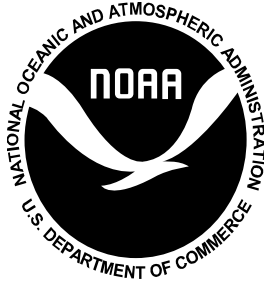




**NOAA Technical Memorandum NMFS-NE-292**

# **NOAA Fisheries and BOEM Federal Survey Mitigation Strategy – Northeast U.S. Region**

**US DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
National Marine Fisheries Service  
Northeast Fisheries Science Center  
Woods Hole, Massachusetts  
December 2022**



## **NOAA Technical Memorandum NMFS-NE-292**

This series represents a secondary level of scientific publishing. All issues employ thorough internal scientific review; some issues employ external scientific review. Reviews are transparent collegial reviews, not anonymous peer reviews. All issues may be cited in formal scientific communications.

# **NOAA Fisheries and BOEM Federal Survey Mitigation Strategy - Northeast U.S. Region**

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## Editorial Notes

**Information Quality Act Compliance:** In accordance with section 515 of Public Law 106-554, the Northeast Fisheries Science Center (NEFSC) completed both technical and policy reviews for this report. These pre-dissemination reviews are on file at the NEFSC Editorial Office.

**Species Names:** The NEFSC Editorial Office's policy on the use of species names in all technical communications is generally to follow the American Fisheries Society's lists of scientific and common names for fishes, mollusks, and decapod crustaceans and to follow the Society for Marine Mammalogy's guidance on scientific and common names for marine mammals. Exceptions to this policy occur when there are subsequent compelling revisions in the classifications of species, resulting in changes in the names of species.

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# Executive Summary

Offshore wind energy development plays an important role in climate change mitigation through the deployment of renewable energy. This new ocean use focuses on energy production, and its development must consider other ocean uses, including food production and wildlife conservation. The National Marine Fisheries Service (NOAA Fisheries) and the Bureau of Ocean Energy Management (BOEM) share a commitment to develop offshore wind energy, while protecting biodiversity and promoting ocean co-use. There are many elements to achieving this shared commitment, including mitigation of the impact of offshore wind energy development on NOAA Fisheries surveys. These surveys are essential for sustainably managing our nation's fisheries, promoting the protection and recovery of marine mammals and endangered and threatened species, and conserving coastal and marine habitats and ecosystems for future generations. These surveys are also critical to understanding the impacts of climate change on living marine resources, marine ecosystems, and the human communities that rely on these resources and ecosystems.

This Federal Survey Mitigation Strategy (hereafter Strategy) is intended to guide the development and implementation of a program to mitigate impacts of wind energy development on fisheries surveys over the expected full duration (30+ years) of wind energy development in the Northeast U.S. (Mitigation Program). The Mitigation Program will include survey-specific mitigation plans for each impacted survey, including both vessel and aerial surveys (Survey-Specific Mitigation Plans). This strategy is specific to the Northeast U.S. Region (Maine to North Carolina) and generally applicable to other regions of the country.

This Strategy has five overarching goals, which are broad primary outcomes expected from implementation of this strategy.

1. Mitigate impacts of offshore wind energy development on NOAA Fisheries surveys;
2. Evaluate and integrate, where feasible, wind energy development monitoring studies with NOAA Fisheries surveys;
3. Collaboratively plan and implement NOAA Fisheries survey mitigation with partners, stakeholders, and other ocean users using the principles of best scientific information available and co-production of knowledge, including fishermen's local ecological knowledge and indigenous traditional ecological knowledge;
4. Adaptively implement this Strategy recognizing the long-term nature of the surveys and the dynamic nature of wind energy development, survey technology and approaches, marine ecosystems, and human-uses of marine ecosystems;
5. Advance coordination between NOAA Fisheries and BOEM in the execution of this Strategy and share experiences and lessons-learned with other regions and countries where offshore wind energy development is being planned and underway.

From these five goals, discrete objectives are defined, and within these objectives, specific actions are identified. Objectives are measurable activities to attain the goals of the strategy, and actions are specific steps to be taken over the next year or two. This Strategy also defines stakeholders, partners, and other ocean users that will be engaged throughout implementation (per

Goal 3) and identifies potential financial resources for successful implementation. A joint NOAA Fisheries-BOEM Implementation Team will be formed (per Goal 5), oversee the completion of the defined actions, conduct regular reviews of progress, and update identified actions (per Goal 4).

Mitigation is defined in this Strategy following guidance from the Council on Environmental Quality and includes: avoiding the impact, minimizing the impact, rectifying the impact, reducing or eliminating the impact over time, or compensating for the impact by replacing or providing substitute resources or environments. In the Northeast U.S., a number of wind energy leases have already been issued and some developments have been authorized; thus, the opportunity to avoid, minimize, and rectify those impacts on NOAA Fisheries surveys has passed. However, opportunities for mitigation are largely unconstrained in areas yet to be leased in the Northeast and in other areas of the country. Thus, the general framework of this Strategy and the goals and objectives can be used to inform federal survey mitigation in these other areas, although the surveys impacted and the specific actions to mitigate impacts will differ for each region.

## Issue Description

Renewable offshore wind energy not only helps to meet domestic energy demands, but it also plays an important role in climate change mitigation by reducing demand from conventional energy sources, thereby reducing greenhouse gas emissions. BOEM, a bureau of the Department of the Interior (DOI), is responsible for managing offshore renewable energy development in Federal waters. In 2009, DOI announced the final regulations for the Outer Continental Shelf (OCS) Renewable Energy Program, which was authorized by the Energy Policy Act of 2005 (EPAct). These regulations provide a framework for issuing leases, easements, and rights-of-way for OCS activities that support production and transmission of energy from sources other than oil and natural gas. On March 29, 2021, the Biden-Harris Administration announced a goal to deploy 30 gigawatts (GW) of offshore wind in the United States OCS by 2030, while protecting biodiversity and promoting ocean co-use<sup>1</sup>. At the time of the March 2021 announcement, there were 17 Atlantic renewable energy lease areas and 14 Construction and Operations Plans (COPs) in various stages of review to help meet the Administration's goal. On October 13, 2021, DOI announced plans to hold up to seven new offshore lease sales by 2025 in the Gulf of Maine, New York Bight, Central Atlantic, and Gulf of Mexico, as well as offshore of the Carolinas, California, and Oregon<sup>2</sup>. In February 2022, six lease areas off New York and New Jersey were auctioned<sup>3</sup>. In September, the Administration announced a goal to deploy 15 GW of floating offshore wind capacity by 2035 and also announced several initiatives and investments to further develop the technology of floating offshore wind<sup>4</sup>.

In the development goals for offshore wind energy, it is important to simultaneously protect biodiversity and promote ocean co-use. NOAA Fisheries, an agency of the National Oceanic and Atmospheric Administration (NOAA) in the Department of Commerce (DOC), is responsible for stewardship of the nation's living marine resources including fisheries, marine mammals, endangered and threatened species, and the habitats and ecosystems that support these species.

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<sup>1</sup> [White House Fact Sheet: Biden Administration Jumpstarts Offshore Wind Energy Projects to Create Jobs](#)

<sup>2</sup> [Department of Interior Press Release - Secretary Haaland Outlines Ambitious Offshore Wind Leasing Strategy](#)

<sup>3</sup> [Biden-Harris Administration Sets Offshore Energy Records with \\$4.37 Billion in Winning Bids for Wind Sale](#)

<sup>4</sup> [White House Fact Sheet: Biden-Harris Administration Announces New Actions to Expand U.S. Offshore Wind Energy](#)

These responsibilities are authorized by the Marine Mammal Protection Act (1972; MMPA), the Endangered Species Act (1973; ESA), the Magnuson–Stevens Fishery Conservation and Management Act (1976; MSA), the Fish and Wildlife Coordination Act (1934), and other laws, executive orders, and policies<sup>5</sup>. These laws require a robust and participatory scientific and management framework to maintain sustainable fisheries, to protect and recover marine mammals and endangered and threatened species, and to conserve the habitats and ecosystems upon which these species depend. In general, a precautionary approach<sup>6</sup> is applied in implementing these laws: greater scientific uncertainty in the information used to inform management decisions typically results in more restrictive (i.e., precautionary) management measures, such as lower fishing quotas or fewer incidental take authorizations. Further, stakeholder and ocean-user involvement is a central feature in these statutes and provides a robust and informed basis for decision-making. NOAA Fisheries also takes an ecosystem-approach to managing living marine resources by recognizing the interconnectedness of ecosystem components and the value of resilient and productive ecosystems (including the human communities on which they depend) to the fisheries, marine mammals, endangered and threatened species, and their habitats<sup>7</sup>.

Nationally, NOAA Fisheries assesses the status of nearly 500 fish stocks and stock complexes, 120 marine mammal species, and 163 threatened and endangered species (some marine mammals are also endangered). These assessments are critical in achieving the purpose and statutory requirements of the MSA, MMPA, and ESA. NOAA Fisheries' scientific surveys collect data used in these assessments and are critical to the agency's mission in carrying out these statutes. These assessments rely on more than 50 long-term, standardized surveys, many of which have been ongoing for more than 30 years (see Box 1 for the definition of a NOAA Fisheries survey). Each survey uses different methods, platforms, and designs, with the goal of providing information on a subset of species to support sustainable management. For example, bottom trawl surveys provide information on bottom fishes, plankton surveys provide information on the early life stages of fishery species and ocean ecosystem productivity (phytoplankton and zooplankton), and aircraft and vessel visual surveys provide information on the abundance and distribution of sea turtles, whales, dolphins, seals, fish, and sharks and rays. Because of the precautionary approach, increased uncertainty in the data originating from these surveys typically results in more restrictive management. As a result, NOAA Fisheries has made extensive efforts to reduce uncertainty and increase accuracy and precision by maintaining consistency in surveys over time<sup>8,9</sup>. Sustaining these surveys with consistent sampling designs and methods is an essential feature of their value, allowing NOAA Fisheries to examine the status and trends of the managed species consistently through time.

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<sup>5</sup> [NOAA Fisheries - Laws and Policies](#)

<sup>6</sup> [Code of Federal Regulations - 50 CFR 600.350\(d\)\(3\)\(ii\)](#)

<sup>7</sup> [NOAA Fisheries - Ecosystem Based Fisheries Management Policy](#)

<sup>8</sup> In response to a change in vessel and sampling gear in 2008, the Northeast Fisheries Science Center Bottom Trawl Survey conducted an extensive year-long calibration experiment involving two research vessels (old and new) and including more than 380 side-by-side collections to develop calibration coefficients between the two gears. (see [Miller TJ, Das C, Politis PJ, Miller AS, Lucey SM, Legault CM, Brown RW, Rago PJ \(eds\). 2010. Estimation of Albatross IV to Henry B. Bigelow calibration factors. Northeast Fish Sci Cent Ref Doc. 10-05; 233 p.](#))

<sup>9</sup> Aircraft surveys of marine mammal and sea turtle abundance use line transect methods that utilize an effort-weighted detection function, which describes how the platform-altitude specific detectability decreases with increasing distance from the transect line. Changes to aircraft and altitude require development of new detection functions (see [Palka D 2020. Cetacean Abundance in the US Northwestern Atlantic Ocean: Summer 2016. Northeast Fisheries Science Center Reference Document 20-05: 65p.](#))

These long-time series surveys also form a critical basis for understanding the effect of climate change on fisheries, protected species, and coastal and marine habitats and ecosystems. Data from these surveys are used in regional, national, and international climate assessments, as well as in regional ecosystem status reports. Data from these surveys are also widely used in scientific investigations. Marine ecosystems of the U.S. are among the best understood and best managed in the world, largely as a result of NOAA Fisheries surveys. Changes to the platform, design, or methods of NOAA Fisheries surveys could decrease the quality and quantity of data, thereby negatively impacting NOAA Fisheries' ability to meet its statutory responsibilities and the broader scientific goal of understanding and sustaining marine ecosystems, particularly in the face of a rapidly changing climate.

### **Box 1 - Definitions**

**NOAA Fisheries Survey** Survey is a general term used to denote standardized data collection in the field as opposed to the laboratory. In this document, we define a NOAA Fisheries Survey more narrowly as the standardized data collection over long-time periods designed and used to support NOAA Fisheries' mission, which includes fisheries, marine mammals, endangered species, habitats, and marine ecosystems.

**NOAA Fisheries and BOEM Federal Survey Mitigation Program Strategy** (also termed the Strategy) The overall approach for developing, implementing, and adapting NOAA Fisheries survey mitigation in response to the impacts of offshore wind development. The Strategy is described in this document.

**NOAA Fisheries Federal Survey Mitigation Program** (also termed the Mitigation Program) The activities conducted to mitigate the effect of offshore wind energy development on NOAA Fisheries surveys. The program consists of a six-component framework to address the four general impacts.

**NEFSC Survey-Specific Mitigation Plans** Detailed plans that provide background on an impacted survey, specific stakeholders for the data collected, description of impacts of offshore wind development, planned mitigation measures, proposed schedule, and estimated costs. These plans will also identify mechanisms to ensure they are adaptive and have a defined peer-review process. These plans are part of the NOAA Fisheries Federal Survey Mitigation Program.

**Project-Specific Monitoring Studies** Within specific offshore wind development areas, studies are being planned and implemented to develop baseline information and to quantify changes in fisheries resources and habitats as a result of wind development. These studies differ in scale, objective, and methodology from NOAA Fisheries' shelfwide, long-term monitoring surveys.

During the environmental review of the first offshore wind energy project in federal waters under the National Environmental Policy Act (NEPA)<sup>10</sup>, BOEM and NOAA Fisheries identified major adverse impacts<sup>11</sup> to the NOAA Fisheries surveys conducted in the Northeast region. In

<sup>10</sup> [Vineyard Wind 1 Offshore Wind Energy Project Final Environmental Impact Statement March 2021.](#)

<sup>11</sup> Major adverse impacts are defined as (i) mitigation would reduce adverse impacts somewhat during the life of the proposed project, including decommissioning; (ii) the affected activity (NOAA Fisheries Surveys) would have to



response to this defined impact, NOAA Fisheries and BOEM agreed to develop and implement a NOAA Fisheries Northeast Federal Survey Mitigation Program (Mitigation Program). Here, we describe the Strategy for the Mitigation Program. The focus is the Northeast U.S., but this Strategy can inform similar efforts in other regions as NOAA Fisheries and BOEM work to achieve the shared goal of promoting offshore wind energy development, protecting biodiversity, and promoting ocean co-use.

The overlap between NOAA Fisheries surveys and offshore wind energy development in the Northeast region is substantial. There are currently more than 27 offshore wind energy projects in various stages of development in the Northeast, totaling more than 2.3 million acres<sup>12</sup>. New areas were leased in February 2022<sup>3</sup>, a Request for Interest in the Gulf of Maine for commercial planning and leasing was released in August 2022<sup>13</sup>, and there are also several additional potential lease areas and planning areas in the region. In terms of NOAA Fisheries surveys, there are currently 13 NOAA Fisheries surveys ([Table 1](#)) that will be impacted by planned offshore wind energy development. As the footprint of offshore wind energy development grows, additional surveys may be impacted and the impacts to existing surveys will likely increase. These surveys support management of more than 40 fisheries, more than 30 marine mammal species, and 14 threatened and endangered species (some marine mammals are also endangered). Further, these surveys support numerous other NOAA Fisheries' science products, including ecosystem and climate assessments. NOAA Fisheries surveys have occurred in the region since the early 1960s, and, as a result, the Northeast U.S. Shelf Ecosystem is one of the best understood marine ecosystems in the world - a remarkable fact resulting from decades of investment of hundreds of scientists, thousands of fishers, and hundreds of millions of dollars.

## Strategy Framework

The purpose of this Strategy is to describe the approach NOAA Fisheries and BOEM will use to mitigate the impacts of offshore wind energy development on NOAA Fisheries surveys, with specific application to the Northeast U.S. Region (Maine to North Carolina). This Strategy calls for the development of a Northeast Federal Survey Mitigation Program as a specific action. The Mitigation Program will include Survey-Specific Mitigation Plans for each impacted survey including both vessel and aerial surveys (see Figure 1). This Strategy is intended to guide the implementation of the Mitigation Program through the duration of wind energy development in the Northeast U.S., anticipated to be 30+ years.

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adjust to significant disruptions caused by large local or notable regional adverse impacts of the project; and (iii) the affected activity (NOAA Fisheries Surveys) may retain measurable effects indefinitely, even after the impacting agent is gone and remedial action is taken (see [Vineyard Wind 1 Offshore Wind Energy Project Final Environmental Impact Statement March 2021](#)).

<sup>12</sup> [Bureau of Ocean Energy Management - State Activities](#)

<sup>13</sup> [Gulf of Maine Commercial Planning and Leasing Process](#)

Although specific for the Northeast region, this Strategy is applicable to other regions where offshore wind energy development may impact NOAA Fisheries surveys. The goals and objectives presented in this Strategy are applicable to other regions and can be the basis for developing additional regionally specific survey mitigation strategies and programs. The actions presented can serve as examples for other regions.

The concepts of survey mitigation considered here are in the context of the Council on Environmental Quality definition of mitigation:<sup>14</sup>

1. **Avoiding** the impact altogether by not taking a certain action or parts of an action
2. **Minimizing** impacts by limiting the degree or magnitude of the action and its implementation
3. **Rectifying** the impact by repairing, rehabilitating, or restoring the affected environment
4. **Reducing or eliminating the impact over time** by preservation and maintenance operations during the life of the action
5. **Compensating** for the impact by replacing or providing substitute resources or environments



**Figure 1. Relationship between this NOAA Fisheries BOEM Federal Survey Mitigation Strategy, the Northeast Federal Survey Mitigation Program, and Northeast Survey-Specific Mitigation Plans.**

This Strategy allows the opportunity for BOEM and NOAA Fisheries to work together to quantify survey impacts and to develop solutions to mitigate these impacts. There are marine spatial planning tools under development, and these tools can be used prior to leasing to avoid or minimize impacts of offshore wind energy development on NOAA Fisheries surveys<sup>15</sup>. If BOEM (through the identification of lease areas) or developers (through their COPs) are unable to avoid or minimize impacts to NOAA Fisheries surveys, this strategy can be used to rectify, reduce or eliminate over time, or compensate for these impacts. This Strategy also will serve as a mechanism to identify, communicate, and document loss in data quantity, accuracy, and precision from NOAA Fisheries surveys and the subsequent effects on NOAA Fisheries science advice and products.

Consistent with BOEM guidance and in response to individual state requirements, developers are starting to conduct project-specific impact monitoring studies<sup>16</sup>. The objectives of these monitoring studies vary by wind development project and monitoring study, but they are generally aimed at characterizing natural resources in the project area<sup>17</sup> and evaluating the impact

<sup>14</sup> [Code of Federal Regulations - 40 CFR §1508.1\(s\)](#)

<sup>15</sup> [Preliminary Wind Energy Areas for the Gulf of Mexico Area Identification Process](#)

<sup>16</sup> [Vineyard Wind - Fisheries Studies and Science](#)

<sup>17</sup> Defined as: land, fish, wildlife, biota, air, water, ground water, drinking water supplies, and other such resources (see [Department of the Interior - Natural Resources and Services](#))

of offshore wind energy development on these resources. These studies may serve to mitigate or augment federal survey efforts. However, these studies have varying durations, use different methods and designs, and the methods are not calibrated to federal survey methods. This Strategy will evaluate these project-specific activities for their potential contribution to the larger-scale federal survey mitigation effort and work to integrate these studies into federal survey programs where feasible.

During the environmental review of the first commercial-scale offshore wind energy project in federal waters<sup>18</sup>, four impacts to NOAA Fisheries surveys were identified:

- Preclusion of NOAA Fisheries sampling platforms from the wind development area because of operational and safety limitations;
- Impacts on the statistical design of surveys (including random-stratified, fixed station, transect, opportunistic, and other designs), which are the basis for scientific assessments, advice, and analyses;
- Alteration of benthic and pelagic habitats and airspace in and around the wind energy development, requiring new designs and methods to sample new habitats;
- Reduced sampling productivity caused by navigation impacts of wind energy infrastructure on aerial and vessel surveys.

Federal survey mitigation in response to offshore wind development includes developing and deploying new approaches to surveying in and around offshore wind energy developments that generate comparable data to the impacted surveys. These new approaches must be calibrated and/or integrated with current approaches to minimize the impact on the integrity of the survey time series. Additionally, these approaches must continue for the duration of the developments to maintain the integrity of the survey time series. The new approaches must also be standardized across offshore wind energy developments to ensure region comparability across the affected surveys. To meet these requirements, six components of federal survey mitigation were defined during the first environmental review of an offshore wind development in federal waters<sup>19</sup>:

- *Evaluation of survey designs*: Evaluate and quantify the effects and impacts of proposed project-related wind development activities on scientific survey operations and on provision of scientific advice to management.
- *Identification and development of new survey approaches*: Evaluate or develop appropriate statistical designs, sampling protocols, and methods, while determining if scientific data quality standards for the provision of management advice are maintained.
- *Calibration and integration of new survey approaches*: Design and carry out necessary calibrations and analyses to integrate existing and new survey approaches by addressing

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<sup>18</sup> [Vineyard Wind 1 Offshore Wind Energy Project Final Environmental Impact Statement March 2021](#)

<sup>19</sup> [Vineyard Wind 1 Offshore Wind Energy Project Final Environmental Impact Statement March 2021](#)

both operational and analytical needs to ensure continuity, interoperability, precision, and accuracy of data products.

- *Development of interim provisional survey indices:* Develop additional interim indices from existing data sets to partially bridge the gap in data quality and availability between pre-construction and operational periods while new approaches are being identified, tested, or calibrated.
- *Wind energy monitoring to fill regional scientific survey data needs:* Apply new statistical designs and carryout sampling methods to effectively mitigate survey impacts caused by offshore wind activities from operations for the operational life span of the project.
- *Development and communication of new regional data streams:* New survey approaches will require new data collection, analysis, management, dissemination, and reporting systems. Changes to surveys and new approaches will require substantial collaboration with fishery management, fishing industry, scientific institutions, and other partners.

This Strategy develops a framework for mitigating the impacts of offshore wind development on NOAA Fisheries surveys. The Strategy defines goals, objectives, and actions. Goals are broad primary outcomes expected from implementation of this strategy. From these goals, objectives are defined, which are measurable activities to attain the goals. The goals and objectives presented here are meant to be generally applicable to the issue of mitigating the impacts of offshore wind energy development on NOAA Fisheries surveys. This Strategy also identifies actions, which are well defined steps that are planned to be taken over the next few years. These actions are specific to the Northeast region and are applicable to the Northeast Federal Survey Mitigation Program.

NOAA Fisheries' scientific enterprise relies on both fishery-independent data collections (e.g., surveys) and fishery-dependent data collections (e.g., Vessel Trip Reports, scientific fishery observers, fishers collecting data). This Strategy focuses on mitigation of fishery-independent surveys. Similar to the impacts to fishery independent surveys, offshore wind energy development may also lead to changes in fishing effort and fishing operations. It is critical that efforts be undertaken to understand and account for potential changes in fishery-dependent data caused by offshore wind energy development, but the impacts on fishery-dependent data are beyond the scope of the Strategy and will need to be further evaluated.

## **Goals, Objectives, and Actions**

This Strategy defines five goals, sixteen objectives, and numerous actions. Goals (numbered 1 - 5) are the primary intended outcomes of this Federal Survey Mitigation Strategy. Objectives and Actions, numbered hierarchically (e.g., 2.1 for Goal 2, Objective 1; and 2.1.2 for Goal 2, Objective 1, Action 2), describe the steps to achieve each goal. Actions are intended to be taken over the next one to two years and revisited annually. [Table 2](#) includes Goals, Objectives, and Actions accompanied by information about the lead organization, funding status, anticipated completion date, and expected products.

## Goals

1. Mitigate impacts of offshore wind energy development on NOAA Fisheries surveys;
2. Evaluate and integrate, where feasible, wind energy development monitoring studies with NOAA Fisheries surveys;
3. Collaboratively plan and implement NOAA Fisheries survey mitigation with partners, stakeholders, and other ocean users using the principles of best scientific information available<sup>20</sup> and co-production of knowledge<sup>21</sup>, including fishermen's local ecological knowledge and indigenous traditional ecological knowledge<sup>22</sup>;
4. Adaptively implement this Strategy recognizing the long-term nature of the surveys and the dynamic nature of wind energy development, survey technology and approaches, marine ecosystems, and human-uses of marine ecosystems;
5. Advance coordination between NOAA Fisheries and BOEM in the execution of this Strategy and share experiences and lessons-learned with other regions and countries where offshore wind energy development is being planned and underway.

## Goals, Objectives, and Actions

Goal 1. Mitigate impacts of offshore wind energy development on NOAA Fisheries surveys.

Objective 1.1. Develop, implement, and track the Northeast Federal Survey Mitigation Program, which includes Survey-Specific Mitigation Plans that both address the four impacts of wind energy development on surveys and describe the six components of survey mitigation (see Section 3 above)

Action 1.1.1. Produce Survey-Specific Mitigation Plans for all impacted NOAA Fisheries surveys

Action 1.1.2. Develop a template for survey-specific mitigation plan development, and share with NOAA partners that undertake scientific surveys

Action 1.1.3. Encourage partners to evaluate wind energy development impacts on other surveys (e.g., NOAA Fisheries supported surveys, state surveys)

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<sup>20</sup> Best scientific information available is a standard established in the ESA, MMPA, and MSA. Under MSA implementing regulations, criteria to consider when evaluating best scientific information include relevance, inclusiveness, objectivity, transparency and openness, timeliness, verification and validation, and peer review, as appropriate - [Code of Federal Regulation 50 CFR § 600.315\(a\)\(6\)](#)

<sup>21</sup> Iterative and collaborative processes involving diverse types of expertise, knowledge, and actors to produce context-specific knowledge and pathways towards a sustainable future (see footnote 20)

<sup>22</sup> Local ecological knowledge (LEK) refers to a form of experiential information about the natural environment that is accumulated by interacting with it on a regular basis (see [Farr ER et al. \(2018\). Effects of fisheries management on local ecological knowledge. Ecology and Society, 23\(3\).](#))

- that contribute to NOAA Fisheries stock assessments and other scientific advice
- Action 1.1.4. Develop a workflow for identifying federal survey mitigation needs and priorities as part of the offshore wind permitting and leasing framework
  - Action 1.1.5. Complete the [Survey Simulation Experimentation and Evaluation Project \(SSEEP\)](#)
  - Action 1.1.6. Review the New England Fishery Management Council’s [Scallop Survey Working Group](#) recommendations
  - Action 1.1.7. Review the Regional Wildlife Science Collaboration for Offshore Wind recommendations for survey mitigation efforts, for example, a passive acoustic monitoring (PAM) network and novel camera technologies
- Objective 1.2. Obtain, use, and report on resources to implement the Northeast Federal Survey Mitigation Program and Survey-Specific Mitigation Plans
- Action 1.2.1. Develop cost estimates for the Northeast Federal Survey Mitigation Program and Survey-Specific Mitigation Plans
  - Action 1.2.2. Review the resources available for the Northeast Federal Survey Mitigation Program and Survey-Specific Mitigation Plans and perform a funding gap analysis
  - Action 1.2.3. Develop an interagency resource plan to support the Northeast Federal Survey Mitigation Program and Survey-Specific Mitigation Plans
  - Action 1.2.4. Develop funding proposals to support aspects of the Northeast Federal Survey Mitigation Program
- Objective 1.3. Continue to seek support for survey mitigation from developers or other entities through collaborative, legislative, and regulatory means
- Action 1.3.1. Develop an inventory of plan components that could be funded or implemented by developers or other entities
  - Action 1.3.2. Develop measures that could be implemented through lease terms, COP conditions, or other mechanisms, which require lessees to clearly and consistently support this Strategy
- Goal 2. Evaluate and integrate, where feasible, wind energy development monitoring studies with NOAA Fisheries surveys;

- Objective 2.1. Develop and apply regional standards and requirements to wind energy development, project-specific monitoring, and data accessibility
  - Action 2.1.1. Develop and communicate regional standardized project-specific monitoring protocols, including process for independent scientific peer review, to address NOAA Fisheries survey needs
  - Action 2.1.2. Develop and communicate regional standards for data accessibility related to wind energy development projects
- Objective 2.2. Evaluate the compatibility of project-specific monitoring studies and related work (e.g., state research and monitoring initiatives) to meet Northeast Federal Survey Mitigation Program needs
  - Action 2.2.1. Evaluate existing project-specific monitoring plans and related work relative to the Northeast Federal Survey Mitigation Program needs
  - Action 2.2.2. Review existing data sharing, access, and documentation for project-specific monitoring plans and related work
  - Action 2.2.3. Develop a template to review future project-specific monitoring plans relative to the Northeast Federal Survey Mitigation Program needs
  - Action 2.2.4. Review the potential of project-specific monitoring plans to evaluate the impact of offshore wind energy development on the marine ecosystem
- Goal 3. Collaboratively plan and implement NOAA Fisheries survey mitigation with partners, stakeholders, and other ocean users using the principles of best scientific information available and co-production of knowledge, including fishermen’s local ecological knowledge and indigenous traditional ecological knowledge
  - Objective 3.1. Provide information regarding the timing, methods, and extents of NOAA Fisheries surveys in wind energy development planning and approval processes.
    - Action 3.1.1. Identify impacts of offshore wind energy development on NOAA Fisheries surveys during regional planning phases and during the individual offshore wind developments’ environmental review processes
    - Action 3.1.2. Ensure availability of survey strata to marine spatial planning initiatives, including ocean data portals, the NOAA NCCOS Siting and Sustainability projects, and the NOS Ocean Reports Tool
  - Objective 3.2. Use public comment and partner and stakeholder input in developing, implementing, and reviewing this Strategy and the Northeast Federal Survey Mitigation Program

- Action 3.2.1. Complete the [Synthesis of the Science](#) Report and use results in developing Survey-Specific Mitigation Plans (Objective 1.1) and in documenting the impact of offshore wind development on NEFSC surveys (Objective 3.1)
- Action 3.2.2. Incorporate input from the [Survey Simulation Experimentation and Evaluation Project \(SSEEP\) Workshops](#) and New England Fishery Management Council's Scallop Survey Working Group into Survey-Specific Mitigation Plans (Objective 1.1)
- Action 3.2.3. Hold Second Synthesis of the Science Workshop to examine the interactions between floating wind technology and fisheries (including surveys)
- Action 3.2.4. Complete the Second Synthesis of the Science Report and use results in developing Survey-Specific Mitigation Plans (Objective 1.1) and in documenting the impact of offshore wind development on surveys (Objective 3.1)
- Action 3.2.5. Collaborate with partners in the peer review of products originating from the Synthesis of the Science Workshop, the [Survey Simulation Experimentation and Evaluation Project \(SEEP\) Workshops](#), and the [NEFMC Sea Scallop Survey Working Group](#)
- Objective 3.3. Use peer-review processes as appropriate to ensure elements of the Northeast Federal Survey Mitigation Program represent the best science available
  - Action 3.3.1. Develop a transparent peer-review process for all Survey-Specific Mitigation Plans (Objective 1.1)
- Goal 4. Adaptively implement this Strategy recognizing the long-term nature of the surveys and the dynamic nature of wind energy development, survey technology and approaches, marine ecosystems, and human-uses of marine ecosystems
  - Objective 4.1. Assess the Federal Survey Mitigation Strategy annually to evaluate progress; reassess goals, objectives, and resources available; and define actions for the next year
    - Action 4.1.1. Meet quarterly as an Implementation Team to assess Strategy progress, review input received, and update actions (see Action 5.1.1)
  - Objective 4.2. Assess the Northeast Federal Survey Mitigation Program annually to evaluate progress; reassess assumptions, objectives, and available resources; and define actions for the next year



- Action 4.2.1. Meet annually as an Implementation Team to assess the Northeast Federal Survey Mitigation Program and Survey-Specific Mitigation Plans, review input received, and propose plan updates (see Action 5.1.1)
- Action 4.2.2. Annually review impacts of offshore wind energy pre-construction, construction, and operation activities on ongoing survey operations and products
- Action 4.2.3. Develop and annually update a dashboard for tracking the mitigation of impacts of offshore wind energy development on NOAA Fisheries surveys (see Action 5.3.3)
- Objective 4.3. Track the development of new survey approaches, including advanced sampling technologies, and introduce new approaches to the Survey-Specific Mitigation Plans and the Northeast Federal Survey Mitigation Program during the annual review
  - Action 4.3.1. Implementation Team will release an annual Request for Information (RFI) for survey technologies to be considered as part of the Northeast Federal Survey Mitigation Program and summarize information received for review by NOAA and BOEM (see Action 5.1.1)
- Objective 4.4. Track and report on offshore wind energy development in the United States including planning, leasing, site assessment, construction, operation, and decommissioning
  - Action 4.4.1. Develop and update monthly dashboard for planning areas, leased areas, site assessment activities, construction and operation activities, and decommissioning activities including area, number of turbines, and energy production (see Action 5.3.3)
- Objective 4.5. Track changes in the ecosystem that may impact survey mitigation
  - Action 4.5.1. Review the NOAA Fisheries/NEFSC [State of the Ecosystem Report](#) and document any changes in ecosystem status that may impact survey mitigation
- Goal 5. Advance coordination between NOAA Fisheries and BOEM in the execution of this Strategy and share experiences and lessons-learned with other regions and countries where offshore wind energy development is being planned and underway
  - Objective 5.1. NOAA Fisheries and BOEM collaboratively lead the implementation of this Strategy
    - Action 5.1.1. Establish a joint NOAA Fisheries - BOEM Implementation Team to oversee the implementation of this strategy

- Action 5.1.2. Hire a Program Manager to oversee the implementation of this Strategy in the Northeast region
- Action 5.1.3. Provide training on the collaboration and co-production of knowledge to BOEM and NOAA Fisheries staff involved in the implementation of this strategy
- Objective 5.2. Communicate on the Federal Survey Mitigation Strategy
  - Action 5.2.1. Communicate on the development and finalization of this Strategy
  - Action 5.2.2. Complete a communication plan for this Strategy and the Northeast Federal Survey Mitigation Program
  - Action 5.2.3. Develop a NOAA website linked to the BOEM website that describes and tracks the Northeast Federal Survey Mitigation Program and the Survey-Specific Mitigation Plans
- Objective 5.3. Communicate lessons-learned during the planning and implementation of this Federal Survey Mitigation Strategy
  - Action 5.3.1. Complete a document entitled “Principles and Best Practices for Developing Regional Survey Mitigation Implementation Strategies and Program Plans”
  - Action 5.3.2. Continue involvement in the ICES Working Group on Offshore Wind Development and Fisheries
  - Action 5.3.3. Provide updates on the Strategy implementation to ROSA, RWSC, and other relevant groups

## Partners, Stakeholders, and Other Ocean Users

This Strategy uses a collaborative approach to designing and implementing survey mitigation. The approach follows the principles of *knowledge co-production*, where scientific design, data collection, analysis, and application are conducted collaboratively, inclusively, and in a manner that respects, engages, and facilitates contributions from different stakeholder groups with the goal of addressing the gap between knowledge and decision-making<sup>23</sup>. NOAA Fisheries will lead implementation of the Strategy in close partnership with BOEM. The design and application of the Strategy and the Northeast Federal Survey Mitigation Program by NOAA Fisheries and BOEM will be guided by open and transparent processes that allow for the meaningful involvement of scientific survey partners and stakeholders.

In developing the collaborative framework for implementing this Strategy, NOAA Fisheries and BOEM will engage with numerous partners, many of whom are also stakeholders. More broadly, NOAA Fisheries and BOEM will engage with ocean users and the American public,

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<sup>23</sup> [Norström et al. 2020. Principles for knowledge co-production in sustainability research](#)

recognizing that the oceans are a public resource. There are a group of specific partners, stakeholders, and ocean users involved in NOAA Fisheries sustainable fisheries, marine mammal and endangered species, and habitat conservation responsibilities, including commercial and recreational fishers, fish processors, and fish dealers. There are also a number of specific partners, stakeholders, and ocean users involved in offshore wind energy development, including wind developers and supporting industries. Finally, there are a number of scientific and knowledge partners and stakeholders, including universities and research organizations. All these organizations, institutions, individuals, and the broader public have various interests in the outcomes of this Strategy. Most are also partners or will be partners in implementing this strategy. As part of this Strategy, NOAA Fisheries and BOEM will communicate with and seek input and participation from these groups, institutions, and organizations. Communication approaches will be tailored to maximize participation in accordance with environmental review processes and fisheries and protected species management programs and processes. For the Northeast region of the U.S., these groups, institutions, and organizations include, but are not limited to:

- *Mid-Atlantic and New England Fishery Management Councils* (MAFMC, NEFMC) are composed of fisheries stakeholders in the Mid-Atlantic and New England and are responsible for the sustainable management of our nation's fisheries in federal waters under the Magnuson-Stevens Fisheries Management and Conservation Act. NOAA Fisheries surveys and data collection support stock assessments, which provide the basis for setting Annual Catch Limits. NOAA Fisheries surveys and data collection also provide data for a number of other management actions, including determining allocations, defining Essential Fish Habitat, and designation of protected areas. NOAA Fisheries also works with the Northeast Trawl Advisory Panel, a joint advisory panel of the Mid-Atlantic and New England Fishery Management Councils whose objectives are understanding the existing NOAA Fisheries/NEFSC trawl survey gear performance and methodology, evaluating the potential to complement or supplement this and other regional research surveys, and improving understanding and acceptance of NOAA Fisheries/NEFSC trawl survey data quality and results.
- *Atlantic States Marine Fisheries Commission* (ASMFC) is composed of member states bordering the Atlantic Ocean (Florida to Maine). Similar to the Fishery Management Councils, the Commission is responsible for managing fisheries, but in state waters under the Atlantic Coastal Fisheries Cooperative Management Act. There is also joint management with the Fishery Management Councils for some fisheries. NOAA Fisheries surveys and data collection support stock assessments, which provide the basis for setting Annual Catch Limits. NOAA Fisheries surveys and data collection also provide data for a number of other management actions including determining allocations and protecting fish habitat.
- *Federally Recognized Tribes* are important partners, and NOAA Fisheries and BOEM will work to ensure an accountable process for meaningful and timely engagement on actions with tribal implications, such as surveys that support Tribal and U.S. government co-management responsibilities.
- *International Partners* are important collaborators with some NMFS surveys that are conducted in partnerships and through international arrangements with Canada. Any efforts to address potential changes in surveys of joint interest would be conducted following established international policies and practices. NOAA Fisheries is also a member of international science organizations (e.g., International Council for the

Exploration of the Sea) and exchange of scientific information in the context of the organizations is an important part of Goal 5.

- *Atlantic Scientific Review Group (ASRG)* advises NOAA Fisheries on the status of marine mammal stocks under Section 117 of the Marine Mammal Protection Act. The ASRG is a representation of marine mammal and fishery scientists and members of the commercial fishing industry mandated to review the marine mammal stock assessments and provide advice to the NOAA Assistant Administrator for Fisheries.
- *States* are important partners in offshore wind energy development, setting renewable energy goals and agreeing to purchase offshore wind energy. States (both individually and through the ASMFC) are also important partners in living marine resource management, working closely with NOAA on sustainable fisheries, wildlife conservation, aquaculture development, and habitat conservation. Some states have been proactive in establishing developer-supported funds that support data collection priorities and communication mechanisms (including Responsible Offshore Science Alliance [ROSA]).
- *Commercial and Recreational Fishing Industry* is a highly diverse group of fishermen, dealers, processors, retailers, restaurants, and suppliers that are involved in catching fish and shellfish. NOAA Fisheries surveys and data collection support fisheries management, which in turn has direct effects on industry's livelihood. NOAA Fisheries and BOEM also work with industry on collaborative research.
- *Fishing Communities* are important social and economic groups that reside in specific locations and share common dependency on commercial, recreational, or subsistence fishing or directly rely on related fisheries dependent services and industries. These communities are defined in Section 600.345 National Standard 8 (MSA).
- *Offshore Wind Energy Leaseholders, Grantees, and Operators* will work with BOEM to address the necessary components of the Northeast Federal Survey Mitigation Program as specifications and requirements are developed through the leasing, site assessment, development, operations, and decommissioning project phases.
- *Non-Governmental Fisheries Organizations* support fishing interests. An example is the *Responsible Offshore Development Alliance (RODA)*. BOEM, RODA, and NOAA Fisheries have a ten year memorandum of understanding<sup>24</sup> that includes collaborating on fisheries research and improving coordination between fisheries and offshore wind management;
- *Non-Governmental Environmental Organizations* have a mission to protect the environment. Each particular organization has different focal areas, approaches, and working relationships with BOEM and NOAA Fisheries.
- *Northeast Regional Ocean Council and Mid-Atlantic Regional Council on the Ocean* are state and federal partnerships that address ocean and coastal issues from a regional perspective. Both councils augment existing governance structures to generate new information and facilitate communication as a means to advance resource management priorities.
- *Scientific Organizations and Institutions* are critical partners for developing the science and communicating the results. These groups include the Integrated Ocean Observation

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<sup>24</sup> [Memorandum of Understanding Between the National Oceanic and Atmospheric Administration's National Marine Fisheries Service, Bureau of Ocean Energy Management And The Responsible Offshore Development Alliance](#)

System Regional Associations, NOAA Cooperative Institutes, Sea Grant Universities, and individual universities and research institutions.

- *Scientists* from academia and other public and private institutions broadly use NOAA Fisheries survey data for a number of scientific uses. Their understanding of potential changes to NOAA Fisheries surveys is critical to ensure the science they produce is robust, accurate, and precise.

## Communication and Outreach

Internal and external communication and outreach are critical for the success of this Federal Survey Mitigation Strategy. NOAA Fisheries and BOEM will have an open and transparent process for communication and outreach with each other and with partners, stakeholders, and other ocean-users to support the goals of this Strategy.

The objectives of communication and outreach will be to:

- *Inform* those that may be affected by the Northeast Federal Survey Mitigation Program of the plan, process, progress, and how they may be affected.
- *Seek input* by providing clear opportunities for stakeholders to comment on and contribute to the Northeast Federal Survey Mitigation Program.
- *Develop and build a collaborative environment* to provide for dynamic interaction between stakeholders and partners with the goal of improving and implementing the Northeast Federal Survey Mitigation Program.
- *Emphasize scientific processes*, including use and generation of peer-reviewed publications, scientific presentations, independent peer review of products, and making data and documents publicly accessible.

The primary mechanisms for communication and outreach will consist of:

- *Publications* - Scientific publications are a foundation of the scientific process. They improve the quality of the science, ensure the results are publicly available, and provide a record of the scientific progress of the Northeast Federal Survey Mitigation Program.
- *Scientific Presentations* - NOAA Fisheries and BOEM will be proactive in presenting and communicating the mitigation plan to scientists, policy makers, partners, stakeholders, and the public whenever appropriate. Such presentations may occur at scientific conferences, regional planning meetings, and information seminars.
- *Workshops* - Theme-based workshops, such as the [Survey Simulation Experimentation and Evaluation Project \(SSEEP\)](#) workshops, will be used to develop different components of the Northeast Federal Survey Mitigation Program. These workshops will serve to develop and inform specific areas related to the Northeast Federal Survey Mitigation Program.
- *Solicitation of Comments* - There will be opportunities for stakeholders and the public in general to submit comments and input on the plan. The NOAA/BOEM public comment process will be used.
- *Public access to information* - Relevant documents will be posted online and available to the public on a website dedicated to the Federal Survey Mitigation Strategy.

- *Press releases/science briefs* - Important events and milestones will be announced via press releases. Summaries of progress and projects will be communicated in various publicly oriented scientific communications.
- *Independent Scientific Peer Review* - Independent peer review panels will be used to evaluate different components of the Northeast Federal Survey Mitigation Program. These components include the Survey-Specific Mitigation Plans, changes in statistical designs, and new survey approaches. Current review processes will be used, including Fishery Management Councils Scientific and Statistical Committees, the Atlantic Scientific Review Group, and the Center for Independent Experts. Additional review processes may also be used, including the International Council for the Exploration of the Sea and the National Academy of Sciences. Peer-review reports will be made publicly available.

## **Financial Resources**

This Federal Survey Mitigation Strategy will be used and adapted over the next 30+ years, and the Northeast Federal Survey Mitigation Program will involve most, if not all, NOAA Fisheries surveys. As such, the effort to mitigate the impact of offshore wind development on NOAA Fisheries surveys will be complex and take extensive financial resources. The scale of wind energy development in the region continues to increase, and thus, the scale of federal survey mitigation also increases. Owing to the nature of discrete regional Large Marine Ecosystems, DOI's announcement of intent to lease additional areas in the Northeast, Southeast, Gulf of Mexico, and West Coast<sup>2</sup> makes federal survey mitigation a national issue with specific regional requirements since NOAA Fisheries surveys are regionally designed and executed. The complexity and cost of this effort very likely means that multiple funding sources will be needed to meet the goals of this Strategy. Several other approaches have been discussed, including legislation to direct leasing revenues towards this effort or requiring developers to contribute to survey mitigation through lease conditions. These and other options will be tracked through this Strategy and used if they become available (Objective 1.2).

Here we list some of the potential funding sources to meet the financial resource needs.

### ***NOAA Fisheries/NEFSC Permanent Funding***

The FY22 Administration's Budget request included \$8.4M for NOAA Fisheries/NEFSC survey mitigation. This amount would partially fund the Northeast Federal Survey Mitigation Program as initially planned in October 2020. The development of Survey-Specific Mitigation Plans updated to include potential impacts from new lease areas in the region (Action 1.1.1) will provide an updated cost estimate. This updated estimate will then allow a formal funding gap analysis to be performed (Action 1.2.1). This gap can then be filled by additional permanent allocations to the NOAA Fisheries/NEFSC and through other sources. If the gap remains, the success of this Strategy and of the Northeast Federal Survey Mitigation Program will be at risk, thereby risking the goal of protecting biodiversity and promoting ocean co-use.

### ***NOAA Project Funding***

There are a number of funding opportunities within NOAA that could support components of the Northeast Federal Survey Mitigation Program. As part of this Strategy, NOAA Fisheries/NEFSC will continue evaluating opportunities as they develop and then request funding

as appropriate. As an example, NOAA Fisheries/NEFSC scientists successfully competed for FY21 NOAA Office of Marine and Aircraft Operations UxS Operations Center opportunity to start the development of an autonomous HabCam. This project will evaluate and develop new technologies for the NOAA Fisheries/NEFSC Sea Scallop surveys, one of the surveys impacted by offshore wind energy development. Similarly, NOAA Fisheries/NEFSC scientists successfully competed for FY21 NOAA National Oceanographic Partnership Program funding to take initial actions to adapt marine mammal surveys for operations in offshore wind development areas and to evaluate the use of eDNA as a survey method that can be conducted within offshore wind energy developments.

### ***BOEM Environmental Studies Program***

BOEM's Environmental Studies Program (ESP) collects data and monitors human, marine, and coastal environments to identify potential ecological, economic, and social impacts resulting from potential OCS activity. Leveraging partnerships to satisfy common scientific needs is a central component of BOEM's approach to gathering robust scientific information for its decisions and consultation processes. For example, the ESP is currently funding an early step in this Strategy through an interagency agreement with NOAA. The study is entitled "Development of a Strategy to Evaluate Impacts of Offshore Wind Energy on the NOAA National Marine Fisheries Service Surveys." The outcomes from this study are reflected in Action 1.1.2. The FY23 Administration's budget request included \$86.4 million for BOEM's Environmental Programs<sup>25</sup> to conduct environmental studies that support clean energy development as well as climate science and conservation and that inform BOEM understanding and policy decisions.

### ***BOEM Renewable Energy Program***

The BOEM Renewable Energy Program is supported by a substantial investment in research. Current studies include those aimed at setting design standards for offshore renewable energy facilities appropriate for U.S. waters. Recently completed studies examined axial cyclic loading of jacket piles, suction bucket foundation feasibility, corrosion and fatigue life, Pacific Region geologic hazards, and wind density and wake effects. The results of BOEM's scientific and technology research are used to inform policy decisions, environmental analysis, mitigation, and monitoring protocols on environmental and cultural issues. In the FY22 Administration's budget request, there was an increase of \$5M to address impacts of offshore energy on the human and marine environment. There was also an increase of \$7M to support research and stakeholder engagement.

### ***Offshore Wind Developer Support***

Developers may support this effort under multiple pathways. (1) Developers could voluntarily contribute funds to this effort; (2) developers could contribute in-kind support, such as vessel time or filling information gaps specifically identified in survey-specific mitigation plans as part of the developer's project-specific environmental monitoring plan; and (3) developers may be required to provide funds through lease or plan approval conditions. As part of this Strategy, BOEM and NOAA Fisheries will continue to identify the impacts of offshore wind development on NOAA Fisheries surveys and will continue to work with developers to mitigate these impacts

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<sup>25</sup> [Biden-Harris Administration Proposes Key Program Increases in Bureau of Ocean Energy Management Budget to Combat Climate Change through Clean Energy Initiatives](#)

(Objective 2.1). To aid in this effort, part of this Strategy is to develop regional standards for project-level monitoring, including data management and sharing, (Objective 2.2) and to evaluate formally the consistency of developer-funded project-level monitoring with the requirements of NOAA Fisheries surveys.

### ***Other Support***

There are a number of elements of this Strategy that could be supported by other entities. However, this support will need to fit into the overall Strategy. These elements will be identified per Action 2.1.2.

- *Other Federal Agencies* - Other Federal agencies, such as the Department of Energy, have funded environmental and technology improvements related to offshore wind energy development.
- *States* - States are establishing programs related to examining and mitigating the effects of offshore wind energy development on state resources. Since fisheries are both national and state resources, the application of these funds to components of the Federal Survey Mitigation is possible.
- *Non-Governmental Organizations (NGOs)* - A number of NGOs, foundations, and philanthropic organizations have interests related to marine ecosystem science and management and offshore wind energy development. Since NOAA Fisheries surveys are foundational to our understanding of marine ecosystems, some components of the Northeast Federal Survey Mitigation Program could be supported by NGOs.
- *Fishing Industry* - The fishing industry already supports NOAA Fisheries surveys through data collection (e.g., industry-based surveys, [Research Set-Aside Programs](#), NOAA Fisheries/[NEFSC Bio-sampling Program](#)), survey collaboration (e.g., NOAA Fisheries/[NEFSC Gulf of Maine Cooperative Bottom Longline Survey](#)), advice and evaluation (e.g., [Northeast Trawl Advisory Panel](#)), and cooperative funding programs (e.g., [Science Center For Marine Fisheries](#)). Building on these collaborative efforts will result in support for the Northeast Federal Survey Mitigation Programs.
- *Fishery Management Councils and Marine Fisheries Commissions* - The fisheries management entities support work related to improving management, including the evaluation and development of science products. As partners and stakeholders in the Strategy, their support for the implementation of the strategy may be possible (e.g., [NEFMC Scallop Survey Working Group](#)).

## **Acronyms Used**

BOEM - Bureau of Ocean Energy Management  
DOC - Department of Commerce  
DOI - Department of the Interior  
NEFMC - New England Fishery Management Council  
NEFSC - Northeast Fisheries Science Center  
NOAA - National Oceanic and Atmospheric Administration  
OCS - Outer Continental Shelf  
RODA - Responsible Offshore Development Alliance  
ROSA - Responsible Offshore Science Alliance



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**Table 1. List of NOAA Northeast Fisheries Science Center Surveys Impacted by Offshore Wind Development in the Northeast U.S. Region.**

Survey	Year Started	Survey Design (Sampling Gear)	Major Applications
<b>Autumn Bottom Trawl Survey</b>	1963	Random Stratified (Bottom Trawl)	Abundance, distribution, length, age, sex, weight, diet, and maturity samples, components of Ecosystem Monitoring survey
<b>Spring Bottom Trawl Survey</b>	1968	Random Stratified (Bottom Trawl)	Abundance, distribution, length, age, sex, weight, diet, and maturity samples, components of Ecosystem Monitoring survey
<b>Sea Scallop Dredge Survey/Integrated Benthic Habitat Survey</b>	1979	Random Stratified (Dredge) Line Transect (HabCam)	Abundance, distribution, biomass, size, and sex of sea scallops and other benthic fauna
<b>Atlantic Surfclam and Ocean Quahog Surveys</b>	1980	Random Stratified (Hydraulic Dredge)	Abundance, distribution, biomass, size, and sex of Atlantic surfclam and ocean quahog
<b>Northern Shrimp Survey</b>	1983	Random Stratified (Commercial Shrimp Trawl)	Abundance, distribution, biomass, and size
<b>Gulf of Maine Cooperative Bottom Longline Survey</b>	2014	Randomly Stratified (Bottom Longline)	Abundance, distribution, length, age, sex, weight, diet, and maturity samples, components of Ecosystem Monitoring survey
<b>Ecosystem Monitoring Survey (6 times per year)</b>	1977	Random Stratified [linked to Bottom Trawl Survey Design] and fixed Stations (Plankton, Oceanographic, and Visual Sampling)	Phytoplankton, zooplankton, ichthyoplankton, carbonate chemistry, nutrients, marine mammals, sea birds
<b>North Atlantic Right Whale Aerial Surveys</b>	1998	Line Transects (Visual)	Right Whale population estimates; dynamic area management
<b>Marine Mammal and Sea Turtle Aerial Surveys</b>	1993	Line Transects (Visual)	Abundance and spatial distribution of marine mammals and sea turtles for stock assessments
<b>Marine Mammal, Sea Turtle, and Seabird Ship-based Surveys</b>	1991	Line Transects (Visual along with Plankton and Oceanographic Sampling)	Abundance and spatial distribution of marine mammals, sea turtles, and sea birds for stock assessments
<b>Seal Aerial Abundance Surveys</b>	1990	Surveys over Haul-out Sites and Pupping Colonies (photographic)	Abundance, distribution, migration (tagging) for assessments of harbor and gray seals
<b>Coastal Shark Bottom Longline Survey</b>	1986	Fixed station (bottom longline)	Abundance, distribution, life history, migrations (tagging)
<b>Cooperative Atlantic States Shark Pupping and Nursery Longline/Gillnet Survey</b>	1998	Random stratified and fixed station (longline and gillnet)	Abundance, distribution, life history, migrations (tagging)

**Table 2. List of Goals, Objectives, and Actions with details on the lead for each action, whether the action is funded or not, the anticipated completion date for the action, and anticipated products. Abbreviations for Leads are: BOEM - Bureau of Ocean Energy Management; NEFSC - Northeast Fisheries Science Center; IT - Joint NOAA/BOEM Implementation Team; RODA - Responsible Offshore Development Alliance, and ST - Strike Team (the authors of this Strategy).**

Goals	Objectives	Actions	Lead	Funded	Completion Date	Anticipated Product
1 Mitigate impacts of offshore wind energy development on NOAA Fisheries surveys.	1.1 Develop, implement, and track the Northeast Federal Survey Mitigation Program, which includes Survey-Specific Mitigation Plans that both address the four impacts of wind energy development on surveys and describe the six components of survey mitigation (see Section 3 above)	1.1.1 Produce Survey-Specific Mitigation Plans for all impacted NOAA Fisheries surveys	NEFSC	Y	Jun 2023	Initial survey-specific mitigation plans that address the four impacts of wind energy development on surveys and include the six components of the survey mitigation program defined in this strategy. Plans will describe stakeholders who use the collected data and partners who are involved in the survey.
		1.1.2 Develop a template for survey-specific mitigation plan development, and share with NOAA partners that undertake scientific surveys	NEFSC	N	Dec 2022	Based on Action 1.1.1 develop a survey mitigation plan template and make available to partners
		1.1.3 Encourage partners to evaluate wind energy development impacts on other surveys (e.g., NOAA Fisheries supported surveys, state surveys) that contribute to NOAA Fisheries stock assessments and other scientific advice	NEFSC	N	Jan 2023	Meet with partners to discuss Northeast Federal Survey Mitigation Program and share template (Action 1.1.2)
		1.1.4 Develop a workflow for identifying federal survey mitigation needs and priorities as part of the offshore wind permitting and leasing framework.	NEFSC		Jun 2023	Document workflow for identifying survey mitigation needs as wind energy development continues

			1.1.5	Complete the Survey Simulation Experimentation and Evaluation Project (SSEEP)	NEFSC/S MAST	Y	Mar 2023	Using a simulation model, identify several survey design options and the implications of changes to fisheries independent surveys with specific focus on the NEFSC multispecies bottom trawl survey	
			1.1.6	Review the New England Fishery Management Council's Scallop Survey Working Group recommendations	NEFSC/ NEFMC	Y	Mar 2023	NEFSC develops proposed actions resulting from the recommendations provided by the New England Fishery Management Council	
			1.1.7	Review the Regional Wildlife Science Collaboration for Offshore Wind recommendations for survey mitigation efforts, for example, a passive acoustic monitoring (PAM) network and novel camera technologies	NEFSC/ RWSC	Y	Mar 2023	NEFSC develops proposed actions resulting from the recommendations provided by the RWSC	
		1.2	Obtain, use, and report on resources to implement the Northeast Federal Survey Mitigation Program and Survey-Specific Mitigation Plans	1.2.1	Develop cost estimates for the Northeast Federal Survey Mitigation Program and Survey-Specific Mitigation Plans	NEFSC	Y	Jun 2023	Include cost estimates in Survey Specific Mitigation Plans
				1.2.2	Review the resources available for the Northeast Federal Survey Mitigation Program and Survey-Specific Mitigation Plans and perform a funding gap analysis.	IT	Y	Apr 2023	A summary of funding available for the survey mitigation program compared to costs of program estimated from survey-specific mitigation plans
				1.2.3	Develop an interagency resource plan to support the Northeast Federal Survey Mitigation Program and Survey-Specific Mitigation Plans	IT	Y	Aug 2023	A resource plan to support Northeast Federal Survey Mitigation Program (Action 1.1.1) potentially including a Joint Agency Budget Initiative or Joint Agency Funding Agreements.
				1.2.4	Develop funding proposals to support aspects of the Northeast Federal Survey	NEFSC/B OEM	Y	ongoing	Proposals submitted to various funders. Proposals tracked as part of Action 1.2.1

				Mitigation Program					
		1.3	Continue to seek support for survey mitigation from developers or other entities through collaborative, legislative, and regulatory means	1.3.1	Develop an inventory of plan components that could be funded or implemented by developers or other entities	IT	N	Aug 2023	Publicly available recommendations of survey mitigation program components that could be funded by developers or other parties
				1.3.2	Develop measures that could be implemented through lease terms, COP conditions, or other mechanisms, which require lessees to clearly and consistently support this Strategy	IT	N	Aug 2023	A policy document that describes various measures
2	Evaluate and integrate, where feasible, wind energy development monitoring studies with NOAA Fisheries surveys	2.1	Develop and apply regional standards and requirements to wind energy development, project-specific monitoring, and data accessibility	2.1.1	Develop and communicate regional standardized project-specific monitoring protocols, including process for independent scientific peer review, to address NOAA Fisheries survey needs	NEFSC	N	Sep 2023	NOAA Fisheries Technical Memorandum provided to developers following the leasing process
				2.1.2	Develop and communicate regional standards for data accessibility related to wind energy development projects	NEFSC	N	Sep 2023	NOAA Fisheries Technical Memorandum provided to developers following the leasing process
		2.2	Evaluate the compatibility of project-specific monitoring studies and related work (e.g., state research and monitoring initiatives) to meet Northeast Federal Survey Mitigation Program needs	2.2.1	Evaluate existing project-specific monitoring plans and related work relative to the Northeast Federal Survey Mitigation Program needs	NEFSC	N	Oct 2023	Publicly available comparison of project specific monitoring plans relative to NEFSC survey needs
				2.2.2	Review existing data sharing, access, and documentation for project-specific monitoring plans and related work	NEFSC	N	Jul 2023	Publicly available document that reviews existing data access and documentation for project specific monitoring plan and activities. Document is updated annually
				2.2.3	Develop a template to review future project specific monitoring plans relative to	NEFSC	N	Jan 2023	NEFSC produce a template for future review

				the Northeast Federal Survey Mitigation Program needs					
			2.2.4	Review the potential of project-specific monitoring plans to evaluate the impact of offshore wind energy development on the marine ecosystem	NEFSC	N	ongoing	Formal comments made to developers through BOEM on developer lead project-specific monitoring plans.	
3	Collaboratively plan and implement NOAA Fisheries survey mitigation with partners, stakeholders, and other ocean users using the principles of best scientific information available and co-production of knowledge, including fishermen's local ecological knowledge and indigenous traditional ecological knowledge	3.1	Provide information regarding the timing, methods, and extents of NOAA Fisheries surveys in wind energy development planning and approval processes.	3.1.1	Identify impacts of offshore wind energy development on NOAA Fisheries surveys during the regional planning phases and individual offshore wind developments' environmental review processes	NEFSC	Y	ongoing	Develop and use a tracking system to document and analyze impacts on NEFSC surveys. Make the tracker available on the program website (see Action 5.3.3). Update annually.
				3.1.2	Ensure availability of survey strata to marine spatial planning initiatives including ocean data portals, the NOAA NCCOS Siting and Sustainability projects, and the NOS Ocean Reports Tool	NEFSC	Y	Jan 2023	NEFSC provide survey strata to regional ocean portals and NCCOS
		3.2	Use public comment and partner and stakeholder input in developing, implementing and	3.2.1	Complete the Synthesis of the Science Report and use results in developing Survey-Specific Mitigation Plans	NEFSC/BOEM/RODA	Y	Jan 2023	Synthesis of the Science Report

		reviewing this Federal Survey Mitigation Strategy and the Northeast Federal Survey Mitigation Program		(Objective 1.1) and in documenting the impact of offshore wind development on NEFSC surveys (Objective 3.1)				
			3.2.2	Incorporate input from the Survey Simulation Experimentation and Evaluation Project (SSEEP) Workshops and New England Fishery Management Council's Scallop Survey Working Group into Survey-Specific Mitigation Plans (Objective 1.1)	NEFSC	N	Jun 2022	Inform survey-specific monitoring plans developed as part of Action 1.1.1
			3.2.3	Hold Second Synthesis of the Science Workshop to examine the interactions between floating wind technology and fisheries (including surveys)	NEFSC/B OEM/RO DA	Y	Mar 2023	Complete Second Synthesis of the Science Workshop
			3.2.4	Complete the Second Synthesis of the Science Report and use results in developing Survey-Specific Mitigation Plans (Objective 1.1) and in documenting the impact of offshore wind development on surveys (Objective 3.1)	NEFSC/B OEM/RO DA	Y	Mar 2024	Complete report and inform survey-specific monitoring plans developed as part of Action 1.1.1
			3.2.5	Collaborate with partners in the peer review of products originating from the Synthesis of the Science Workshop, the Survey Simulation Experimentation and Evaluation Project (SEEP) Workshops, and the NEFMC Sea Scallop Survey Working Group	IT	N	Dec 2023	Inform survey-specific monitoring plans developed as part of Action 1.1.1

		3.3	Use peer-review processes as appropriate to ensure elements of the Northeast Federal Survey Mitigation Program represent the best science available	3.3.1	Develop a transparent peer-review process for all Survey Specific Mitigation Plans (Objective 1.1)	NEFSC	Y	May 2023	Make peer-review process plan publically available
4	Adaptively implement this Strategy recognizing the long-term nature of the surveys and the dynamic nature of wind energy development, survey technology and approaches, marine ecosystems, and human-uses of marine ecosystems	4.1	Assess the Federal Survey Mitigation Strategy annually to evaluate progress; reassess goals, objectives, and resources available; and define actions for the next year	4.1.1	Meet quarterly as an Implementation Team to assess Strategy progress, review input received, and update actions (see Action 5.1.1)	IT	Y	Jan 2023	Quarterly updated Strategy
		4.2	Assess the Northeast Federal Survey Mitigation Program annually to evaluate progress; re-assess assumptions, objectives, and available resources; and define actions for the next year	4.2.1	Meet annually as an Implementation Team to assess the Northeast Federal Survey Mitigation Program and Survey-Specific Mitigation Plans, review input received, and propose plan updates (see Action 5.1.1)	IT	Y	Jan 2023	Annually updated survey-specific mitigation plans
				4.2.2	Annually review impacts of offshore wind energy pre-construction, construction, and operation activities on ongoing survey operations and products	IT	N	Sep 2023	An annual document that reviews impacts
				4.2.3	Develop and annually update a dashboard for tracking the mitigation of impacts of offshore wind energy development on NOAA Fisheries surveys (see Action 5.3.3)	IT	N	Sep 2023	A website on the NOAA webpage that describes the programs and provides status information on progress.



		4.3 Track the development of new survey approaches, including advanced-sampling technologies, and introduce new approaches to the Survey-Specific Mitigation Plans and the Northeast Federal Survey Mitigation Program during the annual review	4.3.1	Implementation Team will release an annual Request for Information (RFI) for survey technologies to be considered as part of the Northeast Federal Survey Mitigation Program and summarize information received for review by NOAA and BOEM (see Action 5.1.1)	IT	N	Jun 2023	Summary of survey technologies for applicability to NEFSC survey
		4.4 Track and report on offshore wind energy development in the United States, including planning, leasing, site assessment, construction, operation, and decommissioning	4.4.1	Develop and update monthly dashboard for planning areas, leased areas, site assessment activities, construction and operation activities, and decommissioning activities, including area, number of turbines, and energy production (see Action 5.3.3)	IT	N	Mar 2023	A website on the NOAA webpage that describes the programs and provides status information on progress.
		4.5 Track changes in the ecosystem that may impact survey mitigation	4.5.1	Review the NOAA Fisheries/NEFSC State of the Ecosystem Report and document any changes in ecosystem status that may impact survey mitigation	IT	N	Dec 2023	Summary of potential changes in ecosystem status that may impact survey mitigation
5	Advance coordination between NOAA Fisheries and BOEM in the execution of this Strategy and share experiences and lessons-learned with other regions and countries where offshore wind energy development is being planned and underway	5.1 NOAA Fisheries and BOEM collaboratively lead the implementation of this Strategy	5.1.1	Establish a joint NOAA Fisheries - BOEM Implementation Team to oversee the implementation of this strategy.	NOAA/BOEM	Y	Jan 2023	A clearly defined team forms to lead implementation of this strategy
			5.1.2	Hire a Program Manager to oversee implementation of	NEFSC	N	Jan 2023	A NOAA Fisheries / NEFSC Program manager is hired

				5.1.3	Provide training on the collaboration and co-production of knowledge to BOEM and NOAA Fisheries staff involved in the implementation of this strategy	NOAA/BOEM	N	Mar 2023	Training is conducted
		5.2	Communicate on the Federal Survey Mitigation Strategy	5.2.1	Communicate on the development and finalization of this Strategy.	ST	Y	Dec 2022	A finalized Strategy, a joint NOAA/BOEM press release announcing completion of strategy development, presentation to stakeholders regarding the strategy, including the MAFMC, NEFMC, ASMFC, ROSA, RWSE, and OneNOAA Seminar. Finalized plan will be posted on the website developed per Action 5.2.1
				5.2.2	Complete a communication plan for this Strategy and the Northeast Federal Survey Mitigation Program	NOAA/BOEM	Y	Mar 2023	A formal communication plan to use during implementation of this strategy
				5.2.3	Develop a NOAA website linked to the BOEM website that describes and tracks the Northeast Federal Survey Mitigation Program and the Survey-Specific Mitigation Plans	IT	N	Apr 2023	A website on the NOAA webpage that describes the programs and provides status information on progress.
		5.3	Communicate lessons-learned during the planning and implementation of this Federal Survey Mitigation Strategy	5.3.1	Complete a document entitled "Principles and Best Practices for Developing Regional Survey Mitigation Implementation Strategies and Program Plans"	ST	Y	Feb 2023	A document is completed that describes the process used to develop regional survey mitigation implementation program plans. The intent is to inform similar activities in other regions in the U.S. A briefing for NOAA and BOEM leadership will accompany this document.
				5.3.2	Continue involvement in the ICES Working Group on Offshore Wind Development	IT	N	ongoing	Contribution to Working Group products including workshops, reports, and publications.

					and Fisheries				
				5.3.3	Provide updates on the Strategy implementation to ROSA, RWSC, and other relevant groups.	IT	N	ongoing	Annual updates of activities provided to ROSA, RWSC, and others

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