan	**Direct resource protection through implementing sanctuary regulations and management plan**	**Indirect resource protection through enhanced management and stewardship**	**Benefits on marine uses and the socioeconomic setting**	**Provision of ecosystem services for compatible use of the sanctuary for recreation, tourism, and other activities**
Marine Mammal Protection	Collecting and sharing research on whale locations, and outreach to boaters could increase compliance with regulations and reduce the likelihood of vessel strikes or entanglements.	Coordinating communication and information sharing among regional agencies may increase compliance with protective measures in place for marine mammals.	Reduced chance of material losses of vessel operators through outreach programs to reduce entanglement risk and vessel strike incidents involving marine mammals.	Improved recreational experiences for visitors to the sanctuary through expanding outreach to whale watching businesses and developing best practices for marine mammal viewing.
Seabird Research	N/A	Continued research on seabird ecology, habitat use, and contaminant loads would inform improved management.	Contributing to dynamic ocean management could improve fishing outcomes.	Improving understanding of seabird use of the sanctuary could increase the quality of recreational experiences for visitors.
Vessel Traffic	Tracking whales and vessel traffic using the WhaleAlert app and the North Atlantic right whale corporate responsibility program could reduce risk of vessel strikes of whales.	Data from tracking and reporting programs, and outreach programs to vessel operators, could inform risk mitigation efforts and improve compliance with seasonal management areas for North Atlantic right whales.	Preventing vessel strikes using the WhaleAlert app and participating in business recognition programs for stewardship programs benefits commercial vessel operators.	N/A

Action Plan	Direct resource protection through implementing sanctuary regulations and management plan	Indirect resource protection through enhanced management and stewardship	Benefits on marine uses and the socioeconomic setting	Provision of ecosystem services for compatible use of the sanctuary for recreation, tourism, and other activities
Maritime Heritage and Cultural Landscapes	Seafloor mapping to identify new shipwreck sites and nomination to the National Register could provide protections to shipwrecks through NHPA. Installing mooring buoys for use by boaters could reduce impacts from vessels anchoring near shipwreck sites. Shipwreck Avoidance Program could protect shipwrecks from incidental damage from entanglement with fishing gear.	Identifying and characterizing shipwreck sites provides a baseline to monitor impacts over time. Understanding of the maritime cultural landscape could increase the ability to interpret and protect historical and cultural resources.	Coordination with fishers on shipwreck locations could avoid entanglement of fishing gear in shipwrecks.	N/A
Compatible Use	Implementing NMSA permitting and consultation processes and business recognition programs can reduce adverse impacts by ensuring activities in the sanctuary comply with regulations and include necessary mitigation.	Tracking emerging issues and potential impacts on sanctuary resources could enable better planning, management, and design of mitigation interventions.	Adopting business recognition programs to demonstrate participants' commitments to ocean stewardship can benefit participating businesses.	Implementing business recognition programs to encourage responsible recreational opportunities can improve quality of visitor experience.
Climate Change	Conducting a climate vulnerability assessment would provide tools to identify those resources at greatest risk from a changing climate and better data to inform resource protection interventions.	Continued research on climate change impacts on the sanctuary ecosystem and coordinating responses with regional agencies and partners would further sanctuary management.	N/A	N/A

Action Plan	Direct resource protection through implementing sanctuary regulations and management plan	Indirect resource protection through enhanced management and stewardship	Benefits on marine uses and the socioeconomic setting	Provision of ecosystem services for compatible use of the sanctuary for recreation, tourism, and other activities
Education and Outreach	Programs promoting ocean stewardship and compliance with sanctuary regulations directly protect sanctuary resources.	Improving ocean stewardship through educational programming could minimize disturbance of sanctuary wildlife and habitat.	Increasing the variety and scope of educational products available to the public will increase the sanctuary's education value.	Increasing public awareness and understanding of the sanctuary encourages responsible use and stewardship of its resources for recreational uses.
Interagency/Inter-governmental Coordination	Regional coordination and information sharing may directly influence protective measures in place for sanctuary resources.	Participation in regional ocean management activities could lead to improved protection and awareness by other agencies.	Increasing sense of place and connection to the sanctuary among communities through coordination, citizen science activities, and education programming.	Coordinating and collaborating with fishery managers on issues of concern could increase efficiencies in data collection, analysis, and communication to support healthy fisheries.
Sanctuary Advisory Council	N/A	Increasing SAC engagement could indirectly expand the breadth of agencies/institutions with a vested interest in sanctuary protection and ocean stewardship.	SAC engagement with agencies/institutions with a vested interest in sanctuary protection and ocean stewardship could benefit those entities.	SAC engagement with recreational and commercial users of the sanctuary to promote ocean stewardship and compatible use could improve quality of visitor experiences.
Research and Monitoring	Coordinated research and data sharing to characterize sanctuary resources could increase scientific basis for future protective measures.	Supporting, promoting, and coordinating scientific research, characterization, and long-term monitoring would enhance the understanding of the sanctuary environment and processes, and improve management decision-making.	Supporting and mentoring within the research community would increase the research opportunities available to local and regional organizations.	Leading citizen science activities could increase a sense of place among participants.

Action Plan	Direct resource protection through implementing sanctuary regulations and management plan	Indirect resource protection through enhanced management and stewardship	Benefits on marine uses and the socioeconomic setting	Provision of ecosystem services for compatible use of the sanctuary for recreation, tourism, and other activities
Soundscape	Collecting and sharing research on whale locations, and outreach to boaters could increase compliance with regulations and reduce the likelihood of vessel and whale interactions.	Monitoring the sources and levels of noise producing activities could better inform actions to reduce such interactions and reduce impacts from human activities.	N/A	N/A
Water Quality	Monitoring contaminants and developing contingency plans would enable prompt identification of changes in water quality and quick interventions to avoid adverse impacts.	Tracking long-term water quality impacts on sanctuary resources, ecosystem dynamics, and the integrity of maritime heritage resources could inform management interventions to protect these resources.	Monitoring and understanding water quality could ensure safe catch for fishers and consumers.	Improving understanding of water quality in the sanctuary could increase the quality of recreational experiences for visitors and fishing activities.
Habitat	Supporting research programs in the Designated Habitat Research Area would provide better data to protect habitat and living resources in those areas.	Studying habitat use by living resources in the sanctuary would inform improved management to protect sanctuary habitats and living resources.	N/A	Characterizing and monitoring benthic habitats in the sanctuary could further understanding of ecosystem services for compatible use of the sanctuary.
Ecosystem Services	N/A	Research on ecosystem service impacts of sanctuary management activities could benefit ongoing resource protection efforts.	N/A	N/A

Action Plan	Direct resource protection through implementing sanctuary regulations and management plan	Indirect resource protection through enhanced management and stewardship	Benefits on marine uses and the socioeconomic setting	Provision of ecosystem services for compatible use of the sanctuary for recreation, tourism, and other activities
Administration and Infrastructure	Active participation in contingency planning enables prompt and effective response in case of emergencies in the sanctuary. Repairs/modifications to SBNMS facilities would mitigate potential consequences of structural failure of the pier/boathouse complex.	Supporting volunteer programs and collaboration with partners enables many activities to further ocean stewardship and resource protection that would not be possible with current staffing.	N/A	N/A

Table 4.8 summarizes the anticipated effects on the human environment from conducting field activities to implement each action plan. These impacts are described in further detail in the remainder of Chapter 4.

Table 4.8. Summary of Impacts of Field Activities

Category of Activity	**Activity Purpose**	**Impacts on Physical Setting**	**Impacts on Living Resources**	**Impacts on Marine Uses and Socioeconomics**	**Impacts on Cultural and Historical Resources**
Vessel use and maintenance	Support all research, resource protection, emergency response, and education activities.	**Negligible or minor** disturbance of seafloor habitat, generation of underwater noise and air emissions, potential for accidental spills.	**Negligible or minor** disturbance or temporary displacement, risk of vessel strike.	**Negligible** risk of interaction with other users.	**Negligible** risk of accidental contact.
Scuba diving	Document habitat, living resources, and shipwrecks.	**Negligible or minor** disturbance of seafloor habitat.	**Negligible** disturbance or temporary displacement.	**Negligible** risk of interaction with other users.	**Negligible** risk of accidental contact.
Deploying buoys and research or monitoring equipment	Passive acoustic monitoring in the sanctuary and managing maritime heritage resources.	**Negligible or minor** disturbance of seafloor habitat.	**Negligible or minor** disturbance or temporary displacement, risk of entanglement.	**Negligible** risk of interaction with other users.	**Minor** risk of disturbance from intentional contact with the seafloor.
Sampling organisms	Collecting organisms for research.	**Negligible or minor** disturbance of seafloor habitat.	**Negligible** disturbance or small-scale removal.	**No effect**	**Minor** risk of disturbance from intentional contact with the seafloor.
Collecting artifacts for time-sensitive resource protection needs	Conserving artifacts from maritime heritage resources to protect from loss, destruction, or injury.	**Negligible or minor** disturbance of seafloor habitat.	**No effect**	**No effect**	**Minor** risk of disturbance from intentional contact with the seafloor.

Category of Activity	Activity Purpose	Impacts on Physical Setting	Impacts on Living Resources	Impacts on Marine Uses and Socioeconomics	Impacts on Cultural and Historical Resources
Removing materials	Reducing marine debris and removing abandoned nets.	**Negligible or minor** disturbance of seafloor habitat.	**No effect**	**No effect**	**Minor** risk of disturbance from intentional contact with the seafloor.
Deploying uncrewed underwater systems	Measuring oceanographic conditions, and characterizing habitats and maritime heritage resources.	**Negligible or minor** disturbance of seafloor habitat, generation of underwater noise	**Negligible or minor** disturbance or temporary displacement.	**Negligible** risk of interaction with other users.	**Negligible** risk of accidental contact.
Deploying uncrewed aerial systems	Observing whales for research.	**No effect**	**Negligible** disturbance or temporary displacement	**Negligible** risk of interaction with other users.	**No effect**
Deploying active acoustic equipment and towed instrument arrays	Characterizing seafloor habitats and maritime heritage resources.	**Negligible or minor** generation of underwater noise.	**Negligible** disturbance or temporary displacement.	**Negligible** risk of interaction with other users.	**Negligible** risk of accidental contact.
Seabird and whale tagging studies	Collecting data on seabird and whale movements.	**No effect**	**Negligible** disturbance or temporary displacement.	**No effect**	**No effect**

4.5.2 Impacts of the Proposed Action on the Physical Setting

This section evaluates the impacts on the physical setting from implementing the proposed action (Alternative 1), as described in Section 4.2.1. An overview of the sanctuary's physical setting is provided in Section 4.3.1.

Beneficial Impacts of the Proposed Action on the Physical Setting

The following beneficial impacts on the physical setting would result from implementing the sanctuary management plan and conducting routine field activities:

Direct protection of habitats through implementing sanctuary regulations or non-regulatory components of the management plan focused on habitat protection

Implementing existing sanctuary regulations would continue to limit discharges into the sanctuary that could compromise water quality, which provides direct resource protection benefits. Continuing to implement sanctuary regulations, permitting, and consultation processes would further the protection of important habitat and physical resources in SBNMS by reducing instances of seafloor disturbance and discharges occurring in the sanctuary. Permitting and consultation processes can directly reduce impacts by ensuring activities conducted within the sanctuary are in compliance with sanctuary regulations and include necessary mitigation.

Similarly, implementing water quality monitoring programs in the Water Quality Action Plan would allow monitoring of contaminants and prompt identification when changes in water quality occur. These monitoring programs, combined with developing contingency plans, would allow sanctuary staff and partners to implement appropriate interventions or quick response as soon as possible, to avoid adverse impacts on water quality and other resources. In addition, continuing research programs in the sanctuary management plan to better characterize the physical habitat of the sanctuary, particularly in the DHRA, would provide sanctuary managers better data to inform direct resource protection of habitat.

Indirect protection of habitat through enhanced management and stewardship

As part of the revised sanctuary management plan, implementing research and monitoring programs would provide sanctuary managers with information to inform decisions related to management of sanctuary resources, resulting in enhanced resource protection. Specifically, supporting, promoting, and coordinating scientific research, characterization, and long-term monitoring of habitat and water quality in the sanctuary would enhance understanding of the physical processes, and improve management decision-making. In addition, implementing resource protection and emergency response activities to remove hazards from the waters of SBNMS, would reduce or avoid adverse impacts to habitat and water quality that can result from seafloor disturbance, hazardous spills, or marine debris.

As detailed in the Action Plans in Chapter 3, the revised sanctuary management plan would focus on addressing emergent environmental concerns in the sanctuary (e.g., shifting species use and impacts of climate change, better characterization of the sanctuary soundscape) as well

as expanding work in ongoing priority areas (e.g., water quality monitoring, research into marine mammal behavior and use of the sanctuary, and coordination and collaboration with agencies and other partners). Through these efforts to expand research, outreach, and education activities, NOAA has the potential to expand the knowledge base and promote ocean stewardship principles among partners, local communities, and the general public. NOAA could achieve this through publishing scientific research findings and formal and informal education programming. This creates an opportunity to influence the behavior and decision-making of individuals, communities, organizations, and agencies in ways that could indirectly benefit physical resources within the sanctuary.

The Climate Change and Water Quality action plans include strategies to focus on understanding and addressing potential impacts from climate change on sanctuary resources, and to continue support for long-term sampling projects to monitor water quality. Specific activities proposed to achieve these strategies are:

- Continued research on the distribution and abundance of focal species such as humpback whales and sand lance,
- Continued research on noise mitigation in the sanctuary,
- Collaborative efforts to share information and coordinate climate change responses across regional agencies and partner organizations, and
- Investigation into how change to water quality may impact ecosystem dynamics and the integrity of maritime heritage resources.

All of these activities are intended to provide beneficial impacts to sanctuary water quality, physical habitat, the soundscape in the sanctuary, or to address ongoing impacts of climate change. The magnitude of the potential beneficial impacts of some of these specific activities would largely depend on actions undertaken by partner agencies with direct regulatory authority over water quality.

Summary of beneficial impacts on the physical setting

The revised sanctuary management plan would improve the understanding, management, and protection of sanctuary resources and therefore provide minor to moderate beneficial impacts to water quality, the acoustic environment, and seafloor habitat in SBNMS.

Adverse Impacts of the Proposed Action on the Physical Setting

As part of implementing the proposed action, some adverse impacts to the physical setting would result from conducting routine field activities and other management activities, as described below.

Minor disturbance of seafloor habitat during research, monitoring, and resource protection activities

Direct disturbance of habitat in the sanctuary could result from intentional or accidental contact with the seafloor during research, monitoring, or resource protection activities to implement the revised sanctuary management plan. These activities could include vessel anchoring, removing materials (e.g., marine debris), sampling organisms, scuba divers coming in contact with the seafloor, deploying uncrewed underwater systems, and deploying buoys or research and

monitoring equipment (e.g., drop cameras, passive listening devices). Scientific equipment is usually deployed for three to 12 months and then retrieved. Buoys would be attached to moorings located on the seafloor, which are deployed as needed and, in most cases, retrieved when no longer needed. NOAA would avoid or minimize the scale of any possible direct impacts to the seafloor by:

- Deploying or lowering instruments onto sandy substrate whenever possible,
- Limiting vessel anchoring to sandy-bottom substrates to avoid damage to living resources and sensitive habitat,
- Deploying instruments slowly and under constant supervision by NOAA staff, and
- Retrieving deployed research and monitoring equipment, when possible.

Due to these operational protocols, and the relatively low intensity of NOAA's planned activities in comparison with the entire seafloor area of the sanctuary, NOAA expects that the areas impacted by seafloor disturbance through conducting sanctuary management activities would be miniscule and any adverse impacts would be temporary and minor.

Temporary, localized decline in water quality

Existing state, federal, and sanctuary regulations prohibit most intentional discharges within the sanctuary, therefore direct impacts to water quality from vessel operations are expected to be highly unlikely because they would only occur from accidental discharge. Very rarely, vessel operations, vessel maintenance, or vessel incidents could result in an accidental or inadvertent release of waste or discharge in the sanctuary. Possible pollutants that could pose a risk to water quality include marine debris, food waste, oil, fuel, detergents, and hydraulic fluid. The likelihood of accidental spills occurring within the sanctuary would be low and, if a spill did occur, any decrease in water quality would be localized and temporary as the pollutant quickly dissipates. In addition, some of the sanctuary management activities described above that have potential to disturb the seafloor (e.g., deploying buoys or research and monitoring equipment, scuba diving, or sampling) could cause localized and temporary increases in water turbidity at a given activity location.

Vessel maintenance could result in temporarily decreased water quality if contaminants used to maintain boats (e.g., oil and cleaning chemicals) inadvertently enter sanctuary waters. For ONMS vessels, trained NOAA personnel or contractors generally conduct routine maintenance. Heavy maintenance typically occurs on land in self-contained contractor facilities which are highly regulated for industrial safety and environmental compliance by local, state, and federal entities. Where possible, NOAA uses bio-based lubricants and fluids (and in some cases bio-based fuels), further reducing the threat to water quality in the unlikely event of a spill. Because most vessel maintenance activities are conducted outside SBNMS and by highly-trained staff, the risk of contaminants entering sanctuary waters during maintenance is extremely low.

Generation of air emissions from vessels

Vessels emit air pollutants from engines and generators on board, including carbon dioxide, which can contribute negatively to local air quality. Relative to the scale of existing vessel traffic in this region, the additional air emissions generated by SBNMS vessel operations to support sanctuary management is expected to be negligible.

Minor disturbance of soundscape during research, monitoring, and resource protection activities from equipment noise and active acoustics

Vessel operations and deploying uncrewed underwater systems could have adverse impacts on the acoustic setting within SBNMS due to movement of equipment through the water, engine noise, and other underwater sound generated from propulsion machinery or depth sounders. Relative to the scale of existing activities in this region that contribute to the sanctuary soundscape, including ambient acoustics and background noise, NOAA expects that the additional noise impacts of vessel use and deploying uncrewed underwater systems to support sanctuary management activities would be negligible or minor.

Summary of adverse impacts on the physical setting

Implementing the proposed action would result in negligible or minor adverse impacts on water quality, air quality, the acoustic environment, and seafloor habitat in SBNMS for the following reasons: (1) Sanctuary-led field activities would occur infrequently (up to 120 days at sea per year), would be periodic, and spread out in space and time; and (2) All ONMS vessels must comply with the operational protocols and procedures in the NOAA Small Boats Policy (NAO, 209-125) and ONMS best management practices as described in Section 4.2.1, which reduces the risk of adverse impacts.

4.5.3 Impacts of the Proposed Action on the Biological Setting

This section evaluates the impacts on the biological setting from implementing the proposed action, as described in Section 4.2.1. An overview of the sanctuary's biological setting is provided in Section 4.3.2.

Beneficial Impacts of the Proposed Action on the Biological Setting

The following beneficial impacts on the biological setting would result from implementing the sanctuary management plan and conducting routine field activities:

Direct protection of living resources through implementing sanctuary regulations or non-regulatory components of the management plan focused on reducing wildlife disturbance

Under the Proposed Action, implementing SBNMS regulations would continue to protect marine habitats and species due to prohibitions on certain activities that would otherwise degrade habitats used by marine species or directly harm marine species, such as: (1) alteration of or construction on the seabed; (2) certain discharges into the sanctuary; (3) taking or possessing any marine mammal, reptile, or seabird except as allowed by other statutes. Implementing these prohibitions through permitting and interagency consultation processes would provide direct resource protection benefits by protecting important biological habitat for living resources in SBNMS and reducing direct disturbance of living resources.

Marine species that make their home or forage within benthic habitats and sediment benefit from compliance with these regulatory prohibitions because of the avoided adverse impacts associated with injury or habitat disturbance or destruction. Some historical resources function in the marine environment as structures that provide valuable three-dimensional habitat for marine life. Therefore, efforts to minimize or avoid disturbance of historical resources within the

sanctuary not only protect these important resources, but also reduce the likelihood of adverse impacts on marine biota using these sites as habitat. For example, as part of implementing the Shipwreck Avoidance Program, NOAA would conduct outreach with the commercial fishing community to reduce impacts to shipwrecks, which could in turn reduce likelihood of injury to the living communities that inhabit shipwrecks.

Similarly, several activities proposed in the Marine Mammal, Vessel Traffic, and Soundscape action plans would contribute to increased resource protection for marine mammals in the sanctuary. For example:

- The BOWW outreach program for recreational boaters and the North Atlantic right whale corporate responsibility program for commercial shippers would increase awareness of whale watching guidelines and compliance with regulations;
- Collecting and sharing data on whale locations, using the WhaleAlert app, and research on the impacts of noise on whales could reduce the likelihood of vessel strikes or entanglements of whales; and
- Coordinating communication and information sharing among regional agencies may directly influence protective measures in place for sanctuary resources.

In addition, conducting a climate vulnerability assessment as part of the Climate Change Action Plan would provide sanctuary managers with tools to identify those living resources at greatest risk from a changing climate and better data to inform direct resource protection interventions.

Indirect protection of living resources through enhanced management and stewardship

As part of the revised sanctuary management plan, implementing research and monitoring programs would provide sanctuary managers with information to inform decisions related to management of sanctuary resources, resulting in enhanced resource protection of marine species and their habitat. Specifically, supporting, promoting, and coordinating scientific research, characterization, and long-term monitoring in the sanctuary would increase understanding of the structure, function, resilience, and status of the resources SBNMS manages. An increased knowledge of the processes, dynamics, and responses of these systems to both human-induced and natural changes would improve long-term management of these resources and their habitats in the sanctuary. In addition, implementing resource protection and emergency response activities to remove hazards from the waters of SBNMS, would reduce or avoid disturbance of important habitats, reduce risk of collisions with or entanglement of marine species, and mitigate any adverse impacts from hazardous spills on living marine species in the sanctuary.

One of the revised management plan's goals is to increase understanding of sanctuary resources, to maintain and improve the status of sanctuary resources, and to maintain or increase efforts to reduce threats to sanctuary resources. As detailed in the Action Plans in Chapter 3, the revised sanctuary management plan would focus on addressing emergent environmental concerns in the sanctuary (e.g., marine debris, impacts to and management of the DHRA, installation of offshore energy infrastructure) as well as expanding work in ongoing priority areas (e.g., wildlife entanglement and ocean noise, outreach and education programs, and expanding research and

monitoring of marine mammals and seabirds). The Action Plans in Chapter 3 propose various strategies and activities to help further these goals, for example:

- Evaluating fishing gear impacts to sanctuary resources and developing best management practices to mitigate adverse impacts,
- Collaborating with fishery management agency partners to further ecosystem-based management approaches and advance understanding and management of fish aggregation sites,
- Continued research on seabird ecology, habitat use, and contaminant loads,
- Expanding outreach programs to improve compliance with speed seasonal management areas for North Atlantic right whales,
- Researching the impacts of climate change on the sanctuary ecosystem,
- Monitoring the sources and levels of noise producing activities and appropriate mitigation in the sanctuary,
- Continued research on habitat use by living resources in the sanctuary and ecosystem service impacts of sanctuary management activities.

Through these efforts to expand research, outreach, and education activities, NOAA has the potential to expand the knowledge base and promote ocean stewardship principles among partners, local communities, and the general public. NOAA could achieve this through publishing scientific research findings, formal and informal education programming, and outreach programs. These activities create an opportunity to influence the behavior and decision-making of individuals, communities, organizations, and agencies in ways that could indirectly benefit living marine resources within the sanctuary. For example, NOAA staff would support regional coordination to share information, increase capacity, evaluate the effectiveness of relationships, strengthen Sanctuary Advisory Council relationships with partners, and engage with international groups, Indigenous tribes, nations and organizations. This collaboration with agencies with overlapping management authority with NOAA would aim to further protection of sanctuary resources while allowing each agency to achieve their respective missions.

In addition, interpretive programming like the BOWW program provides on-water outreach to private boaters about appropriate behavior around whales. This program provides long-term benefits to efforts to protect biological resources, particularly marine mammals, by minimizing disturbance of protected species. For example, educating the public about and promoting the responsible use of sanctuary resources could reduce habitat or wildlife disturbances from other recreational uses of the sanctuary by ensuring that the public is aware of the need to avoid or minimize impacts to habitat for marine species.

All of these activities are intended to provide beneficial impacts to the sanctuary's living marine resources, biological habitat, or to address ongoing impacts of climate change. The magnitude of the potential beneficial impacts of some of these specific activities would largely depend on actions undertaken by partner agencies with direct regulatory authority over protection of certain species or habitat types.

Summary of beneficial impacts on the biological setting

The revised sanctuary management plan would improve the understanding, management, and protection of sanctuary resources and therefore provide minor to moderate beneficial impacts to the living marine resources and habitats in SBNMS.

Adverse Impacts of the Proposed Action on the Biological Setting

As part of implementing the proposed action, some adverse impacts to the biological setting would result from conducting routine field activities and other management activities, as described below.

Minor disturbance of living resources during research, monitoring, and resource protection activities

Minor physical or acoustic disturbance, including temporary displacement of marine species could result from conducting research, monitoring, or resource protection activities to implement the revised sanctuary management plan. These activities could include vessel use, scuba diving, deploying buoys and research or monitoring equipment, sampling organisms, removing materials (e.g., marine debris), deploying uncrewed underwater systems, deploying uncrewed aerial systems, deploying active acoustic equipment and towed instrument arrays, and seabird and whale tagging studies. NOAA would avoid or minimize disturbance of living marine resources by:

- Posting a dedicated marine mammal observer during vessel operations to avoid collisions with marine mammals,
- Maintaining safe distances from any observed large whales,
- Postponing deployment of equipment when marine species that could be potentially entangled are present,
- Supervising deployed instruments or instrument cables while they are deployed to minimize risk of collision or entanglement with marine species,
- Ensuring all NOAA divers are trained and follow NOAA protocols to avoid harming or otherwise disturbing habitat or living marine resources, and
- Implementing the SBNMS-specific vessel standing orders and best practices described in Section 5.2.1, which are intended to minimize and avoid interactions with sanctuary resources.

If living marine resources were present in close proximity to any equipment or an activity's location, NOAA anticipates that any disturbance of the individual would be brief due to the short period of time NOAA-led activities would occur at a single location. Any avoidance would be localized and temporary, animals are expected to return to the area quickly after the vessel leaves the area, and abandonment of habitat is not expected. NOAA would take all possible precautions to minimize the risk of vessel strike or entanglement, or other direct disturbance, of living marine species during vessel operations and other equipment used to support sanctuary research, monitoring, and resource protection activities.

As part of implementing the Shipwreck Avoidance Program and disclosing select shipwreck locations, there is also the potential for minor adverse impacts on any living resources that form

on shipwrecks. This adverse impact would result if the disclosure of shipwreck locations were to attract recreational hook and line fishers to the shipwreck sites seeking aggregations at the shipwreck site.

As described in Section 4.5.1, NOAA determined that the likelihood of changes in water quality occurring due to sanctuary management activities would be extremely low. Therefore, NOAA does not expect any indirect adverse impacts on living marine resources resulting from changes in water quality caused by sanctuary management activities. Similarly, NOAA determined that the contribution of noise to the sanctuary soundscape from conducting sanctuary management activities would be minor related to the scope of existing activities in the region. Therefore, NOAA expects that any acoustics effects on living marine resources from engine noise, movement of equipment through the water, and other underwater sound generated from propulsion machinery or depth sounders would be minor and temporary. Potential impacts from use of multibeam sonar during sanctuary management actions are anticipated to be limited to temporary behavioural disturbances of marine mammals within the mid- and higher frequency hearing range (e.g., dolphinids) with all sound exposures anticipated to be less than one minute.[34] ONMS's multibeam and other active acoustic activities are also being assessed programmatically pursuant to NEPA[35] with those of other National Ocean Service programs, including the Office of Coast Survey who conducts the majority of multibeam surveys for the National Ocean Service. As part of that programmatic review, the National Ocean Service intends to initiate consultation under ESA Section 7 and seek an authorization for incidental take of marine mammals under the MMPA.

Due to these operational protocols, and the low intensity of NOAA's planned activities within the sanctuary, NOAA expects that likelihood of disturbance of living marine resources through conducting sanctuary management activities would be very low and any adverse impacts would be temporary. Implementing the proposed action would result in negligible or minor adverse impacts on living marine resources and biological in SBNMS for the following reasons: (1) Sanctuary-led field activities would occur infrequently (up to 120 days at sea per year), would be periodic, and spread out in space and time; and (2) All ONMS vessels must comply with the operational protocols and procedures in the NOAA Small Boats Policy (NAO, 209-125) and ONMS best management practices as described in Section 4.2.1, which reduces the risk of adverse impacts.

4.5.4 Impacts of the Proposed Action on Protected Species and Habitats

This section summarizes the anticipated impacts of the proposed action on the species and habitats that may occur in the sanctuary that are protected under the ESA, MMPA, MBTA, and the EFH provisions of the MSA, as detailed in Section 4.3.3.

[34] In 2016, NMFS concluded that impacts from use of acoustic equipment as part of the Northeast Fisheries Science Center's research program would have negligible effects on marine mammals (81 FR 53061; August 11, 2016). This information is available at https://www.govinfo.gov/content/pkg/FR-2016-08-11/pdf/2016-18739.pdf.

[35] https://www.federalregister.gov/d/2021-13361 86 FR 33663 (June 25, 2021)

Effects Analysis for ESA Listed Species and Designated Critical Habitat

Section 7 of the ESA requires all federal agencies, in consultation with USFWS and NMFS, ensure their actions are not likely to jeopardize the continued existence of endangered or threatened species, or result in the destruction or adverse modification of the critical habitat of such species.

Impacts on ESA-listed marine mammals, sea turtles, and fish

As noted in Table 4.3 in Section 4.3.3, ONMS determined that 10 endangered or threatened species under NMFS jurisdiction could occur in the action area:

- Kemp's Ridley, leatherback, loggerhead, and green sea turtles,
- Fin, sei, and North Atlantic right whales,
- Atlantic salmon (Gulf of Maine distinct population segment (DPS)), Atlantic sturgeon (Gulf of Maine DPS), and shortnose sturgeon.

Of these species, those most likely to be found in SBNMS are fin, sei, and North Atlantic right whales, and leatherback sea turtles, which are common or abundant in the sanctuary. The remaining six species or DPSs are occasional visitors to SBNMS.

Generally, the potential beneficial impacts of the proposed action on these threatened or endangered species would be the same as those described for all biological resources, see Section 4.5.2. For example, continuing to implement SBNMS regulatory prohibitions through permitting and interagency consultation processes would provide resource protection benefits for these listed species by protecting biological habitat for living resources in SBNMS and reducing potential for direct disturbance. In addition, implementing research, monitoring, and outreach programs under the revised sanctuary management plan would improve the understanding, management, and protection of sanctuary resources and therefore provide beneficial impacts to the living marine resources and habitats in SBNMS, including these ESA-listed species.

Similarly, the potential negative impacts of the proposed action on these listed species would be the same as those described for all biological resources, see Section 4.5.2. Except that NOAA would implement additional protective measures and standing orders designed to reduce any risk of interactions with listed species during sanctuary management actions, as described below.

The research, monitoring, or resource protection activities involved in implementing the sanctuary management plan that have potential to affect listed species are:

- vessel use,
- deploying buoys and research or monitoring equipment,
- sampling organisms,
- deploying uncrewed underwater systems,
- deploying uncrewed aerial systems,
- deploying active acoustic equipment and towed instrument arrays, and

- whale tagging studies.[36]

These activities involve work in or near the marine environment and could affect a listed species if they were to occur at the project location during the activity. The possible routes of effect from these activities to the 10 listed species likely to occur in the action area are: temporary disturbance, risk of entanglement with equipment, and risk of vessel strike. NOAA would implement the protective measures or standing orders detailed in Section 4.2.1 during sanctuary vessel operations in order to avoid or minimize the risk of interactions with listed species, particularly whales. Examples include:

- Postponing deployment of equipment when marine species that could be potentially entangled are present,
- Constantly supervising deployed instruments or instrument cables at all times while they are deployed to minimize risk of collision or entanglement with marine species,
- Following standing orders for vessel speed, operations around marine mammals, and nighttime operations,
- Posting a dedicated marine mammal observer on every mission when practicable,
- Requiring annual Whale Sense training for SBNMS vessel crew members to increase the awareness of vessel operators about operating safely around whales,
- Abiding by GARFO Voluntary Northeast Region Whale Watching Guidelines,
- Complying with speed restrictions in seasonal and dynamic management areas that overlap the sanctuary,
- Reducing vessel speed when North Atlantic right whale listening buoys are activated, and
- Incorporating current whale sighting data from real-time listening buoys and other sources into all cruise plans.

If any sanctuary management activities were to occur in close proximity to ESA-listed species, the activity could result in temporary disturbance. For example, a vessel or ROV transiting through the water could cause a whale, sea turtle, or fish to change swimming speed or direction, change vocalization rate or intensity, or they could have no reaction. Sea turtles, whales, and fish usually avoid human activity, but some large cetaceans have been observed to be attracted to vessel activity (Watkins, 1986). If it were to occur, this type of behavior modification would be temporary because of the low intensity of NOAA planned activities and the short period of time that activities would occur at a single location. Similarly, because of the small areas where sampling or deploying research and monitoring equipment would take place, NOAA expects that if an individual were temporarily displaced, the displacement would be localized and temporary, animals are expected to return to the area quickly after the vessel leaves the area, and abandonment of habitat is not expected. As such, NOAA finds that the likelihood of ONMS vessels or other sanctuary management activities disturbing a listed species is very low, and if an interaction were to occur, the effects on a listed species would be

[36] Whale tagging activities are not evaluated in detail here because no new whale tagging efforts are proposed as part of this action. Continued research would only be conducted in accordance with NMFS Permit #18059 (expiration April 2022) to support research into the foraging ecology, habitat use, physiology, and acoustic and social behavior of humpback, fin, minke, and sei whales in the Gulf of Maine, which was evaluated for compliance at the time of the permit issuance.

insignificant because any disturbance would be brief and is not likely to significantly impact the organism's ability to feed, reproduce, navigate, or avoid predators.

Sanctuary vessel operations have the potential to result in a collision with ESA-listed species that occur in close proximity to a vessel. The severity of potential injuries to an individual from a vessel strike would depend on the speed of the vessel, the part of the vessel that strikes the animal, and the body part impacted. The incidence of collision is expected to increase for all marine species as traffic and animal density increases, or as vessel size and speed increase. For sea turtles, Hazel et al. (2007) demonstrated that greater vessel speed increased the probability that sea turtles would fail to flee from an approaching vessel. Similarly, Vanderlaan and Taggart (2007) determined that the severity of injury to large whales is directly related to speed. For example, the study found that the probability of lethal injury from large ships increased from 21% for vessels traveling at 8.6 knots, to over 79% for vessels moving at 15 knots or more. Additionally, vessel strikes can be a threat to species that surface more often, have slower swim speeds, or that lack adaptations that can help an individual avoid vessels. For example, NMFS identifies boat collisions as a threat to green, Kemp's ridley, and leatherback sea turtles because they are species that need to surface in order to breathe. Whales must also surface to breathe, and are known to rest or bask at the ocean surface, which increases their risk of being struck by a vessel or its propellers. Salmon and sturgeon tend to have higher swim speeds and are more apt to avoid collisions with vessels. They also do not need to surface to breathe and spend less time at the water's surface. To minimize the risk of vessel collisions with whales or sea turtles, NOAA implements specific standing orders and protective measures for reducing vessel speed and spotting marine species from a distance. As such, NOAA finds that the risk of a collision with a listed marine species would be discountable given the low-level of vessel trips that would occur annually as part of sanctuary management activities and compliance with the standing orders and protective measures listed in Section 4.2.1.

Entanglements can cause physical damage to an animal through constriction which can partially sever limbs or flippers, create penetrating injuries, and potentially immobilize an animal (Andersen et al., 2008). If an entanglement is severe enough, it may also result in drowning. As part of the proposed action, NOAA staff would deploy research or monitoring equipment and some tethered ROVs or other uncrewed underwater systems. A listed species could become entangled if an individual encounters buoy lines, ROV tethers, or other filamentous attachments associated with research and sampling activities (e.g., deploying a conductivity, temperature, and depth monitor). In general, the risk of entanglement is greater for whales and sea turtles than fish due to their slower movements and size. To minimize the risk of entanglement, NOAA staff would postpone deployment of devices when marine species that could be potentially entangled are present, and individuals participating in the activity would closely monitor the instrument cables at all times while they are deployed. In addition, many research activities only require lines to be temporarily suspended within the water column for 20 minutes or less. Because of these measures and the low frequency of equipment deployments posing an entanglement risk, NOAA believes that it would be extremely unlikely that any listed species would come into contact with instrument cables or buoys during sanctuary management activities. Therefore, NOAA finds that the risk of entanglement for listed whales, sea turtles, and fish would be discountable.

In summary, temporary disturbance or displacement of listed species could result from conducting research, monitoring, or resource protection activities to implement the revised sanctuary management plan. NOAA concluded these activities may affect, but are not likely to adversely affect the 10 listed species under NMFS jurisdiction given that:

- NOAA staff would implement a relatively low-level of field activities throughout the year, minimizing the likelihood that NOAA staff or vessels would interact with, strike, or entangle listed species.
- All NOAA-authorized vessels and staff would adhere to the NOAA Small Boat Program Guidelines and implement the standing orders and best management practices described in Section 4.2.1, which are intended to minimize and avoid the risk of interactions with listed species.
- Research, education programs in the field, and other on-water activities would be led by highly-trained NOAA staff that consider the potential impact on ESA-listed species and that adhere to the best management practices described in Section 4.2.1.
- NOAA would implement public outreach to further help ensure that the public is aware of the need to avoid or minimize impacts to listed species.
- Implementing sanctuary regulations and management activities aimed at research, resource protection, and stewardship would continue to protect foraging habitats and minimize disturbance for ESA-listed species in SBNMS.

Impacts on designated critical habitat for North Atlantic right whale

The sanctuary is within Unit 1 of the foraging area designated critical habitat for the North Atlantic right whale. Every year, approximately one third of the critically endangered NARW population utilizes the sanctuary and nearby waters for feeding and nursing calves during the spring, summer, and fall. The physical and biological features essential to the conservation of the NARW, which provide foraging area functions in Unit 1 are:

1. The physical oceanographic conditions and structures of the Gulf of Maine and Georges Bank region that combine to distribute and aggregate copepod (*C. finmarchicus)* for right whale foraging, namely prevailing currents and circulation patterns, bathymetric features (basins, banks, and channels), oceanic fronts, density gradients, and temperature regimes;
2. Low flow velocities in Jordan, Wilkinson, and Georges Basins that allow diapausing *C. finmarchicus* to aggregate passively below the convective layer so that the copepods are retained in the basins;
3. Late stage *C. finmarchicus* in dense aggregations in the Gulf of Maine and Georges Bank region; and
4. Diapausing *C. finmarchicus* in aggregations in the Gulf of Maine and Georges Bank region.

NOAA does not expect that any of the sanctuary management activities included in the proposed action, as described in Section 4.2.1 and evaluated above for their impacts to physical and biological resources would affect any of these essential features of the foraging area. Therefore, NOAA finds that the proposed action would have no effect on designated critical habitat for the North Atlantic right whale.

Impacts on ESA-listed Birds

As described in Table 4.4, NOAA determined that two species ESA-listed birds could occur very rarely, if at all, in the action area: red knot and roseate tern. There is a very low likelihood of red knots occurring in the action area; they could fly over the action area at high altitude in spring and fall, but otherwise would not occur in the action area.

Roseate terns do occur in the action area, but only rarely during summer months.

Based on a review of the activities involved in implementing the sanctuary management plan and the very low likelihood of these species occurring in the sanctuary, NOAA determined that the proposed action would have no effect on red knots and roseate terns. The specific rationale is as follows:

1. The vast majority of sanctuary field activities would take place offshore,
2. The proposed action does not involve any onshore fieldwork so would not involve any interactions or potential for disturbance of shorebirds,
3. No activities included in the proposed action would cause any noticeable impact on roseate terns even if they occurred in the same area, such as vessel operations, and
4. If NOAA were to use UAS for research, all operations would be conducted in accordance with NOAA policy and will be operated in such a way to avoid any interaction with any seabirds.

Effect Determination for Marine Mammals

Under the MMPA, take is defined as "to harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill any marine mammal" (16 U.S.C. §1362(13)) and is further defined by regulation (50 C.F.R. § 216.3) as "to harass, hunt, capture, collect, or kill, or attempt to harass, hunt, capture, collect, or kill any marine mammal." NOAA determined that implementing the proposed action would not have the potential to result in the take, injury, or harassment of any species protected under the MMPA, and would result in minor benefits to marine mammals as described in the previous sections.

Effect Determination for Essential Fish Habitat

As described in Section 4.3.3, EFH for 28 marine and one anadromous species or species complexes and life stages occurs within SBNMS. In 2015, ONMS consulted with NMFS on the impacts on EFH from implementing routine field operations in national marine sanctuaries, including consulting with GARFO on activities in SBNMS. At that time, ONMS determined that implementing routine field operations in SBNMS, and other ONMS sites, would have no more than minimal adverse effects on EFH. On April 16, 2016, NMFS provided a General Concurrence with this determination, in accordance with 50 CFR 600.920(g). The 2015 EFH Assessment found the following minimal adverse effects to EFH from field activities at SBNMS:

- Scuba or snorkel operations – impacts may include divers kicking bottom, which may adversely affect bottom habitat. Diving gear acting as vectors for invasive species spread may adversely affect both bottom habitat and pelagic habitat,

- Deployment of AUVs/ROVs/gliders/drifters – impacts may include unintentional contact with the bottom and grounding risk from either the survey equipment or the main vessel from which it is deployed,
- Deployment of equipment on the seafloor – impacts may include contact with the bottom during installation of such equipment or in the event that such equipment breaks free from its moorings, and
- Seafloor habitat recovery monitoring program and wildlife investigations at SBNMS – impacts may include unintentional contact with bottom habitat.

To minimize any potential damage to bottom habitat or the water column, NOAA staff limit activities in accordance with these best management practices:

- instruments are deployed and lowered onto sandy substrate whenever possible;
- deployment of instruments occurs slowly and under constant supervision to minimize risk; and
- while vehicles or personnel are deployed, spotters monitor the activities at all times.

In reviewing this proposed action, NOAA determined that planned field operations at SBNMS are not substantially revised in a way that may adversely affect EFH, and that no new information is now available that affects the basis for NMFS's General Concurrence determination. Therefore, NOAA determined that the impacts of the proposed action on EFH are within the scope of the existing General Concurrence and that no further consultation is required at this time.

Effect Determination for Migratory Birds

Section 4.3.3 describes the 36 migratory bird species protected under the MBTA that may migrate through or forage within the sanctuary. The MBTA authorized federal protection for migratory birds in the United States, and made it unlawful without a permit from USFWS to pursue, hunt, take, capture, kill or sell birds listed therein ("migratory birds") (16 U.S.C. § 703). Over 800 listed migratory bird species are protected under the MBTA (50 C.F.R. 10.13). Any impacts to migratory birds associated with implementing the proposed action would be negligible, such as temporary disturbance from vessel traffic, or from other research and resource protection activities in support of sanctuary management. NOAA finds that any disturbances that did occur would be negligible and would not rise to the level of take under the MBTA.

4.5.5 Impacts of the Proposed Action on Marine Uses and the Socioeconomic Setting

This section evaluates the impacts on the socioeconomic setting and marine uses from implementing the proposed action, as described in Section 4.2.1. An overview of the sanctuary's human and socioeconomic setting is provided in Section 4.3.4.

Beneficial Impacts of the Proposed Action on Marine Uses and the Socioeconomic Setting

The following beneficial impacts on marine uses and the socioeconomic setting could result from implementing the sanctuary management plan and conducting routine field activities:

Provision of ecosystem services for compatible use of the sanctuary for recreation, tourism, and other activities

As detailed in sections 4.5.1 and 4.5.2, implementing existing sanctuary regulations would provide direct resource protection benefits for water quality, habitats, and living marine resources in the sanctuary. Protecting these important resources also provides benefits to recreational, tourism, and commercial users of the sanctuary and the local region. For example, recreational and commercial fishing, tourism, and other recreational activities rely on healthy marine ecosystems with good water quality and free of hazards for their success. Similarly, the recreational dive community benefits from identification and protection of sanctuary shipwrecks.

Education programs delivered through sanctuary visitor centers 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. SBNMS education strategies aim to raise the public's awareness and understanding of the local and regional marine environment, while creating engagement opportunities for protecting sanctuary resources. NOAA utilizes education as a resource management tool to address specific priority ecosystem protection issues, and both complements and promotes other sanctuary programs such as research, maritime heritage, and enforcement through multiple outreach and communication strategies.

Implementing a revised sanctuary management plan would advance regional ocean governance through improved coordination and collaboration, support long-term research and monitoring efforts, improve opportunities for recreation and public use of the sanctuary, and increase the value of the sanctuary for educational and research activities. The Action Plans in Chapter 3 propose various strategies and activities to help further provision of ecosystem services for compatible use of the sanctuary, for example:

- Expanding outreach to whale watching businesses and collaboration on the development of best practices related to marine mammal and seabird viewing,
- Conducting research to improve understanding of seabird use of the sanctuary,
- Long-term monitoring of water quality in the sanctuary,
- Implementing business recognition programs to encourage responsible recreational opportunities,
- Improving interpretive signage at shoreline locations to increase awareness and build knowledge of SBNMS to shoreline visitors,
- Coordinating and collaborating with fishery managers and fishers on issues of concern or to characterize and monitor benthic habitats.

These activities could serve to improve the quality of recreational experiences for visitors to the sanctuary, increase public awareness and understanding of the sanctuary, and encourage

responsible use and stewardship of the living resources that some businesses depend on. Specifically, enhanced coordination and collaborations among fishery managers, fishermen, and sanctuary staff could increase efficiencies in data collection, analysis, and communication, which indirectly benefits the sanctuary ecosystem and habitats that healthy fisheries depend on.

Benefits to marine uses through enhanced management and stewardship

In addition to the provision of ecosystem services, implementing the revised sanctuary management plan could have additional benefits on marine uses of the sanctuary, such as:

- Reducing the likelihood of lost fishing gear from accidental entanglements of gear on shipwrecks through disclosing shipwreck locations to fishers,
- Reducing the chance of material losses of vessel operators through outreach programs to reduce entanglement risk and vessel strike incidents involving marine mammals,
- Adopting business recognition programs to demonstrate participating businesses commitments to ocean stewardship,
- Ensuring safe catch for fishers by monitoring and understanding water quality,
- Increasing research opportunities available to local and regional organizations and individuals by supporting and mentoring within the research community, and
- Increasing the sense of place and connection to the sanctuary among communities by leading citizen science activities and education programming.

Through these efforts to expand research, outreach, and education activities, NOAA has the potential to provide direct or indirect benefits to other users of the marine environment in or adjacent to the sanctuary, including partners, local communities, and the general public.

Summary of beneficial impacts on marine uses and the socioeconomic setting

The revised sanctuary management plan would improve the understanding, management, and protection of sanctuary resources and therefore could provide minor or moderate beneficial impacts to the marine uses and socioeconomic setting within or adjacent to SBNMS.

Adverse Impacts of the Proposed Action on Marine Uses and the Socioeconomic Setting

Potential user conflicts from on-water sanctuary management activities

Conducting routine sanctuary management activities can result in temporary operational interference with other commercial, research, or recreational activities occurring in the sanctuary. Generally, any interference between NOAA and other users of the sanctuary would be temporary and would not result in any significant effect on the operations of recreational, research, or commercial users. The current use of the sanctuary waters by sanctuary staff and other recreational, research, and commercial users has not resulted in any user conflict. Sanctuary staff routinely collaborate with these other users on research and outreach activities. Therefore, any adverse impact from the proposed action on marine uses in the sanctuary would be negligible.

4.5.6 Impacts of the Proposed Action on the Historical and Cultural Setting

This section evaluates the impacts on the historical and cultural setting within the sanctuary from implementing the Proposed Action, as described in Section 4.2.1. An overview of the sanctuary's historical and cultural setting is provided in Section 4.3.5.

Beneficial Impacts of the Proposed Action on the Historical and Cultural Setting

The following beneficial impacts on the historical and cultural setting would result from implementing the sanctuary management plan and conducting routine field activities:

Direct protection of cultural and historical resources through implementing sanctuary regulations or non-regulatory components of the management plan focused on protecting resources from disturbance and physical damage

Implementing existing sanctuary regulations would continue to limit discharges into the sanctuary that could compromise water quality and would restrict prohibited activities that could result in adverse impacts to historical resources in the sanctuary. Continuing to implement sanctuary regulations, permitting, and consultation processes would further the protection of the important historical and cultural resources present in SBNMS by reducing instances of seafloor disturbance and discharges occurring in the sanctuary. Permitting and consultation processes can directly reduce impacts by ensuring activities conducted within the sanctuary are in compliance with sanctuary regulations and include necessary mitigation.

Similarly, certain strategies in the Maritime Heritage and Cultural Landscapes Action Plan would contribute to increased resource protection for historical and cultural resources by increasing understanding of how shipwrecks contribute to the overall maritime landscape, or mitigating impacts from human activities. For example:

- Nominating historical resources which are eligible for listing on the NRHP could lead to further protection through the NHPA,
- Conducting a harms and benefits assessment would reveal the probability or likelihood that the integrity of a specific site(s) would be adversely impacted by disclosure or, conversely, non-disclosure,
- Collaborating with NMFS, NEFMC, fishing interests, and other interested parties on increasing awareness of the SAP could lead to protection through improved compliance with voluntary avoidance areas,
- Removing marine debris or other matter from the sanctuary that could potentially entangle shipwrecks, and
- Installing mooring buoys for use by boaters could reduce impacts from vessel anchoring near shipwreck sites.

Specifically, strategy MH-2 calls for expanding the SAP to mitigate potential adverse impacts to shipwrecks from commercial fishing. The SAP involves the public disclosure of select modern

and historic shipwrecks at high risk of damage from commercial fishing gear and calls on fishermen to voluntarily avoid them. Disclosure reduces the risk of harm by enabling fishermen to avoid the wrecks by planning ahead (i.e., entering the coordinates in their chart plotters as an obstruction to avoid). The status quo of non-disclosure offers less protection because fishermen are unaware of where the wrecks are located and are unable to plan ahead to avoid them.

Indirect protection of cultural and historical resources through enhanced management and stewardship

As part of the revised sanctuary management plan, implementing research and monitoring programs would provide sanctuary managers with information to inform decisions related to management of historical and cultural resources, resulting in enhanced resource protection of these important resources. Continued research and monitoring of historical and cultural resources in SBNMS provide opportunities for improved management of these resources and increased stewardship among users of sanctuary waters. In addition, resource protection activities could mitigate potential direct adverse impacts to cultural and historical resources by avoiding damage from hazardous waste leaks, vessel sinkings, and other accidental disturbance of cultural or historical resources.

Specifically, the Action Plans in Chapter 3 propose various strategies and activities designed to support the long-term protection, preservation, and appreciation of historical and cultural resources, for example:

- Identifying and characterizing shipwreck sites to provide a baseline to monitor impacts from physical processes and human activities over time,
- Seafloor mapping projects could identify additional cultural and historical resources and provide opportunities for further interpretation and protection,
- Efforts to track visitor use of the sanctuary can inform future efforts to mitigate potential impacts of that use,
- Outreach and education programs to interpret historical resources for the public provide an avenue to disseminate the results of research and inventory efforts and further protection of these important resources, and
- Research programs to further understanding of the maritime cultural landscape of the sanctuary could increase NOAA's ability to interpret and understand resources.

Expanding research, education and outreach activities as part of the revised Maritime Heritage and Cultural Landscapes action plan would further the public's understanding of the importance of stewardship and protection of the region's history and culture. This could result in changes in behavior and decision-making of individuals, communities, organizations, and agencies in ways that could indirectly benefit historical and cultural resources within the sanctuary. Specifically, monitoring voluntary compliance with the Shipwreck Avoidance Program would help refine the program to make it more effective, continue partnerships to harness best available technologies to characterize shipwrecks and to share findings with the public such as through live ship-to-shore broadcasts; develop citizen science projects; and facilitate sustainable public access to shipwrecks. These activities would increase opportunities for research and monitoring to better understand, manage, and protect historical and cultural resources in SBNMS.

All of these activities are intended to provide beneficial impacts to the historical and cultural resources in SBNMS. The magnitude of the potential beneficial impacts of some of these specific activities would depend on actions undertaken by partner agencies with direct regulatory authority over certain activities or protection of certain resources.

Summary of beneficial impacts on the historical and cultural setting

The activities proposed in the revised sanctuary management plan would provide NOAA with increased information to inform resource protection decisions, as well as promote ocean literacy and stewardship related to the cultural and historical setting of SBNMS. In combination with continued implementation of sanctuary regulations which afford these resources protection from direct injury, these actions would provide minor to moderate beneficial impacts to the historical and cultural setting in SBNMS.

Adverse Impacts of the Proposed Action on the Historical and Cultural Setting

Minor disturbance of cultural and historical resources during research, monitoring, and resource protection activities

Disturbance of historical resources could result from intentional or accidental contact with the seafloor during research, monitoring, or resource protection activities to implement the revised sanctuary management plan. These activities could include deploying buoys and research or monitoring equipment, removing materials (e.g., marine debris and nets), and expanded implementation of the shipwreck avoidance program (Strategy MH-2) which would involve potential seafloor disturbance or potential interaction with cultural and historic sites. Vessel operations, non-invasive scientific diving operations, and deployment of uncrewed systems carry a very low risk of accidental contact with the seafloor during regular operations. Therefore, the expected impacts from these activities is negligible.

Any activities targeted at shipwrecks or other cultural resources on the seafloor would primarily be visual reconnaissance surveys associated with historic documentation on last reported positions of ship and aircraft wreck sites. Shipwreck reconnaissance surveys focus on individual sites to determine if they are eligible for inclusion in the NRHP. Surveys frequently employed at this level of investigation include visual surveys with no excavation or physical contact with historical artifacts.

For a proposed activity that has the potential to impact a shipwreck, the sanctuary archaeologist consults the shipwreck database to determine if there are any known wrecks in the vicinity. If there are then the proposed activity site is moved a safe distance away, typically 100m away from the known shipwreck. If there are no known wrecks, efforts will be made to survey the proposed site either with side scan sonar or with the vessel's Simrad ES60 echosounder to determine if there are any anomalies. If an anomaly is detected the proposed activity site is moved a safe distance away. NOAA would further avoid or minimize the scale of any possible direct impacts to the seafloor or potential interactions with cultural or historic resources by:

- Deploying or lowering instruments onto sandy substrate whenever possible,
- Limiting vessel anchoring to sandy-bottom substrates,

- Deploying instruments slowly and under constant supervision by NOAA staff, and
- Retrieving deployed research and monitoring equipment, when possible.

If NOAA planned to conduct or authorize activities involving systematic, planned physical disturbance to the marine substrate, these activities would require a sanctuary permit and would be evaluated in advance for proximity to locations of properties listed on the NRHP, and would not be conducted in the immediate vicinity of documented historical or cultural resources.

NOAA's proposed expanded implementation of the SAP includes public disclosure of additional selected shipwreck locations determined to be at high risk of damage from commercial fishing gear and calls on fishermen to voluntarily avoid them. While NOAA believes that public disclosure of selected site locations reduces potential impacts by enabling fishermen to avoid the wrecks, there is the potential that some wrecks could still be subject to damage by accidental or intentional interactions with fishing gear once the fishermen know their locations. For example, some fishermen may attempt to trawl their nets along the side of wrecks in an attempt to capture the fish that take refuge on the wreck. In addition to the potential for increased damage from commercial fishing gear, there may be increased incidental damage from recreational hook and line fishing once the site locations are disclosed.

To minimize the risk of incidental or intentional impacts to shipwrecks from location disclosure, as part of the expanded Shipwreck Avoidance Program, NOAA would do the following:

- Conduct a harms and benefits assessment of sites prior to any location disclosure in accordance with Section 304 of the NHPA and in consultation with the ONMS MHP coordinator,
- Conduct required consultations on sites proposed for disclosure, including with the ONMS MHP Coordinator, the Keeper of the National Register, for those sites that are listed on the NRHP, and the SHPO, and
- Regularly monitor any shipwreck site whose location has been publicly released to evaluate effectiveness of the program.

Based on the outcomes of the program's implementation and evaluation of its effectiveness, NOAA would consider potentially establishing permanent avoidance zones at selected shipwreck sites. Overall, implementing the proposed action would result in negligible or minor adverse impacts on the cultural and historical setting in SBNMS for the following reasons: (1) Sanctuary-led field activities would occur infrequently (up to 120 days at sea per year), would be periodic, and spread out in space and time; (2) All ONMS vessels must comply with the operational protocols and procedures in the NOAA Small Boats Policy (NAO 209-125) and ONMS best management practices as described in Section 4.2.1, which reduces the risk of adverse impacts; and (3) NOAA would minimize risks associated with shipwreck location disclosure by applying evaluation and monitoring protocols includes in the Shipwreck Avoidance Program.

Assessment of Adverse Effects under the National Historic Preservation Act

This section presents an assessment of adverse effects under Section 106 of the NHPA, pursuant to 36 CFR 800.5. The undertaking is defined under Section 4.2.2 to include the activities of

deploying buoys and research or monitoring equipment, removing materials (e.g., marine debris and nets), and expanded implementation of the shipwreck avoidance program (Strategy MH-2). The APE is defined under Section 4.2.2 and potential historic properties within the APE are described under the historical and cultural setting presented in Section 4.3.5.

For the purpose of compliance with the NHPA, an adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that quality the property for inclusion in the NRHP in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association; adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance, or be cumulative (36 CFR 800.5(a)(1)).

Deploying buoys and research or monitoring equipment

The activity of deploying buoys or other research or monitoring equipment may result in discrete and limited disturbance of the seafloor at the installation location. Equipment that may be installed is generally small in size and may include passive acoustic monitoring equipment and weighted markers or moorings for temperature, oxygen, CO2 or other sensors to support sanctuary research and monitoring efforts. Installation of this equipment could result in limited and localized damage to a historic property, if present at the installation location.

NOAA will avoid adverse effects will be avoided through adherence to best practices which include:

- Deploying or lowering instruments onto sandy substrate whenever possible,
- Limiting vessel anchoring to sandy-bottom substrates to avoid damage to living resources and sensitive habitat,
- Deploying instruments slowly and under constant supervision by NOAA staff, and
- Retrieving deployed research and monitoring equipment, when possible.

Further, NOAA will follow the best practice of shipwreck avoidance, as described under Section 4.2.1. This includes review by sanctuary staff of all installation locations prior to the deployment of any equipment that may impact the seafloor to confirm the presence or absence of known archaeological resources. If the installation location includes a known resource inventoried by SBNMS, the installation location will be relocated to avoid any impacts to that site. If the installation location is in an area that has not been previously surveyed or the presence or absence of potential archaeological resources at that location is not known, sanctuary staff will conduct inspection of that area prior to deployment to identify potential archaeological sites either through side scan sonar survey, echosounder survey, diver inspection, or other methods, as appropriate.

As described under management strategy SS-5, NOAA may also consider installation of acoustic monitoring stations at shipwreck sites to deepen understanding of the role of wrecks in supporting sanctuary biodiversity. If any equipment is proposed for installation specifically at the location of a known shipwreck, NOAA will adhere to the following measures to ensure that adverse effects are avoided:

- Sanctuary staff will ensure that any shipwreck sites considered for acoustic monitoring stations are adequately documented and surveyed at a level of resolution that provides for a complete delineation of the site's features and boundaries,
- Sanctuary staff will coordinate with the ONMS MHP to identify areas within a site's boundaries where equipment could be installed without impacting the site (including consideration of potential buried features) and/or to determine installation methods and site-specific procedures to ensure that the site will not be adversely affected
- If any equipment is to be directly affixed or mounted to a feature of a shipwreck site, an assessment will be conducted to ensure that the integrity of the feature will not be compromised and that any installation methods are reversible and conducted in a manner that does not permanently alter or damage the site,
- If a shipwreck site is determined appropriate for installation, all installation and deinstallation activities will be conducted under the supervision of NOAA staff, and
- All equipment and associated material will be removed at the end of its use.

Removing materials (e.g., marine debris and nets)

As needed to further resource protection, NOAA may remove materials, in particular lost fishing gear and/or marine debris, that poses a threat to sanctuary resources, either by divers using hand tools and lift bags or by ROVs using cutting tools. Removal of lost fishing gear or marine debris from an historic property through inappropriate methods could result in damage or physical destruction to part of the property.

NOAA will avoid adverse effects from the removal of any lost fishing gear or marine debris from known or potential historic properties through adherence to the following measures:

- Sanctuary staff will ensure that any shipwreck sites impacted by lost fishing gear or marine debris and considered as candidates for debris removal are adequately documented and surveyed at a level of resolution that provides for a full delineation of the site's features and boundaries and allows for an assessment of the extent of gear entanglement with the resource,
- Sanctuary staff will coordinate with the ONMS MHP and conduct an assessment to evaluate the risks of gear removal and may consider the option to not remove gear, if removal would cause greater damage to the site,
- Sanctuary staff will coordinate with the ONMS MHP to develop appropriate removal methods and site-specific procedures to ensure that the site will not be adversely affected through removal activities, and
- If determined that removal is appropriate at the site, all removal activities will be conducted under the supervision of NOAA staff.

Expanded implementation of the Shipwreck Avoidance Program (Strategy MH-2)

As described under the Maritime Heritage and Cultural Landscapes Action Plan, SBNMS has developed the Shipwreck Avoidance Program (Strategy MH-2) to address impacts from commercial fishing activities. The sanctuary implemented a pilot phase of the SAP in 2018 and is now considering broader implementation of the program under this draft management plan.

The sanctuary previously consulted with the MHC regarding the pilot program and committed to continue consultation through implementation of subsequent phases of the program (see background/context to program under Objective 1.2 and Appendix E-MHC correspondence). Specifically, expanded implementation of the SAP includes NOAA's public disclosure of additional selected shipwreck locations determined to be at high risk of damage from commercial fishing gear and calls on fishermen to voluntarily avoid them.

While NOAA believes that public disclosure of selected site locations reduces potential impacts by enabling fishermen to avoid the wrecks, there is the potential that some wrecks could still be subject to damage by accidental or intentional interactions with fishing gear once the fishermen know their locations. For example, some fishermen may attempt to trawl their nets along the side of wrecks in an attempt to capture the fish that take refuge on the wreck. In addition to the potential for increased damage from commercial fishing gear, there may be increased incidental damage from recreational hook and line fishing once the site locations are disclosed. There is also the potential for increased looting and disturbance from divers.

Ultimately, however, NOAA believes that there is a greater risk of impacts to these resources by not publicly disclosing selected shipwreck locations in light of the high number of sites that have been documented with fishing gear entangled on them and, in many cases, damaging them. NOAA believes that not taking action will lead to continued impacts from commercial fishing activities that are beyond its control and believes the SAP to be a reasonable and proactive solution to further protection of these shipwreck sites within the sanctuary. To further ensure that the potential for adverse effects associated with public release of selected site location information is avoided, the adaptive program will be implemented with the following components intended to work in concert with the public release of any site locations selected. These include:

- Sanctuary staff will make every effort to ensure that any shipwreck sites considered for public release are adequately documented and surveyed at a level of resolution that provides for a full delineation of the site's features and boundaries and allows for a baseline condition assessment,
- Any public disclosure of site location information will be consistent with MHP policy regarding data release under Section 304 of the NHPA,
- Any shipwreck site whose location has been publicly released will be subject to regular monitoring by SBNMS. Monitoring will include side scan sonar surveys and tracking vessel activity using VMS and AIS,
- NOAA will conduct regular outreach to relevant users, e.g., fishermen and divers, to inform them of the importance of protecting the sites and the regulations pertaining to disturbance of historic resources, and
- In the case of sites of exceptional value, such as those that are listed on the NHRP, NOAA may consider establishing mandatory, permanent avoidance buffer zones around the sites to ensure maximum protection of these unique and fragile historic resources.

Given these proposed mitigation efforts, NOAA has made a finding of no adverse effect for this undertaking, pursuant to 36 CFR § 800.5(b). Though there are historic properties present within the APE, NOAA will implement the conditions described above to avoid adverse effects.

4.6 Impacts of the No Action Alternative

Under the No Action Alternative, NOAA would continue to implement the current sanctuary management plan, field activities, and sanctuary regulations to support management of the sanctuary. In general, the anticipated beneficial and adverse impacts of the No Action Alternative on all resource areas would be of the same type and intensity as the Proposed Action (see Section 4.5), except as described below.

If NOAA decided to proceed with the No Action Alternative, the existing beneficial impacts from managing the sanctuary would continue. For example, NOAA would continue to:

- manage sanctuary resources under the current management plan and regulations;
- implement research programs to provide managers with information to inform decisions related to resource protection activities;
- implement outreach programs to inform the public about the value of sanctuary resources;
- protect and manage important habitat and wildlife in the sanctuary; and
- restore damaged resources.

However, if NOAA did not adopt a new sanctuary management plan, NOAA would forgo an opportunity to provide further management clarity and direction for SBNMS, management and research partners, or those seeking to do research and education/outreach work in the sanctuary, among others. In addition, proceeding with the No Action Alternative would limit NOAA's ability to implement additional resource protections. For example:

- Lack of coordinated climate change research would hamper NOAA's understanding of and ability to respond to climate change impacts to sanctuary resources,
- Not expanding water quality monitoring would limit NOAA's understanding of the potential impacts from emerging contaminants,
- Lack of coordinated marine mammal research would limit NOAA's ability to provide regional expertise on marine mammal protections,
- Not expanding outreach and education programming would limit NOAA's effectiveness in informing the public about resource threats, and
- Not disclosing historic shipwrecks at risk of harm from commercial fishing activities will continue to jeopardize the integrity of these resources.

4.7 Cumulative Effects Analysis

This section describes the potential cumulative impacts of implementing the proposed action. Cumulative impacts are defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions" (40 C.F.R. § 1508.7 (1978)). Cumulative impacts can result from, individually minor but collectively significant, actions that take place over a period of time.

4.7.1 Cumulative Impact Assessment Methods

This section identifies projects or other activities in the study area that may have cumulative effects when combined with the impacts from the proposed action or alternatives discussed in this environmental assessment. Cumulative effects may arise from single or multiple actions and may result in additive or interactive effects. Interactive effects may be countervailing, where the adverse cumulative effect is less than the sum of the individual effects, or synergistic, where the net adverse effect is greater than the sum of the individual effects (Council on Environmental Quality, 1997).

NOAA determined that the projects listed in Table 4.9 could contribute to cumulative impacts on the resources assessed in Section 4.3. These are projects that have occurred, are currently occurring, or are anticipated to occur in the reasonably foreseeable future within the study area.[37] NOAA compiled Table 4.9 based on review of the active and pending permits issued by the sanctuary, and NOAA staff knowledge of other existing activities occurring in and around the sanctuary. NOAA selected these past, present, and reasonably foreseeable future actions because they are likely to have similar types of impacts within the study area, affect similar resources, or are large enough to have far-reaching effects on a resource. As the proposed action for the sanctuary is related to management of the sanctuary rather than a specific coastal or offshore development action, the cumulative effects described here are related primarily to local and regional management of the environment and resources in and adjacent to the sanctuary.

NOAA then considered the effects of these actions in combination with the impacts of the proposed action to determine the overall cumulative impact on the resources in the study area. The geographic scope and timeframe for the cumulative effects analysis is the same as for the management plan review (see Section 4.1). NOAA considered cumulative effects to be significant if they exceed the capacity of a resource (physical, biological, socioeconomic, historic, and/or cultural) to sustain itself and remain productive.

[37] For purposes of this analysis, NOAA assumed any future actions in Table 4.9 would be approved and implemented within the next five to 10 years.

Table 4.9. Other Federal and Non-Federal Actions with Potential to Contribute to Cumulative Impacts

Project Name	Project Location	Project Sponsor	Project Description and Status
Fishery Management Actions	Throughout SBNMS, Gulf of Maine, Georges Bank, and Mid-Atlantic Bight	NEFMC; MAFMC; NOAA's National Marine Fisheries Service (NMFS)	Ongoing activity. Implementing and amending fishery management plans and associated fishing regulations; issuing fishing permits; designation of essential fish habitat and habitat areas of particular concern.
Seasonal Management Areas and Dynamic Management Areas	Throughout SBNMS and northwest Atlantic Ocean	NOAA NMFS	Ongoing activity. Implementing vessel speed reductions in seasonal and dynamic management areas to reduce the likelihood of deaths and serious injuries to North Atlantic right whales from collisions with ships.
Endangered Species Conservation under the Endangered Species Act	Throughout SBNMS and northwest Atlantic Ocean	NOAA NMFS	Ongoing activity. Developing and implementing recovery plans for listed species. Consulting on federal actions that may affect a listed species or its designated critical habitat. Issuing permits that authorize scientific research on listed species.
Managing Massachusetts Ocean Sanctuaries	Abutting the NW and SW boundaries of SBNMS	Commonwealth of Massachusetts	Ongoing activity. The Massachusetts Ocean Sanctuaries Act establishes five Ocean Sanctuaries in state waters and defines prohibited and allowed activities in these areas.
Implementing Joint Enforcement Agreements	Throughout SBNMS	NOAA; Mass DEP	Ongoing activity. Collaboration with NOAA's Office of Law Enforcement and MEP on enforcing sanctuary regulations, including operating patrol vessels.
Operation of Deepwater LNG Terminal and Proposed Operational Changes	Adjacent to SBNMS with vessel traffic transiting through SBNMS	Excelerate; U.S. Coast Guard; Maritime Administration	Ongoing activity with potential for future modifications to LNG Terminal Operations.
Proposed Offshore Wind Development	Waters of the Gulf of Maine, Georges Bank, and Mid-Atlantic Bight (not including SBNMS)	Various private project proponents; Bureau of Ocean Energy Management (BOEM)	Ongoing and future activity. The construction, operation, maintenance, and future decommissioning of the proposed Vineyard Wind Offshore Wind Energy Project, and other future similar projects.

Project Name	Project Location	Project Sponsor	Project Description and Status
Research Activities from Local and Regional Institutions	Throughout SBNMS	Various organizations, including: NOAA's Northeast Fisheries Science Center; Woods Hole Oceanographic Institute; University of Massachusetts; Boston University; U.S. Geological Survey	Ongoing activity. Research and monitoring activities would generally include the following types of projects occurring throughout the sanctuary: vessel operations; deployment of research equipment (ROVs, AUVs, UAS, hydrophones, gliders, subsurface moorings, and weather buoys); active acoustic equipment; collection of seafloor substrate and other specimens; bottom trawl surveys by NMFS science centers; aerial photographic surveys; and marine debris removal.
Maintenance of Existing and Potential Installation of New Submarine Cables	Through SBNMS	GTT Atlantic, other private companies	Existing GTT Atlantic submarine cable is permitted until 2025. Potential for future permit applications for transit of submarine cables through SBNMS. Projects would also require permits from the Bureau of Ocean Energy Management and U.S. Army Corps of Engineers.
Maintenance and Other Dredging Activities in Boston Harbor	Western edge of SBNMS, in and near MBDS	U.S. Army Corps of Engineers; MassPort; U.S. Coast Guard	Ongoing activity.
Massachusetts Water Resources Authority Outfall/Discharge Locations	Western edge of SBNMS	Massachusetts Water Resources Authority	Ongoing activity. Discharge of treated wastewater just outside the sanctuary boundary. Use of scientific equipment to monitor water quality.
Mapping and Surveying Activities by the National Ocean Service for Coastal and Marine Data Acquisition	Throughout SBNMS	Office of Coast Survey, National Centers for Coastal Ocean Science, other National Ocean Service Program Officers	NOAA's National Ocean Service prepared a programmatic draft environmental impact statement to analyze the potential environmental impacts associated with its recurring projects throughout U.S. coastal and marine waters to characterize underwater features (e.g., habitat bathymetry, marine debris) for the timeframe of 2022 through 2027 (86 FR 33663, June 25, 2021). This proposal includes up to 50,000 survey miles in SBNMS for coastal and marine data acquisition.

4.7.2 Cumulative Impacts of the Proposed Action

As described in Section 4.5, implementing the proposed action would have both beneficial and adverse impacts on the resource areas described in Section 4.3, including habitats, wildlife, historical resources, and other marine uses. Overall, NOAA found that none of these benefits or adverse impacts would rise to the level of significant.

The activities identified in Table 4.9 include several projects designed to further research and monitoring in the sanctuary, encourage tourism and recreational opportunities in the region, study and mitigate impacts of climate change, and support sustainable management of offshore resources, including fisheries. These projects, in conjunction with the proposed action, would have overlapping beneficial impacts on the tourism industry, commercial fishing, and the research community in the coastal communities near the sanctuary.

For example, several other organizations, including federal, state, and local government entities, are involved in the protection of marine resources in the region. These organizations, including NMFS, conduct research activities aimed at resource protection and regulate activities occurring in this region. For example, NMFS designates EFH and HAPCs overlapping with SBNMS boundaries and prohibits certain types of activities in these areas, as well as designated critical habitat and Seasonal and Dynamic Management Areas for protection of North Atlantic right whales. Existing regulations and future management efforts in the region would continue to benefit and protect biological resources in the sanctuary. Similarly, these regulatory entities and research organizations conduct similar fieldwork activities to those included in the Proposed Action, which would likely have similar types and intensity of impacts on habitat, living resources, and historic resources to those described in Section 4.5.

The Gulf of Maine and SBNMS is warming faster than 99% of the global ocean, both at the surface and bottom temperatures. Climate change is causing shifts in phenology and distributions of plankton, fish, whales, and other organisms in the area. Climate change impacts on prey species are particularly concerning and can drive cascading ecosystem changes to top predators. As ocean warming continues, these stressors are only exacerbated and can contribute to cumulative effects.[38] As part of implementing the proposed action, NOAA would evaluate climate change impacts on sanctuary resources and incorporate changing conditions into management decisions in order to minimize any adverse cumulative effects from NOAA's resource protection, education, and operations activities.

Cumulative effects that could impact historical and cultural resources may include disturbance and physical impacts from research and monitoring activities. Commercial and recreational fishing in the area may damage cultural and historical resources by entangling fishing gear on a resource and through direct contact of gear with shipwrecks. However, as part of implementing the Maritime Heritage and Cultural Landscapes Action Plan and the SAP, NOAA would identify resources and disclose locations of historic shipwrecks with fishers to avoid or minimize the risk of future entanglements of fishing gear with shipwrecks.

[38] https://nmssanctuaries.blob.core.windows.net/sanctuaries-prod/media/docs/20200511-sbnms-climate-change-impacts-profile.pdf

Some ongoing or future industrial activities could impact sanctuary resources, and are therefore also included in Table 4.9, such as commercial shipping, offshore energy production, and submarine cable projects. For example, designated, highly regulated, shipping lanes for the Port of Boston pass through SBNMS in an east-west direction. Various domestic and foreign-flagged vessels use these shipping lanes including container ships, oil and gas tankers, barges and cruise liners. The transit of large commercial vessels through the sanctuary creates a risk of injury for marine species through vessel collisions, potential declines in water quality through accidental leaks or discharges, and introduces vessel noise into the marine environment which could disturb marine species.

Additionally, NOAA has received, and may continue to receive, future permit applications to install commercial infrastructure in or close to the sanctuary, such as submarine cables or energy development projects. It is expected that within the next 10 years, the construction, installation, operation and maintenance of offshore wind facilities will occur in the greater Gulf of Maine region. The Vineyard Wind project is expected to begin construction in 2022 and other projects are in development in the region.[39] Although these projects will not occur within the sanctuary, their implementation is likely to cause additional vessel traffic, increased ocean noise, and potential disruption to species habitats and migratory corridors.

Overall, NOAA found that the combination of implementation of the alternatives with the actions in Table 4.9 would result in cumulative benefits to the physical, biological, historical and cultural, and socioeconomic settings, as well as to existing human uses of the sanctuary. Additionally, NOAA found that any incremental adverse impacts of the proposed action in combination with ongoing resource protection, research, and stewardship programs, and ongoing or future commercial and industrial activities in the region would be negligible for all resources areas because of the low intensity and frequency of SBNMS-led field activities in comparison to existing uses of the area, and operational protocols to reduce or avoid adverse impacts as much as possible. Therefore, the proposed action would not result in significant adverse cumulative effects on any resource areas.

[39] https://www.boem.gov/renewable-energy/state-activities/massachusetts-activities

Appendix A: References

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Appendix B:
List of Preparers

Stellwagen Bank National Marine Sanctuary
Pete DeCola, Superintendent
Ben Haskell, Deputy Superintendent
Alice Stratton, Ecologist
David Wiley, Ph.D., Research Coordinator
Leila Hatch, Ph.D., Ecologist
Michael Thompson, GIS Technician
Tammy Silva, Ph.D., Post-doctoral Fellow
Anna Robuck, Ph.D., NOAA Dr. Nancy Foster Scholar
Anne Smrcina, Education Coordinator
Anne-Marie Runfola, Volunteer Coordinator
Peter Hong, Contractor
Caitlin Fitzmaurice, Contractor
Clea Harrelson, Contractor
Hannah MacDonald, Contractor

Office of National Marine Sanctuaries
Sophie Godfrey-McKee, Environmental Compliance Coordinator
William Hoffman, detailee from Dept. of Interior, Bureau of Ocean Energy Management
Edward Lindelof, Senior Policy Specialist

Office of General Counsel
Jonelle Dilley, Attorney-Advisor

SAC Education & Outreach Subcommittee:
Kevin Blinkoff, On The Water Media
Shelley Brown, Sailors for the Sea
Moira Kelly, NMFS Greater Atlantic Regional Field Office
Tina McMahon, Ipswich Middle School
Monica Pepe, Whale and Dolphin Conservation
Rory Simpson-Brown, Scituate High School
Allen Hale, Scituate High School

SAC Research and Monitoring Subcommittee
Michelle Bachman, New England Fishery Management Council
Jeff Rosen, Corona Environmental Consulting
Kevin Powers, retired scientist
Todd Callaghan, Massachusetts Office of Coastal Zone Management
Les Kaufman, Boston University
Moira Kelly, NMFS Greater Atlantic Regional Field Office
Conor McManus, University of Rhode Island
Mason Weinrich, Center for Coastal Studies
Kelly Whitmore, Massachusetts Division of Marine Fisheries

Tracey Dalton, University of Rhode Island
Wayne Petersen, Massachusetts Audubon
Matt Liebman, U.S. Environmental Protection Agency
Steve Wolf, U.S. Environmental Protection Agency

SAC Interagency Coordination Subcommittee
Michelle Bachman, New England Fishery Management Council
Susan Farady, University of New England
Jeanine Boyle, INSPIRE Environmental Consultants
Moira Kelly, NMFS Greater Atlantic Regional Field Office
Chris McGuire, The Nature Conservancy
Todd Callaghan, Massachusetts Office of Coastal Zone Management
Betsy Nicholson, NOAA Office of Coastal Management

SAC Maritime Heritage Working Group
Bill Adler, retired fisherman
Tim Brady, Capt. Tim Brady and Sons Charters
Tim Donovan, NOAA Office of Law Enforcement
John Galluzzo, South Shore YMCA
Moira Kelly, NMFS Greater Atlantic Regional Field Office
Marty Klein, retired sonographer
Heather Knowles, North Atlantic Dive Expeditions
Marissa Marcoux, Cape Ann Charters
Chris McGuire, The Nature Conservancy
Frank Mirarchi, retired fisherman
Jonathan Patton, Massachusetts Historical Commission
Calvin Mires, Woods Hole Oceanographic Institution
Allison Rosner, NMFS Greater Atlantic Regional Field Office
Brad Barr, Office of National Marine Sanctuaries
Jonelle Dilley, NOAA Office of the General Counsel
Arne Carr, retired scientist
Tim Wilmarth, NOAA Office of Law Enforcement
David Robinson, Massachusetts Bureau of Underwater Archaeological Resources

SAC Vision and Mission Subcommittee
Michelle Bachman, New England Fishery Management Council
Teresa Birkeland, North and South Rivers Watershed Association
Tracey Dalton, University of Rhode Island
Susan Farady, University of New England
John Galluzzo, South Shore YMCA
Laura Howes, Boston Harbor City Cruises
Les Kaufman, Boston University
Moira Kelly, NMFS Greater Atlantic Regional Field Office
Frank Mirarchi, retired fisherman
Iben Munck, Conservation International

Appendix C:
List of Agencies and Persons Notified

NOAA will send copies of this draft management plan and environmental assessment to the following agencies and tribes to invite comments:

Federally Recognized Tribal Nations (in Massachusetts)

Mashpee Wampanoag
Wampanoag Tribe of Gay Head (Aquinnah)

Agencies

NOAA Greater Atlantic Regional Fisheries Office
NOAA Office of Law Enforcement Northeast Region
New England Fishery Management Council
U.S. Coast Guard First District
Massachusetts Office of Coastal Zone Management
Massachusetts Division of Marine Fisheries
Massachusetts Environmental Police
Massachusetts Bureau of Underwater Archaeological Resources
Massachusetts Commission on Indian Affairs
Advisory Council for Historic Preservation
Keeper of the National Register
U.S. Geological Survey-Woods Hole Coastal and Marine Science Center
U.S. Fish and Wildlife Service Maine Coastal Islands National Wildlife Refuge
Bureau of Ocean Energy Management
Environmental Protection Agency Region 1
Massachusetts Governor's Office
Massachusetts Historical Commission

Appendix D:
Additional Compliance Requirements

This appendix provides additional information on NOAA's coordination and consultations conducted as part of review of this action under NEPA to comply with other applicable laws and policies.

National Historic Preservation Act

Section 106 of the NHPA (54 U.S.C. § 306108) and its implementing regulations (36 CFR 800) require federal agencies to consider the effects of their undertakings on historic properties and afford the ACHP an opportunity to comment. NOAA has determined that implementation of a revised sanctuary management plan, the conduct of routine field activities, and continued implementation of existing sanctuary regulations constitute an undertaking subject to Section 106 review. This undertaking has the potential to cause effects on historic properties insofar as certain activities have the potential for seafloor disturbance or potential interaction with historic properties, if present within the area of potential effect for each activity.

The regulations at 36 CFR 800.8 provide for use of the NEPA process to fulfill a federal agency's NHPA Section 106 review obligations in lieu of the procedures set forth in 36 CFR 800.3 through 800.6. This process is known as NEPA substitution for Section 106 and NOAA is implementing this process in this environmental assessment. Under this process, NOAA will not be preparing separate documentation through a Section 106 Finding, but rather that information has been integrated into this NEPA document. To assist with the consulting party and public review of the document, Table D.1 details where the required steps under the Section 106 review process are incorporated into the environmental assessment.

Table D.1. Comparison of Section 106 Review Requirements and Environmental Assessment Sections

Section 106 Requirement	**Section Number in this Environmental Assessment**
Identification of consulting parties	Section 2.4
Description of the undertaking	Section 4.2.2
Identification of the area of potential effects	Section 4.2.2
Identification of historic properties	Section 4.3.5
Assessment of adverse effects to historic properties	Section 4.5.6

NOAA will submit this environmental assessment and draft management plan to the Massachusetts Historical Commission and other consulting parties when making the document available for public comment. Additionally, NOAA will continue to solicit public comment through issuance of the notice of availability for the draft management plan and environmental assessment which documents a finding of no adverse effects for this undertaking and includes conditions to avoid any adverse effects of the undertaking on historic properties.

Endangered Species Act

The Endangered Species Act (ESA; 16 U.S.C. §§ 1531 *et seq*.) protects animals and plants threatened with extinction. Under the ESA, a species is considered endangered if it is in danger of extinction throughout all or a significant portion of its range. A species is considered threatened if it is likely to become an endangered species within the foreseeable future. NMFS works with USFWS to manage ESA listed species. Generally, NMFS manages marine species, while USFWS manages land and freshwater species. Once a species is listed, the ESA prohibits the 'take' of that species by direct or indirect actions. Pursuant to Section 3 of the ESA, "the term 'take' means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." "Harm" is further defined as any act which actually kills or injures fish or wildlife, and emphasizes that such acts may include significant habitat modification or degradation that significantly impairs essential behavioral patterns of fish or wildlife.

Section 7 of the ESA requires all federal agencies, in consultation with USFWS or NMFS, to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species, or result in the destruction or adverse modification of the critical habitat of such species. In fulfilling these requirements, each agency must use the best scientific and commercial data available. The regulations promulgated at 50 C.F.R. part 402 govern the consultation process. If a federal agency determines that its action may affect, but is "not likely to adversely affect listed species or critical habitat," the agency must engage in informal consultation with NMFS or USFWS. This determination can be made only if all of the reasonably expected effects of the proposed action will be beneficial, insignificant, or discountable. For any action with a potential for impacts to federally protected species, NOAA evaluates the potential impacts and, if needed, prepares a biological evaluation to inform consultation for any impacts on federally listed species and designated critical habitat.

In this environmental assessment, NOAA identified ESA-listed species or designated critical habitat under NMFS and USFWS jurisdiction potentially present in the action area (see Section 4.3.3). NOAA then evaluated which of these species and habitat would likely be present in the action area and could be affected by the proposed action and described any potential impacts in Section 4.5.3.

Based on this evaluation, NOAA determined that implementing the Proposed Action may affect, but is not likely to adversely affect any listed species, or designated critical habitat under NMFS jurisdiction. NOAA determined that implementing the Proposed Action would have no effect on any listed species or designated critical habitat under USFWS jurisdiction. See Section 4.5.3 for further details.

Coastal Zone Management Act

The goal of the Coastal Zone Management Act (CZMA; 16 U.S.C. §§ 1451 *et seq*.) is to encourage and assist states to preserve, protect, develop and, where possible, restore and enhance valuable natural coastal resources. Participation by states is voluntary. Section 307 of the CZMA requires that any federal action inside or outside of the coastal zone that affects any land or water use or natural resource of a participating state's coastal zone shall be consistent to the maximum extent

practicable with the enforceable policies of the state's coastal management program. The CZMA provides that no federal license or permit may be granted without giving the state the opportunity to concur that the project is consistent with the state's coastal policies. The regulations implementing the CZMA, 15 C.F.R. part 930, outline the consistency procedures.

In 2018, NOAA reviewed the potential impacts on the Massachusetts coastal zone from implementing routine field operations in SBNMS. At that time, NOAA found that because of the scope and nature of routine field operations and the location of SBNMS outside of state waters, there would be no measurable effects to the Massachusetts coastal zone. As shown in the attached exchange of letters, in November 2018 NOAA requested a list of the Massachusetts Coastal Zone Management Program's enforceable policies that may be relevant to the proposed action. NOAA then reviewed the planned field activities for SBNMS for consistency with these enforceable policies and concluded that the proposed action was consistent to the maximum extent practicable with the Massachusetts Coastal Zone Management Program on February 25, 2019. On April 3, 2019, the Massachusetts Office of Coastal Zone Management concurred with NOAA's finding that the proposed action is consistent with the Massachusetts Coastal Zone Management Program's enforceable policies.

As part of that concurrence, the Massachusetts Office of Coastal Zone Management (MCZM) stated that if the project is modified in any manner, or the project is noted to be having effects on coastal resources or uses that are different than originally proposed, it is incumbent upon the proponent to notify MCZM, submit an explanation of the nature of the change pursuant to 15 CFR 930. MCZM will use this information to determine if further federal consistency review is required. Consistent with this requirement, upon publication of this draft management plan and environmental assessment, NOAA will provide a copy to MCZM along with an explanation of the nature of the change in the action subject to the 2019 federal consistency determination. In reviewing this proposed action, NOAA believes that planned field operations at SBNMS are not substantially revised in a way that may affect coastal resources or uses that are different than proposed in 2019. However, NOAA will coordinate with MCZM to determine if further federal consistency review is required at this time.

Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act (MSA; 16 U.S.C. §§ 1801 *et seq*.) was enacted by Congress in 1976 and was updated in 1996 and 2006. Section 302 of the Act (§ 302) created eight regional fishery management councils, to develop Fishery Management Plans to regulate fisheries in an effort to prevent overfishing. Each council prepares Fishery Management Plans for each fishery under its jurisdiction and submits these plans to the Secretary of Commerce for final approval. The MSA provides Councils and NMFS with authority to identify and designate in the Fishery Management Plan essential fish habitat (EFH) and Habitat Areas of Particular Concern (HAPCs). The MSA defines EFH as "those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity" (MSA § 3(10)). The regulations implementing the EFH provisions of the MSA are codified at 50 C.F.R. part 600, subpart J. Section 600.815(a)(1)(iii)(4) further establishes that "'essential habitats' are those [habitats] necessary to maintain fish production consistent with a sustainable fishery and

the managed species' contributions to a healthy ecosystem." HAPCs are subsets of EFHs that exhibit one or more of the following traits: (i) provide important ecological function; (ii) is sensitive to human induced environmental degradation; (iii) is stressed by development; or (iv) is rare (50 C.F.R. § 600.815(a)(8)).

Section 305(b) of the MSA requires each federal agency to consult with the Secretary of Commerce on all actions, or proposed actions, authorized, funded, or undertaken by the agency, that may adversely affect any EFH. The regulations implementing the EFH coordination and consultation provisions are codified at 50 C.F.R. part 600, subpart K. The regulations define "adverse effect" as "any impact that reduces quality and/or quantity of EFH. Adverse effects may include direct or indirect physical, chemical, or biological alterations of the waters or substrate and loss of, or injury to, benthic organisms, prey species and their habitat, and other ecosystem components, if such modifications reduce the quality and/or quantity of EFH. Adverse effects to EFH may result from actions occurring within EFH or outside of EFH and may include site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions" (50 C.F.R. § 600.910). See Section 4.5.3 for NOAA's determination of potential impacts to EFH from the proposed action.

Executive Order 12898

Executive Order 12898 *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* directs federal agencies to:

- identify and address the disproportionately high and adverse human health or environmental effects of their actions on minority and low-income populations, to the greatest extent practicable and permitted by law,
- develop a strategy for implementing environmental justice, and
- promote nondiscrimination in federal programs that affect human health and the environment, as well as provide minority and low-income communities access to public information and public participation.

The Massachusetts Executive Office of Energy and Environmental Affairs[40] evaluated and identified environmental justice populations in Massachusetts.[41] Education programs delivered through sanctuary visitor centers 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. SBNMS education strategies aim to raise the public's awareness and understanding of the local and regional marine environment, while creating engagement opportunities for protecting sanctuary resources. The Education and Outreach Action Plan in Chapter 3 proposes strategies and activities that would promote research, outreach, and education opportunities for local communities, and engage with minority and low-income populations, for example:

[40] https://www.mass.gov/info-details/environmental-justice-populations-in-massachusetts
[41] https://www.mass.gov/doc/ej2010communitystatisticspdf/download

- Identifying underserved communities in the greater sanctuary region and physically bringing sanctuary education programs into classrooms to promote STEM education and NOAA career possibilities,
- Promoting online versions of this education programming to institutions inside and outside the region (with links to the Sister Sanctuary program), and
- Offering opportunities for in-person or virtual internships for high school, college, and graduate students and provide access to staff as guest speakers and career mentors.

None of the alternatives described in this document or their cumulative effects would result in any disproportionate negative impacts on any minority or low-income population. Rather, the proposed action is expected to result in long-term or permanent beneficial impacts by:

- continuing to protect natural and maritime cultural heritage resources, which may provide employment opportunities and result in improved ecosystem services to nearby inhabitants,
- implementing education and outreach programs that seek to integrate minority and low-income populations into sanctuary management planning, and
- developing outreach products and programming that is inclusive of minority or low-income populations including publishing documents for non-English-speaking populations.

Executive Order 13175

Under Executive Order 13175 of November 6, 2000, federal departments and agencies are charged with engaging in regular and meaningful consultation and collaboration with officials of federally-recognized nations and tribes during the development of federal policies that have implications for Indian Tribes and are responsible for strengthening the government-to-government relationship between the United States and Indian nations and tribes. NOAA identified 2 federally recognized Indian Tribes pursuant to the Federally Recognized Indian Tribe List Act of 1994, 25 USC 5131. NOAA will distribute copies of the draft management plan and environmental assessment and invite participation.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
Phone: (603) 223-2541 Fax: (603) 223-0104
http://www.fws.gov/newengland

In Reply Refer To: October 15, 2021
Consultation Code: 05E1NE00-2021-SLI-2976
Event Code: 05E1NE00-2022-E-00568
Project Name: Development of a Draft Management Plan for Stellwagen Bank National Marine Sanctuary

Subject: Updated list of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

New England Ecological Services Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5094
(603) 223-2541

Project Summary

Consultation Code: 05E1NE00-2021-SLI-2976
Event Code: Some(05E1NE00-2022-E-00568)
Project Name: Development of a Draft Management Plan for Stellwagen Bank National Marine Sanctuary
Project Type: ** OTHER **
Project Description: The National Oceanic and Atmospheric Administration's (NOAA's) Office of National Marine Sanctuaries (ONMS) proposes to issue a revised management plan for Stellwagen Bank National Marine Sanctuary (SBNMS or sanctuary). The National Marine Sanctuaries Act directs NOAA in the management of marine sanctuaries and requires development and periodic review of management plans to guide sanctuary programs that seek to better understand and protect sanctuary resources. This draft management plan revises the 2010 management plan of the sanctuary and includes 15 action plans to a) streamline and focus sanctuary management actions, b) align with the goals and objectives in the ONMS Strategic Plan and, c) address emerging issues like climate change. It also includes an environmental assessment evaluating the potential environmental consequences of implementing a revised sanctuary management plan for SBNMS and conducting field activities to manage the sanctuary over the next 5 to 10 years.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@42.42349475,-70.33595193408112,14z

Counties: Barnstable and Plymouth counties, Massachusetts

Endangered Species Act Species

There is a total of 2 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Birds

NAME	STATUS
Red Knot *Calidris canutus rufa* There is **proposed** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/1864	Threatened
Roseate Tern *Sterna dougallii dougallii* Population: Northeast U.S. nesting population No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/2083	Endangered

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
GREATER ATLANTIC REGIONAL FISHERIES OFFICE
55 Great Republic Drive
Gloucester, MA 01930-2276

Mr. Reed Bohne
Regional Director, Northeast and Great Lakes Region
NOAA Office of National Marine Sanctuaries
10 Ocean Science Circle
Savannah, GA 31411

APR 8 2016

RE: Essential Fish Habitat Assessment and Consultation on Northeast and Great Lakes Region Field Operations Programmatic Environmental Assessment

Dear Mr. Bohne:

We have reviewed the Draft Programmatic Environmental Assessment (DPEA), dated October 23, 2015, including the Essential Fish Habitat (EFH) assessment for field operations occurring within Stellwagen Bank National Marine Sanctuary. We concur with your determination that potential adverse impacts to Essential Fish Habitat (EFH) as a result of field operations in the Northeast and Great Lakes region will be minimal. We agree that the mitigation measures for the activities detailed in the DPEA you provided will ensure no more than minimal impacts to EFH will occur. In accordance with the requirements of 50 CFR 600.920(g), we have determined that the proposed actions detailed in the DPEA qualify for General Concurrence and no further consultation is required for these activities.

Pursuant to 50 CFR 600.920(l), you must reinitiate EFH consultation with us if field operations are substantially revised in a way that may adversely affect EFH, or if new information becomes available that affects the basis for our general concurrence determination. In addition, if we receive new or additional information that may affect our determination, we will consider whether to request additional consultation with you and/or provide additional EFH conservation recommendations.

If you have questions or need additional information regarding this EFH consultation, please contact Alison Verkade (alison.verkade@noaa.gov/ 978-281-9266).

Sincerely,

Christopher Boelke
New England Field Office Supervisor
For Habitat Conservation

cc: Tom Nies, NEFMC
Craig MacDonald, SBNMS

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
Office of National Marine Sanctuaries
Stellwagen Bank National Marine Sanctuary
175 Edward Foster Road
Scituate, Massachusetts 02066
Tel: 781.545.8026 Fax: 781.545.8036

Ms. Brona Simon
State Historic Preservation Officer
Director, Massachusetts Historical Commission
220 Morrissey Blvd.
Boston, MA 02125

February 12, 2018

Dear Ms. Simon:

The Office of National Marine Sanctuaries (ONMS) is considering engaging in an outreach campaign to advertise the locations of historic shipwrecks in the Stellwagen Bank National Marine Sanctuary to the commercial fishing industry so that vessels may avoid gear interactions that may injure shipwrecks. This outreach is in response to an incident last March when scallop dredging destroyed a modern wreck site that was in close vicinity to historic site. In anticipation of this year's scallop fishing, ONMS is planning to advertise the locations of historic wrecks within potential fishing areas in the Sanctuary prior to the opening of the fishing season April 1 (Phase I). ONMS is also convening a working group to develop a long-term disclosure strategy. ONMS would like to provide you with the opportunity to comment on our impending release, as well as to participate in the development of our long-term strategy (Phase II). The attached draft white paper explains the rationale for considering this change of policy and a phased approach for implementing it.

As explained above, Phase I of this approach is immediate and urgent. It is precipitated by the impending scallop fishery that commences on April 1, 2018. During last year's intensive scallop fishery in March 2017 a modern wreck site (*North Star*) was destroyed. There appeared to be no damage to surrounding historic sites, however, the damage to the modern wreck within close proximity of historic wrecks demonstrates a high risk to these important historic properties. The purpose of the actions in Phase I is to request that the scallop industry voluntarily avoid damage to the historic wrecks in the fishery area. A pre-fishery survey using side scan and multibeam of seven wreck sites in the fishery area was conducted this week which will allow the Sanctuary to study the effectiveness of this approach.

I am requesting comments on the potential of proactive public disclosure of historic sites in SBNMS and on the phased approach for doing so. I would also like to request that you consider appointing a staff archaeologist to the Maritime Heritage Management working group recently established by the Sanctuary Advisory Council to develop recommendations for future management of historic resources in the sanctuary. Given the April 1 start date for the scallop fishery, I am requesting your comments by March 5.

I very much appreciate the advice and consultations that the Massachusetts Historical Commission has provided in the past as well as the advice received from Mr. Mastone of MBUAR. I look forward to hearing your perspective on this important issue.

Sincerely,

Benjamin Haskell
Acting Superintendent
cc: Victor Mastone, Director, MBUAR

Enclosures: Draft white paper on SBNMS Maritime Heritage Management and list of sites proposed to be disclosed

The Commonwealth of Massachusetts
William Francis Galvin, Secretary of the Commonwealth
Massachusetts Historical Commission

March 1, 2018

Benjamin Haskell
Acting Superintendent
Stellwagen Bank National Marine Sanctuary
National Oceanic and Atmospheric Administration
National Ocean Service
Office of National Marine Sanctuaries
175 Edward Foster Road
Scituate, MA 02066

RE: Proactive Disclosure of Historic Sites to the Commercial Fishing Industry, Stellwagen Bank National Marine Sanctuary, Massachusetts. MHC # RC.44673.

Dear Mr. Haskell:

Staff of the Massachusetts Historical Commission (MHC), office of the Massachusetts State Historic Preservation Officer (SHPO) have reviewed your letter, received February 14, 2018, for the project referenced above.

The MHC agrees with the proposal to publish historic shipwreck locational information to the commercial fishing industry. Publication of shipwreck locations to the scallop fishery, in coordination with the recent pre-season shipwreck survey, should assist in the evaluation of the proposed approach. The proposal to establish and implement shipwreck buffer zones is also recommended.

Thank you for the opportunity to appoint a member of my staff to the Maritime Heritage Management working group. I hereby appoint Jonathan K. Patton of my staff to serve on the working group.

These comments are offered to assist in compliance with Section 106 of the National Historic Preservation Act of 1966, as amended (36 CFR 800) and 312 CMR 2. If you have questions, please contact Jonathan K. Patton, Staff Archaeologist/Preservation Planner, at this office.

Sincerely,

Brona Simon
State Historic Preservation Officer
Executive Director
State Archaeologist
Massachusetts Historical Commission

xc: Victor Mastone, MBUAR

220 Morrissey Boulevard, Boston, Massachusetts 02125
(617) 727-8470 • Fax: (617) 727-5128
www.sec.state.ma.us/mhc

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
Office of National Marine Sanctuaries
Stellwagen Bank National Marine Sanctuary
175 Edward Foster Road
Scituate, Massachusetts 02066
Tel: 781.545.8026 Fax: 781.545.8036

April 30, 2021

Mr. Jonathan Patton
Massachusetts Historical Commission
220 Morrissey Boulevard
Boston, MA 02125

RE: Initiation of Consultation and Notification of Using the National Environmental Policy Act (NEPA) Process to Fulfill Section 106 Obligations for Review of the Stellwagen Bank National Marine Sanctuary Draft Management Plan

Dear Mr. Patton:

The National Oceanic and Atmospheric Administration's (NOAA's) Office of National Marine Sanctuaries (ONMS) proposes to issue a revised management plan for Stellwagen Bank National Marine Sanctuary (SBNMS or sanctuary). The management plan provides the mission, goals, objectives, and proposed priority actions for the sanctuary and will serve as an overarching framework guiding the activities the sanctuary staff will undertake in the next 5 to 10 years.

NOAA published a Notice of Intent (NOI) to conduct scoping and prepare an environmental analysis in accordance with the NEPA for review of the management plan through Federal Register notice (85 FR 8213) on February 13, 2020. NOAA is now conducting an environmental assessment (EA) which analyzes the potential environmental consequences of implementing the revised management plan and conducting field activities to manage SBNMS, in accordance with the National Environmental Policy Act (NEPA). NOAA has further determined that implementation of the revised sanctuary management plan and the conduct of routine field activities considered under the management plan constitute an undertaking subject to Section 106 of the National Historic Preservation Act (NHPA). This undertaking has the potential to cause effects on historic properties insofar as certain activities have the potential for seafloor disturbance or potential interaction with historic properties, if present within the area of potential effects for each activity.

As you know, the regulations at 36 CFR 800.8 provide for use of the NEPA process and documentation to fulfill a Federal agency's NHPA Section 106 review obligations in lieu of the procedures set forth in 36 CFR 800.3 through 800.6. Through this correspondence, NOAA is notifying the Massachusetts Historical Commission of its intent to use the NEPA process for Section 106 purposes, per 800.8(c). NOAA is concurrently providing similar notification to the Advisory Council on Historic Preservation.

NOAA provided public notification of its intent to utilize NEPA notices and documents to meet its obligations under Section 106 of the NHPA through the NOI. NOAA utilized the NEPA scoping process to identify consulting parties and solicit public comment to inform its consultation and NOAA will continue to solicit public comment through issuance of the notice of availability for the draft management plan and EA. NOAA will submit the draft management plan and EA, which will identify historic properties and assess the effects of the undertaking on such properties in a manner consistent with the standards and criteria of 800.4 through 800.5, to the Massachusetts Historical Commission and other consulting parties when making the document available for public comment.

If you have questions or require additional information, you may contact Deputy Superintendent Ben Haskell at ben.haskell@noaa.gov or phone 781-424-0699.

Sincerely,

Captain Peter DeCola
US Coast Guard (retired)
Superintendent

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
Office of National Marine Sanctuaries
Stellwagen Bank National Marine Sanctuary
175 Edward Foster Road
Scituate, Massachusetts 02066
Tel: 781.545.8026 Fax: 781.545.8036

April 30, 2021

Ms. Alexis Clark
Historic Preservation Specialist
Advisory Council on Historic Preservation
401 F Street NW, Suite 308
Washington DC 20001

RE: Notification of Using the National Environmental Policy Act (NEPA) Process to Fulfill Section 106 Obligations for Review of the Stellwagen Bank National Marine Sanctuary Draft Management Plan

Dear Ms. Clark:

The National Oceanic and Atmospheric Administration's (NOAA's) Office of National Marine Sanctuaries (ONMS) proposes to issue a revised management plan for Stellwagen Bank National Marine Sanctuary (SBNMS or sanctuary). The management plan provides the mission, goals, objectives, and proposed priority actions for the sanctuary and will serve as an overarching framework guiding the activities the sanctuary staff will undertake in the next 5 to 10 years.

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If you have questions or require additional information, you may contact Deputy Superintendent Ben Haskell at ben.haskell@noaa.gov or phone 781-424-0699.

Sincerely,

Captain Peter DeCola
US Coast Guard (retired)
Superintendent

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
Office of National Marine Sanctuaries
1305 East-West Highway
Silver Spring, Maryland 20910

Mr. Robert L. Boeri
Project Review and Dredging Coordinator
Office of Coastal Zone Management
Executive Office of Environmental Affairs
251 Causeway Street, Suite 800
Boston, MA 02114
robert.boeri@state.ma.us

February 25, 2019

Dear Mr. Boeri:

The purpose of this letter is to ensure compliance with the requirements of Section 307 of the Coastal Zone Management Act (CZMA) (16 U.S.C. 1456) for field operations conducted by the National Oceanic and Atmospheric Administration (NOAA) Office of National Marine Sanctuaries (ONMS) in Stellwagen Bank National Marine Sanctuary (SBNMS), which lies in federal waters off the coast of Massachusetts. Therefore, NOAA submits, pursuant to 15 CFR Part 930, subpart C, the following consistency determination for field operations conducted in SBNMS for your review.

Description of the Proposed Action

ONMS conducts field operations to support resource protection, research, and education objectives as mandated by the National Marine Sanctuaries Act (16 U.S.C. 32). ONMS proposes to continue current and historical field operations at SBNMS - defined as those activities located on, in, or above the waters of SBNMS. These field operations include:

- Vessel operations
- Vessel maintenance
- SCUBA and snorkel operations
- Deployment of AUVs/ROVs/gliders/drifters
- Deployment of remote sensing equipment
- Deployment of equipment on seafloor
- Other sampling activities (e.g. extractive sampling, placement and retrieval of sampling devices, tagging and collection of animals).

Note that construction activities are considered a separate federal action by NOAA ONMS and are not assessed in this consistency determination.

Federal Consistency Determination for Proposed Field Operations in waters off the coast of Massachusetts

ONMS developed and published a Draft Programmatic Environmental Assessment of Field Operations in the Northeast and Great Lakes National Marine Sanctuaries (PEA) to assess the environmental impacts of sanctuary field operations in the Northeast and Great Lakes region, which includes SBNMS. The draft PEA was published in the Federal Register on August 7, 2018 (83 Fed. Reg. 38684), and the public comment period closed September 21, 2018. As indicated in the PEA, all of the field activities were determined to have less than significant environmental impacts. For more information on the ONMS activities undertaken at SBNMS and their environmental effects, please refer to the PEA, which can be found online (https://nmssanctuaries.blob.core.windows.net/sanctuaries-prod/media/docs/20180807-pea-of-field-ops-ne-gl-nms.pdf).

Potential Effects to the Massachusetts Coastal Zone

The only field activity that would take place in state waters would be transits to and from SBNMS from their homeport in Scituate, MA. Based on the scope and nature of ONMS field work (as described in the PEA) and the location of SBNMS outside of state waters, NOAA does not anticipate any measurable effects to the Massachusetts coastal zone. However, in the interest of providing a full accounting of our activities and their effects, NOAA prepared this Consistency Determination for review by the Massachusetts Coastal Management Program (MACMP).

Applicability of the Massachusetts Coastal Program and Enforceable Policies

Under the CZMA, each Federal agency activity that has a reasonably foreseeable direct or indirect effect on any coastal use or resource shall be carried out in a manner consistent to the maximum extent practicable with the enforceable policies of approved State management programs. (16 U.S.C. 1456(c)(1); 15 C.F.R. § 930.30). If a Federal agency determines that its activity may have an effect, the agency must send a consistency determination to the State at the earliest practicable time, but in no case later than 90 days before final approval of the Federal Activity or on a schedule mutually acceptable to the state and Federal agency (16 U.S.C. 1456(c)(1)(C)).

NOAA contacted MACMP on November 8, 2018 for a list of the Program's enforceable policies that may be relevant to the proposed action. MACMP responded with a list of following relevant enforceable policies: Coastal Hazards Policy #2, Habitat Policy #1, Protected Areas Policy #1, Public Access Policy #1, Public Access Policy #2, Public Access Policy #3, and Water Quality Policy #1. ONMS reviewed the policies identified and the determinations of consistency are presented below.

Federal Consistency Determination for Proposed Field Operations in waters off the coast of Massachusetts

Coastal Hazards Policy #2
Ensure that construction in water bodies and contiguous land areas will minimize interference with water circulation and sediment transport. Flood or erosion control projects must demonstrate no significant adverse effects on the project site or adjacent or downcoast areas.

Determination for the Proposed Action- Consistent. The proposed action is not a flood or erosion control project. As mentioned previously, construction activities are considered a separate federal action from field operations and are therefore not included in the PEA and are not relevant to this consistency determination.

Habitat Policy #1
Protect coastal, estuarine, and marine habitats—including salt marshes, shellfish beds, submerged aquatic vegetation, dunes, beaches, barrier beaches, banks, salt ponds, eelgrass beds, tidal flats, rocky shores, bays, sounds, and other ocean habitats—and coastal freshwater streams, ponds, and wetlands to preserve critical wildlife habitat and other important functions and services including nutrient and sediment attenuation, wave and storm damage protection, and landform movement and processes.

Determination for the Proposed Action- Consistent. ONMS does not conduct onshore fieldwork at SBNMS and does no work within 3 nautical miles (nm) of shore. Field operations are conducted in federal waters and would not affect wildlife or habitat of the state's coastal zone in a manner or to an extent that would be inconsistent with the enforceable policies of the MACMP. ONMS field operations comply with all existing state and federal environmental regulations, as well as SBNMS's additional protections, in order to maintain the highest level of protection for sanctuary resources and the surrounding environment. ONMS vessel operations in SBNMS are episodic and low intensity, and there are no Areas of Critical Environmental Concern close to the boat basin where sanctuary vessels transit to and from their homeport in Scituate, MA. In addition, ONMS vessel operators are highly trained, adhere to NOAA Small Boat Program policies, and follow other best practices to minimize any potential damage to the environment.

Protected Areas Policy #1
Preserve, restore, and enhance coastal Areas of Critical Environmental Concern, which are complexes of natural and cultural resources of regional or statewide significance.

Determination for the Proposed Action- Consistent. SBNMS is located entirely in federal waters. There are no Areas of Critical Environmental Concern located in or adjacent to SBNMS or close to the boat basin where sanctuary vessels transit to and from their homeport in Scituate, MA.

Federal Consistency Determination for Proposed Field Operations in waters off the coast of Massachusetts

Public Access Policy #1
Ensure that development (both water-dependent or nonwater-dependent) of coastal sites subject to state waterways regulation will promote general public use and enjoyment of the water's edge, to an extent commensurate with the Commonwealth's interests in flowed and filled tidelands under the Public Trust Doctrine.

Determination for the Proposed Action- Consistent. The proposed action does not involve the development of any site.

Public Access Policy #2
Improve public access to existing coastal recreation facilities and alleviate auto traffic and parking problems through improvements in public transportation and trail links (land- or water-based) to other nearby facilities. Increase capacity of existing recreation areas by facilitating multiple use and by improving management, maintenance, and public support facilities. Ensure that the adverse impacts of developments proposed near existing public access and recreation sites are minimized.

Determination for the Proposed Action- Not applicable. The proposed action does not involve changes to public access to any part of the Commonwealth of Massachusetts. The nature and intensity of field operations described in the PEA are consistent with past practice at SBNMS and would not result in additional traffic or parking problems.

Public Access Policy #3
Expand existing recreation facilities and acquire and develop new public areas for coastal recreational activities, giving highest priority to regions of high need or limited site availability. Provide technical assistance to developers of both public and private recreation facilities and sites that increase public access to the shoreline to ensure that both transportation access and the recreation facilities are compatible with social and environmental characteristics of surrounding communities.

Determination for the Proposed Action- Consistent. The proposed action does not involve any changes to any recreation facilities or public areas.

Water Quality Policy #1
Ensure that point-source discharges and withdrawals in or affecting the coastal zone do not compromise water quality standards and protect designated uses and other interests.

Determination for the Proposed Action- Consistent. ONMS field operations comply with all existing state and federal environmental regulations, including all regulations pertaining to vessel

discharge, as well as SBNMS's additional protections to maintain the highest level of protection for sanctuary resources and the surrounding environment. Furthermore, vessel operations in SBNMS are episodic and low intensity. ONMS vessel operators are highly trained, adhere to NOAA Small Boat Program policies, and follow other best practices to minimize damage to the environment.

Conclusion

Based on the information above, ONMS has concluded that the proposed action is consistent to the maximum extent practicable with the Massachusetts Coastal Management Program. No measurable effects to the Massachusetts coastal zone are expected.

If you have questions, or if we can assist you during your review period, please do not hesitate to contact Sophie Godfrey-McKee, Policy and Planning Division, NOAA Office of National Marine Sanctuaries, at sophie.godfrey-mckee@noaa.gov.

Sincerely,

Jay Nunenkamp
Chief, Policy and Planning Division (Acting)
Office of National Marine Sanctuaries
National Oceanic and Atmospheric Administration

THE COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENERGY AND ENVIRONMENTAL AFFAIRS
OFFICE OF COASTAL ZONE MANAGEMENT
251 Causeway Street, Suite 800, Boston, MA 02114-2136
(617) 626-1200 FAX: (617) 626-1240

April 3, 2019

Jay Nunenkamp
U.S. Department of Commerce
NOAA/ONMS
1305 East-West Highway
Silver Spring, Maryland 20910

Re: CZM Federal Consistency Review of Programmatic Environmental Assessment of Field Operations in the Stellwagen Bank National Marine Sanctuary; Statewide.

Dear Mr. Nunenkamp:

The Massachusetts Office of Coastal Zone Management (CZM) has completed its review of the Environmental Assessment of Field Operations in the Stellwagen Bank National Marine Sanctuary to ensure consistency with CZM enforceable program policies.

Based upon our review of applicable information, we concur with your certification and find that the activity as proposed is consistent with the CZM enforceable program policies.

If the above-referenced project is modified in any manner, including any changes resulting from permit, license or certification revisions, including those ensuing from an appeal, or the project is noted to be having effects on coastal resources or uses that are different than originally proposed, it is incumbent upon the proponent to notify CZM, submit an explanation of the nature of the change pursuant to 15 CFR 930, and submit any modified state permits, licenses, or certifications. CZM will use this information to determine if further federal consistency review is required.

Thank you for your cooperation with CZM.

Sincerely,

Lisa Berry Engler,
Director

RLB/pb
CZM#18434

NATIONAL MARINE
SANCTUARIES

AMERICA'S UNDERWATER TREASURES