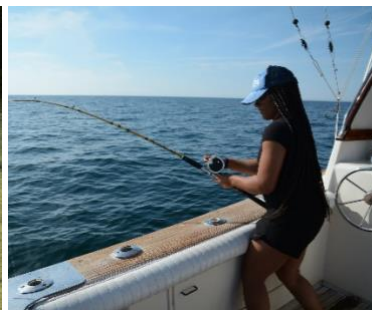
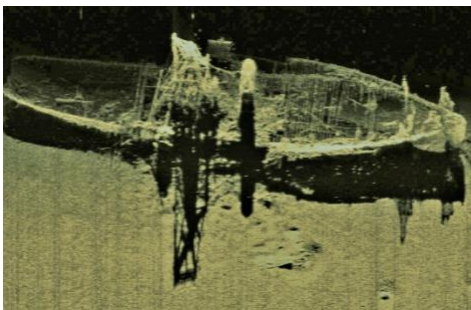




Stellwagen Bank National Marine Sanctuary Final Management Plan and Environmental Assessment



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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
BOEM – Bureau of Ocean Energy Management
BOWW – Boater Outreach for Whale Watching
CCS – Center for Coastal Studies
CEC – contaminants of emerging concern
CEQ – Council on Environmental Quality
C.F.R. – Code of Federal Regulations
DHRA – dedicated habitat research area
DPS – distinct population segment
EFH – essential fish habitat
E.O. – Executive Order
EPA – U.S. Environmental Protection Agency
ESA – Endangered Species Act
FWS – U.S. Fish and Wildlife Service
GARFO – NOAA Fisheries 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 – Massachusetts Historic Commission
MHP – Maritime Heritage Program
MMPA – Marine Mammal Protection Act
MOA – Memorandum of Agreement
MOU – Memorandum of Understanding
MPA – Marine Protected Area
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 – non-governmental organization
NHPA – National Historic Preservation Act
NMSA – National Marine Sanctuaries Act
NOAA – National Oceanic and Atmospheric Administration
NOAA Fisheries – NOAA National Marine Fisheries Service
NRHP – National Register of Historic Places
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
SAPP - Shipwreck Avoidance Pilot Program
SBNMS – Stellwagen Bank National Marine Sanctuary (“the sanctuary”)
SMA – Seasonal Management Area
TSS – transportation separation scheme
UAS – uncrewed aerial system
URI – University of Rhode Island
U.S.C. – United States Code
USCG – U.S. Coast Guard
VMS – vessel monitoring system
VTR – vessel trip report
WHOI – Woods Hole Oceanographic Institution

Executive Summary

Introduction

The National Marine Sanctuaries Act (NMSA) directs the National Oceanic and Atmospheric Administration (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 revised management plan replaces 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 Office of National Marine Sanctuaries (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 Stellwagen Bank National Marine Sanctuary (SBNMS or "the sanctuary") 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 revised 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 SBNMS resources. Prior to the development of the draft management plan in 2021, 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 also helped guide the development of this final 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.

Public Comment on Draft Management Plan and Environmental Assessment

NOAA circulated the draft management plan and environmental assessment through the Federal Register, on the SBNMS website, through social media, and through constituent newsletters to solicit public comments. NOAA also received comments from federal, state, and local agencies, from organizations, and from interested individuals. NOAA's responses to this public input are provided in Appendix E.

Action Plans

This final management plan contains 15 action plans. Below is a brief summary of the goal of each action plan.

Marine Mammal Protection Action Plan: 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: 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: to monitor vessel traffic and mitigate negative effects on sanctuary resources.

Maritime Heritage and Cultural Landscapes Action Plan: 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: to enhance transparency regarding how current and emerging activities are assessed for compatibility while managing sanctuary resources.

Climate Change Action Plan: to evaluate climate change impacts on sanctuary resources and incorporate changing conditions in management actions.

Education and Outreach Action Plan: to increase public awareness and understanding of the sanctuary and encourage responsible use and stewardship of its resources.

Interagency/Intergovernmental Coordination Action Plan: to promote improved management through coordinated partnering with local, state, regional, tribal, and federal partners.

Sanctuary Advisory Council Action Plan: to facilitate an active and engaged community of sanctuary advisory council (SAC) members to advise the superintendent in carrying out the sanctuary's mission.

Research and Monitoring Action Plan: 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: 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: to collaborate on water quality monitoring and research to determine whether the sanctuary can continue to maintain healthy resources or identify areas where management actions can mitigate stressors on water quality.

Habitat Action Plan: to develop an improved understanding of the condition of major habitat types within the sanctuary and identify/implement appropriate site-specific management measures to protect sanctuary habitats and associated species.

Ecosystem Services Action Plan: to explore the dynamic connections between sanctuary resources and ecosystem services to better inform management decisions and to quantify the economic and intrinsic values of SBNMS to natural and human systems.

Administration and Infrastructure Capacity Action Plan: 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 be spent on management of SBNMS. 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 SAC.

Chapter 1: Introduction

This final SBNMS management plan is the result of a thorough process of public consultation, guidance from the SAC, review of relevant scientific and professional reports, and staff input. It serves as an overarching framework for sanctuary management and describes the management actions that sanctuary staff will undertake in the next five to 10 years. This updated 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, 2022).

The text in this management plan provides the mission, goals, objectives, and proposed priority actions. This revised plan incorporates input received during the public comment period.

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.

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 National Marine Sanctuary System currently includes 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 C.F.R. 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. 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 that ensure the health of our most valued ocean and Great Lakes places. A healthy ocean and Great Lakes are 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 managing 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](#).¹

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.

¹ <https://sanctuaries.noaa.gov/about/legislation/>

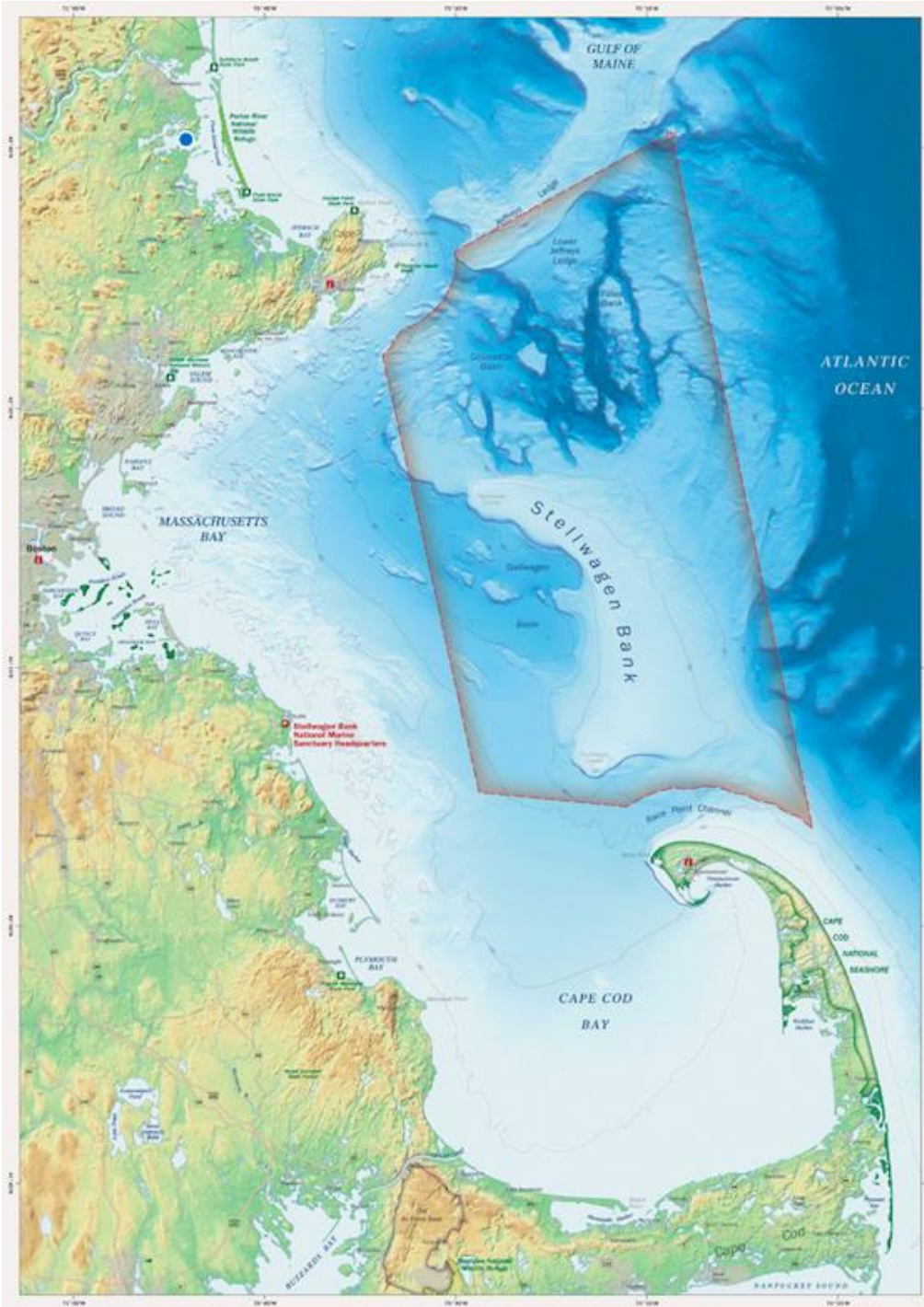


Figure 1.1. Map of Boundary of Stellwagen Bank National Marine Sanctuary

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 C.F.R. 922, subpart N](#)).²

The NMSA requires ONMS to engage in periodic review of national marine sanctuary 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 revised management plan will serve as an update to the 2010 plan. NOAA's proposed changes to the 2010 plan are informed, in large part, from findings in the [Stellwagen Bank National Marine Sanctuary 2020 Condition Report](#)³ and other relevant literature (NOAA Office of National Marine Sanctuaries, 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 eight federal employees and four 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

² <https://stellwagen.noaa.gov/>

³ <https://sanctuaries.noaa.gov/science/condition/sbnms/>

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 assistance from U.S. Coast Guard (USCG), 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

NOAA may consider issuing permits for certain activities otherwise prohibited by sanctuary regulations. In reviewing a permit request in SBNMS, NOAA must determine such activities 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](#)⁴ or view the sanctuary regulations at 15 C.F.R. § 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 USCG, and various regional and state authorities. Cross-agency coordination is particularly important in the context of commercial and recreational/for-hire 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 (NOAA Fisheries) 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](#).

⁴ <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

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 last revised in 2018. The council membership consists of 17 non-governmental voting members, 17 alternates, two non-voting youth members, and seven 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 is [available](#).⁵

⁵ <https://stellwagen.noaa.gov/management/sac/member.html>

Chapter 2: Management Plan Review Process

NOAA developed this final management plan based on the professional expertise of NOAA staff, public input during the public comment periods, and SAC recommendations. In particular, NOAA developed the 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](#)⁶ 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. NOAA published a draft management plan and environmental assessment in November 2021 followed by a public comment period until January 21, 2022. NOAA held two virtual public meetings, on January 11 and 12, 2022, to hear comments from the public. Following the public comment period, NOAA analyzed input received and made appropriate revisions. Details on the comments received and NOAA's responses can be found in Appendix E.

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.

This revised sanctuary management plan will enable the sanctuary superintendent to allocate staff resources to priority management needs and actions, depending on available funding and the best available science. Additionally, a revised management plan would allow NOAA to better articulate its efforts to respond to key findings of the latest sanctuary [condition report](#),⁷ 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 Revising the Management Plan

NOAA is revising the SBNMS management plan to evaluate progress toward implementation of the exiting management plan and goals for the sanctuary, especially the effectiveness of site-specific management techniques and strategies in achieving the sanctuary's conservation and

⁶ <https://www.federalregister.gov/documents/2020/02/13/2020-02832/initiation-of-review-of-management-plan-for-stellwagen-bank-national-marine-sanctuary-intent-to>

⁷ SBNMS 2020 Condition Report: <https://nmssanctuaries.blob.core.windows.net/sanctuaries-prod/media/docs/2020-stellwagen-condition-report.pdf>

protection goals. The management plan review process also updates and makes revisions to site-specific management techniques and strategies and allows for innovative management approaches to be applied to better protect sanctuary resource from continuing and emerging threats. Revisions to sanctuary management plans are supported and influenced by staff and public input on the current management plan, as well as the findings in the 2020 condition report, which are summarized below.

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 10 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.

This revised 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 actions, 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 F.R. 8213⁸) in support of management plan review 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 scoping comments on the SBNMS management plan review at the scoping meeting or electronically online via the e-Rulemaking web portal at www.regulations.gov⁹ (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. Need to implement sector specific noise reduction efforts.
5. Maritime Heritage: Increase management, e.g., mitigate fishing and diving impacts.
6. Interagency Cooperation: Increase engagement with NOAA Fisheries and other partners in the fisheries management process. Unilateral sanctuary fishing regulations if that engagement is not successful.
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. Implement mandatory year-round speed restrictions in SBNMS.
13. Ecosystem Services: Improve understanding of ecosystem services, e.g., consumptive recreation.

⁸ 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>

⁹ E-Rulemaking website: <https://www.regulations.gov/>

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.

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 C.F.R. 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.

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 this management plan. 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 this revised management plan reflect the structure and priorities identified in the 2022 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

- 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 revised 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 this revised sanctuary management plan. NOAA is not proposing any changes to the current regulatory regime for 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, or if current and proposed management actions are not effective. 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 [posted](#)¹⁰ the draft management plan and environmental assessment, distributed copies of the documents to stakeholders and other interested parties, and published a Notice of Availability in the Federal Register to invite comment. NOAA accepted comments electronically through the [e-Rulemaking web portal](#),¹¹ by mail, and during two virtual public meetings. During the public comment period, NOAA solicited comments from federal, tribal, state, and local agencies and officials, from organizations, and from interested individuals.

After the public comment period ended, NOAA reviewed all comments received. A summary of these comments and the corresponding responses is available in Appendix E. NOAA has updated the management plan and environmental assessment based on the public comments received.

¹⁰ <https://stellwagen.noaa.gov/management/2020-management-plan-review/>

¹¹ <https://www.regulations.gov/>

Chapter 3: Final Management Plan

NOAA is implementing a revised sanctuary management plan that will serve as an overarching framework for sanctuary management and outlines the activities that the sanctuary will 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 strategies and activities aiming to accomplish one or more of the following goals:

- **Goal 1:** Ensuring a healthy and resilient sanctuary
- **Goal 2:** Increase and broaden support for SBNMS
- **Goal 3:** Deepen our understanding of SBNMS
- **Goal 4:** Invest in infrastructure to meet current and future needs

These goals for SBNMS are aligned with the ONMS Strategic Plan.¹²

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

This management plan consists of 15 action plans describing 78 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.

¹² <https://sanctuaries.noaa.gov/about/2022-2027-five-year-strategy.html>

GOAL 1: ENSURE A HEALTHY AND RESILIENT 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 manage and protect 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.

Management Actions and Outcomes Over Time:

- **Comprehensive approach to marine mammal protection** – Sanctuary staff have developed a suite of interventions to protect marine mammals in SBNMS. This includes an active Corporate Responsibility Program that monitors vessel traffic and provides compliance feedback to shipping companies, developing the Whale Alert app that provides near real-time information on whale sightings/locations to mariners, and more (see Vessel Traffic Action Plan for more details). While it's difficult to know how many ship strikes and entanglements occur in the sanctuary, these mitigation measures, along with previous measures to move the shipping lanes in and out of Boston to an area where less whales are present, combine to reduce the likelihood of incidents.
- **Participation on right whale protection teams and others** – The SBNMS research ecologist is a member of Atlantic Large Whale Take Reduction Team (ALWTRT), and in that role, shares results of SBNMS research to better inform

managers of the latest data/insights to contribute to improved decision making. He is also a federally appointed member of Northeast Implementation Team (NEIT) of NOAA's Right Whale Recovery Team, a multi-disciplinary team established to advise NOAA Fisheries on issues related to the status and conservation of right whales in the Northeast U.S. (Maine to Virginia).

- **BOWW** – In 2016, the sanctuary initiated the Boater Outreach for Whale Watching program to provide on-water outreach to recreational boaters about boating etiquette around whales, and to establish a visible SBNMS presence within the sanctuary. In 6 years, the program has expanded from a pilot program to a successful summer program with five to six trips into the sanctuary each summer, educating hundreds of recreational boaters on safe whale watching practices and promoting sanctuary stewardship.
- **Right Whale Corporate Responsibility Program** – SBNMS runs a successful corporate responsibility program to encourage companies to increase their commitment to behaviors that are in the public interest. The SBNMS Right Whale Corporate Responsibility program, a partnership with the International Fund for Animal Welfare and NOAA Fisheries/GARFO, uses “Report Cards” that detail the compliance and commitment of vessels traversing the Cape Cod Bay and Off Race Point Seasonal Management Areas (SMAs), in combination with the corporate responsibility paradigm to increase the maritime industry’s awareness of, and compliance with, NOAA’s right Whale Ship Strike Rule. In doing so, the project provides increased protection to North Atlantic right whales, recognizes deserving maritime companies for their contribution to right whale conservation and provides incentive and information to companies needing to improve. Ships and companies receiving compliance grades of A+ or A receive a *Certificate of Corporate Responsibility* demonstrating their commitment to Right Whale Conservation. As an aid to compliance, each package also contains information on NOAA’s *Whale Alert* app. Increased mariner compliance has been identified for SMAs covered by this program; a recent NOAA Fisheries analysis identified the SMAs covered by this program to have the highest compliance of all SMAs.

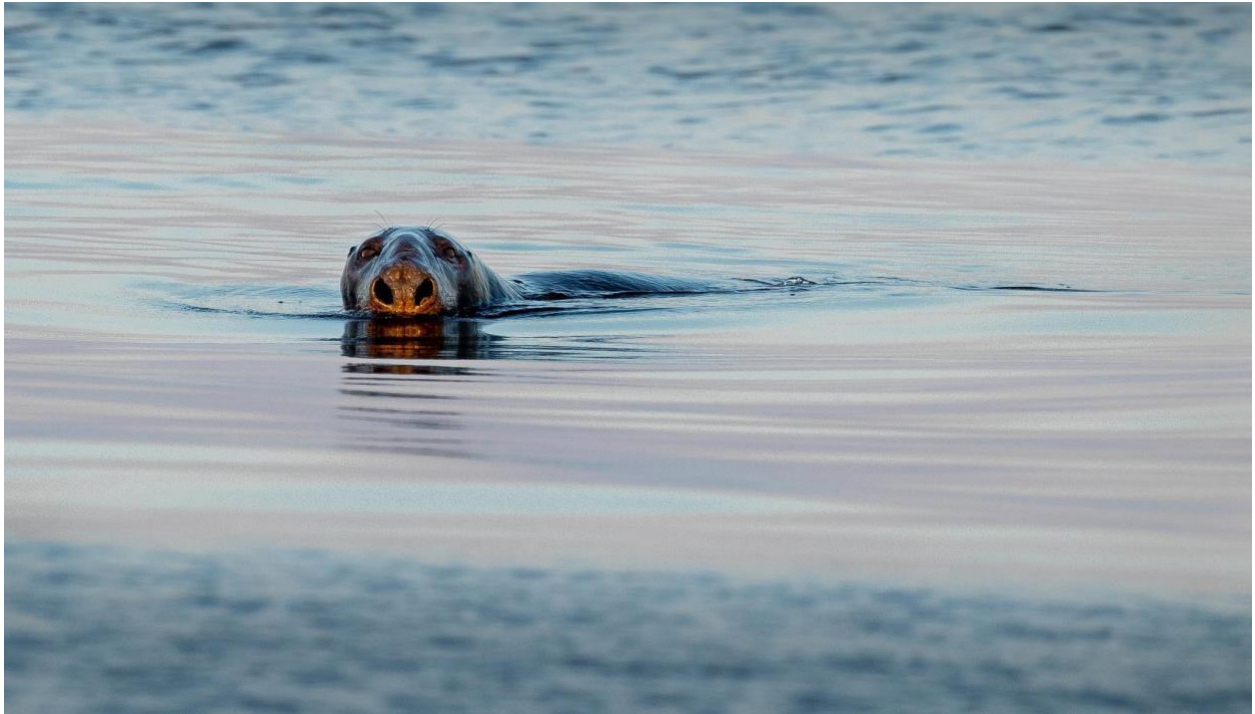


Figure 3.1. A gray seal peeks its head out of the water in Stellwagen Bank National Marine Sanctuary. Photo: Matt McIntosh/NOAA

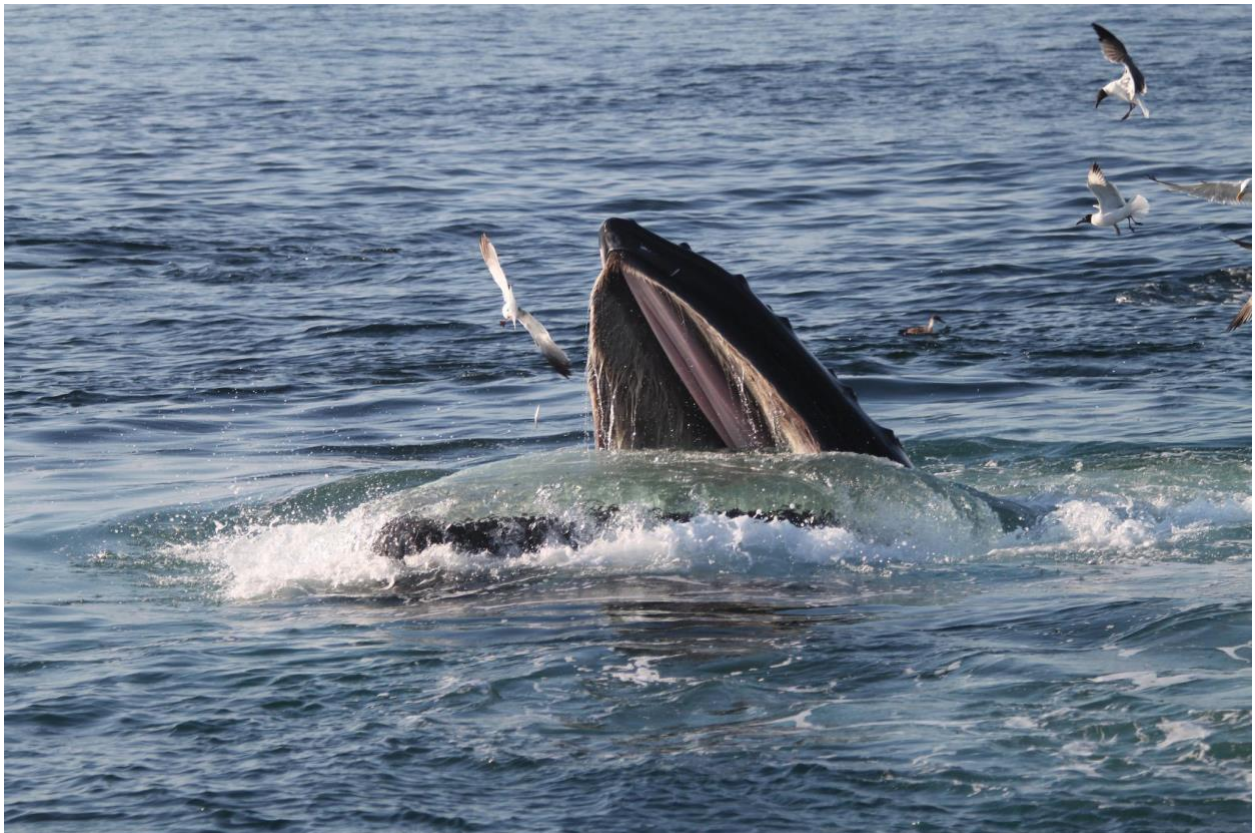


Figure 3.2. Humpback whale bursts through the surface with its mouth open while feeding in Stellwagen Bank National Marine Sanctuary. Photo: NOAA

Management Strategies

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 and fishing 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:** Expand sampling methods to evaluate additional health characteristics and stress response

Strategy MP-2: Support research into entanglement prevention

- **Activity MP 2.1:** Support NOAA Fisheries efforts to 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, seals, and fish
- **Activity MP 2.3:** Collaborate with NOAA Fisheries, 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 (CCS) 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 marine mammal distribution
- **Activity MP 4.3:** Continue and expand programs to understand oceanographic aspects of top predator ecology
- **Activity MP 4.4:** Investigate the contaminant loads in marine mammals

Strategy MP-5: Expand whale watch education programs, including Boater Outreach for Whale Watching (BOWW), Whale SENSE, and See A Spout program to reach more recreational boaters and commercial vessels

- **Activity MP 5.1:** Expand BOWW to reach more recreational boaters; secure adequate funding to train personnel and increase the number of BOWW trips
- **Activity MP 5.2:** Explore partnerships for BOWW, including boating insurance companies and harbormaster organizations
- **Activity MP 5.3:** Continue partnership with NOAA Fisheries and Whale and Dolphin Conservation to support Whale SENSE and See A Spout

Strategy MP-6: Identify and initiate additional management actions as necessary

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, Whale and Dolphin Conservation, Harvard University, UMass Dartmouth, and Boston University.

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.

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

Management Actions and Outcomes Over Time:

- **Shearwater ecology** – SBNMS staff have 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, and necropsy of bycaught and stranded birds. A combination of satellite telemetry, diet information (fecal samples), and demographic information (molt scores and 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).
- **Understanding seabird distribution and abundance** – The Stellwagen Sanctuary Seabird Stewards (S4) program began in 2012 and conducts standardized transects over the top of Stellwagen Bank five times per year. This citizen science program relies on volunteer expert observers affiliated with Massachusetts Audubon and other partners to collect the data and sanctuary staff maintain and analyze the long-term database. This

long-term database reveals trends in seabird abundance, distribution, and phenology, such as the transition from winter to summer species.

- **Dynamic ocean management** – Recent research used satellite-tagged great shearwaters as near real-time tools to explore whether they were able to locate whale aggregations to support flexible management strategies. Data showed that tagged great shearwaters are dynamic indicators of humpback whale habitat use in space and time in SBNMS and across the Gulf of Maine (Silva et al., 2022).
- **2022 mortality event** – Staff are engaged in efforts to document and understand a large-scale seabird mortality event impacting seabird species throughout the Atlantic. Staff are leading the collection of stranded great shearwater carcasses along the U.S. East coast and working with partners to necropsy and sample dead birds to help determine potential causes of the mortality event. Sampled birds will also contribute to a 10+ year necropsy data set evaluating body condition, morphometrics, plastic ingestion, contaminants, and stable isotopes in great shearwaters in the Gulf of Maine. Partners include the National Park Service, NOAA’s National Seabird Program, U.S. Environmental Protection Agency (EPA) and the Woods Hole Oceanographic Institution (WHOI).
- **Building an international network** – Through their research and publications, sanctuary scientists and managers have developed a network of colleagues around the Atlantic Basin who are collaborating on science and management issues related to seabird conservation and management. For example, sanctuary staff met with scientists and staff affiliated with the OSPAR Commission who recently established the North Atlantic Current and Evlanov Sea basin Marine Protected Area (MPA) located in the central North Atlantic. This MPA is designed to help protect a vital foraging ground for a high diversity of seabirds including shearwaters that also feed in SBNMS.

Management Strategies

Strategy SR-1: Identify habitat use of seabirds

- **Activity SR 1.1:** Conduct monthly standardized surveys using 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 and other stressors in seabirds

- **Activity SR 3.1:** Use bycaught seabirds obtained from NOAA Fisheries for tissue analysis of contaminants and to investigate plastics ingestion
- **Activity SR 3.2:** Explore the use of new technologies to assess stress levels in captured seabirds

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 CCS 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 NOAA Fisheries 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 New England Fisheries Management Council (NEFMC), 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

Strategy SR-7: Identify and initiate additional research activities as necessary

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 (URI), 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 strategies in this action plan will continue efforts to understand and mitigate impacts from the large volume of vessel traffic within the sanctuary, including discharges of pollutants, noise impacts to marine mammals and fish, and increased risk of ship strikes in the sanctuary.

Management Actions and Outcomes Over Time:

- **Right Whale Corporate Responsibility Program** – As described in the Marine Mammal Protection Plan, this is a successful program focused on improving marine mammal protection by monitoring vessel compliance with speed restrictions.
- **WhaleAlert app** – In 2012, SBNMS staff developed the WhaleAlert app to help 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.

- **Monitoring vessel speed** – Continue collaboration with USCG, NOAA Office of Coastal Management/Bureau of Ocean Energy Management (BOEM) to acquire and maintain Class A/B AIS data for SBNMS research and monitoring. Continue collaboration with NOAA Fisheries and NEFMC to acquire and maintain vessel trip report (VTR), vessel monitoring system (VMS) and DMIS data for SBNMS research and monitoring. Use AIS data to map vessel transits through SMAs relative to speed restrictions contained in NOAA Ship Strike Rule. Use results to create report cards for ships and companies. Provide certificates of merit as positive reinforcement to deserving ships and companies.



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

Management Strategies

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 Exceleerate 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 SMAs 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, VMS, 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, NOAA Fisheries, and Massachusetts Division of Marine Fisheries (MADMF)), building on existing data processing efforts where possible

Strategy VT-6: Identify and initiate additional management actions as necessary

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).

Consideration of the maritime cultural landscapes is a new focus for the SBNMS management plan. Maritime cultural landscapes (MCL) help NOAA understand the complex, dynamic, and evolving relationships of people and the sea through the investigation of the roles of class, race, and culture, as well as colonization, defense, and industry. NOAA recognizes 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. Using an MCL approach also provides an opportunity to more holistically consider Indigenous values, knowledge, and culture in sanctuary management.

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 thus negatively affects the eligibility of some sites for listing in the National Register of Historic Places (NRHP).

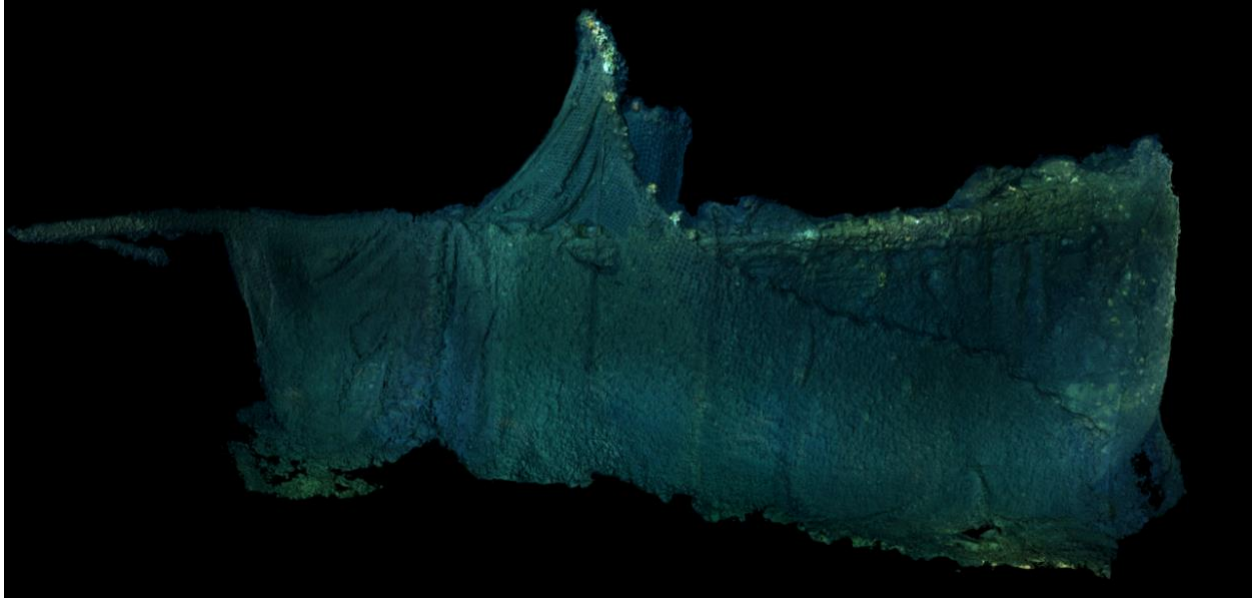
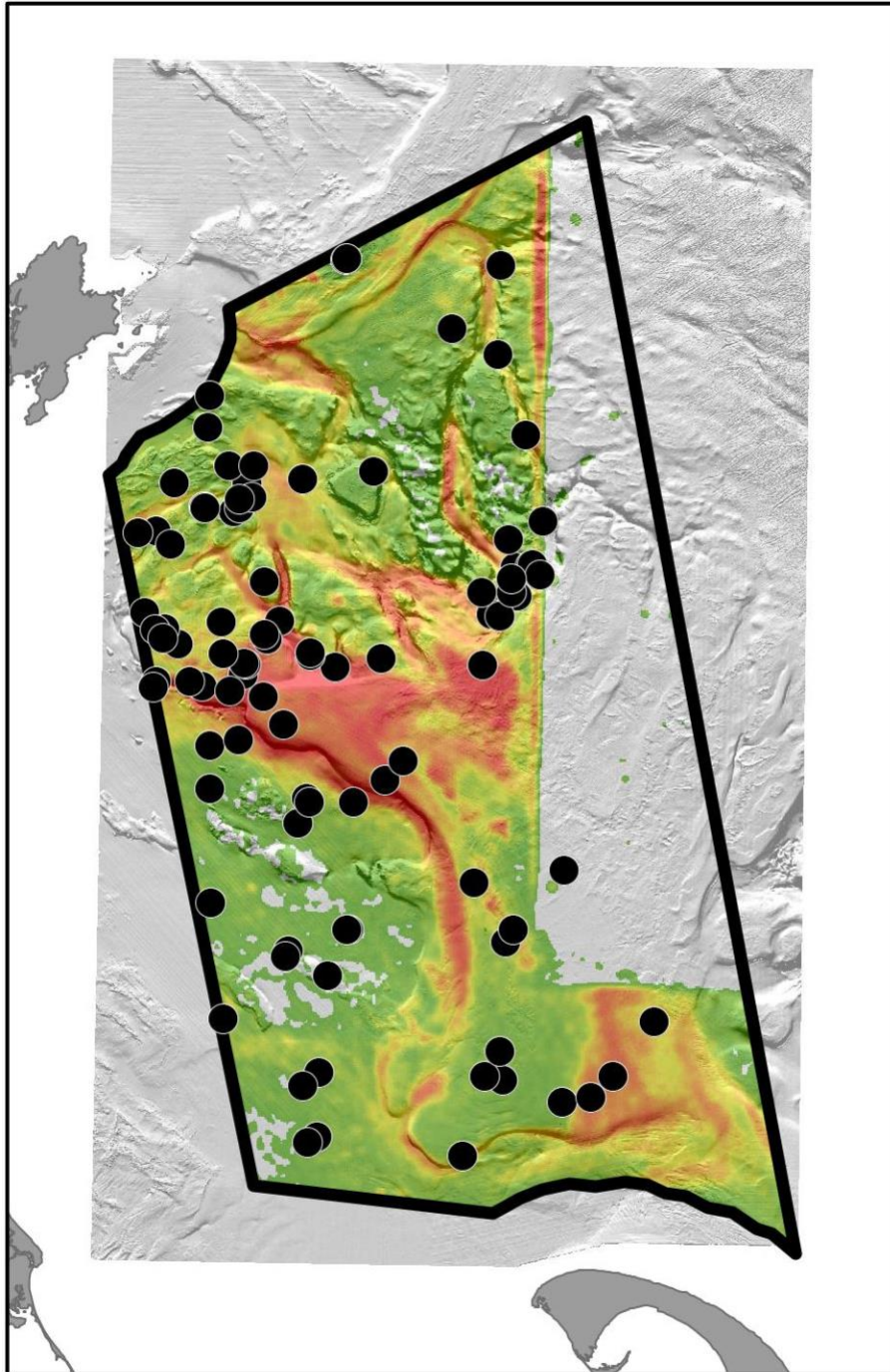


Figure 3.5. Photomosaic image of a trawl net draped across the starboard bow of the steamship *Portland*. This image was created by stitching together thousands of digital photos taken from a remotely operated vehicle in 2020. The date of entanglement and owner of the net are unknown but the net was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



Low  High

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 NOAA Fisheries between 2008-2016 (red colors indicate higher intensity, green colors indicate the least). Image: NOAA

Management Actions and Outcomes Over Time:

- **Telepresence project** – ONMS partnered with WHOI and Marine Imaging Technologies on a two-year project to explore sanctuary shipwrecks, to document the sites, and to study the marine life communities that colonize these structures. The project offered live ship-to-shore broadcasts to provide rare behind-the-scenes looks at an oceanographic research expedition in action. The primary archaeological goal of the project is to assess the current state of several of the more than 200 wrecks in the sanctuary, such as the steamship *Portland* and the coal schooners *Frank A. Palmer* and *Louise B. Crary*. These surveys will help maritime historians better understand the last moments aboard each ship before it sank, as well as the factors contributing to their gradual change over time. The project used new technologies, including high-definition video and 3D photogrammetric mapping, to provide baseline data to evaluate changes to the wreck over time.
- **Debris removal** – Sanctuary staff partnered with MADMF and the NEFSC along with SAC partners to remove a derelict fishing net from the wreck of the *F/V Patriot*. In addition to protecting the wreck, this project was also important for marine mammal protection (at least one entangled seal died in the net) and diver safety. ONMS also partnered with WHOI and Marine Imaging Technology to survey and map a derelict fishing net on the wreck of the *Portland* to better characterize the current status of the net and its impact to the wreck.
- **Survey/inventory** – In 2021, ONMS began a collaboration with MIND Technology, Inc. and its newest Klein side scan sonar technology. Through this mutually beneficial partnership, sanctuary staff received highly detailed images of shipwrecks that provide clues to the effects of fishing and natural degradation on these historic resources. Concurrently, MIND Technology was able to test prototype sonar systems and access real-world data that can be used to fine-tune the new technology. This partnership provided critical support to the U.S. Coast Guard and National Transportation Safety Board by locating the wreck of the fishing vessel *Emmy Rose* which sank in November 2020. Obtaining the location of the wreck enabled the investigation to identify the cause of the sinking.
- **Shipwreck Avoidance Pilot Program** – 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 to mitigate potential damage during the 2018 scallop fishing season by initiating a pilot project, known as the Shipwreck Avoidance Pilot Program (SAPP). The SAPP discloses the locations of historic and modern shipwrecks at high risk of damage from commercial scallop dredge gear and requests 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 and received concurrence for the action. Because of the ongoing threat to historic resources from fishing, NOAA has continued the SAPP. Each year, the commercial fishing fleet is provided notice to voluntarily avoid the sites at risk through a [fishery bulletin](#) (which

provided coordinates) issued by NOAA Fisheries prior to the fishing season. Additional outreach occurred by:

- Working with groundfish sector managers to inform them of the program
- Providing public notification at appropriate meetings such as the NEFMC
- 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

NOAA has been evaluating the effectiveness of SAPP 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
- Preliminary results indicate that outreach to the fleet and raising awareness among fishermen about the importance of maritime heritage was a success; however, this awareness did not prevent some disclosed sites from being impacted



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

Management Strategies:

Strategy MH-1: Conduct surveys using state-of-the-art mapping technology to map 100% of the seafloor within SBNMS to identify and characterize 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: Transition the SAPP to a long-term Shipwreck Avoidance Program (SAP) 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 mitigation 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 State Historic Preservation Officer, 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
- **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

Strategy MH-9: Identify and initiate additional management actions as necessary

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.

BOEM has initiated a process to lease wind energy areas in the Gulf of Maine. SBNMS is excluded from consideration for offshore wind development in the current BOEM Request for Interest process. In the event that lessees propose to route energy transmission cables through portions of SBNMS, authorization from SBNMS would be required. SBNMS would consider any permit applications for an energy transmission cable in much the same manner as it has for subsea telecommunication cables. In making permitting decisions, SBNMS carefully evaluates, on a case-by-case basis, the potential impacts of installation, operation, and decommissioning of subsea cables on a sanctuary’s specific resources and goals. In issuing permits, SBNMS may stipulate terms and conditions to mitigate short- and long-term impacts to sanctuary resources.

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, to enhance existing efforts to facilitate compatible use within SBNMS, and to assess emerging activities to sanctuary resources in order to evaluate and address

potential threats. The strategies in this action plan address current uses, new uses, the scale of use, and the cumulative impacts of multiple uses.

Management Actions and Outcomes Over Time:

- **Permitting/emerging threats** – SBNMS staff regularly use permitting authorities as an effective tool to review and request modifications to proposed research and projects that may have adverse impacts to sanctuary resources. Select outcomes from the permitting review process include: (a) the re-routing of a communication cable to avoid crossing the sanctuary; (b) increased transparency and data sharing with NOAA Fisheries to facilitate necessary ecological surveys while increasing awareness and protection of heritage resources; and (c) design modification of a proposed research array to decrease entanglement risk to whales.
- **Fisheries management coordination** – SBNMS staff regularly work with NOAA Fisheries and NEFMC staff on a variety of issues related to the compatibility of commercial fishing with sanctuary resource protection. Two recent examples are: (1) Implementation of the SAPP (described in Maritime Heritage Action Plan) required partnering to distribute information to the industry, and SBNMS staff have briefed the council on project status and evaluation results; and (2) briefing the council on the BOEM ecology of sand habitats study that revealed the vulnerability of sand lance to scallop dredging in the spring and requesting management measures to mitigate that vulnerability.
- **Participate in regional planning organizations** – SBNMS staff are actively engaged with numerous regional partnerships/collaborations to consider and plan for increasing commercial activity in the Gulf of Maine.
 - NOAA North Atlantic Regional Team
 - Regional Association for Research in the Gulf of Maine
 - BOEM Gulf of Maine wind energy task force
 - Northeast Ocean Plan
 - Northeast Regional Ocean Council
 - Northeastern Regional Association of Coastal Ocean Observing Systems (NERACOOS)
 - Regional Tribal Operations Committee
 - Massachusetts Ocean Plan
 - Outfall Monitoring Science Advisory Panel and the Interagency Advisory Committee of the Massachusetts Water Resources Authority



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

Management Strategies

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 operator program in Florida Keys National Marine Sanctuary, when guidance from headquarters is promulgated
- **Activity CU 3.2:** Continue involvement and expansion of existing business recognition programs, such as Whale SENSE

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 in conjunction with ONMS economists and other partners

Strategy CU-7: Identify and initiate additional management actions as necessary

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, EPA, 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 actions.

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 biological 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 is playing an important role as a sentinel site by conducting long-term monitoring on variables such as noise, humpback whale behavior, and seabird distribution and abundance. Maintenance and analysis of long-term datasets are essential to understanding trends in the ecosystem which will 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.

Management Actions and Outcomes Over Time:

- **Ongoing research into habitat use/behavior** – Research focused on monitoring the abundance and distribution of forage fish, marine mammals, and seabirds and their spatial overlap provided baseline knowledge of how protected predators use SBNMS and the importance of sand lance to support predators. Continued investigations into predator/prey distribution and overlap, as well as the movements, migrations, and foraging ecology of shearwater seabirds will inform shifts in distribution or abundance over time related to changing environmental conditions.
- **Sentinel site for climate change in the Gulf of Maine** – SBNMS is collaborating with NERACOOS to propose the expansion of existing observing systems into the sanctuary to create a high-density cluster of observations needed to track effects of climate change and other stressors. This will enable both high-resolution understanding of the ecological and oceanographic dynamics within the sanctuary, and linkage with the bigger picture created by the regional NERACOOS observing system. Two projects exemplify this collaboration: (1) NERACOOS, SBNMS, WHOI and University of Maine received a grant from the NOAA Climate Programs Office to understand and model the vulnerability of copepod zooplankton populations which are foundational to the health of the sanctuary ecosystem, and (2) NERACOOS, SBNMS, National Data Buoy Center and other partners are designing an ecosystem buoy for long-term deployment in the sanctuary that is capable of monitoring a suite of environmental conditions relevant for tracking climate change impacts.



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

Management Strategies

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 NERACOOS to expand observation capabilities using buoys and other technologies
- **Activity CC 1.7:** Strengthen existing and create new partnerships with land-based conservation partners to support the preservation of coastal habitats to mitigate climate change impacts to sanctuary habitats and resources

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

Strategy CC-4: Identify and initiate additional management actions as necessary

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, EPA, 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, and Gulf of Maine Research Institute.

GOAL 2: INCREASE AND BROADEN PUBLIC 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 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.

Management Actions and Outcomes Over Time:

- **Diversity outreach programming** – SBNMS staff have initiated several programs to reach more diverse communities, including a partnership with the Hispanic Access Foundation and the City of Lawrence, Massachusetts to bring marine education to students in that community, many of whom are of Dominican heritage (the sanctuary has a sister sanctuary agreement with a marine mammal sanctuary in the Dominican Republic.)
- **Exhibits** – NOAA has created and assisted in the development of numerous educational exhibits, including: Animals without Passports traveling exhibit, Maritime Gloucester redesigned main hall, New England Aquarium cold water gallery tanks and Outdoor Art Display, and signage at the Cape Cod National Seashore (expanded by the seashore with an internal exhibit that features the sanctuary.)
- **Collaboration to deliver a marine megafauna course** – SBNMS Staff have a longstanding collaboration with Boston University Marine Program to provide students a month-long, intense course on SBNMS Marine Megafauna. The course is research-focused and involves students joining SBNMS researchers at sea to participate in sanctuary research projects. After staff provide a comprehensive orientation to the sanctuary, students participate in a research component during which they develop their own research question, test hypotheses based on sanctuary projects using real data, and then present their projects at the end of the course. Several of those students have subsequently become volunteers or interns at SBNMS and student research projects have generated future ideas for SBNMS research.
- **Participation in national programs** – Staff frequently present to national organizations to share research, partnership, and other progress updates. These include presentations to the NOAA National Marine Wildlife Viewing Working Group on the Whale SENSE Business Incentive/Business Recognition Program (whalesense.org) to share the background, history, successes, lessons learned, and identify goals to help NOAA teams across the country assess opportunities to join Whale SENSE and/or offer similar programs, to encourage businesses to practice and promote responsible wildlife viewing.
- **Outreach to whale watch naturalists** – Since the release of the last management plan in 2010, the sanctuary has participated in each annual Whale Watch Naturalist Workshop by offering speakers, providing resources (funding or educational materials) and/or attending the event to provide a sanctuary presence. The workshop brings together naturalists, scientists, conservationists, and educators to share new research, techniques and advancements in the field of marine mammals and education, with a focus on local species. Strengthening partnerships with local whale watch naturalists and sharing our work enables them to share what we do with hundreds of thousands of whale watch passengers each year.
- **Outreach to K–12 students** – The annual Marine Art Contest for K–12 students invites students to research and then illustrate sanctuary species, habitats, and/or predator-prey relationships in an activity that supports learning across the curriculum. While most entries are from Massachusetts students, registrants have come from some 20 states and more than 10 countries.

- **Networking with regional educators** – NOAA has been actively involved with the Massachusetts Marine Educators, a non-profit organization of formal and informal educators in the state. Participation has included speaking at conferences, workshops, and serving on the board of directors. These activities promote the sanctuary and its resources to professional educators. Sanctuary materials have also been offered at meetings of the parent organization—the National Marine Educators Association.
- **Visitor center in Provincetown, MA** – Working with CCS and the town of Provincetown, NOAA has completed a feasibility study and conceptual design for a visitor center in Provincetown, Massachusetts.



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

Management Strategies

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

Strategy EO-4: Identify and initiate additional education and outreach programs as necessary

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, WHOI 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, The Nature Conservancy, New Bedford Whaling Museum, Boston National Historic Park (Charlestown Navy Yard), and Town of Provincetown.

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., MMPA, ESA, Outer Continental Shelf Lands Act, MSA, 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 provide ongoing coordination with regional, national, and international partners 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.

Management Actions and Outcomes Over Time:

- **Agency partnerships** – SBNMS leadership meets with GARFO colleagues on a regular and as-needed basis to address issues, e.g., midwater pair trawling, scallop dredging, historic resource protection, reducing whale entanglements, etc. Since 2018, these regular meetings have improved interagency communication and better coordination on local and regional resource protection issues.
- **International partnerships** – In accordance with the NMSA policy “to cooperate with global programs encouraging conservation of marine resources,” SBNMS staff participate in various international forums and meetings to enhance the protection of transboundary sanctuary resources such as whales and seabirds, and to exchange information on science and management. Some examples of international cooperation are:
 - In 2006, NOAA initiated the Sister Sanctuary Program to partner with MPAs in the Caribbean to increase protection for humpback whales on both ends of their migratory route. The goal of this effort is to build a model for international protection of a species along its migratory pathway in the North Atlantic Ocean and Caribbean Sea. Over 10% of the humpback whales that feed in SBNMS go to the Dominican Republic to breed and other areas of the Caribbean serve as breeding sites for Stellwagen whales. SBNMS maintains agreements with MPAs in Bermuda, Dominican Republic, French Antilles (Agoa Sanctuary), and Dutch Antilles (Yarari Sanctuary), and has provided trainings and exchange opportunities for staff of these MPAs. This network of humpback whale MPAs is the largest of its kind in the world with over 669,440 km² providing protection.
 - Staff participate in the Marine Mammals MPA Trans-Atlantic Partnership, which is part of the European Union-sponsored Ocean Governance initiative. The aim of the trans-Atlantic marine mammal partnership is to foster cooperation among countries and MPAs around the Atlantic Ocean basin that have large migrating whales and to share best practices in order to improve protection of these trans-boundary animals.
 - Staff presented to an international forum developing a framework for multiple-use marine areas called MULTI-FRAME, an international research project that aims to increase the knowledge base and capacity of marine spatial planning authorities and other public and private actors for the implementation of ocean multi-use, by providing concrete open-source tools, assessment results, and best

practice examples. Staff presented SBNMS as a multiple-use MPA using the case study of whale watching and its intersection with research and conservation.

- Staff regularly share lessons learned and exchange information on successful management approaches at various international meetings such as the Biennial Conference on the Biology of Marine Mammals and the International Marine Mammal Protected Areas Conference.
- **Pilgrim Nuclear Power Station decommissioning discharge** – In the fall of 2021, SBNMS became aware of potential discharges of radioactive wastewater as part of the decommissioning of the Pilgrim Nuclear Power Station, which, if discharged, could have adverse impacts to sanctuary waters and would potentially be a violation of SBNMS regulations. As described in more detail in the Water Quality Action Plan, in the following months, SBNMS notified the Nuclear Regulatory Commission and EPA of several concerns with this possible discharge, and coordinated with other regulatory agencies to communicate with the Nuclear Regulatory Commission and ensure compliance with all federal and state regulations. This is an ongoing effort.



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

Management Strategies

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 local and regional tribes with cultural ties to the sanctuary

- **Activity IC 2.1:** Identify and initiate engagement with appropriate tribes
- **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 local and regional tribes 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

Strategy IC-6: Use staff expertise and findings from research and monitoring programs to engage appropriate agencies or forums to inform management actions to protect sanctuary resources

- **Activity IC 6.1:** Engage the NEFMC and NOAA Fisheries through established processes when appropriate to propose management actions informed by findings from research and monitoring programs

Strategy IC-7: Identify and initiate additional management actions as necessary

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, EPA, 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, and local and regional conservation organization.

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 seven 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.

Management Actions and Outcomes Over Time:

- **SAC subcommittees/working groups** – The SBNMS SAC has convened several subcommittees and working groups in recent years to provide targeted advice to the SBNMS Superintendent. These groups enable diverse voices, representing all major sanctuary user groups, to contribute to sanctuary management:
 - Maritime Heritage Working Group – provide advice to the SAC on issues and management related to maritime heritage and cultural landscapes.
 - Small Boat Working Group – provide advice to the SAC on addressing small boat impacts on marine mammals.
 - Management Plan Review Subcommittee – conduct an initial assessment of the status of implementation of the 2010 management plan.
 - Management Plan Review Process – 80% of SAC members were actively involved in this process through participation on one or more of the following subcommittees and working group:
 - Research and Monitoring Subcommittee
 - Education and Outreach Subcommittee
 - Interagency Coordination Subcommittee
 - Maritime Heritage Working Group (an extension of discussions already initiated under the existing working group)
 - Mission/Vision Subcommittee
 - Most recently, a Wind Energy Subcommittee was created to support the Superintendent in responding to future offshore wind developments.
- **SAC work plan** – SBNMS established a SAC work plan to better coordinate and track the annual goals of the SAC and ensure SAC activities are directly connected to the management plan. Every work plan activity is led by at least one SAC representative along with a staff liaison, and the status and results of the work plan are tracked and reviewed three times per year at each SAC meeting. In addition, SBNMS encourages each SAC member to create individual work plans and commit to undertaking at least one activity each year that helps meet our management plan and that promotes and educates SAC constituents about SBNMS. At least 50% of all SAC members have created individual plans in any given year. Members who commit to specific activities have reported that this exercise helps them understand their role on the SAC more concretely and that they feel more engaged and focused. The SAC and individual work plans have resulted in a number of initiatives that forwarded our management plan, such as

disclosing shipwreck locations to protect maritime heritage resources and producing outreach products and services to increase safe boating around whales. The work plans have also helped SAC members be more deliberate and proactive in sharing information about the sanctuary with their constituencies.

Management Strategies

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 members could help implement, using their special skills and interests
- **Activity SAC 2.3:** Expand SAC involvement with staff projects to facilitate better integration of SAC expertise 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 update the SAC regarding 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

Strategy SAC-4: Identify and initiate additional management actions as necessary

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.

Management Actions and Outcomes Over Time:

- **Research programs** – As described in the marine mammal, seabird research, climate change and other action plans, SBNMS has several robust and long-term research programs which provide critical data on sanctuary resources and their role in the Gulf of Maine ecosystem.
- **Partnerships with academic institutions, government agencies, and non-governmental organizations** – SBNMS staff lead research collaborations with academic institutions from around the country; these partnerships enhance sharing expertise and equipment, and enable the implementation of projects without internal funding. These collaborations include: Boston University, Boston University Medical School, Bridgewater State University, Center for Coastal Studies, Department of Fisheries and Oceans – Canada, Duke University, Harvard University, International Fund for Animal Welfare, Long Island University, Massachusetts Division of Marine Fisheries, Mt Sinai Hospital, Oregon State University, Stanford University, Syracuse University, Tufts University, The Nature Conservancy, University of California-Santa Cruz, University of Connecticut, University of Massachusetts-Amherst, University of Massachusetts-Boston, University of Massachusetts-Dartmouth, University of New Hampshire, URI, University of Vermont, U.S. Fish & Wildlife Service, Whale Center of New England, and Woods Hole Oceanographic Institution.
- **Supervising/mentoring young scientists** – In the past 15 years, SBNMS staff have mentored numerous academics including directly hosting, eight masters and 12 doctoral students, five postdocs, and an array of interns. This support of young scientists provides much needed support to develop ongoing research and analytical skills, developing the next generation of scientists, and expanding the range of Stellwagen-related research projects to contribute to our knowledge base.
- **Research publications** – Since the 2010 management plan was published, SBNMS staff have authored or co-authored more than 50 papers resulting from research in the sanctuary. These publications ensure that data from SBNMS research is shared widely and continues to increase understanding of sanctuary resources and the regional ecosystems. These publications have been instrumental in providing information to working groups (i.e., NEFSC state of the ecosystem working groups, Atlantic Large Whale Take Reduction Team, NARW recovery, and others) to assist in resource protection decision-making.



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

Management Strategies

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](#)¹³ including background and science products needed for effective resource characterization and management
- **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 SAC 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

¹³ <https://sanctuaries.noaa.gov/science/assessment/>

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., 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 methods to characterize the temporal and spatial distribution of sanctuary resources and understand the connectivity between ecosystem components
- **Activity RM 3.10:** Outfit the research vessel (R/V) *Auk* with a multibeam sonar system (or an advanced fish finder) 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

Strategy RM-5: Identify and initiate additional research and monitoring programs as necessary

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, URI, 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, the International Fund for Animal Welfare, and the Anderson Cabot Center for Ocean Life/New England Aquarium.

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.

ONMS has a long-term underwater sound monitoring program composed of the following projects:

- Noise Reference Station Network – This unique national network of hydrophones is a collaborative effort between NOAA and the National Park Service. The project is dedicated to collecting continuous, consistent, and comparable long-term underwater acoustic data sets covering all major regions of U.S. waters and has included a sensor in SBNMS since 2014. These data are publicly available through NOAA’s Passive Acoustic Archive at the National Centers for Environmental Information.
- Sanctuary Sound Monitoring – Since 2016, ONMS has been working with NEFSC to collect long-term sound monitoring data at several important ecological locations in the sanctuary. Maintained in collaboration with the U.S. Navy between 2018–2022 through a national-scale project known as the Sanctuary Soundscape Monitoring Project

(SanctSound), monitoring efforts continue through ONMS support including two locations in SBNMS. These data are publicly available through NOAA's Passive Acoustic Archive at the National Centers for Environmental Information.

- **Glider data collection** – The use of gliders (a type of AUV) provides real-time passive acoustic data on the presence, location, and behavior of marine mammals throughout the sanctuary during the winter months, when they are difficult to visually survey. Whale detections can also be viewed in real time on Whale Alert. The glider recordings are also being used to study winter spawning activity for Atlantic haddock and Atlantic cod, two important fish species in the sanctuary that make sounds as part of their reproductive activity
- **Right Whale Listening Buoys** – ONMS worked with federal action agencies and NOAA Fisheries through NMSA consultation to require 10 real-time acoustic monitoring units in the Boston Traffic Separation Scheme. The design of this mitigation for operation of two offshore liquefied natural gas (LNG) terminals was focused on providing real-time right whale detection capability within the traffic lanes and mandating LNG carrier speed reduction to avoid collision. This system has been in place since 2009, and, through Whale Alert, this acoustic information on NARW is made available to all offshore mariners, not just LNG carriers.

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.

Management Actions and Outcomes Over Time:

- **Mitigation metrics** – Using data from SanctSound, ONMS created and standardized metrics to define the influence of vessels relative to other sounds. These metrics identify which vessel types, during which operational modes, have the greatest influence on sound levels during time periods and in areas of the sanctuary where and when animals are using sound for reproductive and foraging functions. These metrics can now be used to compare vessel noise influence in SBNMS to vessel noise influence in sanctuaries across the system. ONMS has made these results publicly available so that they are transparent indicators that can be used in dialog with stakeholders. The use of these metrics for the first time allows examination of the diverse roles of many vessel use types in affecting noise levels in the sanctuary at different times of year and in different use areas. The metrics suggest that overall, the vessel influence of noise in SBNMS is, on average, the highest of all monitored locations in the sanctuary system. They further suggest that during some times of year and in some locations important to animals, the sound of large vessels transiting the sanctuary are the dominant source of noise. Although these sources remain important drivers throughout the sanctuary, during the summer months, the influence of local traffic including research, recreational and commercial traffic contribute significantly to whale exposure.
- **Glider data real-time reporting** – Glider data have provided real-time updates on the winter-time presence of critically endangered North Atlantic right whales and other vocally-active baleen whales, such as humpbacks, sei, and fin whales. These updates are

added to Whale Alert and are used by NOAA Fisheries to trigger dynamic management areas.

- **Listening through the pandemic** – In partnership with NEFSC, SBNMS staff successfully gathered three years of continuous underwater recordings from three SanctSound stations during the pandemic. The completion of this task with almost no interruption throughout the pandemic means that SBNMS has monitored [changes in the underwater soundscape](#), associated with changes in human activities offshore during the COVID-19 pandemic, and can study the implications of these changes on local animals that use sound to communicate.
- **Cod seasonal spawning areas** – Locations with known high cod spawning activity in the sanctuary have been near-continuously monitored by acoustic gliders since 2016. Using this data as well as telemetry tagging data, sanctuary staff worked with MADMF, the NEFSC, University of Massachusetts Dartmouth, and The Nature Conservancy to identify the spatial and temporal distribution of cod spawning during winter in Massachusetts Bay (2013–2016 seasons) to improve our understanding of cod spawning dynamics and inform fisheries management. This work informed the NEFMC’s designation of current boundaries for winter cod spawning areas. In the future, similar work can be done to better identify locations and timing of spawning cod aggregations to prevent overexploitation of these vulnerable aggregations.
- **Speed and sound** – For the past decade the Right Whale Listening Buoys have been highlighting the predictable presence of right whales in the sanctuary in December, January and February, as well as the early spring months. The Offshore Race Point SMA overlaps sanctuary waters in the spring months and thus influences a significant component of vessel traffic within sanctuary boundaries. NOAA is examining data from sound monitoring in April–May of 2019–2021 to determine whether vessels that are slowing down in this zone are quieter than vessels during the remaining 10 months of the year. The magnitude of per vessel quieting that is achievable through speed reduction will be determined by how much of the traffic is changing its speed by large amounts (much more than 10 knots to below 10 knots) during this period and in the area around the monitoring stations (one close to the inbound and one close to the outbound lanes). NOAA expects speed variance to be higher for the outbound lanes than the inbound, due to vessels generally needing to drop speed as they approach Boston. If speed variance is high at the outbound location, NOAA expects to see a drop in the contribution of vessels to sound levels in the sanctuary in April and May. This is important to distinguish from sound levels as a whole, which may or may not be reduced, as many other natural sources of sound (wind, waves, animals) contribute to the same frequencies (tones).
- **Supporting Fishery Enforcement** – ONMS has been working with NEFSC and OLE to incorporate underwater listening information into assessments of compliance with fishery regulations, including closures, that overlap the sanctuary boundaries.



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

Management Strategies

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 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

Strategy SS-6: Identify and initiate additional management actions as necessary

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 the system can continue to maintain healthy resources, or identify areas where management actions can mitigate stressors on water quality.

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.

Management Actions and Outcomes Over Time:

- **Contaminants of emerging concern (CEC)** – In 2018, a workshop convened by the MWRA concluded that several specific classes of CECs were not being addressed by the MWRA’s long-term monitoring program designed to address impacts of the Boston Harbor Outfall on the Massachusetts Bay ecosystem. These classes included PFAS, pharmaceuticals, and microplastics. In response to this, SBNMS requested that Dr. Anna Robuck, at the time a graduate student at URI, design and conduct a preliminary study to determine surface and bottom water concentrations of PFAS and active pharmaceutical ingredients in the vicinity of SBNMS. The objectives of the study were to provide an initial assessment of PFAS and active pharmaceutical ingredients in the offshore environment, assess sucralose and certain PFAS as tracers, and determine the attenuation factors of PFAS and active pharmaceutical ingredients in the marine environment. Dr. Robuck conducted surface and bottom water sampling along three transects radiating northeast, east, and southeast from the outfall during September 2019 and February 2020. There was insufficient funding for this study to address the effects of PFAS on sanctuary biota. The study indicates that at least 12 PFAS and 18 active pharmaceutical ingredients are present in treated effluent and in the ambient waters of Massachusetts Bay and SBNMS. Seasonal hydrodynamics govern observed concentrations; though environmental concentrations are generally low to very low, little data exists detailing potential risk for SBNMS biota subject to chronic, low-level exposure to CECs (Robuck et al., 2022). The study helped spur the Outfall Monitoring Science Advisory Panel to write a peer-reviewed white paper on PFAS which Dr. Robuck co-authored. The white paper makes recommendations for consideration by the Massachusetts Department of Environmental Protection, the EPA, and MWRA.
- **Pilgrim Nuclear Power Station decommissioning discharge** – In 2019, Pilgrim Nuclear Power Station stopped producing power and initiated a lengthy decommissioning process overseen by the company Holtec Decommissioning International. The power station is located in Plymouth, Massachusetts and is 13 nautical miles to the southwest of SBNMS. In November of 2021, Holtec proposed discharging into Plymouth Bay approximately one million gallons of wastewater from the decommissioning process which would include low-level radioactive waste such as tritium. On March 14, 2022, the sanctuary superintendent expressed concerns in a letter to the EPA and Nuclear Regulatory Commission, the two agencies regulating the decommissioning process, about the potential impacts on sanctuary resources and qualities if this wastewater discharge were to occur in addition to statutory and regulatory requirements for discharges that may enter the sanctuary and affect sanctuary resources. Discussions with EPA and NRC are ongoing and a decision regarding the disposition of the wastewater will likely be made in 2023.



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

Management Strategies

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), 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, CECs, 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 CCS, 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 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
- **Activity WQ 7.6:** Take appropriate action to monitor discharges from shore-based facilities that have potential to impact sanctuary waters

Strategy WQ-8: Identify and initiate additional management actions as necessary

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

EPA, 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 and identify/implement appropriate site-specific management measures to protect sanctuary habitat and associated species.

Background: 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 10 year period reviewed in the 2020 Condition Report (2007–2018), 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 55% 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). Scallop dredging is of continuing concern, as dredging and NEFMC and GARFO management actions have fluctuated over the last five years. For instance, 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. In 2019, the NEFMC voted to close a small area on the northwest corner of SBNMS to allow an aggregation of sub-legal scallops to grow to marketable size. GARFO created this closed area in 2020 through Framework 32. This closed area was reopened on April 1, 2022 which resulted in a significant increase in scallop dredging activity by Northern Gulf of Maine permitted vessels. Staff continue to work with GARFO and NEFMC to identify measures that minimize impacts to habitat and sand lance populations.

The strategies in this plan are designed, first, to assess the status of and understand the contribution habitats make to the structure and functioning of the sanctuary ecosystem and to improve the condition of habitats. NOAA will assess habitats for their productivity and biodiversity, including those used by large whales, sand lance, and demersal fish. NOAA will focus its assessment on sand, boulder, gravel, mud, and rocky outcrop as well as shipwrecks to the extent they have become hard bottom habitat and refugia for a variety of invertebrates and fish. Second, NOAA will continue to share this essential research with NEFMC, NEFSC and GARFO in order to inform fishery management decisions. SBNMS will also continue to engage

with state and federal fisheries regulators to explore and promote spatial management strategies (such as closures) to protect important sanctuary habitats, and leverage these other agencies' expertise and enforcement authorities to protect sanctuary habitats. SBNMS will also explore other management strategies under its existing regulatory authorities, including voluntary and educational outreach. Additional site specific management measures will be considered when the scope of the problem and potential solutions match up with NMSA authorities and the geographic boundaries of SBNMS.

Management Actions and Outcomes Over Time:

- **Engagement in fisheries management process** – SBNMS staff has worked closely with appropriate GARFO staff to address habitat issues and fishing concerns in the sanctuary, including the impact of scallop dredging on sand lance habitat and early life history stages, the impact of fishing gear on historic shipwrecks, and also to close the loophole that allowed storage of lobster traps in federal waters immediately to the west of the SBNMS boundary. Staff have participated in several NEFMC committees and advisory panels, and provided input on recent research results and efforts that may impact fishery management plans. Work in this area is limited due to staffing challenges.
- **Stellwagen Dedicated Habitat Research Area** – In 2015, SBNMS's proposal to the NEFMC to create a fully protected reference area was not approved by the council. However, the council voted to create a Stellwagen Dedicated Habitat Research Area (DHRA) which overlaps 22% of SBNMS. GARFO promulgated the rule for this action in 2018. In this area of overlap, called the Sliver, no bottom tending commercial fishing gear is allowed, principally trawls, dredges, and gillnets. SBNMS initiated photo and video monitoring of the Sliver in 2021, which is ongoing. While there is no formally designated area within the sanctuary or the Gulf of Maine closed to all fishing activities, the Stellwagen DHRA serves as a de facto reference site to discern the effects of human versus natural disturbance to seafloor habitats and their associated biological communities. This allows comparisons of the state and dynamics of habitats and species outside the Stellwagen DHRA, impacted by different types of direct human uses, with similar habitats inside the protected area that are affected by regional and global conditions. The Stellwagen DHRA and Sliver provide significant conservation, economic, and research benefits to the region. A study published in 2020 on the economic contribution of commercial and for-hire fishing in SBNMS, found that 14% of the \$19.4 million average annual value for commercial fishing was derived from the "edge" of the Sliver. For-hire recreational charter boats landed 37% of their total catch from the Sliver (Schwarzman et al., 2020). Staff will continue to work with colleagues at the NEFMC and GARFO to ensure both the Stellwagen DHRA and Western Gulf of Maine Habitat Closure Area remain protected.

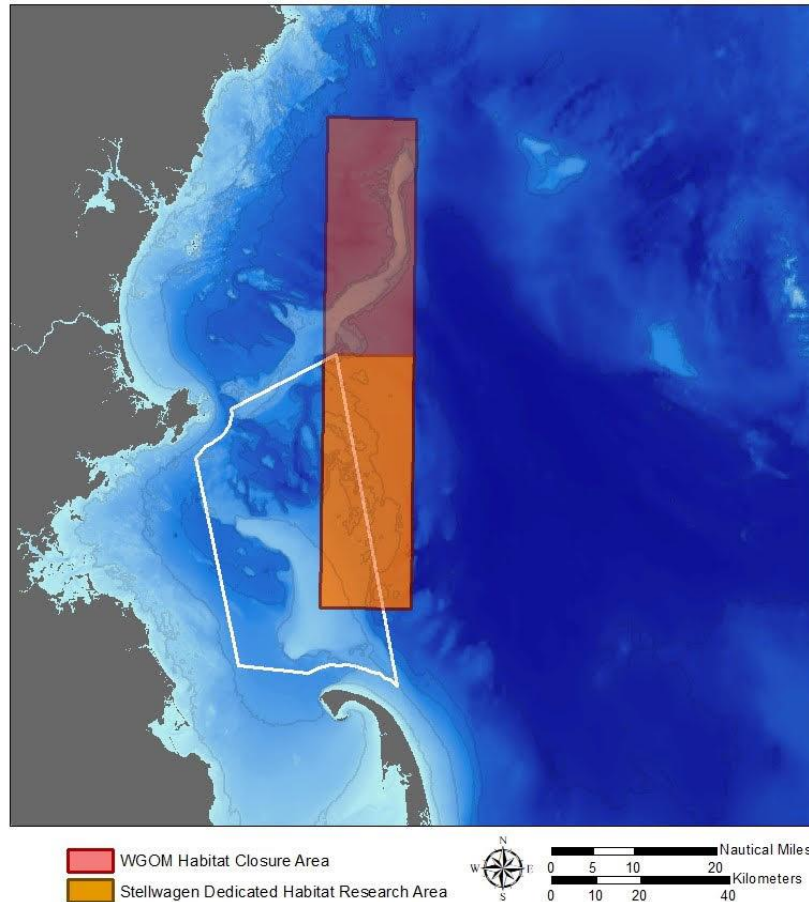


Figure 3.15. Map showing the overlap of the Western Gulf of Maine (WGOM) Habitat Closure Area and the Stellwagen DHRA with SBNMS. The Stellwagen DHRA overlaps SBNMS by 22%, an area referred to as the Sliver. The Sliver has been protected from bottom tending commercial fishing gear since 1998 and therefore serves as a de facto reference area. Image: Michael Thompson/NOAA

- **Working with NEFSC to advance the habitat section of the NEFSC State of the Ecosystem Report** – ONMS conducts a range of research on the status of habitats, including acoustic habitat, as well as the economic value of habitats and their socioeconomic uses. The results of these studies are still being assessed and will be used to better understand the value of habitats, better inform the users of their conservation importance, and identify appropriate management measures.
- **Productivity and ecology of sand habitats** – From 2018–2020, SBNMS conducted a BOEM-funded investigation into the ecosystem and economic value of sand habitats (Wiley et al., 2021). Prior to this research, little was known about the productivity and ecology of offshore sand habitats. Northern sand lance forage fish proved to be a major component of sand habitat productivity, so much of the research focused on investigating that species. An important product of the research was the development of the Northern Sand Lance Vulnerability Matrix and an Ecosystem Vulnerability Matrix designed to identify critical temporal periods when sand lance would be most vulnerable to anthropogenic disturbance.
- **Forage species habitat** – One of the key insights from the above research was an increased understanding of the value of sand habitat for sand lance as well as other

species, and the identification of sand lance as a key driver of sanctuary and sand habitat productivity. SBNMS staff are currently working with NEFMC/GARFO staff to identify measures to better protect sand lance habitat. SBNMS staff have also supported state fisheries management efforts to implement protections of sand lance by limiting landings of sand lance. Massachusetts, Rhode Island, and Connecticut have promulgated regulations limiting the daily amount of sand lance that a fisher can land at state ports, thereby eliminating the potential for the development of a large-scale fishery targeting the species.

- **Scallop dredge impacts** – The aforementioned vulnerability analysis of sand lance indicates that sand lance are particularly vulnerable as they settle to sand habitat during April and May. The Northern Gulf of Maine scallop season opens on April 1 and is prosecuted during these months. SBNMS staff have initiated discussions with NEFMC and GARFO about ways to mitigate the impacts of scallop dredging on sand lance.
- **Maritime heritage ecology** – Once resting on the seafloor, shipwrecks become a form of hard bottom habitat and substrate for invertebrates and fish to settle on. Wrecks are isolated, island-like systems, especially at greater depths, so the communities that inhabit them have different dynamics than natural hard-bottom fauna. Understanding the role that shipwrecks play in seafloor communities is critical for effective management. With an estimated 200 wrecks in SBNMS, this unique habitat is significant and provides an opportunity to understand important ecological processes such as succession and larval dispersal. Recent studies have revealed the differences in invertebrate communities between wreck substrate and surrounding natural boulder reef substrates (Meyer-Kaiser et al. 2022). In 2018, SBNMS implemented a pilot program for improved protection of historic shipwrecks and the habitats they provide by mitigating the impacts of fishing gear. The SAPP is described in the Maritime Heritage Action Plan.
- **Enforcement** – SBNMS maintains a cooperative enforcement program with its enforcement partners, OLE and the USCG, and annually reviews the program and establishes priorities. Enforcing the Western Gulf of Maine Closed Area as well as other regulations pertaining to habitat protection are priorities every year.

Management Strategies

Strategy HB-1: Continue to conduct research in and protect the Stellwagen DHRA in collaboration with NEFMC, NEFSC and GARFO

- **Activity HB 1.1:** Continue implementation of the DHRA research plan
- **Activity HB 1.2:** Collaborate with NEFMC and NOAA Fisheries to ensure long-term protection of the DHRA

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

Strategy HB-4: Explore restoration of macroalgae habitat

- **Activity HB 4.1:** Identify potential areas of macroalgae habitat in need of restoration
- **Activity HB 4.2:** Evaluate possible restoration and mitigation measures

Strategy HB-5: Identify and initiate additional management actions as necessary

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, and Bureau of Ocean Energy Management.

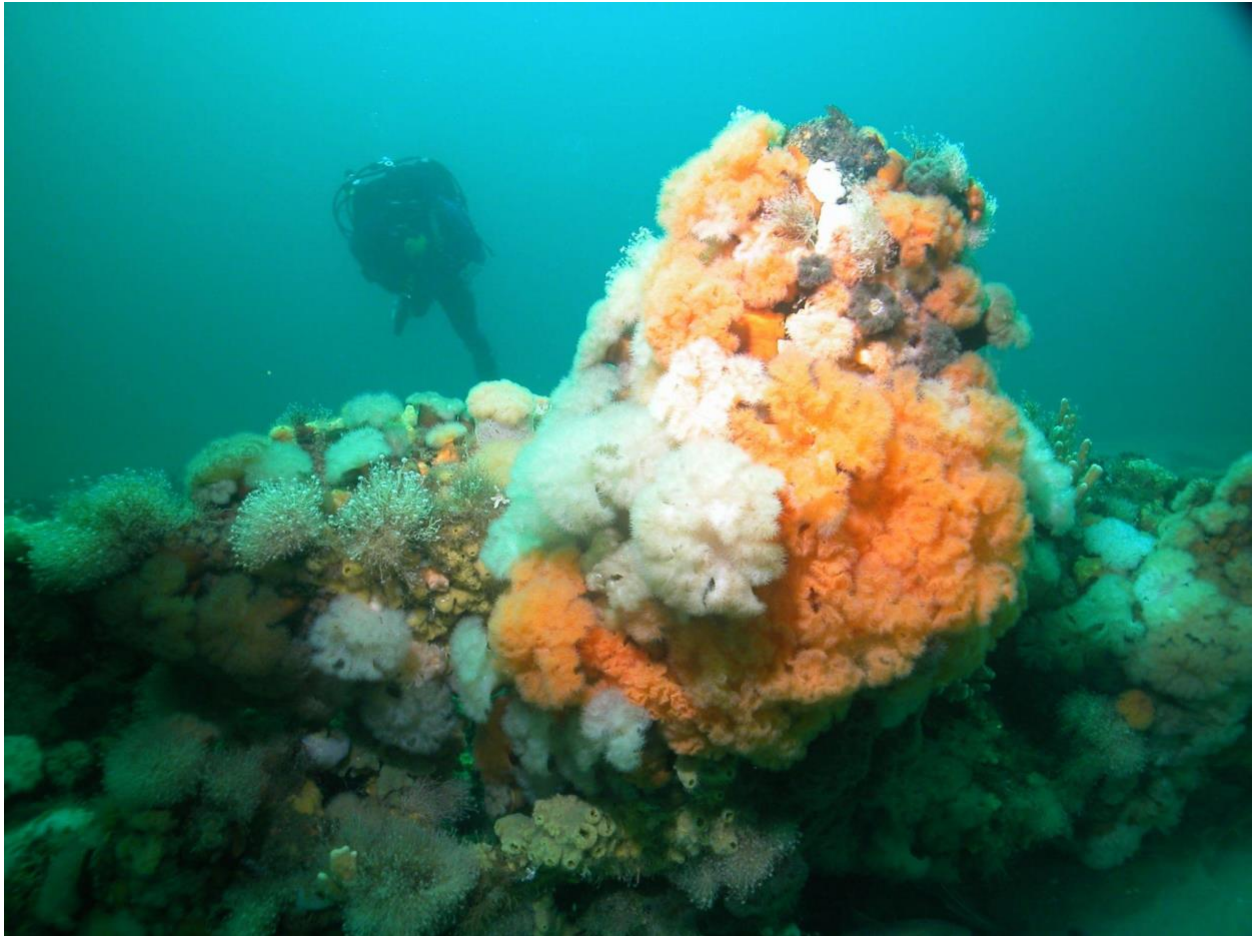


Figure 3.16. A diver looks at anemones and sponges on the schooner *Paul Palmer* shipwreck. Sponges and anemones and other species turn shipwrecks into important localized habitats in the sanctuary. Photo: Matthew Lawrence/NOAA

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 and how human activities impact the sanctuary. Only by understanding each of these important facets of sanctuary use can we create a truly ecosystem-based management plan that supports the long-term viability of the sanctuary’s living resources and the communities that depend upon them. The strategies in this plan support modeling ecosystem service dynamics, expanding socioeconomic research, and developing partnerships to broaden the SBNMS research agenda.

Management Actions and Outcomes Over Time:

- **Fishing valuation report** – In 2020, NOAA ONMS released a report documenting the economic contributions of commercial and recreational fishing in the sanctuary to the local and regional economies. This report recognizes the importance of commercial and recreational fishing in SBNMS to the regional community and also provides a metric to evaluate the value of a healthy ecosystem to support these activities.
- **Whale watch valuation report** – In 2020, NOAA ONMS released a report on market and non-market values associated with whale watching in SBNMS. Based on surveys of

whale watch passengers, the report provided data on the characteristics passengers find most important, as well as the value of the trips to the for-hire industry and local region.

- **Interactive Condition Report** – SBNMS staff are working with NOAA’s National Center for Coastal Ocean Science to make the current and future condition reports more user-friendly and accessible by making them interactive with clickable icons that provide trend data and sources. The desired outcome is to make condition reports an effective outreach tool.



Figure 3.17. Recreational, charter, and commercial fishermen 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

Management Strategies

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

Strategy ES-4: Identify and initiate additional management actions as necessary

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: INVEST IN INFRASTRUCTURE TO MEET CURRENT AND FUTURE NEEDS

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.



Figure 3.18. The headquarters office for SBNMS is located in Scituate, Massachusetts. The campus is composed of an administrative building, meeting annex, and a marine operations center on the waterfront where the R/V *Auk* is berthed (buildings with red roofs). Sanctuary staff along with other local, state, and federal partners are housed in the administrative building. Source: Microsoft Corporation/Pictometry International Corp., 2006

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.

Management Actions and Outcomes Over Time:

- Facility maintenance/upgrades** – The SBNMS campus consists of several buildings in Scituate, Massachusetts that require maintenance to stand up to the harsh New England coastal environment. The boathouse sits over the water on pilings that had not been repaired or reinforced since their installation in 1938. Many of the original pilings were cracked or damaged and their connections to the boathouse were missing or severely corroded. In 2021, NOAA hired a contractor to reinforce the existing pilings by jacketing many of them and making other structural repairs. The bulkhead driveway leading to the boathouse was also completely rebuilt. These repairs were necessary prerequisites to maintain the structural integrity of the boathouse and pier facility. In addition, the largest of the two floating docks was replaced in 2020 because it was installed in 1985 and was at the end of its service life. Annual maintenance is done on the boathouse and pier complex and the smaller floating pier and the piles that support it are nearing the end of their service lives as well. Future plans include renovating the interior of the boathouse to make it more resilient to sea level rise and storm surge.

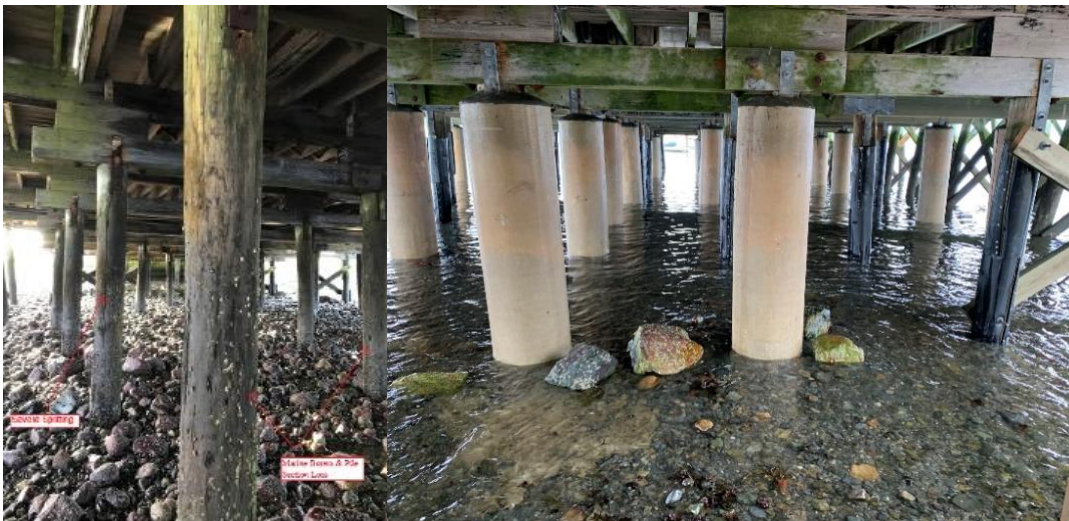


Figure 3.19. SBNMS boathouse pilings before (left) and after (right) 2021 repair project. Photo: NOAA

- Vessel maintenance/upgrades** – The R/V *Auk* was built in 2006 and has experienced considerable wear and tear over the years. It requires annual maintenance of both the hull and main engines. Considerable pitting of the aluminum hull plate has been discovered over the last several years resulting in sections of the hull being cut out and replaced. The main engines are performing well but are due for replacement in the next three years.

- **Enforcement partnerships** – OLE coordinates enforcement activities of itself, the USCG and MEP. OLE and MEP are both co-located in the SBNMS headquarters in Scituate, Massachusetts. The SBNMS enforcement liaison meets regularly with OLE and sets annual priorities each spring. MEP officers are cross-deputized to enforce federal laws and conduct patrols in SBNMS under an ongoing Joint Enforcement Agreement with OLE.
- **Contingency planning** – SBNMS staff regularly participate in USCG Area Committee activities, including any planned drills or other training exercises, and annual meetings. SBNMS co-hosted a table top drill focused on protecting SBNMS resources. This exercise contributed to ongoing efforts to improve awareness and understanding of SBNMS resources with partner agencies.
- **Volunteer program** – The SBNMS volunteer program, which began in 2011, has increased capacity across all program areas that support sanctuary management goals. Volunteers actively increase visibility, awareness, and stewardship of SBNMS, and support staff in a range of activities, including implementation of the S4 citizen science program; supporting sand lance, humpback and shearwater tagging, and internal waves project with WHOI. The volunteer program also provides career development, educational opportunities, and satisfying work for volunteers.
- **Provincetown Visitor Center** – SBNMS has no dedicated visitor center where the public can learn about its resources and efforts to protect them. In 2017, SBNMS began a planning process with the Town of Provincetown and CCS to build a visitor center in the heart of Provincetown near MacMillan Wharf. A concept design study was initiated in 2020 and completed in 2021 by architectural firm, Oudens Ello, in collaboration with interpretive design firm, Main Street Design. The next steps are to develop a fundraising plan and complete a Memorandum of Agreement between the partners (Provincetown, SBNMS, and CCS).



Figure 3.20. Concept design for Provincetown Visitor's Center. Source: Oudens Ello Architecture and Main Street Design



Figure 3.21. 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

Management Strategies

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 the R/V *Auk* and begin planning for its replacement
- **Activity AD 2.6:** Acquire a small, twin-engine boat equipped for large whale tagging activities and to support other sanctuary missions and outreach programs
- **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

Strategy AD-11: Identify and initiate additional management actions as necessary

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, Massachusetts State Police, National Marine Fisheries Services, NOAA General Counsel, National Marine Sanctuary Foundation, Town of Scituate, Town of Provincetown, and 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 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	Number of research projects conducted to understand large whale vulnerability to human activity; number of journal papers published and presentations delivered; and number of management actions (NOAA and other agencies) informed by SBNMS research projects	2018	ongoing	Research coordinator
SR-1: Develop plan with GARFO, NEFMC, and FWS 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	2025	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 and annually	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	number of research permits issued	2020-2021: issued: 4	2025	Permit coordinator
CC-1: SBNMS is recognized as a regional climate change sentinel site	number of deployed assets; number research projects; and number of published papers	Assets: 2 NERACOOS buoys Research projects: 1 Papers: 1	2025	Research coordinator
CC-2: Complete Vulnerability Assessment	percentage of vulnerability report completed	0% of report completed	2024	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 webinars (7 telepresence/WH OI, 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	2022: New website	2024 and annually	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.)	2023: 2,230 Twitter followers	2023 and annually	Education and outreach coordinator
IC-1: All relevant state, regional, and federal agencies are aware of and engaged with SBNMS	Percentage of meetings affecting SBNMS covered by staff, volunteers, or SAC members	2021: to be determined	2023 and annually	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 identified	2024	Engagement coordinator

Performance Indicator	Method of Evaluation	Baseline	Timeline	Staff Lead
IC-3: Maintain agreements with four sister sanctuary partner countries	Number of joint activities with sister sanctuaries	2021: 0 activities	2025	Deputy superintendent
SAC-1: Achieve 80% engagement of SAC members and alternates in SAC work plan activities	Three to four meetings per year; 50% or more 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	2023 and annually	Advisory council coordinator
RM-1: Appropriate research and monitoring data are publicly accessible through data portals	Number 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	Number of long-term stations and number of short term deployments in SBNMS	3-4 long term stations, approximately 2 targeted short term deployments per 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	2020: approximately 5 TB	2027	Marine ecologist
SS-3: Maintain dissemination of results within scientific community and to public	Number of reports, scientific papers, media articles, etc. published that synthesize and interpret the relevance and significance of SBNMS acoustic data	2020: approximately 75 publications	2027	Marine ecologist

Performance Indicator	Method of Evaluation	Baseline	Timeline	Staff Lead
SS-4: Maintain or increase management applications of SBNMS passive acoustic data	Number of SBNMS, national, and international management actions or activities supported by SBNMS acoustic data collection efforts	Approximately 15 actions or activities	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	Number of partnerships created or maintained	Approximately 15 partnerships	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	2020: 2 projects	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 partnerships	2024	Research coordinator

Performance Indicator	Method of Evaluation	Baseline	Timeline	Staff Lead
ES-2: Develop indicators for ecosystem services	Percentage of performance indicators developed for all ecosystem services listed in 2020 condition report	2022: 2 indicators – heritage and sense of place	2024	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	2023	2025	Superintendent
AD-3: Completion of scheduled maintenance	Percentage of scheduled maintenance completed for facilitates and vessels	TBD 2023: To be determined	2023 and annually	Vessel and facility coordinator
AD-4: Compliance with applicable laws and regulations	Percentage of law enforcement contacts (e.g., boardings) that have no violations	2023: to be determined	2025	Deputy superintendent
AD-5: Volunteer program maintained	Number of active volunteers per year and # of volunteer hours provided	2021: 75 volunteers, 3,600 hours	2023	Engagement coordinator

Funding

Since management plan implementation is inextricably linked to resources, a brief discussion on funding is appropriate. The management of national marine sanctuaries is 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.

Currently, ONMS has sufficient resources to conduct 46 of the 78 strategies identified in this management plan. Of those 46 ongoing strategies, 24 are funded with current (FY23) levels of appropriated funding. Implementation of the remaining 32 strategies in this management plan will not be accomplished without additional resources. These funded 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 tasks required for responsible and effective sanctuary management. Ten ongoing strategies are funded with a mix of appropriated and external

funding, and 12 strategies are primarily resourced with external funding. These tasks are primarily research and monitoring activities. 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. 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. Add staff capacity to address issues identified in the Education and Outreach Action Plan (Strategies EO 1-3) and the Administration and Infrastructure Capacity Action Plan (Strategy AD-10)
2. Fund research and monitoring programs and add staff to make SBNMS a sentinel site for climate change (Strategies CC 1-4)
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 BOWW 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 CECs 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 below and in Table 3.2. Conversely, external funds understandably need to also consider the source of funding availability along with the funding source and project partner's priorities in addition to those of ONMS. Decreased funding would require a similar decision-making process but one that focuses on further reducing SBNMS management efforts.

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 this strategy would 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. General strategies under each action plan were not included in this prioritization exercise.

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 International Fund for Animal Welfare and The Volgeneau Foundation; funded thru FY23
Strategy MP-1: Continue projects to inform ship strike, entanglement, and response to noise	M	Y	N	Y	Funded by U.S. Navy, International Fund for Animal Welfare, and The Volgeneau Foundation; funded thru FY23
Strategy MP-5: Expand Whale Watch education programs, including BOWW, WhaleSENSE, and See A Spout to reach more recreational boaters and commercial vessels	M	Y	Y	N	Could be more efficiently conducted with whale tag boat
Strategy MP-2: Support research into entanglement prevention	L	N	N	N	SBNMS supports other entities involved in this work
Strategy SR-1: Identify habitat use of seabirds	H	Y	Y	Y	Seabird research is primarily funded by a grant from the Volgeneau Foundation
Strategy SR-2: Understand foraging ecology of seabirds	H	Y	Y	Y	Seabird research is primarily 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	Y	Y	Seabird research is primarily 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	Y	Y	Seabird research is primarily funded by a grant from the Volgeneau Foundation

Strategy/Activity	Priority	Ongoing Strategy?	Funded Internally?	Funded Externally?	Comments
Strategy SR-3: Understand contaminant loads and other stressors in seabirds	L	Y	N	Y	Seabird research is primarily funded by a grant from the Volgeneau Foundation
Strategy SR-4: Investigate the use of seabirds as a tool for dynamic ocean management	L	Y	N	Y	Seabird research is primarily funded by a grant from the Volgeneau Foundation
Strategy VT-4: Monitor impacts to the sanctuary from discharge and noise from vessels, deep water port operations, and other associated federal actions to provide project-specific mitigation recommendations and support international shipping noise reduction efforts	H	Y	Y	N	
Strategy VT-5: Monitor vessel traffic using all available data (ex: AIS, VMS, VTR, etc.) in order to understand patterns of use and potential impacts on resources	H	Y	Y	N	
Strategy VT-2: Continue Right Whale Corporate Responsibility program	M	Y	N	Y	Right Whale Corporate Responsibility is funded primarily by International Fund for Animal Welfare
Strategy VT-1: Maintain and update Whale Alert data, technology and infrastructure	M	Y	N	Y	Whale Alert is funded primarily by International Fund for Animal Welfare
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	N	Non-discretionary activity; contingent on acquiring a side scan sonar system
Strategy MH-2: Transition the Shipwreck Avoidance Pilot Program to a long-term SAP to facilitate protection of historic resources and reduce damage to shipwrecks resulting from contact with fishing gear	H	Y	Y	N	

Strategy/Activity	Priority	Ongoing Strategy?	Funded Internally?	Funded Externally?	Comments
Strategy MH-3: Continue to inventory and characterize historical resources	H	N	N	N	
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	N	
Strategy MH-8: Facilitate sustainable public access to shipwrecks	M	N	N	N	
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	N	
Strategy MH-1: Conduct surveys using state-of-the-art mapping technology to map 100% of the seafloor within SBNMS to identify and characterize resources	M	N	N	N	Mapping project with Mind/Klein Marine Systems began 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	N	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/Activity	Priority	Ongoing Strategy?	Funded Internally?	Funded Externally?	Comments
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 CC-3: Share data and communicate results of monitoring studies and how they inform our understanding of climate change	H	N	N	N	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	N	
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	Y	Y	N	Being 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	N	N	N	
Strategy EO-3: Increase support for New England's national marine sanctuary by building partnerships and developing MOUs and MOAs to 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	Y	Y	N	

Strategy/Activity	Priority	Ongoing Strategy?	Funded Internally?	Funded Externally?	Comments
Strategy IC-2: Promote intergovernmental collaboration with local and regional tribes with cultural ties to the sanctuary	H	N	N	N	Non-discretionary activity; will be a top priority upon completion of the management plan revision
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-6: Use staff expertise and findings to engage appropriate agencies to inform management actions to protect sanctuary resources	M	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	N	
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	Y	Y	Impossible to focus scientific activities on priority needs due to the lack of appropriated funding; external funds come with shared priorities of the funding entities
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/Activity	Priority	Ongoing Strategy?	Funded Internally?	Funded Externally?	Comments
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 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	Y	Y	This activity is currently funded by NOAA Fisheries, OAR, and NOS (ONMS)
Strategy SS-2: Maintain three broadband soundscape monitoring stations (i.e., "SanctSound"), which have collected seasonal data 2016-2018, 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	Y	Y	This activity is currently funded by NOS (ONMS, IOOS) and NOAA Fisheries
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	Y	N	This activity is currently funded by NOS (ONMS) and NOAA Fisheries
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 periodically funded through external grants or NOAA Fisheries projects
Strategy SS-5: Add an acoustic monitoring station to shipwrecks as possible to deepen understanding of the role of shipwrecks in supporting sanctuary biodiversity	L	Y	Y	Y	This activity is currently funded by NOAA Fisheries OLE and NOS (ONMS)
Strategy WQ-6: Assess how changes in water quality may impact maritime heritage resources	H	N	N	N	
Strategy WQ-7: Monitor major sources of contaminant discharge into or near sanctuary waters	M	N	N	N	Research completed by Nancy Foster Scholar; funding expired in 2021
Strategy WQ-1: Support ongoing long-term water quality monitoring efforts in SBNMS	M	Y	N	Y	Funded through MWRA Outfall Monitoring Program

Strategy/Activity	Priority	Ongoing Strategy?	Funded Internally?	Funded Externally?	Comments
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	N	
Strategy WQ-4: Develop a program to characterize the status of CECs in sanctuary waters over time	L	N	N	N	Research completed by Nancy Foster Scholar; funding expired in 2021
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	N	
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 (e.g., temperature, dissolved oxygen, water column stratification, nutrients, pH, total alkalinity, and dissolved inorganic carbon), including any available historical datasets	L	Y	N	Y	
Strategy HB-1: Develop and implement a DHRA Research Plan in collaboration with the NEFMC and GARFO	H	Y	Y	N	Research resumed in the DHRA in 2021; 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	N	N	N	Sand lance project funding provided by BOEM expired in 2021
Strategy HB-3: Evaluate 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	N	Funding for this work expired in 2020
Strategy HB-4: Explore restoration of macroalgal habitat	L	N	N	N	

Strategy/Activity	Priority	Ongoing Strategy?	Funded Internally?	Funded Externally?	Comments
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 flows 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 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	Y	N	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 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; NOAA relies on WHOI to provide boat for whale tagging research

Strategy/Activity	Priority	Ongoing Strategy?	Funded Internally?	Funded Externally?	Comments
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

Chapter 4: Environmental Assessment

This chapter serves as an environmental assessment evaluating the potential environmental consequences of NOAA’s preferred 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) Regulations for Implementing the Procedural Provisions of NEPA (40 C.F.R. §§ 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.”¹⁴

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

¹⁴ 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 F.R. 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 E.O. 12898. Appendix D 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 facilities¹⁵
- Implementing cooperative enforcement agreements with MEP and OLE
- Development of and management of visitor center

Activities that Require Individual NMSA Permits¹⁶

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

¹⁵ 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.

¹⁶ 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.

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](#)¹⁷ 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 C.F.R. § 1502.20 (1978)) and "incorporation by reference" (40 C.F.R. § 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 will 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 revised 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.

Chapter 3 contains the full action plans that NOAA would implement under the proposed action. Table 4.1 summarizes the goals of the revised management plan and the action plans that would contribute to each goal. The strategies and activities detailed in the revised action plans would

¹⁷ NOAA's NEPA Companion Manual: <https://www.nepa.noaa.gov/>

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 healthy and resilient sanctuaries and other marine protected areas	Marine mammal protection Seabird research Vessel traffic Maritime heritage and cultural landscapes Compatible uses Climate change
Goal 2: Increase and broaden public support for ocean conservation and the national marine sanctuary system	Education and outreach Interagency/Intergovernmental coordination Sanctuary Advisory Council
Goal 3: Deepen our understanding of national marine sanctuaries	Research and monitoring Soundscape Water quality monitoring Habitat Ecosystem services
Goal 4: Invest in infrastructure to meet current and future system needs	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. The 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, 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](#)¹⁸ and [Handbook](#)¹⁹ provide guidance to NOAA users of UAS and a framework for the safe and efficient operation of UAS operated or sponsored by NOAA. For flights over animals, applicable statutes may include but are not limited to: the Endangered Species Act (16 U.S.C. § 1531 *et seq.*), Marine Mammal Protection Act (16 U.S.C. § 1361 *et seq.*), and Migratory Bird Treaty Act (16 U.S.C. § 703 *et seq.*). These permits may contain specific mitigation measures, or other terms and conditions that will need to be met. NOAA also complies with best management practices to reduce or avoid disturbance to seabirds.

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 the R/V *Auk* to locate dive sites and to collect data. Occasionally, NOAA would deploy multibeam equipment from a towed instrument or AUV for specific shipwreck investigations or

¹⁸ OMAO Policy 1107 Uncrewed Aircraft Systems Operations (December 2022)

¹⁹ NOAA Uncrewed Aircraft Systems Handbook (February 2022)

characterization and seafloor mapping. The sanctuary's multibeam and other active acoustic activities are assessed programmatically pursuant to [NEPA](#),²⁰ ESA, and MMPA, along with survey and mapping activities of other National Ocean Service program offices, including the Office of Coast Survey who conducts the majority of multibeam mapping surveys for the National Ocean Service (NOS Programmatic Environmental Impact Statement. See Chapter 2.2.4 of the NOS Programmatic Environmental Impact Statement for a detailed description of the use of echosounders.

Deploying Telemetry to Track Whale and Seabird Movements

NOAA deploys acoustic recording tags (D-TAGs, CATS tags, and others) affixed to a whale's back with suction cups to track whale movements. These remain on the animal for about 24 hours. The tags are deployed by UAS or 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. All research on marine mammals is conducted in accordance with NOAA Fisheries marine mammal research permits.

NOAA deploys Platform Terminal Transmitters (PTTs; Solar PTT-100 tags (15g, Microwave Telemetry) to study movements, foraging habits, and migrations of seabirds. Tags are attached to the bird's back below the nape and between the wings using four subcutaneous sutures (Prolene suture 4.0 Ethicon). All tags eventually stop transmitting data, likely due to tag failure, but transmission lasts from days to months. All research on seabirds is conducted in accordance with the U.S. Fish and Wildlife Service (FWS), ESA, and MBTA 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

²⁰ NOS, Final Programmatic Environmental Impact Statement for Surveying and Mapping Projects In U.S. Waters for Coastal and Marine Data Acquisition (November 2022), available at: <https://oceanservice.noaa.gov/about/environmental-compliance/final-surveying-mapping-PEIS-sections.html>; Federal Register 87 F.R. 72447 (November 25, 2022), available at: <https://www.federalregister.gov/documents/2022/11/25/2022-25309>

Category of Activity	Estimated Activity Level – Proposed Action (Alternative 1)	Estimated Activity Level – No Action Alternative (i.e., maintain current operations)
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).
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.

Category of Activity	Estimated Activity Level – Proposed Action (Alternative 1)	Estimated Activity Level – No Action Alternative (i.e., maintain current operations)
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, maintaining appropriate setback or approach distances from marine mammals 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).
- **Reduce speeds in Seasonal Management Areas and Right Whale Slow Zones** – NOAA Fisheries is evaluating the effectiveness of the speed reduction efforts and SBNMS will continue to support speed reduction measures in the future (such as SMAs and DMAs/Right Whale Slow Zones). Currently, there are two SMAs overlapping SBNMS that require commercial vessels to transit at 10 knots or less. The R/V *Auk* is required via a standing order to comply with speed reduction measures. Furthermore, if

a speed reduction zone is created by NOAA Fisheries, 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 TSS that overlaps SBNMS. If right whales are detected, a 5 nautical-mile diameter area around the buoy is activated for 24 hours or as long as whales are detected and 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 NOAA Fisheries 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.
- **Minimize and avoid disturbance to seabirds during UAS operations** – Activities using UAS are planned and executed using the following best management practices:
 - Conduct a pre-flight check for birds in the flight area prior to UAS take-off. If birds are detected in the flight airspace, wait until they depart before initiating takeoff
 - Provide a 50–100-foot buffer from areas where birds are present. This includes on land, nearshore, or on the water
 - If one or more migratory birds or non-migratory birds are suspected of being disturbed in the air during airborne operations, wait until the bird(s) clear the flight area. Attempt operations again using more conservative parameters such as a different approach angle, different time of day, etc. If a second incident occurs, conduct no further UAS operations for this day.
 - If one or more threatened or endangered birds are suspected of being disturbed in/around the nest, and/or if disturbance occurs during nesting season, conduct no further UAS operations. Contact the environmental compliance coordinator.
 - Maintain a log of each day's UAS operations to account for any disturbances to migratory or other birds, and review this information with the site coordinator and the environmental compliance coordinator

In addition to these self-imposed measures, ONMS operates all small boats in accordance with all NOAA Small Boat Program [guidelines](#)²¹ and complies with all NOAA Fisheries 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 C.F.R. 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 1993.²²

²¹ ONMS Small Boat Program Guidelines: <http://www.sbp.noaa.gov/policy/manual.html>

²² 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)
- Expanded implementation of the SAP (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 SAP, 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.²³ 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.”

²³ 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 revised 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](#)²⁴ 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

²⁴ 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.

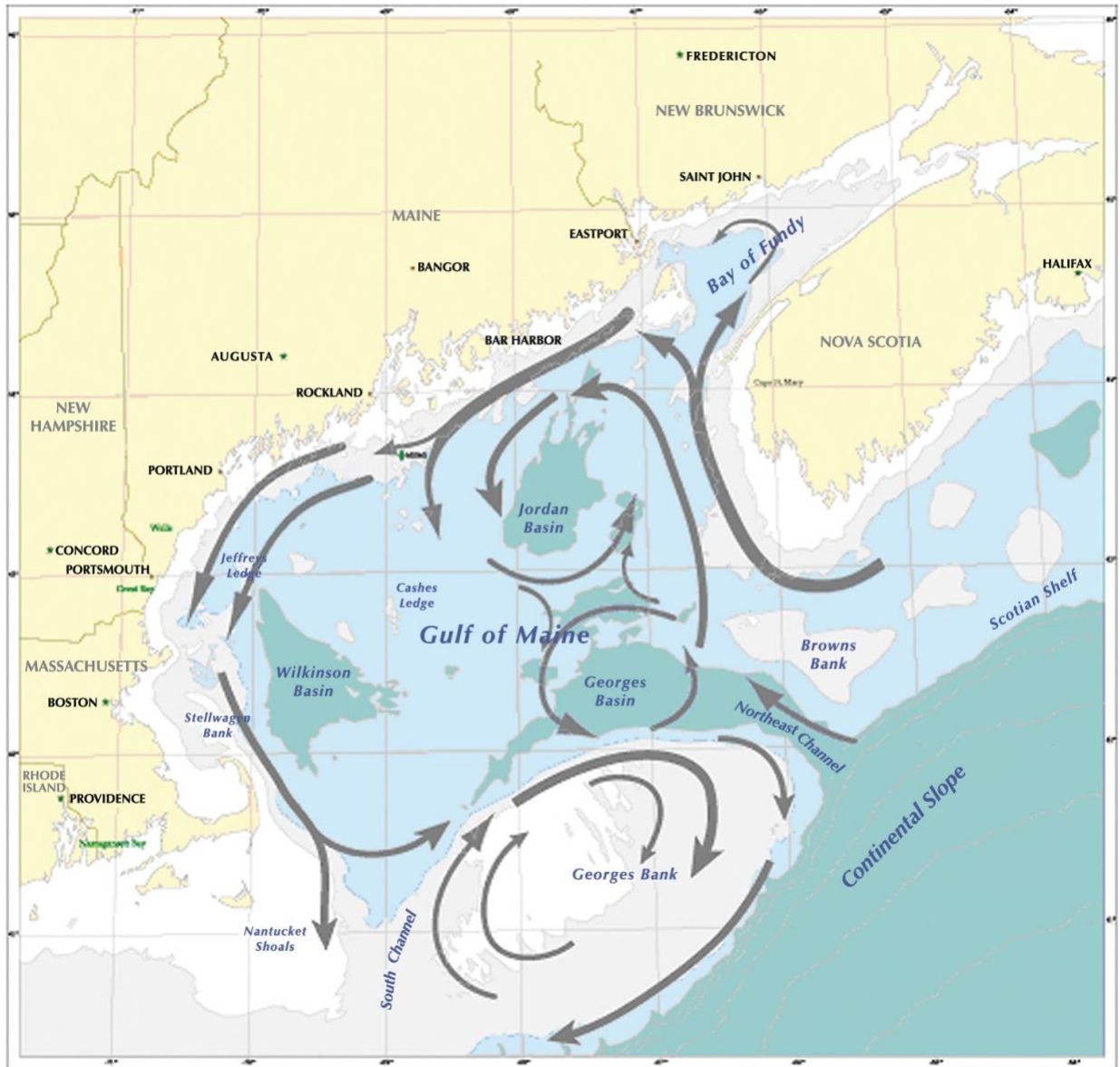


Figure 4.1. Circulation in the Gulf of Maine. Source: Pettigrew et al., 2005

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 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](#).²⁵

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.

²⁵ ONMS sound monitoring website: <https://sanctuaries.noaa.gov/science/monitoring/sound/>

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 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 59 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 NOAA Fisheries Jurisdiction

Table 4.3 provides a list of endangered or threatened species under NOAA Fisheries jurisdiction, and species using designated critical habitat, that may reside in or migrate through SBNMS.²⁶

After evaluating the species' habitat requirements and habitat availability²⁷ within the action area, ONMS determined that certain activities included in the proposed action could affect 10 listed species under NOAA Fisheries 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.

²⁶ ONMS used the NOAA Fisheries Protected Resource Division's Threatened and Endangered Species Directory (October 15, 2021) to develop this table.

²⁷ 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 NOAA Fisheries 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	<i>Lepidochelys kempii</i>	Endangered (35 F.R. 18319 , Dec 2, 1970); Recovery Plan (Mar 6, 2010)	None designated	Occasional, seasonal
Leatherback sea turtle	<i>Dermochelys coriacea</i>	Endangered (35 F.R. 8941 , June 3, 1970); Recovery Plan (May 2, 1998)	Not in the action area	Common, seasonal
Loggerhead sea turtle	<i>Caretta caretta</i>	Threatened (76 F.R. 58868 , Oct 24, 2011); Recovery Plan (Dec 8, 2008)	Not in the action area	Occasional
Green sea turtle	<i>Chelonia mydas</i>	Endangered (81 F.R. 20057 , April 6, 2016); Recovery Plan (May 22, 1998)	Not in the action area	Occasional
Fin or finback whale	<i>Balaenoptera physalus</i>	Endangered (35 F.R. 12222 , July 30, 1970); Recovery Plan (Aug 8, 2010)	None designated	Abundant
Sei whale	<i>Balaenoptera borealis</i>	Endangered (35 F.R. 12222 , July 30, 1970); Recovery Plan (Dec 1, 2011)	None designated	Common
North Atlantic right whale	<i>Eubalaena glacialis</i>	Endangered (73 F.R. 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))	<i>Salmo salar</i>	Endangered (74 F.R. 29343 , June 19, 2009)	Not in the action area	Occasional
Atlantic sturgeon (Gulf of Maine DPS)	<i>Acipenser oxyrinchus oxyrinchus</i>	Threatened (77 F.R. 5879 , Feb 6, 2012)	Not in the action area	Occasional
Shortnose sturgeon	<i>Acipenser brevirostrum</i>	Endangered (32 F.R. 4001 , Mar 11, 1967); Recovery Plan (Dec 1, 1998)	None designated	Occasional

ONMS determined that the following listed species under NOAA Fisheries 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 NOAA Fisheries jurisdiction occurs within the action area.

Species and Habitat Under FWS Jurisdiction

Table 4.4 provides a list of endangered or threatened species under FWS jurisdiction that have the potential to occur in or migrate through SBNMS.²⁸ No designated critical habitat units under FWS jurisdiction are found within the action area. No proposed or candidate species, or proposed designated critical habitat under FWS jurisdiction occur within the action area.

Table 4.4. Listed species under FWS 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	<i>Calidris canutus rufa</i>	Threatened (79 F.R. 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	<i>Sterna dougallii dougallii</i>	Endangered (52 F.R. 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, NOAA Fisheries determines that such species or stock is below its optimum sustainable population and it is designated as a depleted stock under the MMPA.

²⁸ NOAA used the FWS's Environmental Conservation Online System (ECOS) Information for Planning and Conservation (IPaC) tool to identify the ESA-listed species and designated critical habitat under FWS 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	<i>Lagenorhynchus acutus</i>	Protected (2019 , Western North Atlantic)	Common; most frequent in April-May and August
Fin whale	<i>Balaenoptera physalus</i>	Depleted (2019 , Western North Atlantic)	Abundant
Gray seal	<i>Halichoerus grypus atlantica</i>	Protected (2019 , Western North Atlantic)	Common
Harbor porpoise	<i>Phocoena phocoena</i>	Protected	Common
Harbor seal	<i>Phoca vitulina</i>	Protected (2019 , Western North Atlantic)	Common
Humpback whale	<i>Megaptera novaeangliae</i>	Protected (2019 , Gulf of Maine)	Abundant; foraging
Long-finned pilot whale	<i>Globicephala melas</i>	Protected (2019 , Western North Atlantic)	Uncommon. Very hard to distinguish short finned and long finned pilot whales at sea.
Minke whale	<i>Balaenoptera acutorostrata</i>	Protected (2019 , Canadian Eastern Coastal)	Abundant
North Atlantic right whale	<i>Eubalaena glacialis</i>	Depleted (2019 , Western Stock)	Abundant; feeding and calving
Risso's dolphin	<i>Grampus griseus</i>	Protected (2019 , Western North Atlantic)	Occasional
Sei whale	<i>Balaenoptera borealis</i>	Depleted (2019 , Nova Scotia)	Common
Short-beaked common dolphin	<i>Delphinus delphis</i>	Protected (2017 , Western North Atlantic)	Common
Short-finned pilot whale	<i>Globicephala macrorhynchus</i>	Protected (2019 , Western North Atlantic)	Uncommon. Very hard to distinguish short finned and long finned pilot whales at sea.
White-beaked dolphin	<i>Lagenorhynchus albirostris</i>	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 C.F.R. § 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.²⁹

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	<i>Sterna paradisaea</i>	Rare in summer	Foraging
Atlantic puffin	<i>Fratercula arctica</i>	Uncommon in winter	Foraging
Black guillemot	<i>Cephus grylle</i>	Rare in winter	Foraging
Black scoter	<i>Melanitta nigra</i>	Uncommon in spring and fall	Migrating
Black-legged kittiwake	<i>Rissa Tridactyla</i>	Common in winter	Foraging
Bonaparte's gull	<i>Chroicocephalus philadelphia</i>	Uncommon in spring and fall	Foraging, migrating
Brown pelican	<i>Pelecanus occidentalis</i>	No records	No records
Common eider	<i>Somateria mollissima</i>	Uncommon in fall and winter	Migrating
Common loon	<i>Gavia immer</i>	Common in fall, winter, and spring	Foraging, migrating
Common murre	<i>Uria aalge</i>	Common in winter; uncommon in spring	Foraging
Common tern	<i>Sterna hirundo</i>	Common in summer; uncommon in spring and fall	Foraging, migrating
Cory's shearwater	<i>Calonectris diomedea</i>	Common in summer and fall	Foraging
Double-crested cormorant	<i>Phalacrocorax auritus</i>	Uncommon in spring, summer, and fall	Foraging, migrating
Dovekie	<i>Alle alle</i>	Uncommon in winter and spring	Foraging
Great black-backed gull	<i>Larus marinus</i>	Abundant year around	Foraging

²⁹ NOAA used the FWS's ECOS IPaC tool to search for migratory bird species that may be present in the action area. The FWS 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 phalarope, Sabine's gull, sooty shearwater). Breeding information for these species is available at <https://www.audubon.org/field-guide>.

Common Name	Species Name	Likelihood of Occurrence in the Action Area	Use of the Action Area
Great shearwater	<i>Puffinus gravis</i>	Common to abundant in summer and fall; rare in winter.	Foraging
Herring gull	<i>Larus argentatus</i>	Abundant year round	Foraging
Leach's storm-petrel	<i>Oceanodroma leucorhoa</i>	Uncommon in summer	Foraging
Least tern	<i>Sterna antillarum</i>	No records	No records
Long-tailed duck	<i>Clangula hyemalis</i>	Uncommon in spring and fall	Migrating
Manx shearwater	<i>Puffinus puffinus</i>	Uncommon in summer; common in fall	Foraging, migrating
Northern fulmar	<i>Fulmarus glacialis</i>	Uncommon in fall, winter, and spring	Foraging
Northern gannet	<i>Morus bassanus</i>	Abundant in spring and fall; uncommon in summer and winter	Foraging, migrating
Parasitic jaeger	<i>Stercorarius parasiticus</i>	Uncommon in summer and fall	Foraging, migrating
Pomarine jaeger	<i>Stercorarius pomarinus</i>	Uncommon in summer, fall, and winter	Foraging, migrating
Razorbill	<i>Alca torda</i>	Abundant in winter; uncommon in spring	Foraging
Red-breasted merganser	<i>Mergus serrator</i>	Uncommon in spring and fall	Migrating
Red phalarope	<i>Phalaropus fulicarius</i>	Uncommon in fall	Migrating
Red-necked phalarope	<i>Phalaropus lobatus</i>	Uncommon in summer and fall	Migrating
Red-throated loon*	<i>Gavia stellata</i>	Uncommon in spring and fall	Migrating
Ring-billed gull	<i>Larus delawarensis</i>	Uncommon in spring and fall	Foraging
Roseate tern	<i>Sterna dougallii</i>	Rare (two records in Aug)	Foraging
Sabine's gull	<i>Xema sabini</i>	Rare in fall	Migrating
Sooty shearwater	<i>Ardenna grisea</i>	Common in spring, summer, and fall	Foraging
South polar skua	<i>Stercorarius maccormicki</i>	Rare (no S4 records but have been seen in summer)	Foraging
Surf scoter	<i>Melanitta perspicillata</i>	Uncommon in fall and winter	Migrating

Common Name	Species Name	Likelihood of Occurrence in the Action Area	Use of the Action Area
Thick-billed murre	<i>Uria lomvia</i>	Rare in winter	Foraging
White-winged scoter	<i>Melanitta fusca</i>	Uncommon in fall and winter	Migrating
Wilson's storm-petrel	<i>Oceanites oceanicus</i>	Abundant in summer	Foraging

*This species has been identified as a Bird of Conservation Concern range-wide. All others listed in this table are non-Bird of Conservation Concern 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](#)).³⁰ 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.

³⁰ NOAA Economics and Demographics website: <https://coast.noaa.gov/states/fast-facts/economics-and-demographics.html>

Commercial Fishing

An active, domestic commercial fishery continues throughout the Gulf of Maine. Although overfishing has contributed to declines in stock sizes and commercial fishing effort, 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.

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).³¹ 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. 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

³¹ ONMS whale watching report: <https://sanctuaries.noaa.gov/science/conservation/2020-stellwagen-bank-whale-watching.html>

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).

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. A 2010 ROV survey along the cable route revealed what appeared to be small portions of unburied cable. A follow up ROV survey conducted in 2022 by the new cable owner, GTT-Interoute, revealed what appeared to be small portions of unburied rope along the cable route. At this time, it is unresolved whether these objects are the same object and whether the previously reported unburied cable could have been buried through natural processes. Regardless of what the object is, the unburied portions are in the Sliver or area closed to bottom-tending mobile gear and are unlikely to be disturbed by mobile gear.

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 C.F.R. 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 revised 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 federally 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 NRHP:

- *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 C.F.R. § 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 C.F.R. § 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 C.F.R. § 1508.7 (1978))

4.4.1 Significance of Potential Impacts

To determine whether an impact is significant, the CEQ regulations (40 C.F.R. § 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
- 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 number 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 implementation of 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.	Data 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

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/Intergovernmental 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
- 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
- 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 SAP, 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 Whale Alert app, and research on the impacts of noise on whales could reduce the likelihood of vessel strikes or entanglements of whales.
- 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 uses 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 SAC 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 onboard 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
- 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 SAP 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 behavioral disturbances of marine mammals within the mid- and higher frequency hearing range (e.g., dolphinids).³² As described above, ONMS' multibeam and other active acoustic activities were assessed programmatically pursuant to NEPA, ESA, and MMPA³³ with mapping and surveying activities of other National Ocean Service program offices, including the Office of Coast Survey who conducts the majority of multibeam surveys for the National Ocean Service. SBNMS will comply with all required mitigation when conducting activities under this NOS Programmatic Environmental Impact Statement. The NOS Programmatic Environmental Impact Statement also assesses the potential for acoustic effects on habitats, fish, EFH, macroinvertebrates, turtles, and sea birds, and concluded all effects would be adverse, negligible to minor.

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.

³² See Chapter 3.5 of the NOS Programmatic Environmental Impact Statement for a detailed discussion of potential effects to marine mammals from use of echosounders.

³³ NOS, Final Programmatic Environmental Impact Statement for Surveying and Mapping Projects In U.S. Waters for Coastal and Marine Data Acquisition (November 2022), available at: <https://oceanservice.noaa.gov/about/environmental-compliance/final-surveying-mapping-PEIS-sections.html>; <https://www.federalregister.gov/documents/2022/11/25/2022-25309> 87 F.R. 72447 (November 25, 2022)

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**.

Effects Analysis for ESA-Listed Species and Designated Critical Habitat

Section 7 of the ESA requires all federal agencies, in consultation with FWS and NOAA Fisheries, 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 NOAA Fisheries 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 uses
- 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
- Whale tagging studies³⁴

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
- Reduce speeds to 10 knots or less in SMAs and Right Whale Slow Zones (which includes DMAs as well as acoustically-triggered areas)
- Reducing vessel speed when North Atlantic right whale listening buoys are activated.
- 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

³⁴ Whale tagging activities are conducted in accordance with NOAA Fisheries permits pursuant to MMPA and ESA, as appropriate, 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.

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 **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, NOAA Fisheries 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 NOAA Fisheries 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

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.
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.³⁵

³⁵ As described above, sanctuary use of multibeam sonars is addressed in the NOS Programmatic Environmental Impact Statement. On June 3, 2022, NOS submitted an application to NOAA Fisheries for a Final Rule and Letter of Authorization for the incidental take of marine mammals from active acoustic sources under the MMPA. This application is still pending.

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 NOAA Fisheries 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, NOAA Fisheries provided a General Concurrence with this determination, in accordance with 50 C.F.R. 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
- 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
- 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 NOAA Fisheries' 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 FWS 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
- 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 NOAA Fisheries, 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
- 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 would 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.

- 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 SAP 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 SAP (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
- 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 SAP, 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 Maritime Heritage Program (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 State Historic Preservation Officer
- 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 included in the SAP.

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 C.F.R. 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 SAP (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 qualify 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 C.F.R. 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
- 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.
- 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.
- If it is determined that removal of gear or debris 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 SAP (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 revised 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.
- 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 C.F.R. § 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
- 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.

- 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.³⁶ 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.

³⁶ 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 Fisheries	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 Fisheries	Ongoing activity. Implementing vessel speed reductions in Seasonal Management Areas and Right Whale Slow Zones 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 Fisheries	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 NOAA Fisheries 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 F.R. 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

As described in sections 4.5 and 4.6, implementing the proposed action and the no action alternative 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 and the no action alternative, 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 NOAA Fisheries, conduct research activities aimed at resource protection and regulate activities occurring in this region. For example, NOAA Fisheries 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 and the no action alternative, which would likely have similar types and intensity of impacts on habitat, living resources, and historic resources to those described in Section 4.5 and 4.6.

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](#).³⁷ 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.

³⁷ <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, 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 began construction in 2022 and is expected to begin delivering power in 2023. Many other wind projects are in development in the region.³⁸ Although wind energy development will not likely 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 under the no action alternative, 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 and alternative **would not result in significant adverse cumulative effects** on any resource areas.

³⁸ <https://www.boem.gov/renewable-energy/state-activities/massachusetts-activities>

Appendix A: References

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Appendix B: List of Preparers

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Appendix C: List of Agencies and Persons Notified

NOAA will send copies of this revised 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 C.F.R. 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 C.F.R. 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 C.F.R. 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 submitted the draft environmental assessment and management plan to the Massachusetts Historical Commission and other consulting parties when making the document available for public comment in November, 2021. On December 28, 2021, the Massachusetts Historical Commission issued a letter of concurrence. Additionally, NOAA solicited public comment through issuance of the notice of availability for the draft management plan and environmental assessment which documented a finding of no adverse effects for this

undertaking and included 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. NOAA Fisheries works with FWS to manage ESA-listed species. Generally, NOAA Fisheries manages marine species, while FWS 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 FWS or NOAA Fisheries, 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 NOAA Fisheries or FWS. 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 NOAA Fisheries and FWS 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 NOAA Fisheries jurisdiction. NOAA determined that implementing the Proposed Action would have **no effect** on any listed species or designated critical habitat under FWS jurisdiction. See Section 4.5.3 for further details. On February 23, 2022, NOAA Fisheries issued a letter of concurrence and no further consultation is required.

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 C.F.R. 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 provided 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 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.

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 NOAA Fisheries 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
- 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 Affairs³⁹ evaluated and identified environmental justice populations in Massachusetts.⁴⁰ 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

³⁹ <https://www.mass.gov/info-details/environmental-justice-populations-in-massachusetts>

⁴⁰ <https://www.mass.gov/doc/ej2010communitystatisticspdf/download>

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:

- 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)
- 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
- 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 U.S.C. 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

10/15/2021

Event Code: 05E1NE00-2022-E-00568

1

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

10/15/2021

Event Code: 05E1NE00-2022-E-00568

2

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 Fisheries¹, 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 <i>Calidris canutus rufa</i> 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 <i>Sterna dougallii dougallii</i> 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



RECEIVED
MAR 8 2018



FILE COPY

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

Federal Consistency Determination for Proposed Field Operations in waters off the coast of Massachusetts

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,

NUNENKAMP.JAY.LA
WRENCE.1152652271

Digitally signed by
NUNENKAMP.JAY.LA WRENCE.1152652271
Date: 2019.02.25 10:28:56 -0500

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



Appendix E: Response to Draft Management Plan Comments

Marine Mammals

1. **Comment:** Commenters supported Whale SENSE and suggested expanding outreach and promotion of Whale SENSE and responsible viewing guidelines, including See a Spout. A few commenters stated that Whale SENSE is an important program that should be referenced in multiple action plans and there should be more outreach and promotion of the program. Similarly, commenters were concerned that the management plan did not appropriately include plans to continue implementation of Whale SENSE and See A Spout, which were the foundation for the sanctuary's Boater Outreach for Whale Watching (BOWW) program.

Response: NOAA was one of the founders/sponsors of Whale SENSE, along with Whale and Dolphin Conservation, and appreciates the recognition that this is a valuable program. NOAA is committed to the continued success of all of these programs. NOAA requires annual Whale SENSE training for SBNMS vessel crew members to increase their awareness about operating safely around whales. NOAA also operates the Boater Outreach for Whale Watching (BOWW) program to reach private boaters and teach them responsible viewing guidelines. In this updated management plan, NOAA modified Strategy MP-5 to clarify that it addresses continued efforts with Whale SENSE and See A Spout, and the expansion of BOWW, and Whale SENSE is also referenced in MH 7.3, CU 3.2, and the background to Education & Outreach Action Plan.

2. **Comment:** Commenters stated that reducing entanglement of large whales should be a high priority and stated that SBNMS needs to take more actions to reduce marine mammal interactions with fishing gear and vessels.

Response: NOAA agrees that reducing entanglement is a high priority and staff are actively engaged in entanglement prevention on several fronts. The Corporate Responsibility Project (see MP-1) provides annual report cards to shipping companies on their compliance with speed restrictions. Speed compliance in management areas that overlap SBNMS is higher than in any other part of the country. NOAA has several ongoing efforts in partnership with NEFMC to reduce bycatch of small marine mammals and reduce serious injury and mortality of large whales. NOAA, in collaboration with the commercial fishing industry and NGOs, is actively involved in entanglement prevention including: developing and testing on-demand fishing gear; advocating for the development of fishing equipment and techniques that reduce entanglement; and identifying areas of entanglement risk (Strategy MP-2). NOAA will continue to provide guidance to federal and state agencies designed to reduce entanglement and whale strikes (Strategy MP-3).

3. **Comment:** Commenters stated that the SBNMS management plan should prioritize protection of marine mammals. Specifically, the Marine Mammal Commission recommends that strategies MP-1 and MP-2 be assigned high priority and allocated sufficient funding to ensure their implementation.

Response: NOAA agrees that marine mammal protection is a high priority. Our ongoing and proposed activities are described in the Marine Mammal Protection Action Plan.

4. **Comment:** Commenters noted that although SBNMS does not regulate fishing within the sanctuary, mapping of fishing effort should be included as an activity under Strategy MP-1, which already includes mapping ship traffic within the sanctuary. Not only could the mapping of fishing help improve efforts to monitor and mitigate entanglement and bycatch within the sanctuary, it could also contribute to the strategies of the Climate Change Action Plan that aim to detect climate change impacts on the sanctuary ecosystem.

Response: NOAA has regularly mapped fishing effort for a variety of projects (see Condition Report), and this was inadvertently left out of the draft management plan. Activity MP 1.4 was revised to include mapping of fishing activity.

Sea Birds

5. **Comment:** Commenters suggested that seabird research should expand parameters for monitoring.

Response: The protection of seabirds is an important component of the sanctuary management plan. The goal of the research and monitoring program is to understand the parameters of abundance, distribution, habitat use, and foraging ecology of seabirds and their connection with the wider Gulf of Maine Atlantic ecosystems. The Stellwagen Sanctuary Seabird Stewards (S4) monitoring uses standardized transects and well-established methodology that enables analysis of long-term trends.

6. **Comment:** Commenters suggested the SBNMS monitoring program should focus on the roseate tern due to its endangered species status.

Response: Due to the high concentration of great shearwaters in SBNMS, research and monitoring 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. Roseate terns are currently monitored by the U.S. Fish & Wildlife Service and the state of Massachusetts; the tags and monitoring system used in the SBNMS monitoring program are not appropriate for use on roseate terns.

7. **Comment:** Commenters noted that using tagged great shearwaters as a tool for potential dynamic management is a great concept for exploring climate change effects within the SBNMS boundaries.

Response: NOAA agrees and has several efforts underway to continue these investigations and has recently published a paper on dynamic ocean management.

Vessel Traffic

8. **Comment:** Commenters advocated for the need to reduce vessel speeds and vessel traffic as a means for reducing the potential for and severity of vessel strikes on marine mammals.

Response: NOAA agrees that reducing the potential for and severity of vessel strikes on marine mammals is a very important part of SBNMS management and has implemented several measures to do so. NOAA also agrees that reducing vessel traffic and speeds are strategies to achieve this. NOAA has been working with other regulatory agencies, vessel owners, manufacturers, and other users to make their activities compatible with resource protection. NOAA has implemented slow speed zones or seasonal management areas to reduce the risk of ship strike of whales and to concentrate large vessel traffic into shipping lanes to minimize noise impacts to whales and other sensitive species. NOAA has also requested that the USCG, as part of their Port Access Routing Study for the approaches to Maine, New Hampshire, and Massachusetts, consider additional vessel traffic measures in SBNMS to minimize the risk of a vessel strike on a whale and reduce underwater radiated noise in SBNMS. NOAA has been working both locally and internationally to achieve quieter ship designs that will augment some of the operational changes inside sanctuary boundaries and collectively make the sanctuary quieter to facilitate communication between marine mammals.

Through a separate process, under its authority in the Marine Mammal Protection Act, NOAA has also proposed modifying the seasonal management area (SMA) rules that would expand coverage to vessels 35-65 feet in length and would also increase the areas covered under the SMA requirements (87 F.R. 46921). Should that rule become effective, NOAA will evaluate options for incorporating those smaller vessels into compliance tracking under the SBNMS management plan. Compliance tracking depends upon the types of data that become available through this process.

9. **Comment:** Commenters stated that the Boston Traffic Separation Scheme (TSS) for ships passing through SBNMS to reach Boston Harbor and auxiliary (military training; whale watching; commercial and saltwater angling; recreational boating; whale watching; etc.) needs better coordination and stricter rules to prevent harm to marine mammals, sea turtles, and seabirds.

Response: Rules for the TSS are established by the USCG. NOAA works in cooperation with USCG and other agencies to coordinate protection of marine fauna, and provides data and advice for improved resource protection as needed. For example, the development of the WhaleAlert app and shifting the TSS to avoid high concentrations of marine mammals, illustrates the beneficial outcomes of these coordinated efforts. Since the Boston TSS was moved in 2007 at the request of NOAA, it has proven to be a powerful tool that separates vessel traffic from sensitive ecological resources and significantly reduces the risk of environmentally harmful collisions between whales and shipping traffic in SBNMS. In addition, the USCG recently accepted recommendations from NOAA to establish fairways to consolidate vessel traffic in SBNMS to minimize impacts on sanctuary resources in their Port Access Routing Study (PARS). Additional discussion of our recommendations to the USCG to reduce noise impacts can be found in Comment 39 below.

Maritime Heritage and Cultural Landscapes

10. **Comment:** Commenters expressed support for the maritime cultural landscape approach, and several commenters specifically expressed support for the Shipwreck Avoidance Pilot Program.

Response: NOAA appreciates the support for these programs.

11. **Comment:** Commenters expressed concerns about fishing impacts to heritage resources.

Response: NOAA is also concerned about fishing impacts to heritage resources. As described in the Maritime Heritage Action Plan, the voluntary Shipwreck Avoidance Pilot Program is a new effort in partnership with the commercial fishing industry to limit such impacts. NOAA will continue to evaluate the program and if effective, expand it to a broader number of participants; if it proves to be ineffective, NOAA will consider additional actions to better protect maritime heritage resources.

12. **Comment:** Commenters expressed support for installing mooring buoys on shipwrecks.

Response: NOAA agrees that installing mooring buoys on certain shipwrecks is an important measure to protect shipwrecks from anchor damage while encouraging sustainable access. As described in Strategy MH-8, NOAA will continue supporting installation of dive buoys based on availability of resources, and will ensure they are properly designed, installed, and maintained.

13. **Comment:** Commenters requested that SBNMS evaluate the Shipwreck Avoidance Pilot Program to determine whether additional measures are needed to protect maritime heritage resources and should the program prove ineffective, that SBNMS eliminate the traditional fishing exemption.

Response: NOAA agrees that additional actions may be necessary if the Shipwreck Avoidance Pilot Program proves to be ineffective in protecting maritime heritage resources. As described in Management Outcomes section of the Maritime Heritage and Cultural Landscapes Action Plan, NOAA has conducted surveys of the area before and after the scallop season to determine whether wrecks are being damaged and if dredge tracks within the restricted areas are visible. In addition, from 2019-2021, NOAA conducted interviews of fishing captains to determine whether they were aware of the avoidance areas and to better understand whether they had received notices. NOAA will continue to evaluate the program and consider additional actions to better protect maritime heritage resources should it prove to be ineffective.

14. **Comment:** Commenters expressed concern that increased protection of SBNMS resources is important for tribal heritage, and that SBNMS should consult with tribes regarding protection of tribal heritage. Commenters also suggested that NOAA should incorporate traditional ecological knowledge into management strategies as well as consider co-stewardship models with tribal nations.

Response: NOAA recognizes its unique relationship with tribes and the trust responsibility with tribal governments as set forth in the U.S. Constitution, treaties, statutes, executive

orders, and court decisions. Consistent with EO 13175, Consultation and Coordination with Indian Tribal Governments, it is NOAA's policy to consult on a government-to-government basis with federally recognized tribal governments when the federal actions and decisions have tribal implications. Federally recognized tribes are welcome to request government-to-government consultation at any time for any of the management plan projects that may have tribal implications. The consultation and coordination process would be conducted in accordance with NOAA's Procedures for Government-to-Government Consultation with Federally Recognized Indian Tribes and Alaska Native Corporations (NOAA 13175 policy, November 12, 2013).

NOAA agrees that respect for and incorporation of tribal heritage information and traditional ecological knowledge is an important aspect of sanctuary management. As part of this management plan revision process, NOAA has committed to increasing engagement with federal and state tribes through direct coordination, better understanding of pre-settlement cultural and biological communities and uses of SBNMS resources.

15. **Comment:** Commenters noted that the ocean is very important to Latinos.

Response: NOAA acknowledges that the ocean is significant to Latinos. Over the past few years, NOAA has established a partnership with the Hispanic Access Foundation, and regularly engages with several local school districts that have strong Latino cultural ties. As described in Strategy MH-5, NOAA plans to continue to engage in better understanding the relationships that associated communities have with sanctuary resources.

Compatible Uses

16. **Comment:** Commenters expressed concern that some statements on the potential for offshore wind in SBNMS are confusing.

Response: NOAA has revised language in the final management plan to clarify that BOEM is not currently considering offshore wind development in SBNMS. However, it is possible that associated infrastructure, including power cables, could be proposed to cross through the sanctuary. In the event that there is a proposal to route energy transmission cables through portions of SBNMS, authorization from NOAA would be required. NOAA would consider any permit applications for an energy transmission cable in much the same manner as it has for subsea telecommunication cables. In making permitting decisions, NOAA carefully evaluates, on a case-by-case basis, the potential impacts of installation, operation, and decommissioning of subsea cables on a sanctuary's specific resources and goals. In issuing permits, NOAA may stipulate terms and conditions to mitigate short- and long-term impacts to sanctuary resources. BOEM is the lead federal agency responsible for offshore energy exploration and development in the United States. NOAA is a consulting federal agency and is collaborating with BOEM to reduce the impacts of offshore wind energy development. NOAA is providing feedback to BOEM on their planning activities in the Gulf of Maine as well as information on sanctuary resources, such as sand and acoustic habitats, that may be impacted by offshore wind development.

17. **Comment:** Commenters requested closing the sanctuary to all industrial activities.

Response: NOAA carefully assesses activities that have the potential to impact sanctuary resources and qualities in accordance with its responsibilities under the NMSA. Refer to the Compatible Uses Action Plan for more information about how NOAA does this.

18. **Comment:** Commenters expressed support for the Compatible Uses Action Plan.

Response: NOAA agrees that facilitating and encouraging compatible uses can lead to better management and improved resource protection. Some examples of this are: (1) Developing the Whale Alert app to give mariners the information they need to comply with regulations and avoid striking whales, (2) implementing the Shipwreck Avoidance Pilot Program to reduce fishing impacts on shipwrecks and improve safety for fishermen (Strategy MH-2), (3) encouraging the use of affordable, on-demand fishing gear (i.e., “ropeless gear”) to reduce entanglements with whales, (4) shifting the Boston Traffic Separation Scheme (shipping lane) to reduce ship strikes of whales by large ocean-going vessels, (5) using the Right Whale Corporate Responsibility Program to provide feedback to the shipping industry on compliance with speed regulations, and (6) promoting responsible whale watching through Whale SENSE, See a Spout, and other programs.

19. **Comment:** Commenters requested that SBNMS increase recreational diving opportunities.

Response: As described in the Maritime Heritage and Cultural Landscapes Action Plan, NOAA has identified facilitating sustainable public access to shipwrecks as a goal for this revised management plan.

20. **Comment:** Commenters suggested that the management plan should include a list of fisheries that operate within SBNMS boundaries, perhaps as an appendix, and that this appendix be referenced in the Compatible Uses Action Plan.

Response: NOAA included a detailed description of fishing activities and the status of fish stocks in the 2020 Condition Report (see page 50).

Climate Change

21. **Comment:** Commenters stated that products from the Ecosystem Services Action Plan could help adapt to climate change.

Response: NOAA agrees. As described in Strategy CC-2, NOAA has proposed incorporating biological, cultural, and ecosystem services data into the development of a vulnerability assessment to better understand the challenges from climate change and then develop tools to adapt to them.

22. **Comment:** Commenters expressed support for the Climate Action Plan, and also expressed support for the importance of SBNMS as a sentinel site for climate change.

Response: NOAA agrees. NOAA research programs have collected long term data sets that will be useful to understand climate change along with additional sensors to measure climate change parameters.

23. **Comment:** Commenters indicated this draft management plan document is based upon status and trends on key natural resources and human activities that are now out of date (largely because of climate change.)

Response: NOAA agrees that the consequences of climate change are already having, and are expected to continue to have, measurable impacts on sanctuary resources. However, as noted in Section 4.3.2, data on some species is often limited and this management plan was prepared using the best data available at the time. This management plan is designed to provide a strategic approach to resource protection, and provides flexibility for sanctuary management to adjust priorities and activities as needed in response to future conditions.

24. **Comment:** Commenters stated that NOAA should modify the management plan to highlight the role preserving coastal terrestrial habitat has in mitigating the effects of climate change on the sanctuary and to include land trust organizations as partners.

Response: NOAA added Activity CC 1.7 to strengthen existing and create new partnerships with land-based conservation partners.

Education and Outreach

25. **Comment:** Commenters stated that NOAA should expand education and outreach collaborations with local communities, land trusts, and natural resource departments.

Response: NOAA appreciates the support for SBNMS education and outreach programs. Public outreach and education is a critical component of the overall SBNMS mission and activities. As described in the Education and Outreach Action Plan, NOAA would like to continue to increase education programming and develop additional partnerships with a range of partners if resources allow. NOAA is always open to developing new partnerships and collaborations, and welcomes the opportunity to engage with new as well as long standing partners.

26. **Comment:** Commenters believe that environmental justice will be enhanced through education and outreach activities.

Response: NOAA appreciates the support for our environmental justice efforts. Environmental justice is essential to achieving education and outreach objectives in this management plan, and the sanctuary is actively working with partners such as the Hispanic Access Foundation and the Lawrence School District to expand our reach to Latino communities who often face barriers of access to nature and ocean recreation.

27. **Comment:** Commenters supported education rather than regulations to limit whale strikes, and also stated that education is the key to many of the management plan goals.

Response: NOAA agrees that education and outreach activities play an important role in the protection of sanctuary resources. Further, NOAA also agrees that regulatory and non-regulatory interventions should be assessed on a case by case basis to determine the appropriate intervention that best supports a management action. Education and outreach programs, including BOWW, Whale SENSE, and See A Spout, are important, on the water activities staff regularly engage in to reach sanctuary users directly. Also, programs such as

the Right Whale Corporate Responsibility Program offer an example of providing positive feedback to stakeholders to promote compliance, resulting in the highest compliance rates in the country for speed management areas.

28. **Comment:** Some commenters requested clarification on how land trust organizations can better conduct supporting outreach programs that connect land-based conservation efforts (in abutting coastal Stellwagen Bank National Marine Sanctuary watershed communities) to ultimately help protect water quality and biodiversity within the sanctuary boundaries.

Response: NOAA welcomes support and collaboration from all local and regional partners, and believes this is addressed in Activity EO 1.3.

Interagency/Intergovernmental Coordination

29. **Comment:** Commenters requested that the revised management plan should provide clear paths to management goals (including climate change) including regulations and non-regulatory actions.

Response: NOAA has revised language in this final management plan to more clearly describe science-to-management outcomes of past and current activities, and has also clarified, where appropriate, what additional steps NOAA may take to achieve management goals.

30. **Comment:** Commenters stated that NOAA should expand the interagency action plan strategies to include local organizations, specifically for research and regional watershed conservation activities.

Response: NOAA is always open to collaboration and coordination with local organizations. NOAA did not intend to limit the types of organizations to partner with; the language in the Interagency/Intergovernmental Coordination Action Plan has been modified to clarify that.

Interagency Coordination/Fisheries Management

31. **Comment:** Commenters stated that the SBNMS management plan needs more concrete cod protections within SBNMS including expanding seasonal spawning protections for or prohibiting all directed take of Atlantic cod.

Response: Under its authority of the Magnuson Stevens Act, NOAA, through the NEFMC, manages cod stocks throughout their range in federal waters. Data obtained by sanctuary research and monitoring programs such as on spawning aggregations to increase protections as needed, is provided to support this management. For example, sanctuary science has been used by NEFMC to understand the new cod stock structure and consider how this new data may affect development of conservation and management measures.

Currently, there are already restrictions on commercial and recreational catches for cod. NOAA and NEFMC rely on the best available science to manage Atlantic cod and only allow fishing that is intended to prevent overfishing and rebuild overfished stocks. Spatial closures

as management measures are regularly considered by NEFMC as issues arise and NOAA will continue to support these efforts.

With respect to recreational fishing, NOAA shares the concerns regarding high mortality rates from catch/release programs for groundfish despite use of best practices. NOAA will continue supporting the efforts of Massachusetts Division of Marine Fisheries to minimize the incidental mortality of recreationally caught cod through research and outreach efforts.

32. **Comment:** Commenters stated that NOAA should revise the SBNMS terms of designation document to empower NOAA to regulate fishing through its authorities under the National Marine Sanctuaries Act.

Response: NOAA does not believe that additional regulations are required at this time. NOAA considered potential regulatory changes during the public process of developing the management plan (see Chapter 2). During development of the draft action plans, the SAC did not identify the need for any regulatory changes. For more information on NOAA's efforts to minimize the impacts of fishing activities to sanctuary resources, see NOAA's response to Comment 13.

33. **Comment:** Commenters stated that SBNMS should be a no-take sanctuary and commercial fishing should be prohibited within SBNMS.

Response: NOAA disagrees. Under the current SBNMS management regime, removal of sanctuary resources, including marine mammals, marine reptiles, seabirds, and historical resources, is prohibited except for activities undertaken as part of traditional fishing. Congress has recognized the primary jurisdiction and expertise of NOAA Fisheries and the FMCs in regulating fishing in federal waters. Under Section 304(a)(5) of the NMSA, national marine sanctuaries may only issue fishing regulations after providing an opportunity to the FMC's to do so first, and only when the sanctuary determines fishing regulations are necessary to protect sanctuary resources or qualities for which the sanctuary was designated.

34. **Comment:** Commenters stated that references to recreational fishing and cod harvest are very dated. This section should include discussion of the current, very restrictive regulations that apply throughout the Gulf Of Maine, including the sanctuary.

Response: NOAA recognizes that fisheries regulations can be very dynamic and there are challenges associated with including them in reports that take a great deal of time to produce. As of this writing, there are restrictions on fishing for cod in SBNMS. These restrictions are managed by NOAA Fisheries for the entire range of the stocks that inhabit SBNMS.

Research and Monitoring

35. **Comment:** Commenters stated that NOAA should focus on using information obtained from the Research and Monitoring Action Plan to inform resource protection and management actions. A few commenters specifically highlighted the importance of the sanctuary's sand lance research.

Response: NOAA appreciates the support for its research efforts that have highlighted the importance of sand lance ecology in the Gulf of Maine. This management plan will continue those research efforts and continue to share the results widely to continue progress for ecosystem protections. NOAA's emphasis on science has contributed to several other enhancements for resource protection and will continue to do so under this plan. NOAA believes that understanding our ecosystem and sharing that data with others makes us better stewards for the sanctuary.

36. **Comment:** Commenters requested that NOAA increase technology for research and to expand cooperative research options.

Response: NOAA is always looking for opportunities to test and apply new technology and methods into our research and monitoring activities. Whale Alert is a good example of using cutting edge technology to put information in the hands of the public to avoid whale ship strikes, provide an increased awareness of regulations in addition to providing the ability to report live, entangled, and dead whales. Some recent examples of technology being used in NOAA programs include developing and testing the use of drones for whale tagging, testing multiple sensors to measure dimethylsulfide for prediction of right whale presence, and exploring various infrared camera systems for automatic detection of large whales for ship strike mitigation.

37. **Comment:** Commenters requested that the management plan should include a rationale for the selection of focal species.

Response: As noted in the latest condition report, the focal species were identified during a workshop in March 2017, during which participants developed a conceptual model for the SBNMS ecosystem by identifying key components of the ecosystem and the drivers, pressures, and links between them. In February 2018, the local species identified during the 2017 workshop were presented to the expert panel, who agreed with the selections. Focal species are defined as those of particular interest from the perspective of sanctuary management; they may not be abundant or provide high value to ecosystem function, but their presence and health is important for the provision of other conservation-related or economic services. The identified focal species are North Atlantic right whales, humpback whales, harbor porpoises, Atlantic white-sided dolphins, great shearwaters, lobster, bluefin tuna, and Atlantic cod.

38. **Comment:** Commenters stated that Strategy RM-1, which supports science focused on priority sanctuary needs, should be given a high priority. A focus on increasing external funding opportunities, partnerships, and student engagement will be essential to the success of several individual action plans and the priority strategies within them.

Response: NOAA chose to use a systematic approach to assign priorities across a wide spectrum of strategies. This prioritization scheme was applied to each strategy based on the following factors:

- 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

As noted in the management plan, the priorities represent a snapshot in time. The prioritization criteria described above can and will be reassessed throughout the life of the management plan to provide a flexible framework to assess priorities as situations change and new challenges arise. NOAA will also continue to identify and pursue external funding sources and research partners to the maximum extent practicable to identify additional resources to enable implementation of more of the strategies and activities in this management plan.

Soundscape

39. **Comment:** Commenters stated that NOAA should promulgate stronger regulations to reduce anthropogenic noise in the sanctuary.

Response: NOAA disagrees that issuing regulations to reduce anthropogenic noise in the sanctuary is appropriate at this time. As stated in the vessel traffic and soundscape action plans, NOAA continues to work with agencies that have regulatory authority to address the issue of underwater radiated noise from vessel traffic. In August, NOAA provided input to the USCG’s Port Access Route Study: Approaches to Maine, New Hampshire, and Massachusetts based on an analysis of vessel traffic in SBNMS that identified two additional fairways or traffic separation schemes that would separate vessel traffic from sensitive ecological resources, reduce underwater radiated noise in SBNMS in those areas, and reduce the risk of harmful collisions between whales and shipping traffic in the SBNMS. These recommendations were accepted by USCG, as reflected in the Port Access Route Study final report published on April 6, 2023. Based on vessel traffic analysis and findings from SBNMS research and monitoring programs, NOAA further requested that the USCG add an additional overall objective for this and future studies to “determine and mitigate environmental impacts of existing and anticipated vessel traffic” because, as the Boston TSS example shows, the placement of fairways and traffic separation schemes can have a dramatic impact on mitigating environmental impacts like water and air pollution discharges in addition to ship strikes and impacts from underwater radiated noise.

Working with agencies that have regulatory authorities has the added extra benefit of applying these protective measures to sensitive biological areas outside of SBNMS. NOAA also continues to work with other U.S. agencies in international forums to reduce underwater radiated noise from shipping. The U.S. is an active co-sponsor of current efforts

by the International Maritime Organization to improve the industry's adoption of existing voluntary guidelines for quieting ships. The International Maritime Organization is revising the existing guidelines to further define the noise management planning process to allow for further incentivization and partnership among sectors operating both locally and internationally.

40. **Comment:** Commenters suggested that NOAA should monitor above water noise and also increase underwater noise monitoring.

Response: NOAA does not believe that monitoring above water noise is necessary at SBNMS because there are no sound-related key wildlife protection issues above water, nor a dominant air traffic path over SBNMS. As described in the Soundscape Action Plan, NOAA has several active and ongoing acoustic monitoring programs within SBNMS and will continue and expand those as resources allow.

41. **Comment:** Commenters suggested that NOAA should follow Fisheries and Ocean Canada in developing noise standard regulations so that research on the acoustic environment and animal behavior within SBNMS can lead to policy changes and regulations to reduce non-essential noise sources.

Response: NOAA research in SBNMS has led the way in better understanding soundscapes, including noise introduced by anthropogenic activities and its impacts on sanctuary resources. This research has supported NOAA recommendations for new routing measures which reduced peak exposures to vessel noise for some sanctuary species. This research also supports NOAA's evaluation of speed management rules to better protect North Atlantic right whales by providing assessments of the indirect benefits of such measures in reducing noise exposure. To further address the impacts of ocean-going commercial traffic transiting the sanctuary, NOAA has provided science support to federal agencies with direct vessel management authorities.

Water Quality

42. **Comment:** Commenters expressed concerns about water quality, particularly CECs, PFAs, and discharges from the Pilgrim Nuclear Plant. Some also expressed concern about the status of the MBDS, and suggested that SBNMS should monitor it.

Response: NOAA agrees, and has identified these issues in the Water Quality Action Plan, and intends to increase monitoring and understanding of the stressors to water quality, current status, and any actions that may need to be taken. NOAA has added a new section to this management plan to each action plan titled "Management Action and Outcomes over Time" which provides examples and details of how NOAA has addressed and will continue addressing several of the concerns identified by commenters. NOAA is coordinating with the EPA and the Nuclear Regulatory Commission with respect to the potential discharge of spent fuel pool water from the decommissioned Pilgrim Nuclear Power Station. The 2020 Condition Report notes that based on previous monitoring programs, the MBDS is still considered to be an effective disposal site, because material disposed there seems to be confined to specific areas where it was deposited. Further, the deposit of dredge spoils from

the project to deepen the Port of Boston has further buried the historically deposited hazardous materials and has not resulted in any observed impacts on local and regional water quality.

43. **Comment:** Commenters suggested that NOAA should add wastewater/stormwater runoff management strategies to the SBNMS management plan.

Response: NOAA does not currently have the resources to initiate or undertake this work, and will need to consider partnerships and other funding mechanisms to support these efforts.

44. **Comment:** Commenters expressed concerns about bioaccumulation of PFAs and microplastic pollution. Since PFA chemicals contain components that are both fat and water soluble, their bioaccumulation potential within the marine food chain differs from methylmercury and PCBs in finfish and biotoxins in shellfish. The same may be true for microplastics discussed in the Water Quality Monitoring Action Plan.

Response: NOAA recognizes that there are many unknowns about water quality contaminants and traditional monitoring parameters are not adequate. Ongoing monitoring and potential modification are addressed in the Water Quality Action Plan. NOAA is working closely with the EPA on water quality issues associated with the Deer Island Outfall and participates in regularly scheduled meetings of the Outfall Monitoring and Scientific Advisory Panel to address legacy contaminants in addition to contaminants of emerging concern.

Habitat

45. **Comment:** Commenters stated that NOAA should formally request that the NEFMC prepare appropriate area-based protections for the southern portion of the sanctuary because of the importance of the area for sand lance, a critical prey species, and for humpback whales which feed on the sand lance.

Response: NOAA agrees that sand lance is an important species and has initiated discussions with NEFMC to share data on sand lance ecology and the need to protect sand lance habitat.

46. **Comment:** Commenters stated that NOAA should formally request that the NEFMC issue regulations for the protection of unmanaged forage species, including sand lance, and plankton such as *Calanus* copepods.

Response: NOAA works with NEFMC to protect all recreational and commercial fish species. NOAA believes that currently there are sufficient measures in place to prevent the development of a directed fishery for sand lance and *Calanus*. The most important of these measures is a prohibition on the mesh size of a net necessary to fish for either species. In addition, there are prohibitions on landings of sand lance in Massachusetts, Rhode Island, and Connecticut that eliminate any incentive to initiate a directed fishery. Given that these measures exist, the resources required to develop a new or amend an existing fishery

management plan would be better invested in other resource protection strategies for these important species.

47. **Comment:** Commenters stated that NOAA should formally request that the NEFMC prepare the establishment of a fully protected control area within the Designated Habitat Research Area and implement a research plan to assess the impacts of fishing gear on sanctuary resources and habitat.

Response: NOAA has added a section to the Habitat Action Plan discussing its 2015 proposal to the NEFMC to create a fully protected reference area. This proposal required a significant investment in staff resources and, in the end, was not approved by the NEFMC. However, the council voted to create a Stellwagen Dedicated Habitat Research Area (DHRA) which overlaps 22% of SBNMS and NOAA promulgated the rule for this action in 2018 (83 F.R. 15240). In this area of overlap, informally referred to as “the Sliver,” bottom tending commercial fishing gear is largely prohibited, including trawls, dredges, and gillnets. NOAA has been monitoring the Sliver since 2021. While there is no formally designated area within the sanctuary or the Gulf of Maine closed to all fishing activities, the Stellwagen DHRA serves as a de facto reference site to discern the effects of human versus natural disturbance to seafloor habitats and their associated biological communities. This allows comparisons of the state and dynamics of habitats and species outside the Stellwagen DHRA, impacted by different types of direct human uses, with similar habitats inside the protected area that are affected by regional and global conditions. NOAA believes that the status quo is sufficient for now and would prefer to invest its resources on other action plans.

48. **Comment:** Commenters stated that NOAA should formally request that the NEFMC reconfigure the boundary established in Amendment 8 to the Atlantic Herring Fishery Management Plan and prohibit midwater trawl fishing throughout SBNMS.

Response: In March of 2022, the U.S. District Court vacated NOAA’s inshore midwater trawl restricted area measure that was implemented through Amendment 8 to the Atlantic Herring Fishery Management Plan. As a result, the inshore midwater trawl restricted area provisions are not in effect and cannot be enforced. NOAA continues to work with the NEFMC to identify appropriate locations for midwater trawl fisheries to operate.

49. **Comment:** Commenters suggested that the management plan should address habitat degradation, including adding plans to restore macroalgae habitat.

Response: NOAA appreciates the suggestion to consider additional types of habitat. NOAA has added an activity to the Habitat Action Plan to evaluate macroalgae habitat and consider restoration or mitigation measures as appropriate.

50. **Comment:** Commenters expressed support for the habitat action plan.

Response: NOAA appreciates the support for activities in this management plan.

51. **Comment:** Commenters stated that NOAA should ban all bottom trawling in SBNMS.

Response: NOAA appreciates the concern expressed about the status of bottom habitat, and agrees that trawling is destructive to bottom habitat. As described in the management

plan, NOAA works with the NEFMC to share results of research and monitoring in SBNMS to help modify fishing regulations as appropriate to increase resource protection.

52. **Comment:** Commenters advocated for more details on protecting marine biodiversity within the management plan and ecological assessment.

Response: NOAA appreciates the support for protecting marine biodiversity and agrees that climate change will alter marine food webs. Two ongoing research projects are aimed at monitoring biodiversity in order to inform protections. The first uses underwater video surveys inside the Stellwagen DHRA to monitor changes in benthic diversity over time and builds on previous research detailed in the 2020 Condition Report. The second is a newer collaboration with Gloucester Marine Genomics Institute where the goal is to develop eDNA methods to monitor species biodiversity within the sanctuary. The SBNMS long-term dataset on sand lance-predator abundance and distribution will serve as a baseline of comparison with eDNA data to corroborate results and help inform a management framework.

NOAA also works closely with the Bucci Lab at University of New Hampshire who is working to characterize benthic microbial diversity. All of these studies will contribute to monitoring and management of biodiversity.

Ecosystem Services

53. **Comment:** Commenters stated that NOAA should protect and enhance non-consumptive uses, such as diving and whale watching.

Response: NOAA agrees that non-consumptive uses are important to our stakeholders, and many of the activities in this management plan are designed to encourage and enhance those activities. Activities related to this comment include engaging the public in maritime heritage, facilitating sustainable public access to shipwrecks; the Education and Outreach Action Plan, expanding BOWW, Whale SENSE, and See a Spout.

Administration

54. **Comment:** Commenters expressed support for SBNMS's effort to prioritize strategies.

Response: NOAA agrees that prioritization is an integral component of this management plan. As discussed in the prioritization section, NOAA believes that all the strategies in this plan are important to ensure ongoing and enhanced protection of sanctuary resources, but given the limited staff and funding resources available to implement the entire plan, it is essential to prioritize impactful actions so that staff can focus their efforts in an efficient manner.

55. **Comment:** Commenters expressed concerns about funding given that there is no way to implement the proposed management plan done with the current budget.

Response: NOAA acknowledges that funding, both from Congress in the form of annual appropriations as well as from other sources, is critical for successful implementation of this

management plan. NOAA hopes that the prioritization process will help to clarify the need for resources and the limitations it imposes on management actions.

Management Plan Content/Review Process

56. **Comment:** Commenters stated that the draft management plan needs more concrete management actions, and suggested that SBNMS revise the draft management plan.

Response: NOAA believes that the strategies and activities included in this management plan are proactive and will strengthen current protections. The living resources within SBNMS are managed by multiple agencies and under multiple authorities which requires NOAA to work collaboratively with other federal and state agencies; as described in the Management Actions and Outcomes Over Time section of each action plan, many of the research, outreach, and coordination actions of sanctuary staff have and will continue to strengthen protections. Revisions have been made to the final management plan to provide additional detail on the many management actions undertaken by staff. NOAA believes that the strategies and activities described in this management plan provide a solid plan for ongoing and enhanced protection of SBNMS resources.

57. **Comment:** Commenters stated that increased protections would demonstrate the administration's commitment to biodiversity and climate crises.

Response: NOAA believes that the strategies and activities included in this management plan fully support the administration's commitment to biodiversity and the climate crisis, especially when coupled with other actions the agency is taking under its other authorities. In addition to the many concrete actions specific in this plan, this plan provides clear long-term strategies and goals for addressing multiple resource protection issues over the coming 5-10 years. The strategies are intended to provide a framework to direct action, while also providing flexibility to allow and encourage sanctuary staff the needed opportunities to address issues as they arise and as resources and situations change.

58. **Comment:** Commenters stated that NOAA takes too long to revise sanctuary management plans.

Response: NOAA agrees that the management plan review process takes a long time, and understands the concerns about the extended time required to revise management plans and is always striving for ways to streamline and improve the process. NOAA is committed to an open and transparent process and requires public input during the management plan review process. These activities require intensive time and effort. This review process was also initiated just at the beginning of the coronavirus pandemic, which required changes to how the staff collaborate and gather stakeholder input, as well as coordination and collaboration with other agencies.

59. **Comment:** Commenters stated that it is difficult for diverse constituent groups to access information products developed from SBNMS monitoring and research data, which may have limited participation during the public comment process.

Response: NOAA agrees that the pandemic made public outreach more challenging than under normal circumstances; however, the use of all virtual meetings enabled public input from beyond the immediate vicinity of the sanctuary. NOAA will continue to seek public input during implementation of this management plan.

Environmental Assessment

60. **Comment:** Commenters suggested the environmental assessment should consider options with more tangible management actions and regulatory modifications.

Response: NOAA believes that the environmental assessment associated with this action evaluates a reasonable range of alternatives to meet the purpose and need.

61. **Comment:** Commenters expressed concern that SBNMS regulations have not been updated since 1993 and thus environmental analyses (including NEPA and ESA Section 7 consultation) of seafloor mapping and shipwreck investigations were being assessed under outdated permitting requirements.

Response: The date of the SBNMS regulations does not impact NOAA's compliance with other agency permitting and compliance requirements. NOAA complies with NEPA and other requirements like ESA and MMPA before conducting field work. NOS has completed a programmatic NEPA document assessing all of the mapping and surveying work by NOS, and SBNMS intends to use this analysis for its future field work that falls under the scope of this analysis.



NATIONAL MARINE
SANCTUARIES

AMERICA'S UNDERWATER TREASURES