Offshore Wind Planning in the New York Bight:

Fish and Fisheries Data Aggregation Study

NEW YORK STATE | NYSERDA New York State Energy Research and Development Authority

NYSERDA Report 25-07
February 2025

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Offshore Wind Planning in the New York Bight: Fish and Fisheries Data Aggregation Study

Final Report

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NYSERDA Report 25-07 NYSERDA Contract 155561 February 2025

Notice

Preferred Citation

New York State Energy and Research Development Authority (NYSERDA). 2025. "Offshore Wind Planning in the New York Bight: Fish and Fisheries Data Aggregation Study" NYSERDA Report Number 25-07. Prepared by Henningson, Durham & Richardson Architecture & Engineering, P.C., New York, NY. nyserda.ny.gov/publications

Abstract

The Fish and Fisheries Data Aggregation Study was conducted to provide information about the environmental factors related to offshore wind energy development in the Mid-Atlantic Bight in waters greater than 60 meters deep. The objective is to identify areas of high environmental risk for the siting of offshore wind energy development by using up-to-date scientific knowledge and stakeholder engagement. One of five desktop studies, the Fish and Fisheries Data Aggregation Study compiles and analyzes existing data on fish habitat, fish species, and commercial and recreational fisheries in the Area of Analysis (AoA) that may be sensitive to offshore wind development (OSW). The elements that were analyzed include Essential Fish Habitat (EFH), Habitat Areas of Particular Concern (HAPC), Endangered Species Act (ESA) listed species, fish species counts and biomass, fishing vessel presence and usage of the AoA, and targeted commercial and recreational fisheries within the AoA. The stressors that were considered include noise, vessel traffic, physical habitat alterations, changes to water quality, changes to oceanographic dynamics, and the implications of new structures in the offshore environment to commercial and recreational fisheries. The findings suggest the AoA is within the range of some threatened and endangered species and encompasses many important commercial and recreational fisheries that could be impacted by OSW. The stressors to fish and fisheries vary by location, habitat, and species. Future considerations are provided to help achieve greater clarity for avoiding and minimizing potential conflicts with deepwater OSW.

Keywords

fish, fisheries, offshore wind, deep water, assessment, stressors, receptor, sensitivity, risk, best practices

Acknowledgments

We thank the Project Advisory Committee (PAC) and New York State Fisheries Technical Working Group (F-TWG) and all Fish and Fisheries Study reviewers for volunteering their time toward providing advice on data sources and study review. We also acknowledge the data providers and authors cited whose research and effort contributed to this study.

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Acronyms and Abbreviations

°C	degrees Celsius
AC	alternating current
AIS	Automatic Identification System
AoA	Area of Analysis
ASMFC	Atlantic States Marine Fisheries Commission
BOEM	Bureau of Ocean Energy Management
BMPs	Best Management Practices
CBI	Consensus Building Institute
CFF	Coonamessett Farm Foundation
Climate Act	Climate Leadership and Community Protection Act
COASTSPAN	Cooperative Atlantic States Shark Pupping and Nursey Program
CPUE	Catch Per Unit Effort
CWA	Clean Water Act
dB	decibel
DC	direct current
DEC	New York State Department of Environmental Conservation
DFW	New Jersey Division of Fish and Wildlife
DOF	Declared Out of Fishery
DPS	Distinct Population Segment
EcoMon	Ecosystem Monitoring Program
EFH	Essential Fish Habitat
EMF	Electromagnetic fields
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FMP	Fisheries Management Plan
F-TWG	Fisheries Technical Working Group
GARFO	Greater Atlantic Regional Fisheries Office
GIS	geographic information system
GPS	global positioning system
GW	gigawatts
HAPCs	Habitat Areas of Particular Concern
HDR	Henningson, Durham & Richardson Architecture & Engineering, P.C.
HMS	Highly Migratory Species
HVDC	high-voltage direct current
Master Plan	New York State Offshore Wind Master Plan
MFA	Mid-frequency active sonar
MNK	Monkfish Plan

MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act
MSY	maximum sustainable yield
MW	megawatts
NEAMAP	Northeast Area Monitoring and Assessment Program
NEFMC	New England Fishery Management Council
NEFSC	Northeast Fisheries Science Center
NEPA	National Environmental Policy Act
NJDEP	New Jersey Department of Environmental Protection
NMS	Northeast Multispecies Plan
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NYSERDA	New York State Energy Research and Development Authority
NY WEA	New York Wind Energy Area
OCS	Outer Continental Shelf
OCSLA	Outer Continental Shelf Lands Act
OSW	offshore wind development
PAC	Project Advisory Committee
ppt	parts per thousand
RIMA WEA	Rhode Island/Massachusetts Wind Energy Area
ROD	Record of Decision
RODA	Responsible Offshore Development Alliance
ROSA	Responsible Offshore Science Alliance
SCO	Atlantic Surfclam, Ocean Quahog, and Mussel Plan
SES	Sea Scallop Plan
SMAST	University of Massachusetts School of Marine Science and Technology
SMB	Squid, Mackerel, and Butterfish Plan
SMF	static magnetic field
TWG	Technical Working Group
UK	United Kingdom
USCG	U.S. Coast Guard
USFWS	U.S. Fish and Wildlife Service
UXO	unexploded ordnance
VIMS	Virginia Institute of Marine Science
VMS	Vessel Monitoring System
VTR	Vessel Trip Report
WEA	Wind Energy Area

Executive Summary

In 2019, New York's historic Climate Leadership and Community Protection Act (Climate Act) was signed into law, requiring the State to achieve 100% zero-emission electricity by 2040 and to reduce greenhouse gas emissions 85% below 1990 levels by 2050. The law specifically mandates the development of 9,000 megawatts (MW) of offshore wind energy by 2035, building upon its previous goal of 2,400 MW of offshore wind energy by 2030. The New York State Energy Research and Development Authority (NYSERDA) is charged with advancing these goals.

Since the early 2000s, offshore wind development off New York's coast has advanced in relatively shallow areas in the New York Bight, on the Outer Continental Shelf (OCS). As offshore wind (OSW) development continues to mature and offshore wind leases are developed in deeper waters, the size and type of offshore wind components are likewise expected to grow, and the project footprint will change as the use of floating OSW technology begins to be deployed. This may result in changes in the types of potential effects and interactions seen to date for fixed-bottom offshore wind projects. NYSERDA is conducting studies to investigate the implications of developing floating offshore wind in deeper waters. The objectives of this Fish and Fisheries Data Aggregation Study were to identify areas of high-environmental risk that should not be considered further for the siting of deepwater OSW development and incorporate the best-available scientific information into the risk reduction process.

Three zones comprise the Area of Analysis (AoA): Zone 1 is on the continental shelf (60–150 meters deep), Zone 2 is at the shelf break and slope (150–2,000 meters deep), and Zone 3 overlaps the continental rise (2,000–3,000 meters deep). Five desktop environmental studies compile and analyze existing data on resources in the AoA that may be sensitive to OSW development.

The most current publicly available data and survey data provided by federal agencies were used to inform the Fish and Fisheries Data Aggregation Study of the potential stressors and conflict with OSW in the AoA. Three receptor groups were analyzed: fish habitat, fish species, and commercial and recreational fisheries. The elements that were analyzed within each receptor group include Essential Fish Habitat (EFH), Habitat Areas of Particular Concern (HAPC), Endangered Species Act (ESA) listed species, fish species counts and biomass, fishing vessel presence and usage of the AoA, and targeted commercial and recreational fisheries within the AoA. Several stressors to each of these receptor groups were considered, including vessel traffic; physical habitat alterations, which may displace some species but create new habitat for others; changes to oceanographic dynamics; changes to water quality; and the implications of new structures in the offshore environment to commercial and recreational fisheries. Knowledge uncertainties were identified that include impacts to future fisheries studies, impacts to historical fishing grounds, fishing industry employment, operations, revenue, impacts to vessel traffic, hydrodynamic processes, tourism, climate change, and the potential impact of additional future wind projects within the AoA. The findings suggest the AoA is within the range of some threatened and endangered species and encompasses many important commercial and recreational fisheries that could be impacted by OSW. Future considerations are provided to help achieve greater clarity for avoiding and minimizing potential conflicts with deepwater OSW.

1 Introduction

For more than a decade, New York State has been conducting research, analysis, and outreach to evaluate the potential for offshore wind energy. New York State Energy Research and Development Authority (NYSERDA) led the development of the New York State Offshore Wind Master Plan (Master Plan), a comprehensive roadmap and suite of more than 20 studies for the first 2,400 megawatts (MW) of offshore wind energy. The Master Plan encourages the development of offshore wind in a manner that is sensitive to environmental, maritime, economic, and social issues while addressing market barriers and aiming to lower costs. The Master Plan included spatial studies to inform siting of offshore wind energy areas. Now, NYSERDA is undertaking new spatial studies to review the feasible potential for deepwater offshore wind development at or exceeding depths of 60 meters in the New York Bight. Planning processes considering the development of offshore wind in the deepwater areas examined in each of NYSERDA's spatial studies must consider these studies in the context of one another. Decision making must additionally consider different stakeholders and uses and will require further adjusted approaches and offshore wind technologies to ensure the best outcome. Globally, deepwater wind technology is less mature and primarily concentrated on floating designs at the depth ranges being assessed through these spatial studies, while deepwater fixed foundations are at their upper technical limit within the Area of Analysis (AoA). Therefore, floating designs were predominantly considered since most, if not all, of the AoA would likely feature floating offshore wind. NYSERDA, along with other state and federal agencies, is developing research and analysis necessary to take advantage of opportunities afforded by deepwater offshore wind energy by assessing available and emerging technologies and characterizing the cost drivers, benefits, and risks of floating offshore wind. Findings from these studies and available datasets will be used to support the identification of areas that present the greatest opportunities and least risk for siting deepwater offshore wind projects.

Offshore wind energy development is being introduced into a highly dynamic and human-influenced system. These reports seek to better understand the potential interaction of offshore wind development and marine wildlife and habitats; however, it is important to consider these within the broader context of climate change and existing land-based and marine activities. The State will continue to conduct research through its established Technical Working Groups (TWGs) concerning the key subjects of fishing, maritime commerce, the environment, environmental justice, jobs, and the supply chain. These TWGs were designed to inject expert views and the most recent information into decision making. Taken together, the information assembled in these spatial studies will help empower New York State and its partners to take the informed steps needed to capitalize on the unique opportunity presented by offshore wind energy.

1.1 Spatial Studies to Inform Lease Siting

- Benthic Habitat Study
- Birds and Bats Study
- Deepwater Wind Technologies – Technical Concepts Study
- Environmental Sensitivity Analysis
- Fish and Fisheries Data Aggregation Study
- Marine Mammals and Sea Turtles Study
- Maritime Assessment – Commercial and Recreational Uses Study
- Offshore Wind Resource Assessment Study Zones 1 and 3
- Technology Assessment and Cost Considerations Study

Each of the studies was prepared in support of a larger planning effort and shared with relevant experts and stakeholders for feedback. The State addressed comments and incorporated feedback received into the studies. Feedback from these diverse groups helps to strengthen the studies, and also helps ensure that these work products will have broader applicability and a comprehensive view. Please note that assumptions have been made to estimate offshore wind potential and impacts in various methodologies across the studies. However, NYSERDA does not necessarily endorse any underlying assumptions in the studies regarding technology and geography, including but not limited to turbine location, turbine layout, project capacity, foundation type, and point of interconnection.

The Energy Policy Act of 2005 amended Section 8 of the Outer Continental Shelf Lands Act (OCSLA) to give BOEM the authority to identify OSW sites within the Outer Continental Shelf (OCS) and to issue leases on the OCS for activities that are not otherwise authorized by the OCSLA, including wind development. The State recognizes that all development in the OCS is subject to review processes and decision-making by BOEM and other federal and State agencies. This collection of spatial studies is not intended to replace the BOEM Wind Energy Area (WEA) identification process and does not commit the State or any other agency or entity to any specific course of action with respect to OSW energy development. Rather, the State's intent is to facilitate the principled planning of future offshore development off the coast of New York, provide a resource for the various stakeholders, and encourage the achievement of the State's offshore wind energy goals.

1.2 Study Area

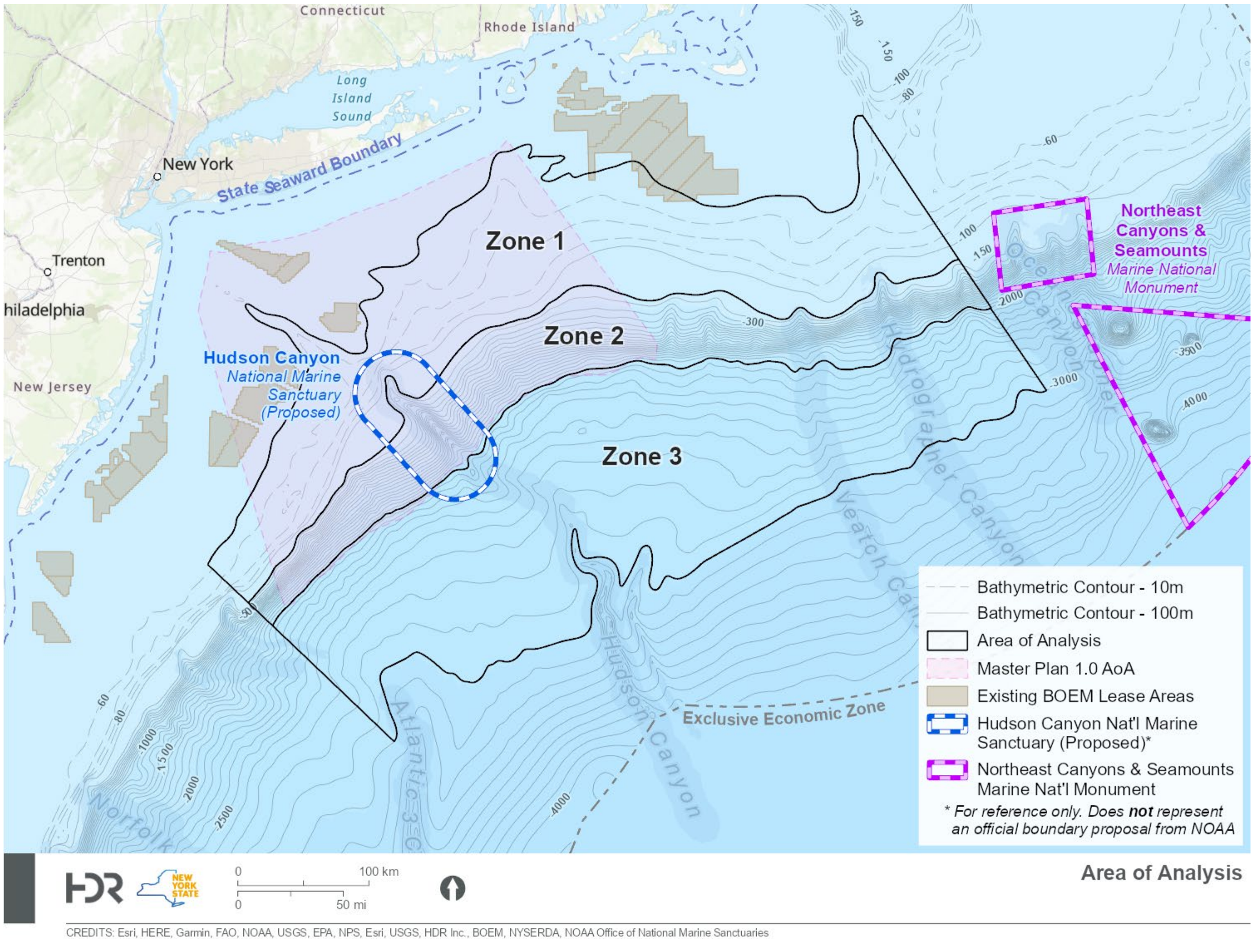
The spatial studies evaluate potential areas for deepwater OSW within a specific geographic AoA of approximately 35,670 square miles of ocean area extending from the coast of Cape Cod south to the southern end of the New Jersey (Figure 1). It includes three zones extending outward from the 60-meter depth contour, which ranges between 15 and 50 nautical miles from shore to the 3,000-meter contour, which ranges from 140 to 160 nautical miles from shore.

The eastern edge of the AoA avoids Nantucket Shoals and portions of Georges Bank, since those areas are well known to be biologically and ecologically important for fish and wildlife, fisheries, and maritime activity. The AoA does include areas such as the Hudson Canyon, which is under consideration to be designated as a National Marine Sanctuary and, thus, unlikely to be suitable for BOEM site leases. While offshore wind infrastructure will not be built across the entire AoA, the spatial studies analyze a broad expanse to provide a regional context for these resources and ocean uses.

- Zone 1 is closest to shore and includes a portion of the Outer Continental Shelf. It extends from the 60-meter contour out to the continental shelf break (60 meters [197 feet] to 150 meters [492 feet] deep). Zone 1 is approximately 12,040 square miles.
- Zone 2 spans the steeply sloped continental shelf break, with unique canyon geology and habitats (150 meters [492 feet] to 2,000 meters [6,561 feet] deep). Zone 2 is approximately 6,830 square miles.
- Zone 3 extends from the continental shelf break out to 3,000 meters (9,842 feet) depth. Zone 3 is approximately 16,800 square miles.

Zone 2, stretching across the steeply sloped continental shelf break with its distinctive canyon geology and unique habitats, is unlikely to host offshore wind turbines, but is still likely to be impacted by OSW activities through maritime traffic and/or cabling; therefore, Zone 2 is included in this study. The underwater canyons in this region are distinctive and ecologically significant, making Zone 2 an area of particular interest for scientific research, conservation efforts, and fish and benthic habitats. Another crucial factor prompting this analysis is the presence of electrical cabling in the area, which can have several environmental implications, including electromagnetic fields (EMF) that might disrupt marine life and the physical disturbance of the seafloor during installation. Lastly, maritime vessel activities throughout the zone could involve shipping traffic, fishing, and other recreational activities related to the sea, which can introduce pollutants, noise, and physical disturbances such as vessel strikes that may have adverse effects on the surrounding environment.

Figure 1. Area of Analysis



1.3 Study Objectives

The objectives of this study are as follows:

1. Compile and synthesize the best available data on fisheries, fish habitat and species of importance within the AoA. Depict areas of greatest (or least) risk based on data reviewed.
2. Discuss gaps in data and provide recommendations on how to close data gaps.
3. Review and summarize existing data and literature on the potential impacts of each phase of deepwater OSW on fish and fisheries resources.
4. Provide guidelines on best practices for avoiding, minimizing, and mitigating impacts to fish and fisheries from deepwater OSW.
5. Describe the uncertainties in impact assessment, including potential cumulative effects.
6. Provide summary of locations of potential risk to fish and fisheries for deepwater OSW, based on results of this study.

Results of this study are intended to inform the relative risk that potential wind energy areas pose to fish and fisheries and identify potential permitting risks, building on the information collected from previous tasks.

This identification process should help to provide detail on relative conflicts across the AoA, areas of least conflict, areas to consider avoiding based on high-ecological and/or high-economic importance, and any aspects of these that warrant further consideration by BOEM to inform their decision making. Further, analysis of data may help shape the spatial or temporal trends or identify data sources that require in-depth modeling to gather a better understanding of the identified AoA.

This study is one of a series of environmental desktop studies that synthesize available and relevant existing data sets on four key resources groups: marine mammals and sea turtles, birds and bats, fish and fisheries, and benthic habitats. Each of these studies leverages information developed for the New York Offshore Wind Master Plan and expands on the type of habitat and species within the AoA that are found in deep water and identifies potential stressors from different phases of OSW to each resource group, with a focus on deepwater technology. A fifth study builds upon and compiles the results from the four studies into a single environmental sensitivity analysis and presents a series of maps showing areas of greatest risk from OSW.

The report organization for this study focuses on fish and fisheries resources within the AoA. Section 1 describes the study area, report objectives, regulatory framework, and stakeholder engagement process. Section 2 discusses methods used for the literature review and data collection process, geospatial analysis, and gap analysis, while section 3 presents the results of the study analysis. Section 4 discusses the potential stressors associated with each phase of deepwater OSW by AoA zone and how they may affect the fish and fisheries resources identified in section 3. Section 5 provides an overview of existing guidance documents established within the industry to avoid, minimize, and mitigate the potential impacts from these stressors, while section 6 summarizes the key uncertainties in impact assessment, including the combined effects of multiple OSW projects, potential hydrodynamic and oceanographic changes resulting from the presence of in-water structures, and effects of climate change on fish and fisheries resources. Section 6 also identifies important knowledge gaps and provides a list of future considerations for addressing these gaps and to assist in the planning and siting of deepwater OSW projects, while protecting to the greatest extent possible the nation’s fish and fisheries resources.

1.4 Regulatory Framework

The Outer Continental Shelf Lands Act (OSCLA) (43 U.S.C. §1331 et seq.) defined submerged lands under federal jurisdiction as the OCS and assigned authority for leasing to the Secretary of the Interior. In 2005, the Energy Policy Act (42 U.S.C. §13201 et seq.) amended the OCSLA to clarify uncertainties about offshore wind and granted development authority to the Secretary of the Interior. 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. BOEM Office of Renewable Energy Programs facilitates the responsible development of renewable energy resources on the OCS. BOEM is currently in the planning and analysis phase of identifying deepwater WEAs off of the New York and New Jersey (NJBPU 2020) coastline. This phase is to collect information, reduce potential conflicts of use, and identify areas that are potentially suitable for lease sale. BOEM conducts an environmental assessment once the WEA is established.

The relevant federal and state laws, regulations, and policies that pertain directly to fish and fisheries are summarized in Table 1. The Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA), as amended by the Sustainable Fisheries Act of 1996, is the primary law governing marine fisheries in U.S. federal waters. Important commercial and recreational fisheries are managed by the principle of protecting and maintaining Essential Fish Habitat (EFH), which is defined as "those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity" (NOAA 2023b). EFH designations emphasize the importance of habitat protection to healthy fisheries and serve to protect and conserve the habitats of marine and estuarine finfish, mollusks, and crustaceans. Under the EFH definition, necessary habitat is that which is required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem.

Table 1. Relevant Fish and Fisheries Laws and Regulations

Laws, Regulations, and Groups	Overview
Federal	
Endangered Species Act	• Allows U.S. Fish and Wildlife Service (USFWS) and the National Oceanic and Atmospheric Administration (NOAA) Fisheries to list species as endangered or threatened. • Prohibits take of endangered/threatened species without federal permit. • Recommends federal agencies to consult USFWS and/or NOAA regarding safety of proposed actions toward critical habitats and requires consultation take place for federal actions. • In the case of adverse effects, formal consultation is to take place and results in a Biological Opinion and Incidental Take Statements as warranted.
Magnuson-Stevens Fishery Conservation and Management Act	• Governs marine fisheries management in U.S. federal waters up to 200 nautical miles from shore. • Aims to increase the economy, keep seafood supplies safe, prevent overfishing, and recover overfished stocks. • Amended by the 1996 Sustainable Fishery Act to provide resources to identify and protect federal marine and anadromous fish species' habitats (EFH).
Coastal Zone Management Act of 1972	• Administered by NOAA to establish appropriate development, restoration, and conservation of coastal and shoreline resources. • Outlines the effects of proposed federal projects that would result in approval and ensures consistency in coastal practices with state policy.
Outer Continental Shelf Lands Act of 1953	• Defines the outer continental shelf and lends the federal government basic authority over the area and its natural resources for oil and gas exploration. • States guidelines for leasing and management of the region. • Places the Secretary of the Interior in the position to lead mineral exploration and development, grant leases, and formulate regulations.
National Environmental Policy Act of 1969	• Requires federal agencies to assess environmental effects of development and activities prior to permitting decisions with an environmental assessment (EA), environmental impact statement (EIS), and/or finding of no significant impact (FONSI), depending on significance level of impact. • Requires opportunities for public input during the environmental impact review process.
Council on Environmental Quality	• Established by National Environmental Policy Act (NEPA). • Operates within the Executive office of the President to promulgate guidelines for all federal agencies to follow procedures in NEPA. • Reviews and approves federal agency NEPA procedures.

Table 1 continued

Laws, Regulations, and Groups	Overview
State	
New York State threatened and endangered species regulation under the ESA	• Implemented and promulgated by the New York State Department of Environmental Conservation (DEC). • Allows DEC to list species as endangered or threatened. • Prohibits the taking of endangered/threatened species without state permit. • Recommends entity consult with DEC to request a determination whether activity is subject to regulation. • In the case of adverse effects, formal consultation is to take place and may result in an incidental take permit.
New Jersey Endangered Species Conservation Act of 1973, Title 23	• Protects endangered or threatened plants and animals in-state.
New York State Public Lands Law	• Involves the DEC in the reviewal process of proposed state submerged lands easements obtained from the Office of General Services (OGS). Review results in either concurring with the joint approval without conditions, a recommendation to the OGS for protection of natural resources, or the decision that the natural resources cannot be adequately protected
New York State Public Service Commission	• Administers a certificate of approval to transmission lines within State waters, under the Public Services Law.
Councils and Commissions	
Atlantic States Marine Fisheries Commission	• Comprised of three representatives from 15 Atlantic coast states and Pennsylvania (the director of the state's marine fisheries management agency, a state legislator, and a state governor-appointed individual to represent stakeholders). • Responsible for the conservation and management practices of inshore fishery species. • Promotes responsible use of marine fishery resources within the states' jurisdictional waters. • Develops and implements interstate fishery management plans to govern fishery conservation and use.
New England Fishery Management Council	• Created by the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) in 1976. • Member states are Maine, New Hampshire, Massachusetts, Rhode Island, and Connecticut. • Members include each constituent states' fish and wildlife agencies representatives, the NOAA Fisheries Regional Administrator for the Greater Atlantic Region, and private citizens with knowledge on recreational fishing, commercial fishing, or marine conservation. • Develops fishery management plans, recommends management strategies to the Secretary of Commerce through NOAA Fisheries, manages region-specific species through fishery management plans.

Table 1 continued

Laws, Regulations, and Groups	Overview
Councils and Commissions Continued	
Mid-Atlantic Fishery Management Council	• Created by the MSFCMA in 1976. • Member states are New York, New Jersey, Pennsylvania, Maryland, Delaware, Virginia, and North Carolina. • Members include each constituent states' fish and wildlife agencies representatives, the NOAA Fisheries Regional Administrator for the Greater Atlantic Region, and private citizens with knowledge on recreational fishing, commercial fishing, or marine conservation. • Develops fishery management plans, recommends management strategies to the Secretary of Commerce through NOAA Fisheries, manages region-specific species through fishery management plans.
New York State Marine Resource Advisory Council	• Advises the DEC on proposed regulations, including those for marine fisheries, and marine resource protection, utilization, and marine resource related issues. • Reviews the allocations and expenditures for marine resources made by the DEC. • Works with commercial and recreational harvesters on marine resources programs.
New Jersey Marine Fisheries Council	• Advises the NJDEP Commissioner on marine fishery- related issues, management programs for marine fishery resources, and departmental policies. • Representatives on the council include recreational and commercial fishers, fish processors, the general public, and the Atlantic Coast and Delaware Bay subsections of the Shellfisheries Council. • Has the ability to veto marine fishery regulations proposed by the New Jersey Department of Environmental Protection (NJDEP) Commissioner, aids in the preparation of fishery management plans, holds marine fishery-related public hearings and species-related citizen panels.
New Jersey Shellfisheries Council	• Part of NJDEP Division of Fish, Game, and Shellfisheries. • Split into groups with jurisdiction over the Delaware River, Delaware Bay, and their tributaries, and the Atlantic Coast Section and its in-state tidal waters. • Proposes policies to preserve and better N.J.'s shellfish industry. • Advises the NJDEP Commissioner and New Jersey Marine Fisheries Council (NJMFC) on the implementation of shellfish programs and sets terms and fees for leasing shellfish grounds with Commissioner approval.

1.5 Agency and Stakeholder Engagement

Stakeholder engagement is and will continue to be integral to the Fish and Fisheries Data Aggregation Study to gather feedback and guidance for identifying potential data gaps, understanding commercial and recreational fishery use, and obtaining relevant data sets and planning studies within and adjacent to the AoA. NYSERDA is committed to engaging fisheries stakeholders in offshore wind planning processes.

Building on NYSERDA's previous and ongoing collaboration, a comprehensive stakeholder engagement process was established for this Fish and Fisheries Data Aggregation Study that facilitated two-way dialogue and sharing of information. The process provided multiple opportunities for stakeholders to voice their opinions and participate in technical working groups (TWGs), project advisory committees (PACs), and periodic virtual "office hours" meetings, as described below. State agency partners were also engaged in the review of this study, consisting of New York State Department of State, New York State Department of Environmental Conservation, New York State Office of Parks, Recreation, and Historic Preservation, New York State Department of Transportation, Empire State Development, New York Department of Public Service, New York State Office of General Services, and New York State Department of Labor. The feedback and guidance received from the stakeholders was used to inform and guide the development of the sensitivity analysis (risk assessment) and guidance documents to be considered during the future siting, construction, and operation of OSW energy projects within the AoA.

During the development of this Fish and Fisheries Data Aggregation Study, the project team was supported by a PAC with broad representation across the industry, including members from National Oceanic and Atmospheric Administration (NOAA) Fisheries; state regulatory agencies; fishing industry and OSW developers as well as representatives from the Responsible Offshore Science Alliance (ROSA), a nonprofit organization leading a collaborative effort to advance research and monitoring on the potential effects of offshore wind on fisheries; and the Responsible Offshore Development Alliance (RODA), a regional coalition of fishing industry associations and fishing companies committed to improving the compatibility of new offshore development with the fishing industry.

The Fisheries PAC met during the early phases of the report development and assisted with review of draft deliverables and provided important technical input to the project team. Specifically, the Fisheries PAC provided valuable feedback on the list of available data sources and references used in the Fish and

Fisheries Data Aggregation Study and their applicability to the study objectives; and when necessary, assisted the project team in obtaining access to the best and most recently available data, thereby improving the overall completeness of the study.

The Fisheries Technical Working Group (F-TWG) is an independent advisory body led by NYSERDA and the New York State Department of Environmental Conservation (DEC) and comprised of regional commercial fishery representatives and offshore wind energy developers who provide guidance on how to responsibly implement efforts to advance offshore wind energy development in the eastern United States.

The project team for this Fish and Fisheries Data Aggregation Study participated in two F-TWG meetings: on April 10, 2023, and on September 22, 2023, to present an overview of the Fish and Fisheries Data Aggregation Study and timeline for engagement activities. During the September meeting, the project team presented the draft study results, highlighted comment themes, and discussed the next steps in the study process.

Understanding and valuing fishing communities requires understanding and valuing fishermen and their knowledge of the sea. Fishermen's expert knowledge of the fisheries and environment, and its utility via cooperative fisheries research, has been well-documented and respected (NJDEP 2022; MARCO 2023; NOAA 2023zn; NYSDOS 2023). Using local ecological knowledge held by fishermen, and other ocean users, can provide potential developers and policymakers alike with valuable information that cannot be found in literature or data banks (NOAA 2023e). Therefore, during the development of this Fish and Fisheries Data Aggregation Study, the F-TWG held four virtual "office hours" meetings to gain fishing industry perspectives on deepwater wind technologies and development within the AoA. Goals for the office hour meetings included providing an overview of the spatial studies and a forum for the fishing industry to engage, explore, and coordinate views and comments on the process. Invitations were sent to F-TWG members and other fisheries stakeholders Fishing industry participants were encouraged to join throughout the two-hour session to ask questions, make comments and suggestions, and participate in discussions. Participants that attended represented both commercial and recreational fishing interests. Staff from NYSERDA, Tetra Tech, the Consensus Building Institute (CBI), and the Cadmus Group were present to provide technical, logistical, and facilitation support.

The office hours meetings were held remotely by webinar on:

- Thursday June 1, 2023: 4:00–6:00 p.m.
- Monday June 26, 2023: 12:00–-2:00 p.m.
- Monday July 17, 2023: 5:00–7:00 p.m.
- Tuesday August 15, 2023: 6:00–8:00 p.m.

The comments received from the office hours and engagement process include, but are not necessarily limited to, concerns about potential changes to oceanographic processes, such as the cold pool and gulf stream, potential impacts to larval dispersal patterns, habitat conversion, habitat restoration following OSW, a lack of data available for Zone 3, and the inclusion of all available fisheries data sets into the analysis. Some comments were specifically related to stressors to the fishing industry, including concerns over the loss of historical fishing grounds, revenue losses, impacts to shoreline communities dependent upon viable fisheries, complications with fishing gear and floating OSW platforms, and navigational hazards. The comments and concerns were reviewed and incorporated, as possible, into this final draft. A summary of the office hours meetings, stakeholder engagement processes, and findings for this Fish and Fisheries Data Aggregation Study are presented in appendix A.

2 Methods

For this study, a detailed review of the available literature was conducted to identify the current scientific knowledge of fish and fisheries within the AoA, the overall affected environment, and any potential impacts that may occur from OSW to those resources. Publications and primary data sets were selected based upon species relevance, the spatial extent of the study, interactions specific to OSW, and the concerns of the commercial and recreational fishing industry. Sources include the primary scientific literature, research reports, and information from federal and state agencies, including NOAA, BOEM, and NYSERDA, and ongoing OSW construction projects within the northeast. Stakeholder concerns and recommendations were considered throughout the fisheries assessment process during periodic consultations with the scientific community and through a dedicated stakeholder engagement process described above and in appendix A.

Biological data were used to describe the ecology of the AoA and identify specific habitat and species potentially impacted by OSW within the Mid-Atlantic Bight. These data were spatially evaluated and summarized to identify gaps and, where additional scientific information or data surveys could be needed, to comprehensively evaluate the potential impacts to all zones of the AoA. Coordination with the scientific and industry stakeholders helped identify historical fishery studies relative to the AoA and key commercial and recreational fisheries to be considered. A list of fish and shellfish species that occur within the AoA was compiled using geographic information system (GIS) maps created from fisheries survey data that were provided by NOAA Fisheries (NEFSC 2023a,b,c,d). The selection of these data was based upon current surveys conducted within the AoA and include up-to-date information on fish habitat and species distribution.

For this study, critical habitat areas for fish and fisheries were identified using the NOAA EFH mapper for species managed by both the New England and Mid-Atlantic Fishery Management Councils (NOAA 2023b). Data were downloaded and mapped, and included additional source layers to identify Endangered Species Act (ESA)—listed and candidate species, Atlantic Highly Migratory Species (HMS), as well as to evaluate Habitat Areas of Particular Concern (HAPCs) and other sensitive marine habitats that occur within the AoA (NOAA 2023a,b). In addition, proposed marine sanctuary and national monument areas, such as the Hudson Canyon and Seamounts National Monument, were identified and mapped to assist in the evaluation of critical fish habitat and species of concern.

Commercial and recreational fisheries of the AoA were assessed using maps created from fisheries survey data provided by NOAA Fisheries (NEFSC 2023a,b,c,d) to identify locations of potential impacts from OSW. The University of Massachusetts School of Marine Science and Technology (SMAST) provided reports of scallop density within the AoA (Bethoney and Stokesbury 2019). Vessel tracking data acquired from the U.S. Coast Guard (USCG) and NOAA were used to create GIS maps of fishing vessel usage in the AoA (USCG 2023a; NOAA 2023zf). NOAA also provided figures of fishing vessel usage in the AoA and fishing industry revenue reports for the AoA boundaries (NOAA 2023f,g,zk,zl). The complete list of data sources consulted for this study, and where they were applied, is provided in appendix B.

Note that data confidentiality laws may limit the data shared by government agencies that are presented in this Fish and Fisheries Data Aggregation Study report. Associated tables, figures, and the results of appended reports may not capture all aspects of each fishery that is present within the AoA. However, BOEM has access to confidential data and can base future decisions upon those fisheries data, which may not appear fully represented in this study.

3 Fish and Fisheries within the Area of Analysis

The AoA is located within the New York Bight, which includes the continental shelf waters offshore of Long Island, New York, and New Jersey, just outside of the Nantucket Shoals offshore of Rhode Island and Cape Cod. A diversity of fish habitat, fish species, and commercial and recreational fisheries occur within the region and are discussed in this section.

3.1 Fish Habitat of the Area of Analysis

The incredible diversity of fish species and abundance within the AoA is created in part by the dynamic habitats of the continental shelf and the unique hydrodynamics of the Mid-Atlantic Bight, where the prominent ocean currents of the Gulf Stream carry warm water from the Gulf of Mexico northward along the east coast of the United States and Canada, then eastward toward Europe into the Norwegian Sea (NOAA 2023zh). The Gulf Stream is created by a large, oceanic gyre called the North Atlantic Subtropical Gyre, which circulates water throughout the Atlantic Ocean (NOAA 2023zh). Mesoscale eddies are formed off the edge of the Gulf Stream, which mix water masses and influence thermal distribution, salinity, and the transportation of nutrients along the continental shelf, creating complex marine ecosystems where a diversity of fish species thrive (Devine et al. 2021). As warm Gulf Stream water is carried northward in the Atlantic Ocean, it causes colder water to sink into the depths of the ocean and eventually move south to Antarctica (NOAA 2023zh).

Beginning in the spring, the Cold Pool is an oceanic condition that occurs in the bottom water of the Mid-Atlantic Bight that is caused by cold water movement from the Arctic (Lentz 2017; Friedland et al. 2022). This stratification continues throughout the summer and fall and provides unique habitat for cold water species that are important to fisheries that would otherwise be absent in the region, such as yellowtail flounder (*Limanda ferruginea*), ocean quahog (*Arctica islandica*), and Atlantic Sea scallop (*Placopecten magellanicus*) (Sullivan et al. 2005; Friedland et al. 2022). The Cold Pool also affects the seasonal migrations of recreationally important species such as striped bass (*Morone saxatilis*) (Friedland et al. 2022).

3.1.1 Zone 1

The shallowest part of the AoA is within Zone 1, which is located over the continental shelf where water-column depth ranges from 60 to 150 meters. Sand and gravel primarily comprise the seafloor sediment here, but areas of rock, gravel, silt, and mud are also present (NYSERDA 2017). The Hudson Canyon bisects the New York Bight seaward to the shelf break in Zone 1 and provides diverse habitat for a variety of marine species (NOAA 2023h).

3.1.2 Zone 2

Zone 2 of the AoA is located on the edge of the continental shelf and extends to the continental slope, where the water depth ranges from 150 to 2,000 meters. Fine sediments such as silt and clay are common on the edge of the shelf; sediment on the continental slope is primarily mud (NEFSC 2023e). Several submarine canyons are in Zone 2, which are unique to the area, including the Hudson Canyon. The submarine canyons are located along the edge of the continental shelf and support diverse marine ecosystems that include species of deep-sea coral that attract and provide structural habitat for many species of fish and shellfish (NMFS 2017; NYSERDA 2017). Seasonally variable ocean currents are influenced by the seafloor bathymetry of each of the canyons where upwelling carries nutrient-rich water to the surface and generates phytoplankton blooms (NYSERDA 2017; NOAA 2023i). Productive waters along the edge of the continental shelf are often targeted by fishing vessels because of the diversity of fish species that are present.

3.1.3 Zone 3

Zone 3 of the AoA is located seaward of the shelf break and includes the continental rise where the ocean reaches depths of 3,000 meters. While sediments found on the continental shelf are primarily created by erosion from land, the sediments of the continental rise contain settled particles and debris from the water column with a higher amount of dead organic matter and plankton (Pratt 1968; Middleton 2023). The deep water of Zone 3 does not provide the same habitat diversity found along the continental shelf and submarine canyons of the shelf break; therefore, few demersal species are found there. However, the offshore waters of Zone 3 are home to many species of migratory fish that seasonally travel through the Mid-Atlantic region.

3.1.4 Essential Fish Habitat

EFH is defined as the habitat required by fish and other marine animals for survival, reproduction, and maturity (NOAA 2023b). NOAA Fisheries works to protect EFH to sustain viable commercial and recreational fisheries, replenish declining fish stocks, and help support overall ecosystem health (NOAA 2023b). A total of 63 species were identified with designated EFH in the AoA and 39 of the species have EFH designated for every life stage (Table 2). There are 62 species with designated EFH for at least one life stage in Zone 1, 55 species with designated EFH in Zone 2, and 29 species with designated EFH in Zone 3. The list of EFH-designated species and life stages identified within each zone of the AoA are presented in Table 2. Geospatial summaries of EFH within the AoA are presented in section 3.4.

In addition, BOEM identified habitat that could potentially be disturbed by OSW activities in the New York Wind Energy Area (NY WEA) and the Rhode Island/Massachusetts Wind Energy Area (RIMA WEA), which border and occur within Zone 1 of the AoA (Guida et al. 2017). Habitat within Zone 1 that could potentially be impacted by OSW includes black sea bass (during warmer months), Atlantic cod (during cold months), longfin squid eggs (during warmer months), sea scallop, surfclam, and ocean quahog (Guida et al. 2017).

Table 2. List of Fish and Shellfish Species with Designated Essential Fish Habitat within the Area of Anaysis

Note: Most shark species comprise HMS EFH.

Source: NOAA (2023b).

Common Name	Scientific Name	Life-stage	Zone Presence		
			Z1	Z2	Z3
Mid-Atlantic Finfish Species					
Atlantic Butterfish	*Peprilus triacanthus*	Eggs	Y	Y	N
		Larvae	Y	Y	N
		Juvenile	Y	Y	N
		Adult	Y	Y	N
Atlantic Mackerel	*Scomber scombrus*	Eggs	Y	Y	N
		Larvae	Y	Y	N
		Juvenile	Y	Y	N
		Adult	Y	Y	N
Black Sea Bass	*Centropristis striata*	Larvae	Y	Y	N
		Juvenile	Y	Y	N
		Adult	Y	Y	N

Table 2 continued

Common Name	Scientific Name	Life-stage	Zone Presence		
			Z1	Z2	Z3
Bluefish	*Pomatomus saltatrix*	Eggs	Y	Y	N
		Larvae	Y	Y	Y
		Juvenile	Y	Y	Y
		Adult	Y	Y	N
Golden Tilefish	*Lopholatilus chamaeleonticeps*	ALL	Y	Y	N
Scup	*Stenotomus chrysops*	Juvenile	Y	Y	Y
		Adult	Y	Y	N
Summer Flounder	*Paralichthys dentatus*	Eggs	Y	Y	N
		Larvae	Y	Y	N
		Juvenile	Y	N	N
		Adult	Y	Y	N
New England Finfish Species					
Acadian Redfish	*Sebastes fasciatus*	Larvae	Y	Y	N
		Juvenile	Y	Y	N
		Adult	N	Y	N
American Plaice	*Hippoglossoides platessoides*	Eggs	Y	N	N
		Larvae	Y	Y	N
Atlantic Cod	*Gadus morhua*	Eggs	Y	Y	N
		Larvae	Y	Y	N
		Juvenile	Y	N	N
		Adult	Y	N	N
Atlantic Halibut	*Hippoglossus*	ALL	Y	Y	N
Atlantic Herring	*Clupea harengus*	Eggs	Y	N	N
		Larvae	Y	N	N
		Juvenile	Y	Y	N
		Adult	Y	Y	N
Atlantic Wolffish	*Anarhichas lupus*	ALL	Y	N	N
Haddock	*Melanogrammus aeglefinus*	Eggs/Larvae/Juvenile	Y	Y	N
		Adult	Y	N	N
Monkfish	*Lophius americanus*	Eggs/Larvae	Y	Y	Y
		Juvenile	Y	Y	N
		Adult	Y	Y	Y
Ocean Pout	*Zoacres americanus*	Eggs	Y	N	N
		Juvenile	Y	N	N
		Adult	Y	N	N
Offshore Hake	*Merluccius albidus*	Eggs	Y	Y	Y
		Larvae	Y	Y	Y
		Juvenile/Adult	Y	Y	N

Table 2 continued

Common Name	Scientific Name	Life-stage	Zone Presence		
			Z1	Z2	Z3
Pollock	*Pollachius virens*	Eggs	Y	Y	N
		Larvae	Y	Y	N
		Juvenile	Y	N	N
		Adult	Y	Y	N
Red Hake	*Urophycis chuss*	Eggs/Larvae/Juvenile	Y	N	N
		Adult	Y	Y	N
Silver Hake	*Merluccius bilinearis*	Eggs/Larvae	Y	Y	N
		Juvenile	Y	Y	N
		Adult	Y	Y	Y
White Hake	*Urophycis tenius*	Eggs/larvae/juvenile	Y	Y	N
		Adult	Y	Y	N
Windowpane Flounder	*Scophthalmus aquosus*	Eggs/larvae	Y	Y	N
		Juvenile	Y	N	N
		Adult	Y	N	N
Winter Flounder	*Pseudopleuronectus ameracanus*	ALL	Y	N	N
Witch Flounder	*Glytocephalus cynoglossus*	Eggs/larvae/juvenile	Y	Y	N
		Adult	Y	Y	Y
Yellowtail Flounder	*Limanda ferruginea*	Eggs/larvae	Y	Y	Y
		Juvenile/Adult	Y	N	N
Highly Migratory Finfish Species					
Albacore Tuna	*Thunnus alalunga*	Juvenile	Y	Y	Y
		Adult	Y	Y	Y
Bigeye Tuna	*Thunnus obesus*	Juvenile	Y	Y	Y
		Adult	Y	Y	Y
Blue Marlin	*Makaira nigricans*	Juvenile	Y	Y	Y
		Adult	Y	Y	Y
Atlantic Bluefin Tuna	*Thunnus thynus*	Eggs/larvae	Y	Y	Y
		Juvenile	Y	Y	Y
		Adult	Y	Y	Y
Longbill spearfish	*Tetrapturus pfluegeri*	ALL	Y	Y	Y
Roundscale Spearfish	*Tetrapturus georgii*	Juvenile	Y	Y	Y
		Adult	Y	Y	Y
Skipjack Tuna	*Katsuwonus pelamis*	Juvenile	Y	Y	Y
		Adult	Y	Y	Y

Table 2 continued

Common Name	Scientific Name	Life-stage	Zone Presence		
			Z1	Z2	Z3
Swordfish	*Xiphias gladius*	Juvenile	Y	Y	Y
		Adult	Y	Y	Y
White Marlin	*Kajikia albida*	Juvenile	Y	Y	Y
		Adult	Y	Y	Y
Yellowfin Tuna	*Thunnus albacares*	Juvenile	Y	Y	Y
		Adult	Y	Y	Y
Invertebrate Species					
Atlantic Sea Scallop	*Placopecten magellanicus*	ALL	Y	Y	N
Atlantic Surfclam	*Spisula solidissima*	Juvenile	Y	N	N
		Adult	Y	N	N
Atlantic Deep-Sea Red Crab	*Chaceon quinquedens*	Larvae/Juvenile	Y	Y	Y
		Eggs	Y	Y	N
		Adult	Y	Y	N
Longfin Inshore Squid	*Loligo pealeii*	Eggs	Y	N	N
		Juvenile	Y	Y	N
		Adult	Y	Y	N
Northern Shortfin Squid	*Illex illecebrosus*	Eggs/juvenile	Y	Y	N
		Adult	Y	Y	Y
Ocean Quahog	*Artica islandica*	Juvenile/Adult	Y	N	N
Skate Species					
Barndoor Skate	*Dipturis laevis*	Juvenile/Adult	Y	Y	N
Little Skate	*Leucoraja erinacea*	Juvenile	Y	N	N
		Adult	Y	N	N
Rosette Skate	*Leucoraja garmani*	Juvenile/Adult	Y	Y	N
Smooth Skate	*Malacoraja senta*	Juvenile	N	Y	N
		Adult	N	Y	N
Thorny Skate	*Amblyraja radiata*	Juvenile	Y	Y	N
		Adult	Y	Y	N
Winter Skate	*Leucoraja ocellata*	Juvenile	Y	N	N
		Adult	Y	N	N
*Shark Species**					
Basking Shark	*Cetrohinus maximums*	*ALL*	Y	Y	N
Bigeye Thresher Shark	*Alopias superciliosus*	ALL	Y	Y	Y
Blue Shark	*Prionace glauca*	ALL	Y	Y	Y
Common Thresher Shark	*Alopias vulpinus*	ALL	Y	Y	N
Dusky Shark	*Carcharhinus obscurus*	Neonate	Y	N	N
		Juvenile/Adult	Y	Y	Y
Longfin Mako Shark	*Isurus paucus*	ALL	Y	Y	Y
Night Shark	*Carcharhinus signatus*	ALL	Y	Y	Y
Porbeagle Shark	*Lamna nasus*	ALL	Y	Y	Y

Table 2 continued

Common Name	Scientific Name	Life-stage	Zone Presence		
			Z1	Z2	Z3
Sand Tiger Shark	*Carcharias taurus*	Neonate/Juvenile	Y	N	N
Sandbar Shark	*Carcharhinus plumbeus*	Neonate	Y	N	N
		Juvenile/Adult	Y	Y	N
Shortfin Mako Shark	*Isurus oxyrinchus*	ALL	Y	Y	Y
Silky Shark	*Carcharhinus falciformis*	ALL	Y	Y	Y
Smoothhound Shark Complex (Atlantic Stock)	*Mustelus spp.*	ALL	Y	Y	N
Spiny Dogfish	*Squalus acanthias*	Juvenile	Y	Y	Y
		Adult	Y	Y	N
Tiger Shark	*Galeocerda cuvier*	Juvenile/Adult	Y	Y	Y
White Shark	*Carcharodon carcharias*	Neonate	Y	Y	N
		Juvenile/Adult	Y	N	N

3.1.4.1 Essential Fish Habitat Life Histories

Life history descriptions of key deepwater EFH-designated species that are important to several deepwater fisheries are provided below, as determined through the literature review and recommended after consultation with the Fisheries PAC. Each of these species EFH zones preferences can be found in Table 2 above. Additional species life histories were reported in Masterplan 1.0 (NYSERDA 2017) and all EFH descriptions can be found in links provided in the NOAA EFH mapper (NOAA 2023zo).

Atlantic Bluefin Tuna

Atlantic bluefin tuna (*Thunnus thynus*) are a highly migratory species that live near the surface in temperate ocean waters and sometimes dive to depths ranging from 500 to 1000 meters (NOAA 2023u). Western Atlantic bluefin tuna spawn in the Gulf of Mexico from mid-April to June and are known to make migrations over thousands of miles to the boundary of the Eastern and Western Atlantic Ocean (NOAA 2023u). The species can be found in water temperatures ranging from 3 to 30 degrees Celsius (°C) (NOAA 2023u); diving patterns are associated with thermoregulation and allow bluefin tuna to cool their body temperature after spending time in warm surface water (Fromentin and Powers 2005). Egg fertilization occurs within the water column; post yolk-sac larvae are pelagic and prey upon zooplankton (Fromentin and Powers 2005). Juvenile and adult bluefin tuna are opportunistic feeders (Fromentin and Powers 2005); juveniles use moonlight to locate the silhouettes of their prey (Marcek et al. 2016).

Golden Tilefish

Golden tilefish (*Lopholatilus chamaeleonticeps*) are found on the outer continental shelf and upper continental slope at depths between 250 and 1,500 feet with temperatures ranging from 9 to 14 °C (NOAA 2023o). Tilefish burrow in mud or sandy sediments within the submarine canyons, but also prefer rock and boulder habitat. Golden tilefish larvae are pelagic and feed on plankton; juveniles and adults are demersal and live in coral reefs, rocky and soft-bottom substrate, and exposed limestone (NOAA 2017b). Adults are also attracted to artificial reefs such as sunken ships and bridges (NOAA 2017b). Golden tilefish aggregate on hard substrates offshore to spawn (NOAA 2017b). Eggs are pelagic and early larvae drift with plankton (NOAA 2023n). Nearshore habitat for larvae includes mangrove wetlands, submerged aquatic vegetation, oyster beds, and estuaries (NOAA 2017b). Adults create burrows where they live throughout their lifespan and do not migrate (NOAA 2023n).

Monkfish

Monkfish (*Lophius americanus*), or goosefish, are a demersal species that live in sand, mud, and shell hash substrate (NOAA 2023q). Monkfish have a wide temperature tolerance and inhabit a variety of depths within nearshore and offshore habitat, up to 3,000 feet deep (NOAA 2023q). Adult monkfish live partially buried on the ocean floor; however, monkfish occasionally use ocean currents to travel during seasonal migrations to spawn (NOAA 2023q). Spawning occurs from spring through fall; eggs are buoyant; post yolk-sac larvae are pelagic (NOAA 2023r). Juvenile monkfish are demersal and utilize benthic habitat, similar to the adult stage (NOAA 2023r). Adults migrate offshore throughout the summer and fall in the Mid-Atlantic region to avoid the warm temperatures associated with nearshore waters (NOAA 2023r).

Atlantic Deep-Sea Red Crab

Atlantic deep-sea red crabs (*Chaceon quinquedens*) are distributed along the continental shelf and slope of the Western Atlantic Ocean. Eggs hatch from the female abdominal flap; larvae are released into the water column and eventually settle onto the substrate where they grow into adults (Steimle et al. 2001). Pelagic larvae are found in warm surface waters along the continental slope where adult female crabs are often observed (Steimle et al. 2001). Juveniles live in cold deep water on the seabed of the outer and upper continental shelf, and the continental slope (Steimle et al. 2001). Juveniles settled around the middle of the continental slope at approximately 1,000 meters in depth, then move up the slope as they grow (Steimle et al. 2001). Deep-sea red crab prefers stable salinity of 35 to 36 parts-per-thousand (ppt) and temperatures between 4 and 10°C; the upper thermal threshold for adults is 12°C (Steimle et al. 2001). Life history information on the deep-sea red crab is limited and data on the stock status are sparse; however, National Marine Fisheries Service (NMFS) expects the fishery to be sustainable, based upon historical long-term landings (NOAA 2023 zg).

Northern Shortfin Squid

The northern shortfin squid (*Illex illecebrosus*) is a migratory species that lives for less than one year (NOAA 2023s). The shortfin squid inhabits waters along the continental shelf and slope, usually at depths between 150 and 275 meters (NOAA 2023s). During the summer and fall, shortfin squid can be found in shallow waters nearshore before migrating to the shelf break during late fall (NOAA 2023s). Spawning occurs off the coast of New Jersey and Rhode Island, primarily from October through June; their winter spawning habitat is unknown (NOAA 2023s; NOAA 2023t). Shortfin squid produce gelatinous egg masses that are buoyant and contain thousands of eggs (NOAA 2023t). Eggs hatch in one to two weeks; the upper temperature threshold for eggs and paralarvae is 12.5 °C (NOAA 2023t). An unknown portion of the population remains offshore year-round (NOAA 2023t).

Silver Hake

Silver hake (*Merluccius bilinearis*) are nocturnal predators that rest on the seafloor during the day: their preferred substrate is sand, mud, or pebbles (NOAA 2023p). At night, they move into the water column to feed (NOAA 2023p). Silver hake inhabit variable depths in the water column, from 11 to 500 meters, and tolerate temperatures from 2 to 17°C (NOAA 2023p). The species migrates according to the season and inhabits shallow water during the spring, then returns to deep water in the fall; spawning occurs in shallow water during late spring and summer (NOAA 2023p). Eggs are pelagic and found at depths between 50 and 150 meters; larvae are pelagic and inhabit depths of 50 to 130 meters (Lock and Packer 2004). Juvenile silver hake prefer muddy bottom habitat (Lock and Packer 2004).

3.1.4.2 Habitat Areas of Particular Concern

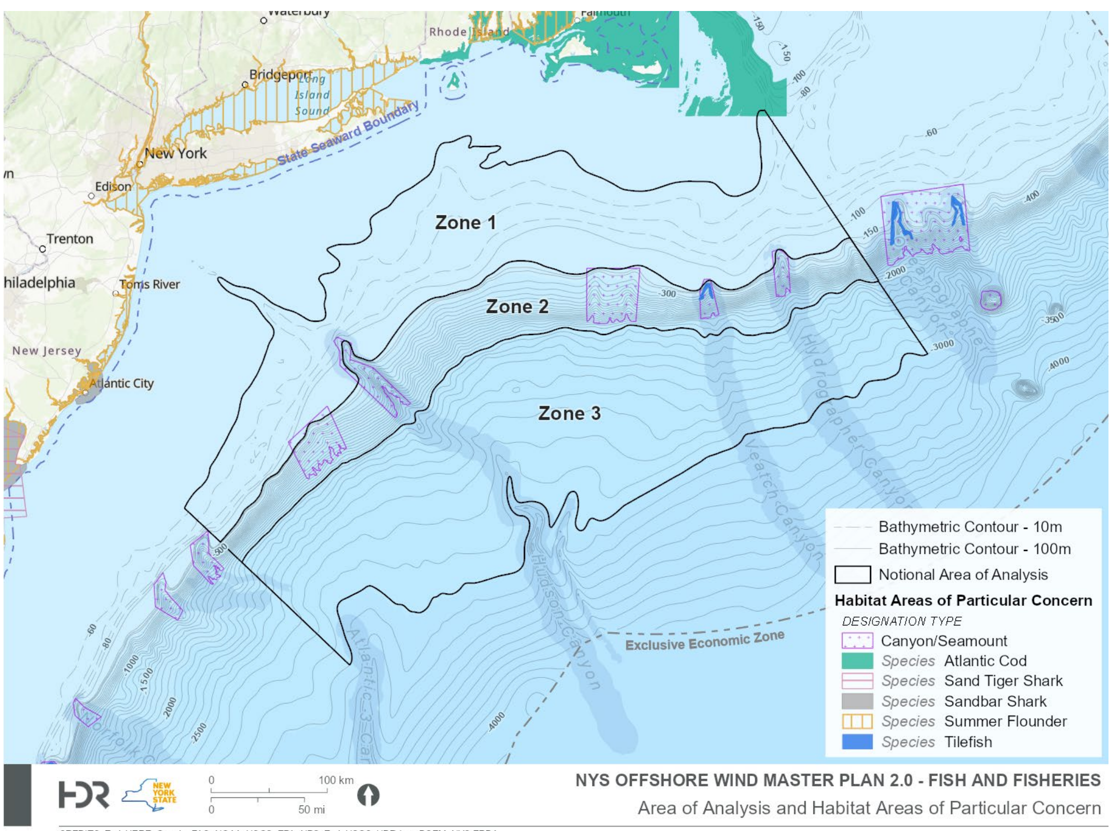
HAPCs are subsets of EFH that contain rare species or unique habitat, help support the survival and reproduction of federally listed species, may be particularly vulnerable to impacts from human activities, or a combination of these traits (NOAA 2023b). The federal designation of HAPCs allows for heightened awareness, study, and the conservation of fisheries, which are all highlighted during an environmental assessment (NOAA 2023b).

HAPC was identified and mapped within the vicinity of the AoA (Figure 2). Juvenile Atlantic cod HAPC was identified in a small portion of Zone 1 of the AoA, within the northeast corner. Several submarine canyon HAPCs were identified during the study: Wilmington Canyon, Toms, Middle Toms and Hendrickson Canyons, Hudson Canyon, Alvin and Atlantis Canyons, Veatch Canyon, Hydrographer Canyon and Oceanographer Canyon (NOAA 2023b). Within the Veatch Canyon HAPC, there is the tilefish HAPC.

In addition to the HAPCs mapped in Figure 2, NOAA has recently proposed designating HAPC for cod spawning grounds around OSW leases in Southern New England, which include the Cox Ledge lease area (NOAA 2023zp). The new designation was recommended by the New England Fishery Management Council (NEFMC) to protect Atlantic cod eggs, larvae, juveniles, and adults that utilize habitat in and around OSW platforms in Southern New England (NOAA 2023zp). This proposed HAPC would also include complex benthic habitat found at OSW lease sites, which are used for shelter and foraging habitat by the early life stages of fishes (NOAA 2023zp).

Figure 2. Map of Area of Analysis and Habitat Areas of Particular Concern

Source: NOAA 2023b.



3.1.5 Marine Sanctuaries and National Monuments

The Proposed Hudson Canyon Sanctuary is a submarine canyon that extends 350 miles from the outer continental shelf seaward into the shelf break (NOAA 2023h). The Hudson submarine canyon is one of the largest in the world and provides diverse habitat for a variety of marine species (NOAA 2023h). The canyon is located 100 miles southeast of New York City and spans as much as 7.5 miles in width and up to 2.5 miles in depth. The Hudson Canyon has been nominated as a marine sanctuary, and if designated, will conserve the ecological diversity, vital marine habitat, and cultural resources linked to some local indigenous communities (NOAA 2023h). The canyon's expansive size, unique structure, and marine diversity provides habitat for a variety of fish species that feed, spawn, and mature in the safety of the sanctuary (NOAA 2023h).

The Northeast Canyons and Seamounts National Monument was the first national monument in the Atlantic Ocean and is located 130 miles east-southeast of Cape Cod (NOAA 2023i) (Figure 1). This biodiverse marine ecosystem ranges 4,913 square miles and hosts a variety of sensitive species, including deep-sea coral, endangered sea turtles, whales, and many species of fish (NOAA 2023i). The monument features unique bathymetry with upwelling zones that carry nutrient-rich waters to the surface and support phytoplankton blooms, which form the foundation of food webs (NOAA 2023i). The monument is managed jointly by NOAA and the U.S. Fish and Wildlife Service (USFWS), who enforce regulations that protect its valuable resources (NOAA 2023i). The Northeast Canyons and Seamounts National Monument does not occur within the AoA but is located off the east side of Zone 2 and Zone 3.

3.2 Delineation of Fish Species Presence in the Area of Analysis

The temperate marine waters of the AoA are home to a wide variety of fish species and habitats that support many important commercial and recreational fisheries. Able and Fahay (2010) describes the habitat use of more than 125 common species in the waters of the Mid-Atlantic Bight, but the longest running source of reliable fish population data in the region is the annual Northeast Fisheries Science Center (NEFSC) Bottom Trawl Survey, which collected more than 190 species from Zones 1 and 2 of the AoA in the spring and fall between 2013 and 2022 (appendix C). Additional information about the Bottom Trawl Survey can be found in section 3.3.7.1.

The top 10 species collected in Zone 1 and Zone 2 of the AoA are presented in Figure 3 and Figure 4, respectively, according to the NEFSC Bottom Trawl Survey data from 2013 through 2022. The most abundant species collected in Zone 1 and Zone 2 was longfin squid (*Doryteuthis pealeii*) (26.1% and

30.1% of total catch, respectively) and the second-most common species was butterfish (*Peprilus triacanthus*), which accounted for 24.0% of the combined total in Zone 1 and 24.6% of the combined total in Zone 2. Sea scallop (*Placopecten magellanicus*) (13.1%) was the third most abundant species collected in Zone 1 and haddock (*Melanogrammus aeglefinus*) (11.8%) was the third most abundant species collected in Zone 2.

The NEFSC Bottom Trawl Survey is not conducted in Zone 3 of the AoA because of gear limitations in deeper water. To provide additional details on fish species that utilize Zone 3, NEFSC Fisheries Observer data from 2013–2022 was evaluated. The NOAA Fisheries Observer program provides fishery managers with information about the type of species caught with fishing tackle, including catch weight and total collected. However, it is important to note these data only provide partial coverage of the AoA, and the species surveyed are limited by gear selectivity. Additional information about the NOAA Fisheries Observer program can be found in section 3.3.5.

The top 10 species observed in Zone 3 of the AoA, according to data from the NOAA Fisheries Observer Program from 2013 through 2022, are presented in Figure 5. Monkfish (*Lophius americanus*) (7.5%) was the species most frequently observed by NOAA in Zone 3, followed by longfin squid and butterfish (6.5% and 5.9%, respectively). Several HMS were observed in Zone 3, including spiny dogfish (*Squalus acanthias*), swordfish (*Xiphias gladius*), basking shark (*Cetorhinus maximus*), and many other species of sharks, skates, and rays. American lobster (*Homarus americanus*) and Jonah crab (*Cancer borealis*) were the two most abundant shellfish species observed in Zone 3, respectively.

Figure 3. Ten Most Abundant Species of Zone 1 of the Area of Analysis

Source: NEFSC 2023a, b.

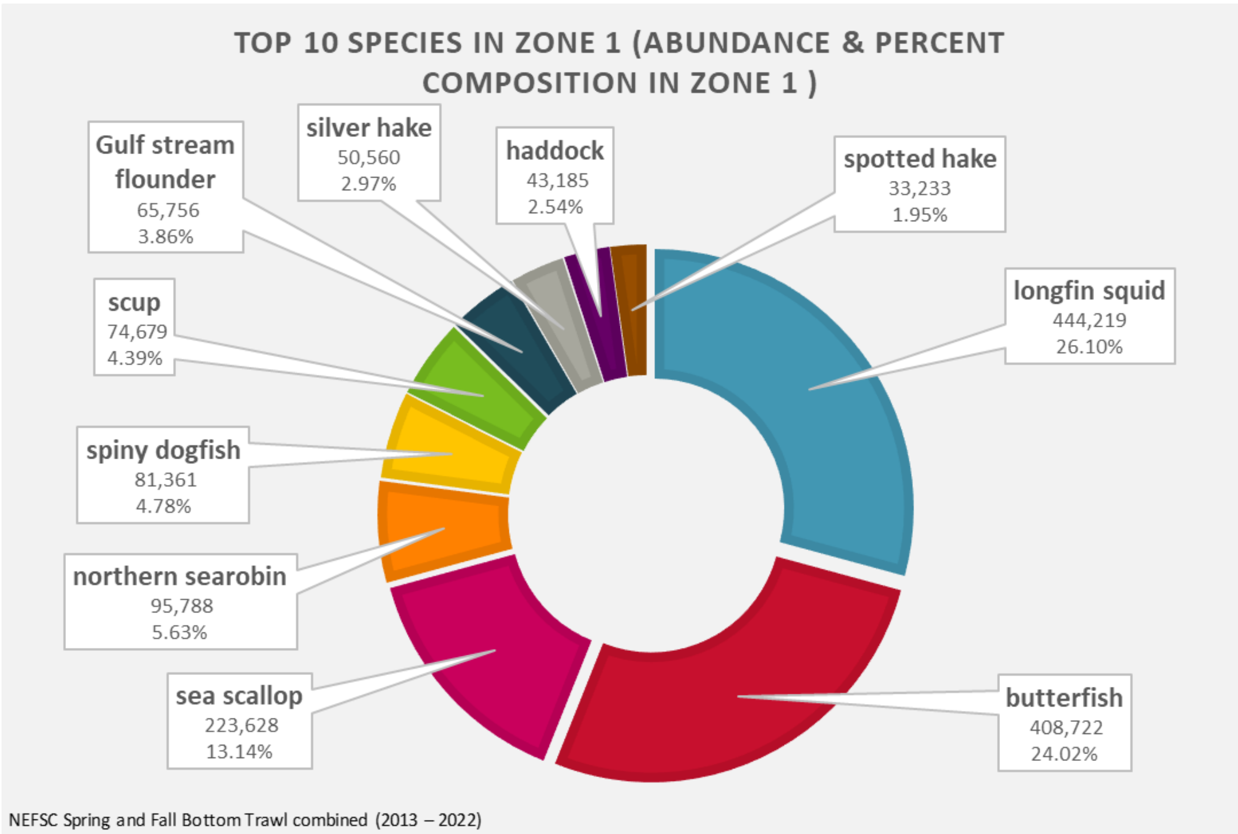


Figure 4. Ten Most Abundant Species of Zone 2 of the Area of Analysis by Percent Composition of Total Catch

Source: NEFSC 2023a, b.

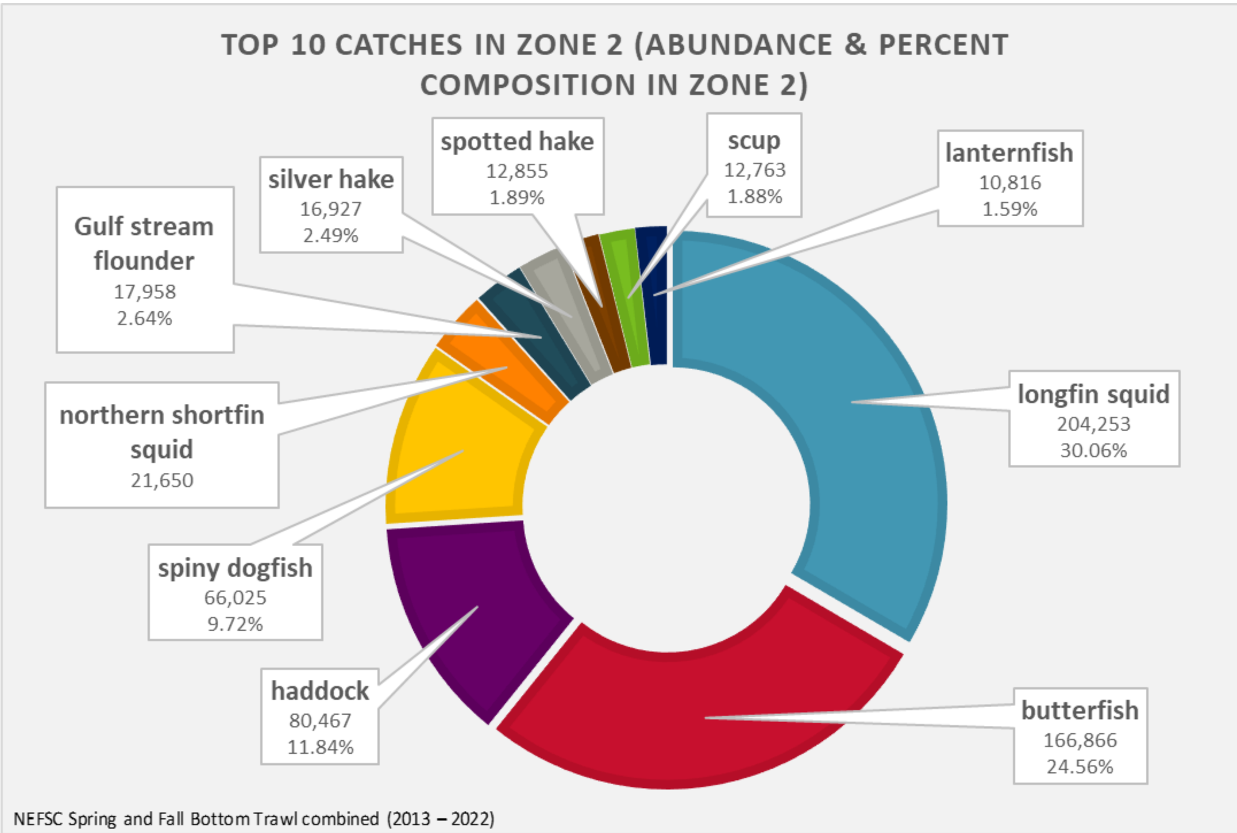
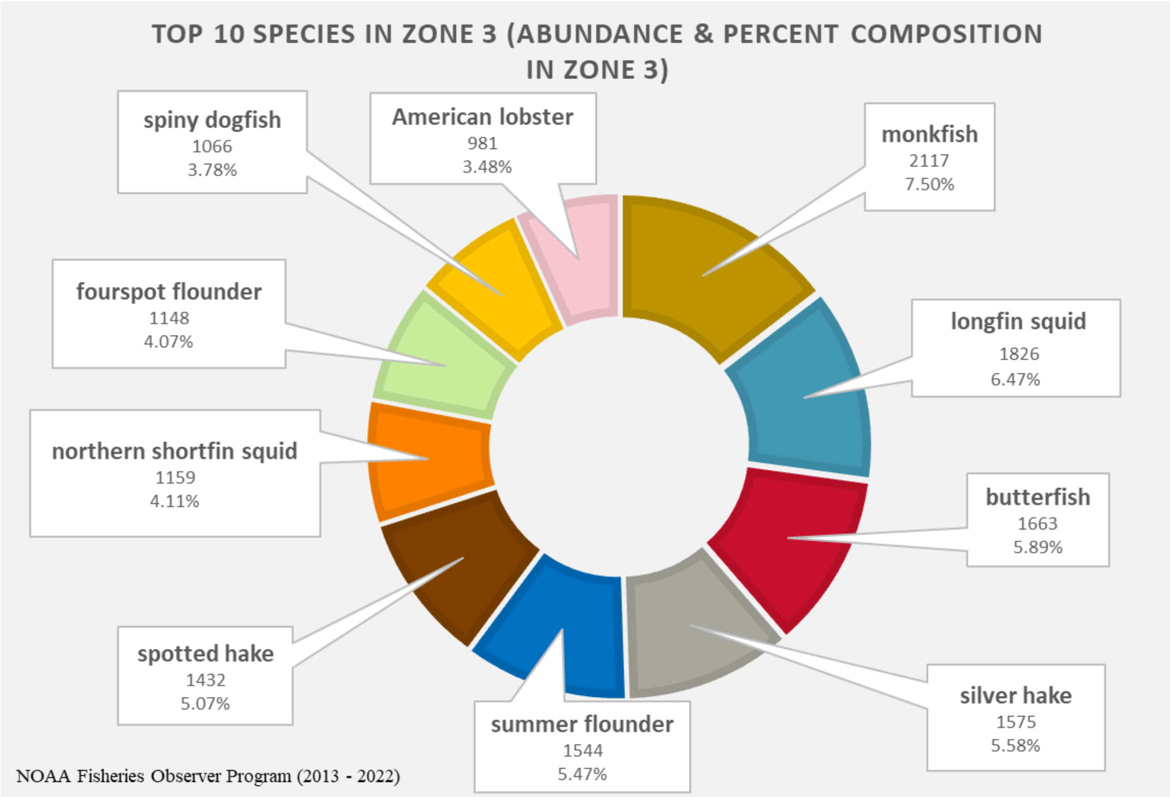


Figure 5. Ten Most Abundant Species of Zone 3 of the Area of Analysis by Percent Composition of Total Catch

Source: NEFSC 2023ze.



3.2.1 Endangered Species Act-Listed Threatened and Endangered Species

The entirety of the AoA falls under the jurisdiction of the NOAA Greater Atlantic Regional Fisheries Office and an evaluation of threatened and endangered species that occur within the AoA is presented in this section. Only one ESA-listed endangered species, Atlantic sturgeon, has a range within the AoA, according to the NOAA Section 7 mapper (NOAA 2023c). The shortnose sturgeon is an ESA-endangered species within the New England/Mid-Atlantic region; however, the species occurs within rivers and nearshore habitat outside of the AoA (NOAA 2023a,c). Atlantic salmon is another ESA-endangered species within the New England/Mid-Atlantic region; however, the listed Distinct Population Segment (DPS) is the Gulf of Maine and the species range does not overlap with the AoA (NOAA 2023a,c).

Two ESA-threatened species, the giant manta and the oceanic whitetip shark, are listed within the New England and Mid-Atlantic regions (NOAA 2023a). The giant manta has occasionally been reported along the edge of the continental shelf and within Hudson Canyon, but the species is considered uncommon within the AoA (NOAA 2023c). As of June 2023, no candidate species for ESA listing occur within the AoA (NOAA 2023a). The ESA-threatened and -endangered species that occur within the AoA are presented in Table 3. Descriptions and life-histories of each ESA-listed species are provided in this section. These species were also identified in the Master Plan where additional details are provided.

Table 3. List of ESA Threatened and Endangered Fish Species that Occur within the Area of Analysis

Note: E = ESA Endangered; T = ESA Threatened.

Source: NOAA 2023a,c.

Species	Status
Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*)	E/T
Oceanic whitetip shark (*Carcharhinus logimanus*)	T
Giant Manta (*Manta birostris*)	T

3.2.1.1 Life History Descriptions of Threatened and Endangered Species Identified in the Area of Analysis

Atlantic Sturgeon

Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*) are an ESA-listed species with five DPSs within the New England/Mid-Atlantic region. The species is listed as endangered within the Carolina, Chesapeake Bay, New York Bight, and South Atlantic DPS; and as threatened within the Gulf of Maine DPS (NOAA 2023a). No critical habitat for the Atlantic sturgeon occurs within the AoA; however, the subadult and adult range occurs throughout the AoA (NOAA 2023a,c).

Atlantic sturgeon are an anadromous species that spend most of their adult life in oceans and estuaries but return to their spawning rivers in the fall (NOAA 2023j). Their eggs are adhesive and are laid on hard surfaces in cold water. Atlantic sturgeon larvae require cold and clean water for development. Juveniles remain in their natal rivers for several months until they mature into sub-adults before migrating to the sea (NOAA 2023j). Non-breeding sub-adults and juveniles also sometimes migrate upriver. Atlantic sturgeon can live up to 60 years; however, southeast populations have a shorter lifespan of 25 to 30 years. Atlantic sturgeon are found in waters from 10 to 50 meters in depth, with hard bottom substrates such as cobble or gravel and sometimes sand (NOAA 2017a). Adult and juvenile sturgeon at sea have been documented to congregate over sandy substrates, while not spawning (ASMFC 2018).

Oceanic Whitetip Shark

Oceanic whitetip shark (*Carcharhinus logimanus*) are an ESA-listed threatened species that has experienced declines since the mid-1990s; along the Atlantic coast, declines of up to 88% have been documented (NOAA 2023l). Whitetip sharks live offshore near the upper part of deepwater columns, in tropical and subtropical waters. Despite shallow water preferences, they are known to make dives up to 1,082 meters deep. The species has an average lifespan of approximately 25 years, but individuals may live up to 36 years. The oceanic whitetip shark exhibits late maturity and low-reproductive output, which adds to their populations' vulnerability (NOAA 2023l).

Giant Manta Ray

Giant manta ray (*Manta birostris*) are an ESA-listed threatened species that is occasionally reported offshore in the Mid-Atlantic region along the continental shelf and near the Hudson Canyon; however, the species is not included on the NOAA Section 7 Mapper (NOAA 2023c). Giant mantas are found offshore along productive coastlines in tropical, subtropical, and temperate waters. The species sometimes feeds in shallow waters of less than 10 meters in depth, but often dives to depths between 200 and 450 meters (maximum depth of 1,000 meters) (NOAA 2023k). Giant mantas are often solitary and seasonally migrate to follow oceanic upwelling and circulation patterns. They have a lifespan of approximately 45 years and exhibit low fecundity (NOAA 2023k).

3.2.2 NOAA Trust Resources and Species of Concern

NOAA Trust Resources are defined as living marine resources that benefit from NOAA federal protections and restoration efforts, including ESA threatened and endangered species, EFH and HAPCs, marine sanctuaries and national monuments, commercial and recreational fisheries, and a variety of marine and coastal habitat that support these resources (e.g., coral reefs and marshes) (NYSERDA 2017; GARFO 2023c). Many NOAA Trust Resources found within the AoA have been discussed in previous sections of this study. Additional NOAA Trust Resources identified in this assessment are presented in Table 4. Refer to the Benthic Habitat Study (NYSERDA, 2025) for a description of coral reefs and seabed habitat.

Species of concern are defined as species with potential threats such as habitat loss, stock depletion, and reproductive concerns but that are not ESA-listed species (NYSERDA 2017). Species of concern include HMS that occur offshore (i.e., Atlantic bluefin tuna, several shark species, cusk), but may also include

species encountered during fishing operations, such as thorny skate and Atlantic wolffish (NYSERDA 2017). Many species of concern that occur within the AoA have been discussed in previous sections of this study and many were already identified in the Master Plan, except for nearshore species. Table 4 presents a list of NOAA Trust Resources and some key species of concern identified during the literature search of this study.

Table 4. NOAA Trust Resources and Species of Concern that Occur within the Area of Analysis

Sources: NYSERDA 2017; NOAA 2017b; NOAA 2023a,c,n,o,p,s,u.

Common Name	Scientific Name	Species Type	Species of Concern
American eel	*Anguilla rostrata*	Catadromous	Y
Striped bass	*Morone saxatillis*	Anadromous	Y
Blueline tilefish	*Caulolatilus microps*	Demersal	Y
Golden tilefish	*Lopholatilus chamaeleonticeps*	Demersal	*N*
Halibut	*Hippoglossus hippoglossus*	Demersal	Y
Black seabass	*Centropristis striata*	Demersal/hard bottom	*N*
Cusk	*Brosme brosme*	Demersal/hard bottom	Y
Tautog	*Tautoga onitis*	Demersal/hard bottom	*N*
Red hake	*Urophycis chuss*	Demersal/semi-pelagic	Y
Silver hake	*Merluccius bilinearis*	Demersal/semi-pelagic	*N*
Shortfin mako shark	*Isurus oxyrinchus*	Highly Migratory Species	Y
Atlantic mackerel	*Scomber scombrus*	Forage species	Y
Atlantic menhaden	*Brevoortia tyrannus*	Forage species	*N*
Sand lance	Ammodytidae	Forage species	Y
American lobster	*Homarus americanus*	Shellfish	Y
Atlantic sea scallop	*Placopecten magellanicus*	Shellfish	*N*
Atlantic surfclam	*Spisula solidissima*	Shellfish	*N*
Horseshoe crab	*Limulus polyphemus*	Shellfish	Y
Ocean quahog	*Arctica islandica*	Shellfish	*N*
Deep-sea red crab	*Chaceon quinquidens*	Shellfish	Y
Northern shortfin squid	*Illex illecebrosus*	Cephalopod	Y

3.3 Commercial and Recreational Fisheries of the Area of Analysis

The diverse habitats and fish species of the AoA provide exceptional opportunities for commercial and recreational fisheries that utilize the Mid-Atlantic region. A variety of fisheries management plans occur within the AoA and popular fishing destinations are found along the continental shelf and the shelf break. In particular, the submarine canyons of Zone 2 are targeted by recreational fishing vessels that utilize the area. Information on the various commercial and recreational fisheries of the AoA is provided in this section, including discussion of historical fisheries surveys and fishing vessel tracking information. Geospatial summaries of key data sources consulted for this study are presented in section 3.4.

3.3.1 Commercial and Recreational Fisheries Management Plans

Seventeen federally managed commercial and recreational fisheries occur within the offshore waters of the AoA and are presented in Table 5. Commercial and recreational fishing operations that fall under these fisheries management plans (FMPs) have the potential to be impacted by OSW in the AoA. A summary of target fisheries and fishing gear types within the AoA by Zone is presented in Table 6. Brief descriptions of the key fisheries management plans (FMPs) as identified by stakeholders for deeper water areas of the AoA are provided below. Information on additional FMPs can be found on the NOAA Rules and Regulations webpage (NOAA 2023y). In addition to these federally managed fisheries, the Atlantic States Marine Fisheries Commission (ASMFC) manages 27 species that occur within the coastal and nearshore waters of the east coast of the United States (ASMFC 2023). Although the ASMFC FMP regulates nearshore fisheries, several of those species also occur within Zone 1 of the AoA, including American lobster, Atlantic croaker, black sea bass, and Jonah crab (NOAA 2023f). Additional fisheries managed by the Southeast Fisheries Management Council may occur within the AoA. As future evaluations are made, consultation with the Southeast Fisheries Management Council will be considered to identify potential impacts to managed FMPs and necessary recommendations will be provided in subsequent NYSERDA reports.

Table 5. Federally Managed Commercial and Recreational Fisheries within the Area of Analysis

Source: NOAA 2023y.

Fisheries Management Plan	Management Area	Date of Inception
American Lobster	New England, Mid-Atlantic	1997
Atlantic Herring	New England, Mid-Atlantic	1999
Atlantic Salmon	New England	1987
Atlantic Sea Scallop	New England	1982
Atlantic Surfclam and Ocean Quahog	New England, Mid-Atlantic	1977
Bluefish	Mid-Atlantic	1990
Consolidated Atlantic Highly Migratory Species	Highly Migratory Species, New England, Mid-Atlantic, South Atlantic	2006
Deep-Sea Red Crab	New England	2002
Dolphin/Wahoo	South Atlantic	2004
Jonah Crab	New England, Mid-Atlantic	2015
Mackerel, Squid and Butterfish	Mid-Atlantic	1978
Monkfish	New England, Mid-Atlantic	1998
Northeast Multispecies	New England	1985
Northeast Skate Complex	New England	2003
Spiny Dogfish	New England, Mid-Atlantic	1999
Summer Flounder, Scup, and Black Sea Bass	Mid-Atlantic	1988
Tilefish Fishery	Mid-Atlantic	2001

Table 6. Target Fisheries and Fishing Gear Types within the Area of Analysis by Zone

Source: NOAA 2023v,w,x,y,ze,zf; USCG 2023a.

Target Fisheries of the AoA		
Zone 1	**Zone 2**	**Zone 3**
American lobster	American lobster	Consolidated Atlantic Highly Migratory Species
Atlantic Herring	Consolidated Atlantic Highly Migratory Species	Deep-Sea Red Crab
Atlantic Sea Scallop	Deep-Sea Red Crab	Dolphin/Wahoo
Atlantic Surfclam and Ocean Quahog	Jonah Crab	
Bluefish	Mackerel, Squid and Butterfish	
Jonah Crab	Monkfish	
Mackerel, Squid and Butterfish	Northeast Skate Complex	
Monkfish	Summer Flounder, Scup, and Black Sea Bass	
Northeast Multispecies (includes Whiting)	Tilefish	
Northeast Skate Complex		
Summer Flounder, Scup, and Black Sea Bass		
Tilefish		
Fishing Gear Type Within the AoA		
Zone 1	**Zone 2**	**Zone 3**
Bottom Trawl	Bottom Trawl	Longline
Dredge	Longline	Other tackle
Gillnet	Pots and Traps	
Longline	Other tackle	
Pots and Traps		
Other tackle		

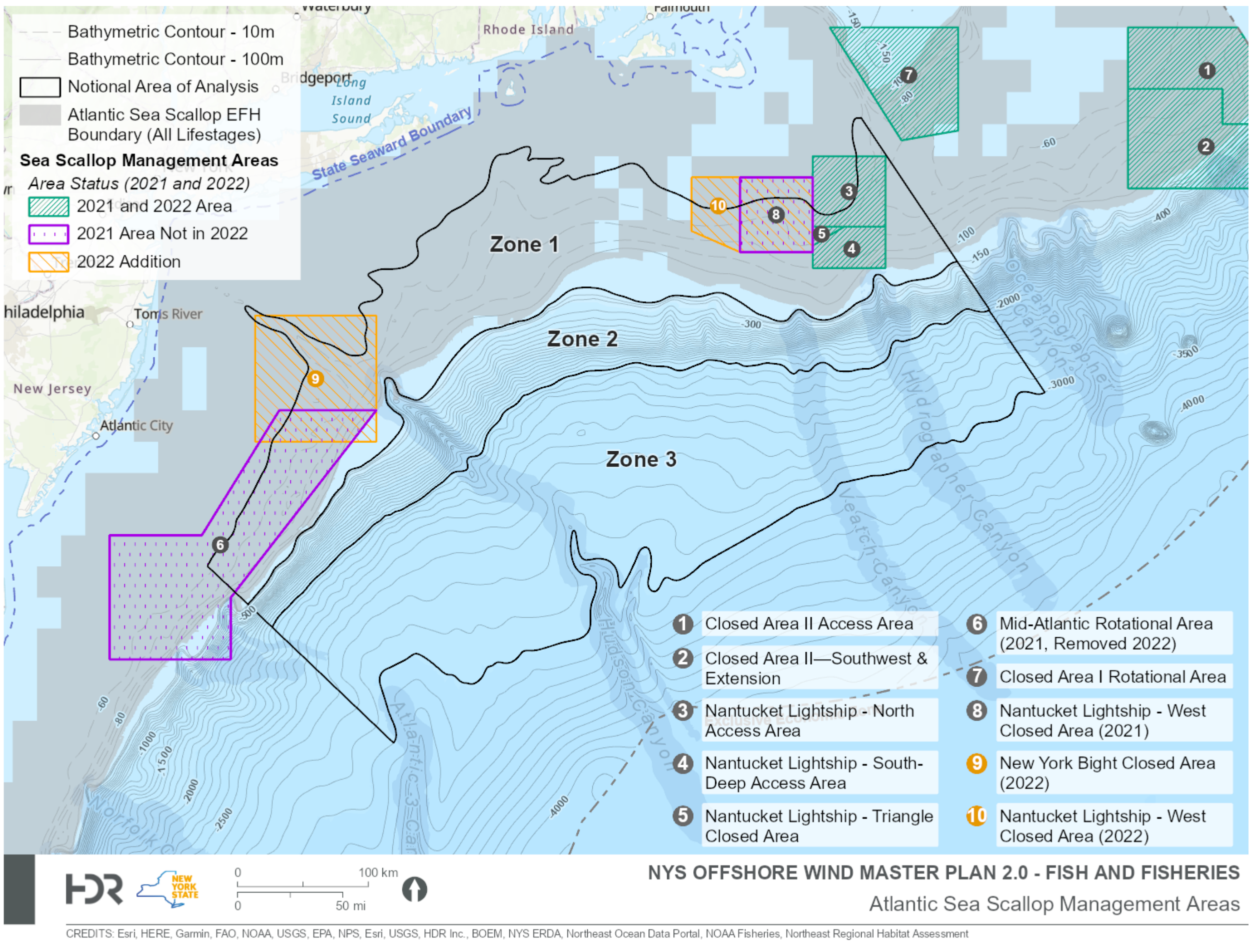
3.3.1.1 Atlantic Sea Scallop Management Plan

The Atlantic Sea Scallop FMP was established in 1982 to implement regulations that support a viable and economically valuable scallop fishery in the U.S. The main extent of the Atlantic Sea scallop fishery ranges from the Mid-Atlantic coast of the United States to the Canadian border (NOAA 2023y). The industry primarily uses single and paired dredges to capture scallops throughout much of its range; although some areas of the fishery use trawl gear, but this is mostly limited to the Mid-Atlantic region (NOAA 2023y). Atlantic sea scallops are primarily caught and then shucked; however, some vessels land whole scallops (NOAA 2023y).

A total of six Sea Scallop Management Areas occur within Zone 1 of the AoA and Atlantic Sea Scallop EFH occurs throughout most of Zone 1 (Figure 6) (NOAA 2018a; NOAA 2022d; NOAA 2023b; 2023zd; NRHA 2023). No Sea Scallop Management Areas nor sea scallop EFH are present in Zones 2 and 3 of the AoA.

Figure 6. Atlantic Sea Scallop Management Areas and Atlantic Sea Scallop EFH in relation to the Area of Analysis

Source: NOAA 2018a; NOAA 2022d; NOAA 2023b,zd; NRHA 2023.



3.3.1.2 Atlantic Surfclam and Ocean Quahog Management Plan

The Atlantic Surfclam and Ocean Quahog FMP was established in 1977 and requires that offshore fishing vessels log their activities with the standardized Individual Transferrable Quota management system (NOAA 2023y). The primary gear used by the industry is the hydraulic clam dredge, which is engineered to spray water and dislodge the two species from sediment. The Atlantic surfclam survey range includes the Western North Atlantic from the southern Gulf of St. Lawrence to Cape Hatteras while the ocean quahog survey ranges from the North Atlantic from Newfoundland to Cape Hatteras. It is projected that 3.4 million bushels of Atlantic surfclam and 5.4 million bushels of ocean quahogs will be collected by the fishery in 2023 (NOAA 2023y).

3.3.1.3 Consolidated Atlantic Highly Migratory Species Management Plan

Implemented in 2006, the Consolidated Atlantic Highly Migratory Species FMP is managed by NOAA Fisheries and includes species such as Atlantic tunas, swordfish, sharks, and billfish that are found throughout the Atlantic Ocean and must be managed both domestically and internationally. This includes pelagic longline, bottom longline, purse seine, gillnet, hand gear, and green-stick fisheries. Atlantic HMS fisheries are highly regulated using permit and reporting requirements, including vessel monitoring systems and implementation of fleet-wide electronic monitoring in 2015 on all commercial vessels fishing with pelagic longline gear. NOAA Fisheries estimates landings using commercial dealer reports and reports by anglers in the HMS Non-Tournament Recreational Swordfish and Billfish Landings Database and the Recreational Billfish Survey. Directed fishery and recreational landings of North Atlantic swordfish as an example totaled 954 metric-tons dressed weight in 2020 compared to 1,194 metric tons of bluefin tuna (NOAA 2023y).

3.3.1.4 Deep-Sea Red Crab Management Plan

The Atlantic deep-sea red crab fishery operates year-round along the edge of the continental shelf from southern New England to the Mid-Atlantic Bight and targets male red crabs at a primary fishing depth of approximately 400 to 800 meters (Zone 2 of AoA), using baited traps and pots (NOAA 2023y). Implemented in 2002, the Deep-Sea Red Crab Management Plan includes recommendations for biological catch and annual catch limits to prevent overfishing, account for population uncertainties, and ensure that small commercial fishing and cultural entities involved in the fishery would not incur significant economic impacts (NOAA 2023y). The current total allowable landings for red crab is set at 4.41 million pounds per year and management restrictions include a vessel limit of 600 traps/pots, prohibit the use of fishing gear other than traps or pots, and limit the possession at sea of red crab claws and legs separate from their bodies (NOAA 2023y).

3.3.1.5 Mackerel, Squid, and Butterfish Management Plan

Implemented in 1978, the Mackerel, Squid, and Butterfish Management Plan includes annual quotas to account for the scientific and management uncertainty of five jointly managed species, including Atlantic mackerel, Atlantic chub mackerel, longfin (Loligo) squid, shortfin (Illex) squid, and Atlantic butterfish (NOAA 2023y). Managed by the Mid-Atlantic Fishery Management Council, this fishery operates primarily over the continental shelf from Massachusetts to North Carolina and uses single and paired mid-water trawl, bottom trawl, purse seine, and to a lesser extent, gillnet gear throughout the entire range. NOAA Fisheries notes in the plan that there is substantial interannual variability in the availability of the fishery and operations because the distribution and productivity of these species are highly dependent upon environmental conditions (NOAA 2023y). In more recent years, NOAA Fisheries has adopted an ecosystem approach to managing this fishery, which recognizes the biological, economic, social, and physical interactions and components of the entire ecosystem (NOAA 2023y).

According to the 2021 stock assessment and NOAA Fisheries commercial landings database, Atlantic mackerel is overfished with commercial landings totaling 12 million pounds in 2021. By comparison, commercial landings in 2021 of Atlantic chub mackerel totaled 37,000 pounds while commercial landings of butterfish totaled 4 million pounds. According to the landings database, commercial landings totaled 23.4 million pounds and 39 million pounds for longfin squid and shortfin squid, respectively, in 2021. Within Zone 1 of the AoA, the Mackerel, Squid and Butterfish FMP is dominated by longfin squid, rather than the other four managed species. Within Zones 2 and 3, the Mackerel, Squid, and Butterfish FMP is dominated by the Illex squid fishery (GARFO 2023e).

3.3.1.6 Monkfish Management Plan

The Monkfish fishery operates from North Carolina to Maine and targets the species primarily using trawl gear in the north and with gillnets in the south (NOAA 2023zj). Implemented in 1998, the Monkfish Management Plan includes recommendations for biological catch and annual catch limits to prevent overfishing and rebuild a viable fishery that operates at maximum sustainable yield (MSY) (NOAA 1998). The monkfish fishery uses a “days-at-sea” and “trip limit” type management system where fishing vessel activity is regulated through limitations on the number of vessel trips and the duration (NOAA 2023zj). The current minimum size limit for whole monkfish is 17 inches or a tail length of no less than 11 inches (NOAA 1998; NOAA 2023zj).

3.3.1.7 Northeast Multispecies Management Plan

The Northeast Multispecies Management Plan was established in 1985 and is managed by the New England Fishery Management Council. This FMP covers 13 species of groundfish, including cod, haddock, pollock, redfish, American plaice, Atlantic halibut, ocean pout, Atlantic wolffish, hake, and various flounder species such yellowtail, winter, windowpane, and witch flounder. The fishery uses bottom trawl, sink gillnet, and hook gear throughout the Greater Atlantic region, from Cape Hatteras to the United States/Canada border, with most of the fishery harvested in the Gulf of Maine and on Georges Bank outside of the AoA. However, historically, many of the vessels that actively fish for groundfish have hailed from ports from New Jersey to Maine with Atlantic cod, haddock, and yellowtail flounder having traditionally been the highest-value groundfish species (NOAA 2023y). The Small-mesh Multispecies fishery is regulated within the Northeast Multispecies FMP, which targets "whiting" (silver hake and offshore hake) and red hake with small mesh trawl nets (NOAA 2023zi).

3.3.1.8 Tilefish Fishery Management Plan

Originally developed by the Mid-Atlantic Fishery Management Council in 2001 to manage golden tilefish, the Tilefish Fishery Management Plan was amended in 2017 to include blueline tilefish. Although neither species is currently considered overfished, the fishery has operated under an individual fishing quota since 2009. The fishery is concentrated between Nantucket Island south to Cape May between Hudson and Veatch Canyons. The commercial fishery predominantly uses longline gear, although handline, rod and reel, and trawl gear are also authorized. There is also a small recreational component to the tilefish fishery using rod and reel that has been increasing in recent years (NOAA 2023y). Commercial landings of tilefish totaled 2.2 million pounds and recreational landings totaled 260,000 pounds in 2021, according to the NOAA Fisheries landings databases.

3.3.2 Recreational Fishing Locations

New Jersey's Recreational and Commercial Ocean Fishing Grounds is a comprehensive map of fishing data collected through interviews with fishing boat captains in combination with researched publications and NOAA's nautical charts (NJDEP 2022). The first fishing chart was created in 1982 and a second was printed in 1984 (NJDEP 2022). By 2003, the map was moved to a digital format that includes GIS data from boat captain interviews with the Division of Fish and Wildlife's Bureau of Marine Fisheries (NJDEP 2022). A total of 97 fishing boat captains were interviewed to confirm the accuracy of delineated fishing areas (NJDEP 2022). The boat captains who were interviewed included a variety of commercial and recreational fishers who frequent the fishing areas and catch a diversity of fish species with various types of tackle (NJDEP 2022). The boat captains were asked to contribute to the finalized version of the map by drawing boundaries and pointing out prime fishing locations. The database now includes 654 prime fishing areas ranging from sizes of 11.6 to 439,444.5 acres and includes descriptions of each location with environmental features and targeted species (NJDEP 2022). The finalized map helped expand designated fishing areas through collaboration with the fishing community (NJDEP 2022).

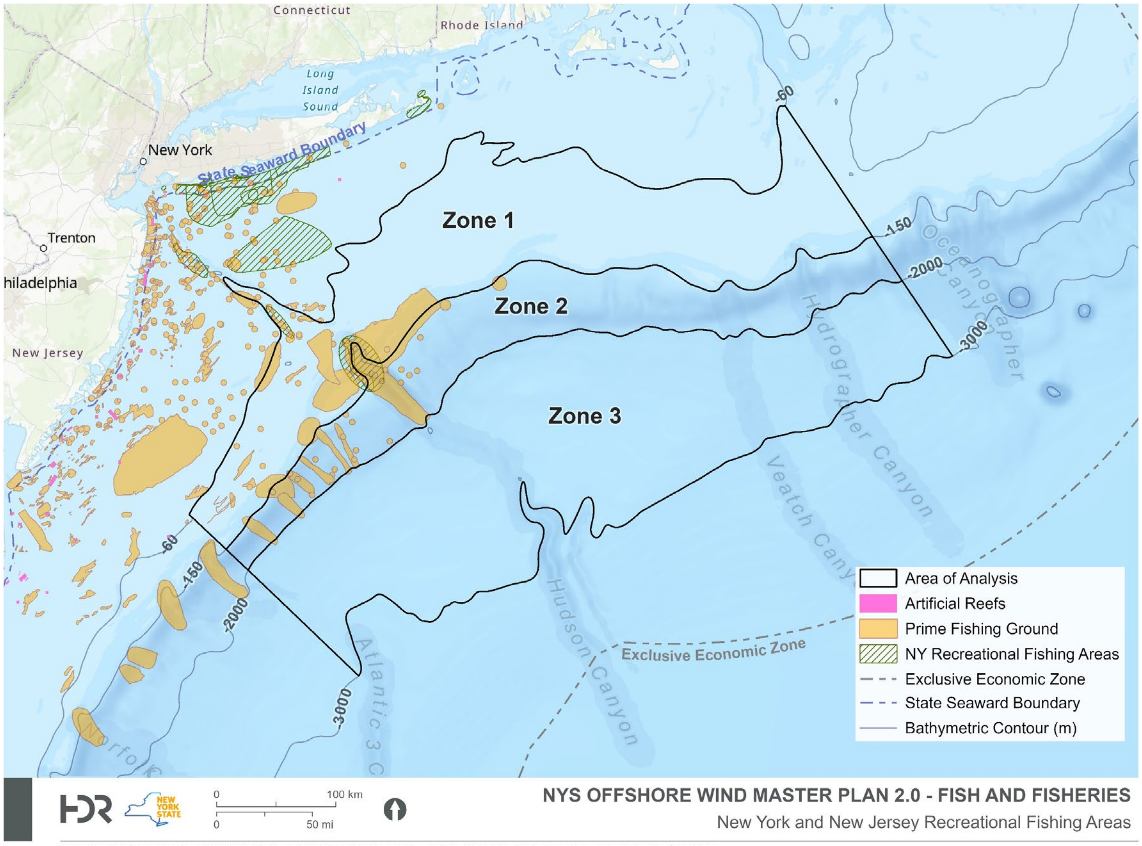
The Prime Fishing Grounds of New Jersey Recreational Fishermen are located on the west side of Zones 1 and 2 of the AoA (Figure 7) (NJDEP 2022). These popular fishing destinations are primarily within and around the Hudson Canyon within the AoA; however, several destinations also occur along the shelf break and on the continental shelf. Several artificial reef sites are also located along the New Jersey Coast, but outside of the AoA.

The New York Recreational Uses Workshop compiled a map of recreational fishing locations that occur along the coast and offshore of New York State through a collaborated effort between Department of State (DOS) and NOAA's Coastal Services Center (CSC) (MARCO 2023). Thirty different organizations partnered together in this cooperative to review ocean use data, offshore habitats, navigation charts, and fishing data to create a single comprehensive data set of ocean usage offshore of the State. DOS staff "field verified" the data set between 2011 and 2012 and updated the digital maps to reflect the locations identified during this effort (MARCO 2023).

The New York State recreational fishing locations are located primarily off the coast of Long Island in Zone 1 of the AoA and within Hudson Canyon at the shelf break (Figure 7) (NYSDOS 2023).

Figure 7. Prime Fishing Grounds of New York and Jersey Recreational Fishermen in relation to the Area of Analysis

Source: NJDEP 2022.



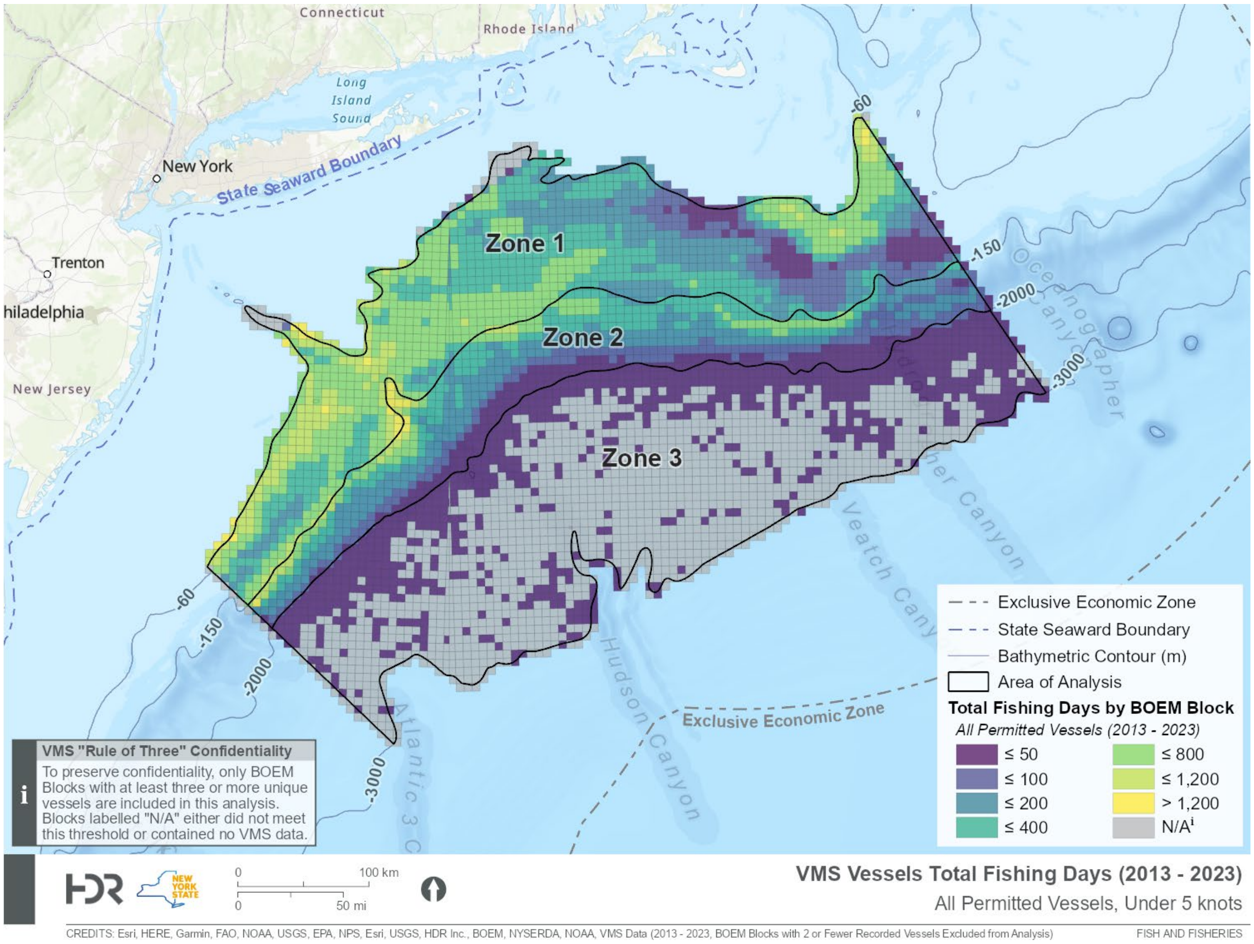
3.3.3 Vessel Monitoring System (VMS) Data

Vessel Monitoring System (VMS) data utilizes advanced technological systems to monitor commercial fishing vessels operating in the U.S. Exclusive Economic Zone and treaty areas (NOAA 2023zc). VMS uses satellites to track over 4,000 vessels throughout their journeys and ensures operators remain in compliance with fishing permits and designated fishing zones (NOAA 2023zc). The monitoring system sends hourly updates on vessel positions, which allows law enforcement to determine the location of potential violators (NOAA 2023zc). VMS is a useful tool for agencies monitoring marine protected areas and provides information for data validation, catch share programs, and assists fishery observer program by supplementing data on fishing effort, targeted species, and fishing locations (NOAA 2023zc). These data are useful for understanding the location and usage of the AoA by commercial vessels and how the footprint of OSW may impact commercial fishing activities. VMS data were requested from NOAA to fill gaps in fisheries data and vessel usage within the AoA to aid in the assessment.

To summarize VMS data, a vessel speed threshold of less than 5 knots was used to focus on fishing activity, rather than vessels in transit (NYSERDA 2017). Data points were excluded using the "rule of three" as required by NOAA for fishing industry confidentiality: grid blocks containing less than three unique vessels were omitted from VMS maps. The data were summarized by the total number of unique days that vessels were identified in each grid block over the 10 years of data provided by NOAA. Due to this data confidentiality selection method, not all fisheries may be fully represented on maps of vessel presence within the AoA. BOEM has access to confidential data and will use them to inform future decisions concerning OSW. A VMS map of all permitted vessels is presented in Figure 8 and additional VMS maps of specific FMPs are provided in section 3.4.

The highest number of VMS fishing vessels (for all permitted vessels) traveling less than 5 knots within the AoA from 2013 through 2023 occurred in Zone 1 off the coast of Rhode Island and Massachusetts, near the Nantucket Shoals (Figure 8). A high number of VMS fishing vessels also occurred along the shoreward boundary of Zone 1 off the coast of Long Island and offshore of New Jersey, including along the shelf break at the boundary of Zone 1 and Zone 2. A modest number of fishing vessels traveling less than 5 knots occurred elsewhere along the shelf break. The fewest VMS fishing vessels occurred in Zone 3 along the continental rise.

Figure 8. Map of Permitted Vessel Density (VMS) (Number of Fishing Days per Block Over 10 Years) within the Area of Analysis (2013–2023)

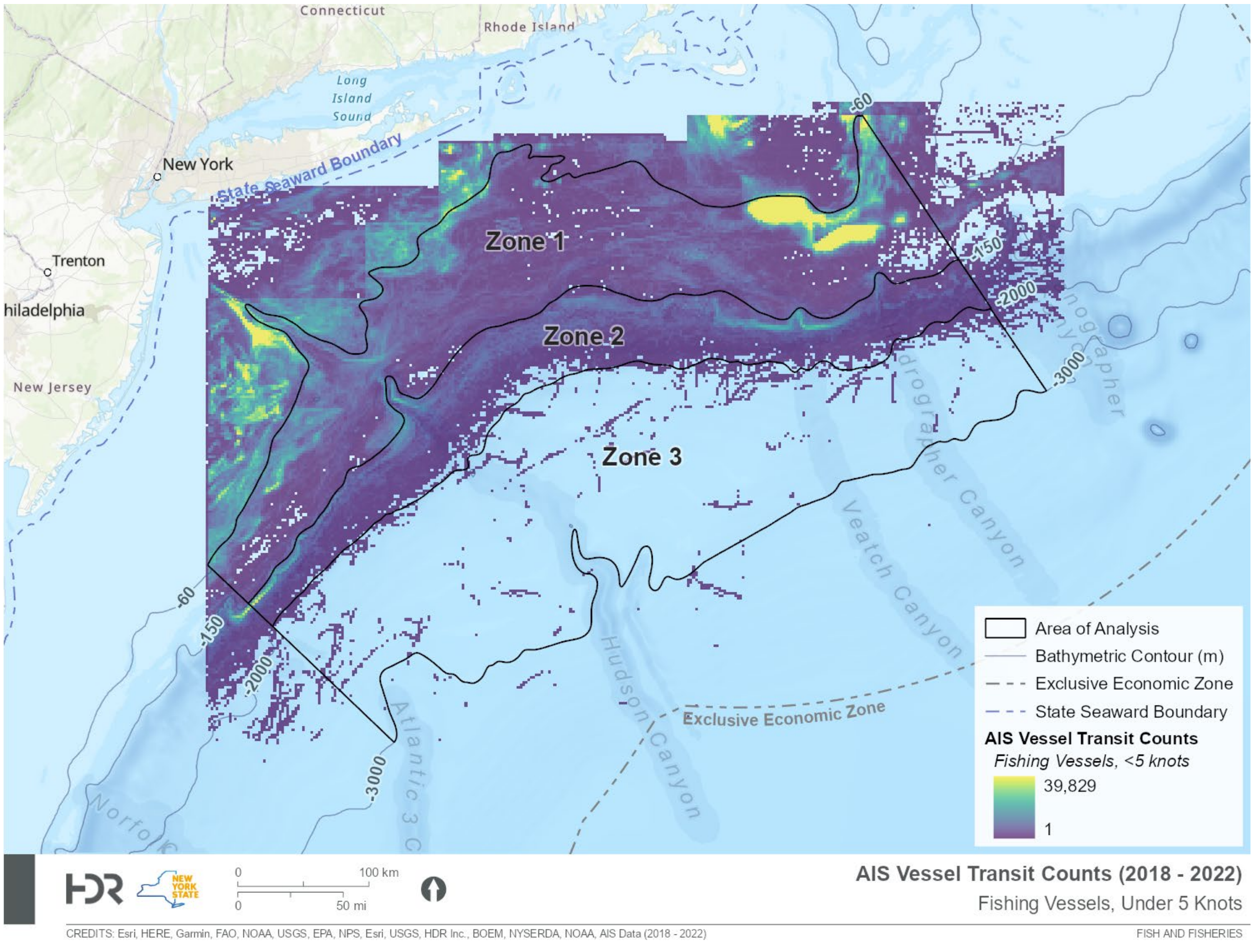


3.3.4 Automatic Identification System (AIS) Data

The Automatic Identification System (AIS) is a safety device that is used on vessels over 65 feet in length and monitors the location and activities of the vessel in real-time (NYSERDA 2017; NOAA 2019a). The USCG uses AIS data for enforcement and management by generating a national GIS network to spatially record the movements and activities of marine vessels (NOAA 2019a; USCG 2023a). These data are useful for understanding the location and usage of the AoA by large vessels and how the footprint of OSW may impact large vessel activities. The USCG, NOAA, and BOEM work together to provide public access to AIS data that includes details such as location, time, vessel type, and speed (NOAA 2019a). One caveat to AIS data is that commercial fishing vessels sometimes turn off the AIS device when they are farther than 12 nautical miles from shore, which is outside the USCG regulated zone; therefore, these data do not capture all offshore vessel traffic (NYSERDA 2017; USCG 2023b). Additionally, vessel operators sometimes record their vessel type as “Other” rather than indicating they are fishing, which underrepresents the number of fishing vessels in the AIS fishing vessel data (NYSERDA 2017). A vessel speed threshold of less than 5 knots was used to summarize AIS data and focus on fishing activity, rather than vessels in transit (NYSERDA 2017).

The highest concentration of AIS fishing vessel transit counts less than 5 knots within the AoA from 2018 through 2022 occurred in Zone 1 off the coast of Rhode Island and Massachusetts (Figure 9). A modest number of AIS fishing vessel transits (less than or equal to 50) occurred along the shoreward boundary of Zone 1 off the coast of Long Island and parts of New Jersey, and additionally along the boundary of Zone 1 and Zone 2 at the shelf break. Few AIS fishing vessel transits occurred elsewhere within the AoA and the fewest vessel transits occurred in Zone 3 along the continental rise. Again, note that due to the fishing vessels switching AIS off past 12 nautical miles these data may be an underestimate of the total vessels utilizing the different zones.

Figure 9. Map of Commercial Fishing Vessel Density (AIS) within the Area of Analysis (2018–2022)



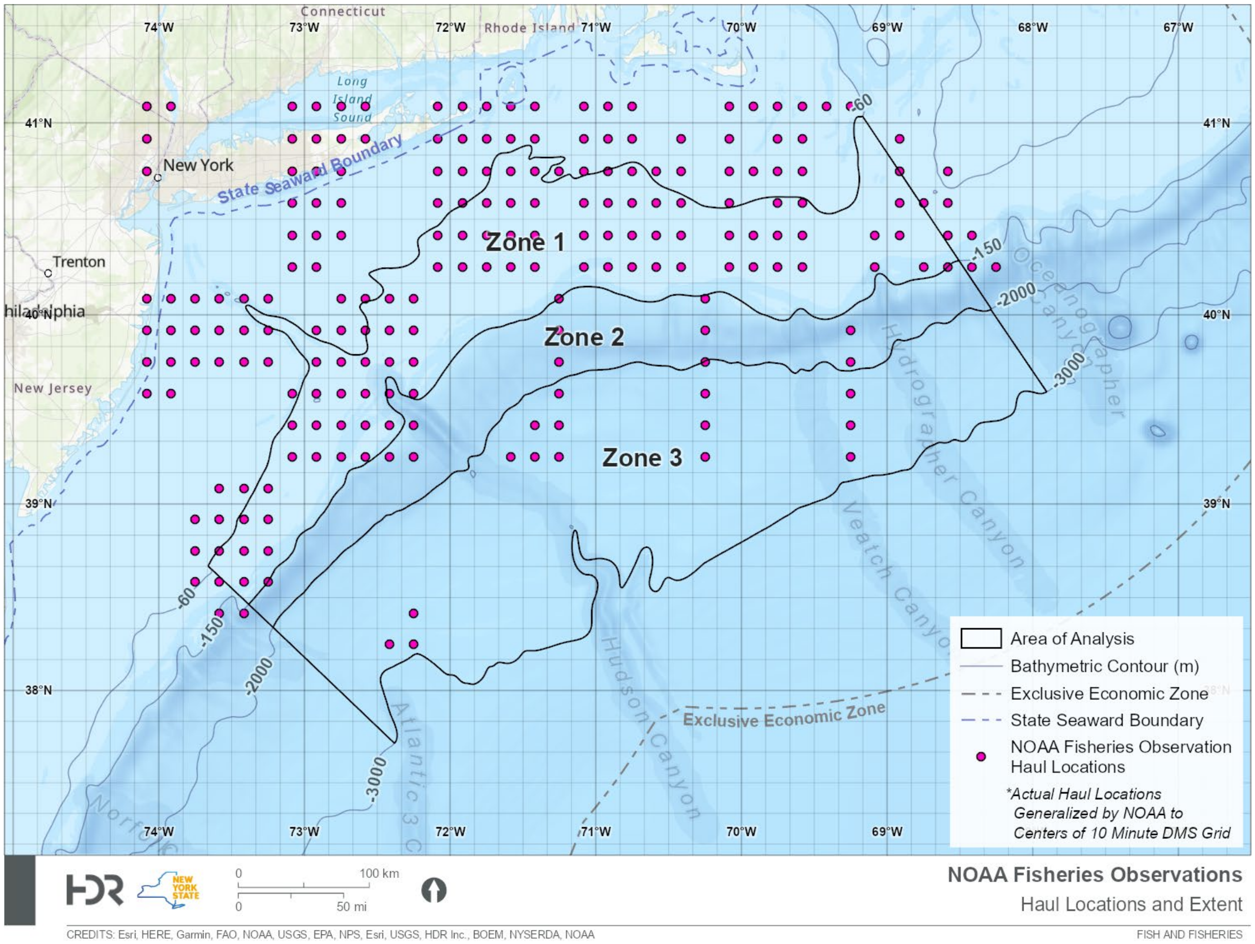
3.3.5 NOAA Fishery Observer Data

NOAA Fishery observers are trained to record data on fishing vessels and fish processing sites to document which species are caught and which are released or discarded (NOAA 2023za). These data are important for fisheries managers who use the information for fish stock assessments, setting catch quotas, and implementing regulatory guidelines. Fishery observer data are also used to document and reduce bycatch and record the presence of protected species such as marine mammals, sea turtles, and birds (NOAA 2023za). The Observer Program contributes information to FishWatch, which keeps consumers and businesses informed on sustainable sources of U. S. seafood and responsible practices (NOAA 2023zb). Similar to the VMS data, these data are useful in understanding the location and usage of the AoA by fishing vessels and how the footprint of OSW may impact commercial fishing activities.

NOAA provided Fishery Observer data for the AoA from 2013 through 2022 for this Fish and Fisheries Data Aggregation Study and the Environmental Sensitivity Analysis. Data coverage from the observer data is included in Figure 10. Note: due to fishing industry confidentiality, NOAA provided these data using a data selection method that excluded some vessel data and the exact location of collection; therefore, data gaps are still evident in Zone 3 and not all fisheries and species that occur within the AoA may be represented in the data. Additionally, Fishery Observer data generally account for only a small portion of all fishery trips; therefore, coverage may be limited (GARFO 2023d). Additionally, the data included is dependent up on the gear used by the fishing vessel. For example, Zone 3 data does not exhibit many trawl-caught species because trawls are unlikely to be used in deep water. In general, there is a need for additional data on the fish species potentially impacted in Zone 3, including Atlantic HMS for which EFH has been identified. BOEM has access to confidential data and will use them to inform future decisions concerning OSW.

For the Environmental Sensitivity Analysis, NOAA Fishery Observer data pertaining to the various FMPs identified within the AoA, as detailed in section 3.3.1 above, were analyzed to inform fisheries resources in the AoA. For maps, including Fisheries Observer data, please refer to the Environmental Sensitivity Analysis (NYSERDA, 2025).

Figure 10. Map of NOAA Fishery Observer Data Coverage (2013–2022)



3.3.6 NEFSC Fishing Footprints Data

NOAA compiles Fishing Footprints Data for the Mid-Atlantic and New England regions using Vessel Trip Report (VTR) data collected from commercial and recreational fishing vessels (NOAA 2023f and 2023g). VTRs are required to be submitted by all fishing vessels that hold a NOAA Greater Atlantic Regional Fisheries Office (GARFO) permit during each fishing outing (NYSERDA 2017). VTRs log a single global positioning system (GPS) location based upon where a vessel was fishing and include information about the target species and type of gear used. NOAA uses VTR to generate fishing footprint data reports and revenue-based spatial maps of the different fisheries reported by fishing permit holders, which are made available online or by request. The most recent fishing footprint data available for the AoA were provided by NOAA detailing the potentially impacted fisheries of the AoA: two reports for each zone, one for commercial and one for recreational fisheries. Commercial Fishing Footprints reports were provided for the years 2008 through 2021 and recreational Fishing Footprints reports were provided for the years 2012 through 2021. NOAA provided these reports using a data selection method to protect fishing industry confidentiality, which omitted data for some fishing vessels; therefore, some fisheries and species that are present within the AoA may not be fully represented, or even represented at all, in these reports. BOEM has access to confidential data and will use them to inform future decisions concerning OSW. Each of the six Fishing Footprints reports provided by NOAA are included in appendix D.

In the context of offshore wind, NOAA Fishing Footprints reports are important for understanding not only the fisheries impacted within each zone, but also the impacted shoreline communities that are tied to each fishery. Although outside the AoA, many ports located along the Mid-Atlantic and New England coastline are heavily dependent upon theses fisheries. The livelihoods of fisherman, fishing communities, and the businesses associated with those communities are reliant upon the revenue generated by productive commercial and recreational fisheries.

To provide a snapshot of the commercial fisheries potentially impacted in each zone, the top five FMPs by revenue identified in the NOAA Fishing Footprints Data are provided below in Table 7. Within Zone 1, the Mackerel, Squid and Butterfish FMP is dominated by longfin squid (*Doryteuthis pealeii*), rather than the four other species managed within the FMP. Within Zones 2 and 3, the Mackerel, Squid, and Butterfish FMP is dominated by the shortfin squid (*Illex illecebrosus*) fishery. Additional impacted commercial fisheries within the AoA that were identified by NOAA in the Fishing Footprints reports, including "All Others," Atlantic Herring, Bluefish, Highly Migratory Species, Monkfish, Northeast Multispecies, Southeast Regional Office FMP, Skates, Small-Mesh Multispecies, and Spiny Dogfish and Surfclam. "All Others" is a category for FMPs with less than three permits that is designated for data confidentiality purposes (NOAA 2023f). Refer to appendix D for more information about all impacted fisheries.

The top five species kept in each zone by the recreational fishing industry are presented in Table 8. Additional impacted recreational species within the AoA identified by NOAA in the Fishing Footprints reports include big eye tuna (*Thunnus obesus*), blue marlin (*Makaira nigricans*), blue shark (*Prionace glauca*), bluefin tuna (*Thunnus thynnus*), blueline tilefish (*Caulolatilus microps*), bonito (*Sarda sarda*), chub mackerel (*Scomber japonicus*), conger eel (*Conger oceanicus*), cunner (*Tautogolabrus adspersus*), cusk (*Brosme brosme*), frigate mackerel (*Auxis thazard*), golden tilefish (*Lopholatilus chamaeleonticeps*), haddock (*Melanogrammus aeglefinus*), hammerhead shark (*Sphyrna zygaena*), little tuna (*Euthynnus Alletteratus*), mako shortfin shark (*surus oxyrinchus*), ocean pout (*Zoarces americanus*), pollock (*Pollachius virens*), red hake (*Urophycis chuss*), sea robins (*Prionotus spp.),* skates, skipjack tuna

(*Katsuwonus pelamis*), smooth dogfish (*Mustelus canis*), spiny dogfish (*Squalus acanthias*), spotted weakfish (*Cynoscion nebulosus*), striped bass (*Morone saxatilis*), summer flounder (*Paralichthys dentatus),* swordfish (*Xiphias gladius*), tautog (*Tautoga onitis*), triggerfish (*Balistes capriscus*), wahoo (*Acanthocybium solandri*), white hake (*Urophycis tenuis*), white marlin (*Kajikia albida*), and winter flounder (*Pseudopleuronectes americanus*).

Table 7. Top Five Fisheries Management Plans by Revenue within the Area of Analysis from 2008 through 2021

Note: revenue figures are approximate. "No Federal FMP" includes species that are not federally managed, including lobster (*Homarus americanus*), Jonah crab (*Cancer borealis*), smooth dogfish (*Mustelus canis*) and chain dogfish (*Scyliorhinus retifer*), whelk species, and menhaden (*Brevoortia tyrannus*).

Source: NOAA 2023f.

AoA Zone	Fisheries Management Plan	14-year Revenue (2008 - 2021)
Commercial Fisheries		
Zone 1	Sea Scallop	$1.5 billion
	Summer Flounder, Scup, and Black Sea Bass	$215.9 million
	Mackerel, Squid, and Butterfish	$160.3 million
	Atlantic States Marine Fisheries Commission (ASMFC)	$128.4 million
	Surfclam and Ocean Quahog	$114 million
Zone 2	Mackerel, Squid, and Butterfish	$115.3 million
	Atlantic States Marine Fisheries Commission (ASMFC)	$64.9 million
	Summer Flounder, Scup and Black Sea Bass	$38.8 million
	Sea Scallop	$36.7 million
	Tilefish	$29.1 million
Zone 3	Mackerel, Squid, and Butterfish	$21.3 million
	Atlantic States Marine Fisheries Commission (ASMFC)	$11.4 million
	Sea Scallop	$7.7 million
	Summer Flounder, Scup, and Black Sea Bass	$5.4million
	No Federal FMP	$5 million

Table 8. Top Five Recreational Species Potentially Impacted within the Area of Analysis from 2012 through 2021

Note: numbers are approximate. “All Others” is a category for species with less than three permits and is designated for data confidentiality purposes.

Source: NOAA 2023f.

AoA Zone	Species	Ten Year Fish Count (2012 - 2021)
Recreational Fisheries		
Zone 1	Black Sea Bass (*Centropristis striata*)	200,500
	Scup (*Stenotomus chrysops*)	157,000
	Bluefish (*Pomatomus saltatrix*)	33,300
	Red Hake (*Urophycis chuss*)	12,700
	Cod (*Gadus morhua*)	6,600
Zone 2	Dolphinfish (Mahi Mahi) (*Coryphaena hippurus*)	24,800
	Yellowfin Tuna (*Thunnus albacares*)	7,100
	Golden Tilefish (*Lopholatilus chamaeleonticeps*)	6,700
	Albacore Tuna (*Thunnus alalunga*)	3,600
	Black Sea Bass (*Centropristis striata*)	3,100
Zone 3	All Others	18,500
	Scup (*Stenotomus chrysops*)	3,000
	Black Sea Bass (*Centropristis striata*)	900
	Yellowfin Tuna (*Thunnus albacares*)	500
	Dolphinfish (Mahi Mahi) (*Coryphaena hippurus*)	100

3.3.7 Fishery-Independent Surveys and Programs

Several fishery-independent surveys conducted by NOAA in the AoA were evaluated in this study. The NEFSC Bottom Trawl Survey has been conducted by NOAA since 1968 and is the most comprehensive survey of fish species available within the AoA. Several other surveys are conducted by NOAA, State agencies, and universities in the vicinity of the AoA, primarily along the coastline, which could become impacted by OSW substations and shoreline cable tie-ins. Descriptions of fishery-independent surveys are provided in this section. Geospatial summaries of the NEFSC Bottom Trawl Survey are provided in section 3.4.

3.3.7.1 NEFSC Bottom Trawl Survey

The NEFSC bottom trawl survey assesses marine benthic fish and invertebrate populations in the Atlantic Ocean, from Cape Hatteras to the Canadian border (NEFSC 2023a,b; NOAA 2023x). The bottom trawl survey is the longest running survey of its kind in the world and provides researchers with time-series data on the distribution, abundance, and biomass of sampled fish populations (NOAA 2023x). The trawl survey is conducted annually at ocean depths from 30 to 1,200 feet and deploys over 300 tows on every survey. Additional data collected during the survey includes water quality, plankton research, and information on ESA threatened and endangered species. Since inception, the NEFSC bottom trawl survey has sampled over 900 species of fish and invertebrates and identified multiple species that were previously unknown. The data collected from this survey are used in 45 stock assessments of commercial and recreational fisheries along the northeastern coast of the United States, which supports many but not all of the finfish species that may be impacted by this assessment (NOAA 2023x). Data from the NEFSC Spring and Fall Bottom Trawl Survey were provided by NOAA for this study. A portion of Zone 2 and all of Zone 3 do not have available data for mapping from the NEFSC spring and fall survey due to bottom trawl gear limitations in deeper water of (NOAA 2023a,b). The master list of fish species identified in the NEFSC Bottom Trawl Survey is provided in appendix C.

3.3.7.2 NEFSC Sea Scallop Survey

Since 1980, NEFSC has conducted annual dredge surveys for Atlantic Sea scallops (*Placopecten magellanicus*) and has covered habitat from Cape Hatteras to Georges Bank (NYSERDA 2017; NEFSC 2023d; NOAA 2023v). The data collected from this survey are used to assess the distribution and abundance of sea scallops for stock assessments (NYSERDA 2017; NOAA 2023v). The survey uses an 8-foot-wide New Bedford style scallop dredge to conduct 15-minute tows at randomly selected sampling stations to avoid bias (NOAA 2023v). Several different NOAA vessels have performed the sea scallop survey over the years (NEFSC 2023f; NOAA 2023v). Data collected during the sea scallop dredge survey include number of individuals, number of dead scallops, whole weight, gonad weight, meat weight, and shell height (Hart 2015). The NOAA HabCam survey is conducted alongside the dredge survey and collects drop camera data of sea scallop density in transects at the same locations as the tows. The HabCam survey provides additional data and enhances the dredge survey by providing information on various locations, some of which are difficult to sample or under surveyed due to the gear limitations of the scallop dredge. Data from the NEFSC dredge and HabCam survey were provided by NOAA and its research partners for this study.

Research group partners for the NEFSC Sea Scallop Survey include the Virginia Institute of Marine Science (VIMS) dredge survey, SMAST drop-cam survey, and the Coonamessett Farm Foundation (CFF) HabCam survey (NOAA 2023c). Each partner is assigned a section of the NEFSC Sea Scallop Survey extent and additional locations are sometimes included to enhance the coverage of surveyed sea scallop habitat (NEFMC 2022; NOAA 2023c). VIMS has conducted their annual survey since 2000 and utilizes commercial fishing vessels to deploy dredge sampling gear and research crew members (NEFMC 2022). Since 2015, VIMS has completed all the scallop dredge surveys along the east coast. The SMAST drop-cam survey began annually in 1999, also with the assistance of commercial scallop vessels to deploy survey gear. At the time of this Fish and Fisheries Data Aggregation Study report, SMAST has not surveyed within the AoA since 2019. The CFF HabCam survey was initiated in 2006, then later revised to include the HabCam V3 equipment in 2017 (NEFMC 2022). The updated HabCam equipment uses two cameras with additional sensors that can produce over 500,000 images in one day. CFF uses a commercial fishing vessel to deploy the necessary survey gear and associated crew members (NEFMC 2022).

3.3.7.3 NEFSC Atlantic Surfclam and Ocean Quahog Survey

NEFSC has conducted annual dredge surveys for Atlantic surfclam (*Spisula solidissima*) and ocean quahog (*Artica islandica*) using a 13-foot commercial dredge since 2012 (NEFSC 2023c; NOAA 2023w). Surveys are conducted in 5-minute tows at randomly selected sampling stations to eliminate bias (NOAA 2023w). This survey has covered habitat from Cape Hatteras to Georges Bank and provides data on the abundance and viability of clam populations in the survey area. Data collected during the survey include catch weight, number of individuals, and length measurements of clams and are used by NOAA in stock assessments (NOAA 2023w). Data from the NEFSC Atlantic Surfclam and Ocean Quahog Survey were provided by NOAA for this study.

3.3.7.4 NEFSC Cooperative Shark Tagging Program

The Cooperative Shark Tagging Program was established in 1962 to tag and recapture Atlantic sharks from the North Atlantic to the Gulf of Mexico and provide data on their life history (NOAA 2022a). The program includes biologists, NOAA fisheries observers, and commercial and recreational fishers and is the longest running program of its kind in the world. Since inception, the program has tagged over 295,000 individuals of over 50 species. Program participants use rod and reel, longline fishing methods, and nets to capture sharks. The program gathers distributional data on sharks, documents age and growth, monitors migrations, and provides information for establishing the EFH of 38 managed species (NOAA 2022a).

3.3.7.5 NEFSC Coastal Shark Bottom Longline Survey

The Coastal Shark Bottom Longline Survey is a fishery-independent study that started in 1995 to survey the spring migrations of sharks along the East Coast from Florida to the Mid-Atlantic (NOAA 2019b; NOAA 2022a). The program offers a standardized method of documenting the relative abundance of shark species and utilizes that information in coastal shark population assessments. The program uses bottom longline gear to catch sharks and collects data on a variety of water quality parameters; sharks are tagged and then released. These surveys are important for the protection of dusky and sandbar sharks and have supported the recovery of both shark species (NOAA 2022a).

3.3.7.6 NEFSC Cooperative Atlantic States Shark Pupping and Nursery Program

The NEFSC Cooperative Atlantic States Shark Pupping and Nursey Program (COASTSPAN) was established in 1998 to monitor estuaries and nearshore waters and determine where sharks utilize nursery habitat along the Atlantic Coast from Port Royal Sound to Bull Bay (SCDNR 2020; NOAA 2022a). Identifying shark nursery habitat allows the COASTSPAN Program to determine species composition and habitat requirements (NOAA 2022a). The COASTSPAN Program uses bottom longline, gillnet surveys, and mark-recapture data to monitor relative abundance, distribution, and migrations of sharks to suitable habitat. This program is essential in establishing EFH for coastal shark species, which is reported annually to the Highly Migratory Species Stock Assessment and Fisheries Evaluation Report (NOAA 2022a).

3.3.7.7 NEFSC Ecosystem Monitoring Program

Since 1992, the NEFSC has conducted the Ecosystem Monitoring (EcoMon) Program to collect data on zooplankton, larval fish and eggs, and hydrographic features along the continental shelf and the continental slope of the northeastern U.S. (NOAA 2018b). EcoMon includes four seasonal surveys in winter, later spring, late summer, and late autumn. Two additional EcoMon surveys are conducted in conjunction with the NEFSC Spring and Fall Bottom Trawl Surveys from the NOAA survey vessel, the Henry B. Bigelow (NOAA 2018b). Each EcoMon survey includes 30 randomly selected stations for plankton sampling (from a pool of 120 stations) and 35 fixed hydrographic stations (NOAA 2018b). The program also measures water quality parameters such as temperature, salinity, conductivity, and chlorophyll concentration (NOAA 2018b).

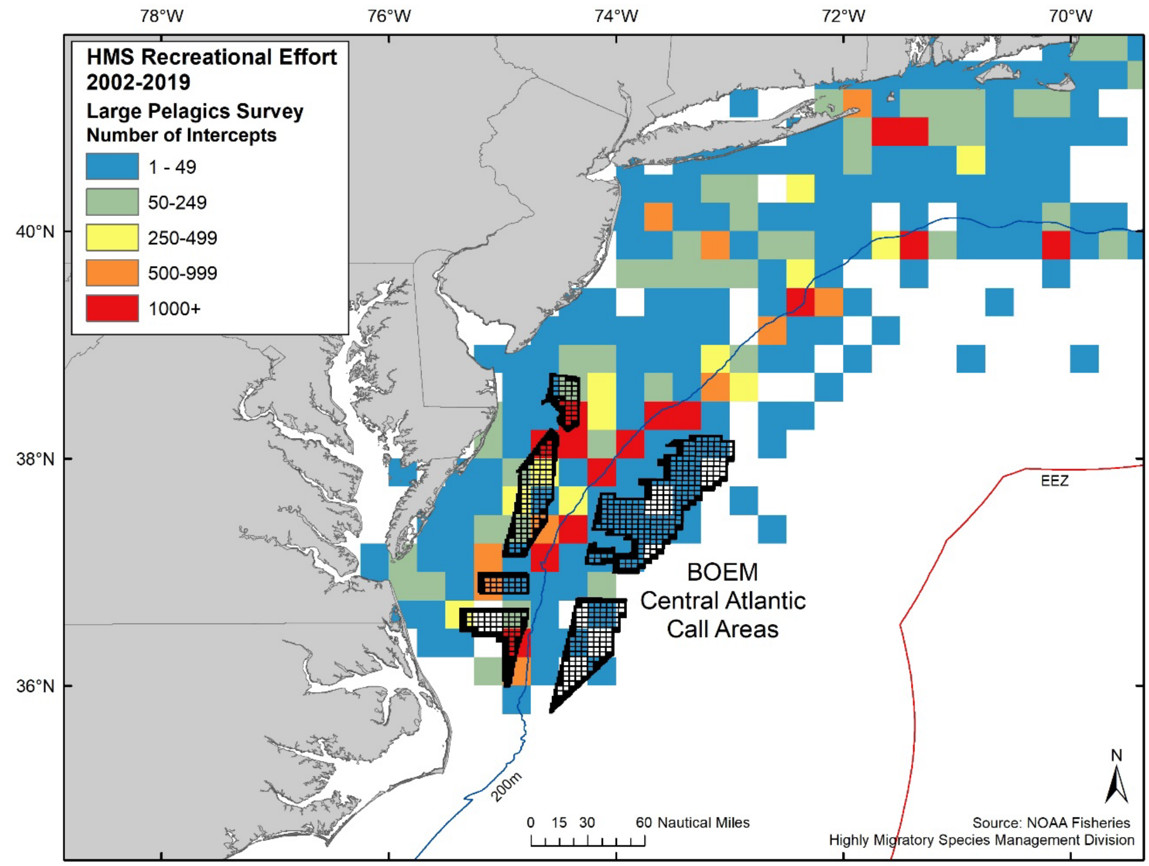
3.3.7.8 NEFSC Large Pelagics Survey

The NEFSC Large Pelagics Survey compiles fishing catch and effort data from recreational fishing vessels targeting HMS and large pelagic species (NOAA 2023zn). The survey is conducted annually from June through October by state partners and contractors along the east coast from Maine to Virginia and collects data from private and for-hire fishing operations that target swordfish, sharks, billfish, tunas, and other large pelagic fish species (NOAA 2023zn). NOAA uses the data collected in the Large Pelagics Survey to generate monthly recreational fishing catch estimates. The survey fills data gaps by providing vital information on specific gear types and fishing methods that are often missed in standard recreational fishing studies and provides resource managers with additional data for monitoring catch quotas and informing regulatory decisions (NOAA 2023zn).

NOAA provided a figure of HMS Recreational Fishing Effort based upon the NEFSC Large Pelagics Survey for inclusion in the Masterplan 2.0 assessment. As indicated by the Large Pelagics Survey data from 2002 through 2019, recreational fishing effort for HMS in the Mid-Atlantic region is primarily concentrated along the middle and outer continental shelf, especially along the shelf-break (Figure 11).

Figure 11. Map of HMS Recreational Fishing Effort in the NEFSC Large Pelagics Survey from 2002–2019

Source: NOAA 2023zk.



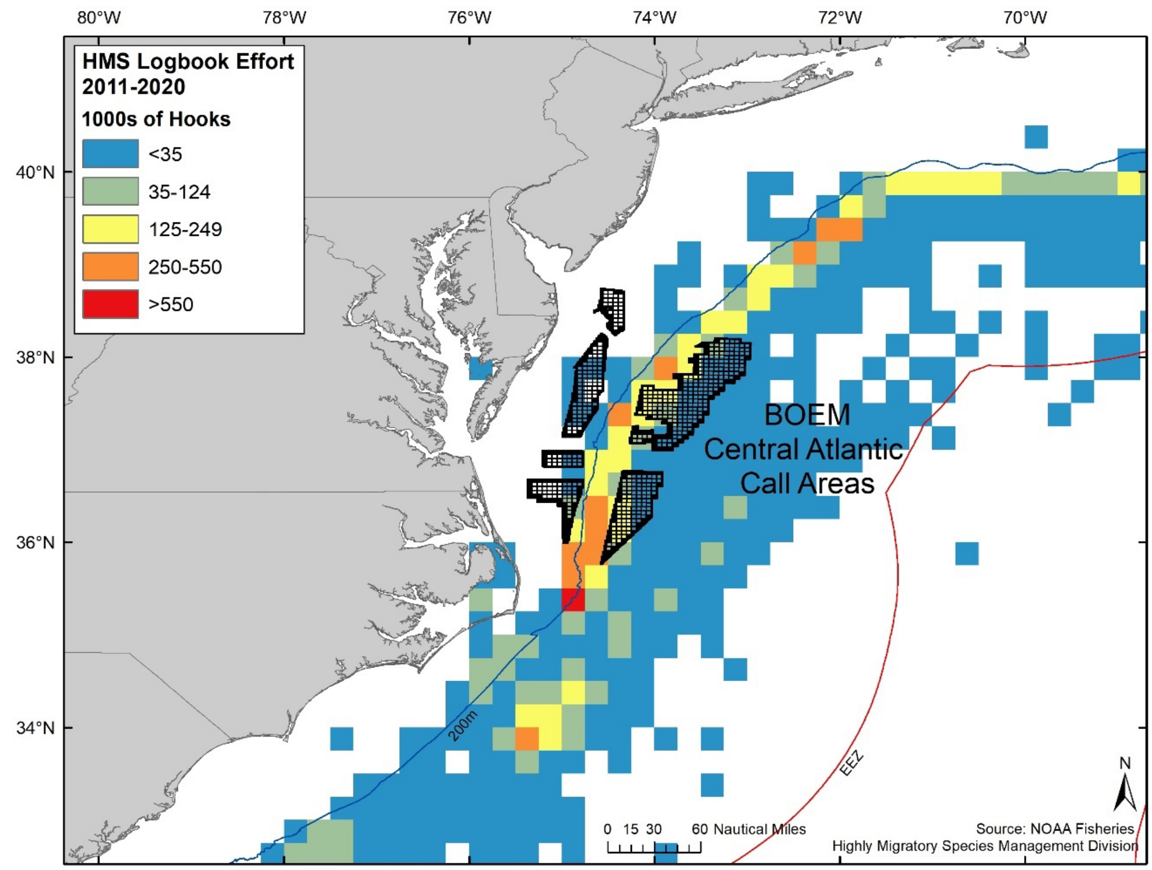
3.3.7.9 NMFS Highly Migratory Species Logbook Program

The NMFS HMS Logbook Program collects information on commercial and recreational fishing vessels targeting HMS within the Western Atlantic Ocean (NOAA 2017c). Vessel logbooks are used to document and monitor the catch of swordfish, sharks, billfish, and tunas to ensure compliance under the MSFCMA (NOAA 2017c; NOAA 2023zm). Data provided by this program document targeted and incidental catch of species, including dolphinfish, wahoo, and sea turtles, by permitted vessels on a per-trip or per-set basis which are useful in stock assessments and while documenting fisheries bycatch (NOAA 2017c). Additional information collected through this program include fishing industry operational costs and earnings data that allow NOAA to comprehensively assess the economic impacts of various regulations on the fishing industry and associated communities (NOAA 2017c).

NOAA provided a figure of HMS logbook effort in the Mid-Atlantic region for inclusion in this assessment, based upon the HMS Logbook Program data. According to logbook data from 2011 through 2020, HMS logbook effort in the Mid-Atlantic region is concentrated along the shelf-break (Figure 12).

Figure 12. Map of HMS Logbook Effort in the Mid-Atlantic region from 2011–2020

Source: NOAA 2023zl.



3.3.7.10 Nearshore Surveys

Several fishery-independent surveys are conducted by state agencies and universities along the northeast coast of the United States. These studies cover coastal waters that are outside of the AoA or along the nearshore boundary of Zone 1. The New Jersey Department of Environmental Protection (NJDEP) Division of Fish and Wildlife (DFW) conducts their ocean trawl survey along the Mid-Atlantic coast, and the Northeast Area Monitoring and Assessment Program (NEAMAP) nearshore trawl survey takes place in coastal waters. Similar to the federal fishery-independent surveys, these surveys track species abundance, distribution, fisheries stock, and environmental changes (NYSERDA 2017). Refer to the Master Plan, which addresses nearshore waters, for discussion of these surveys.

3.4 Biological Data Summary

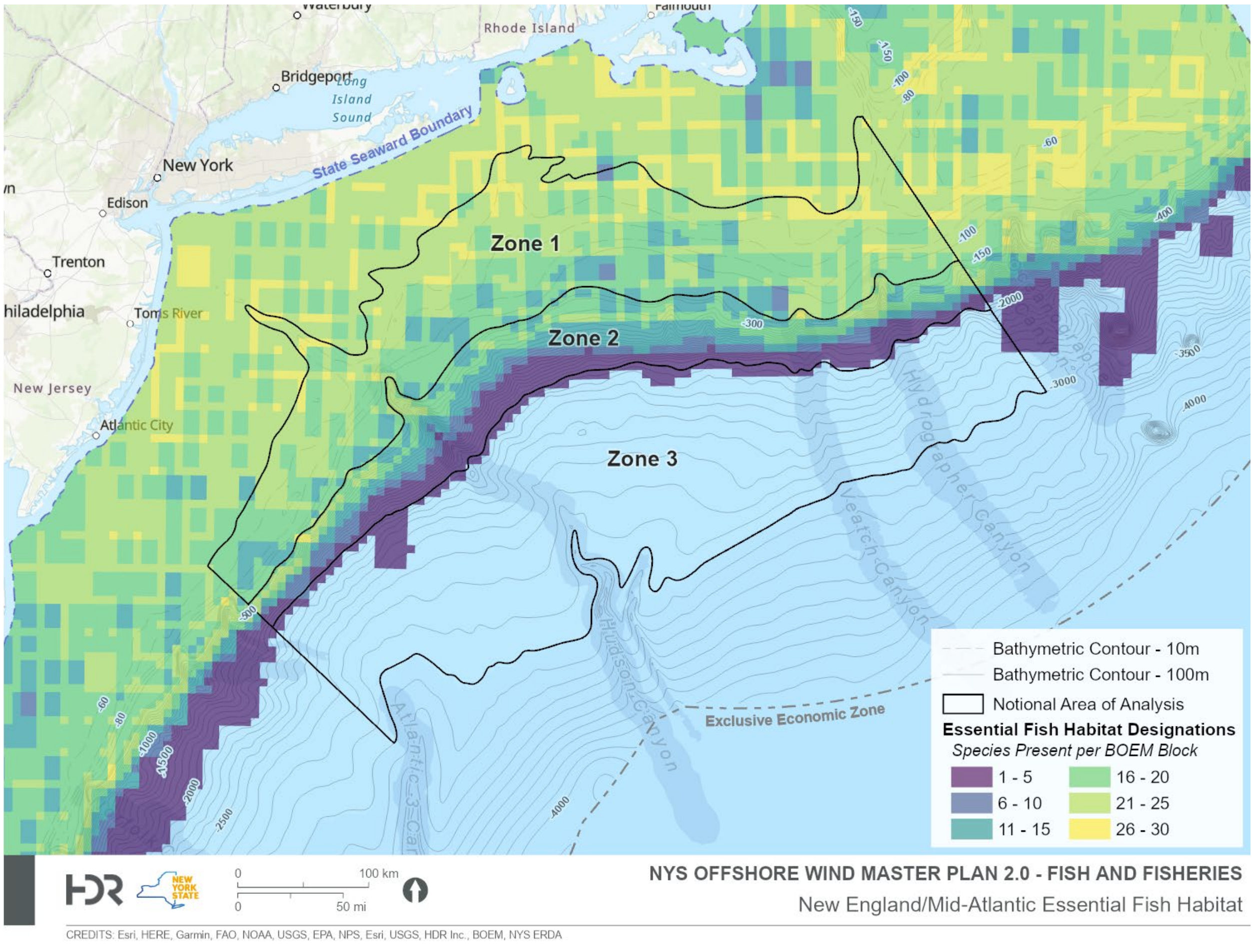
To assess the potential impact from future OSW within the AoA, NOAA EFH designations, NEFSC Bottom Trawl Survey data, NEFSC Sea Scallop Dredge Survey data, NEFSC Sea Scallop HabCam data, NEFSC Atlantic Surfclam and Ocean Quahog Survey data, and available VMS data for managed species were used to develop heat maps showing EFH distribution within the AoA, biomass and estimated density of important fish and fisheries, and fishing vessel density in the region. Additionally, time-series bar graphs of demersal and pelagic species within the AoA were generated from the NEFSC Bottom Trawl data to identify long-term trends. The heat maps of fish biomass and estimated density use colors ranging from blue to red to indicate concentrations of biomass. Survey catch locations (+) are included on each biomass map to show the extent of the survey data. No data are available for areas of the map where survey catches did not occur.

3.4.1 Essential Fish Habitat

The greatest number of New England and Mid-Atlantic EFH designations by species occurs within Zone 1 of the AoA on the continental shelf (Figure 13). Note that color scale on this figure shows the fewest to most EFH designations per block (purple to yellow) at various life stages and does not reflect biomass concentrations. Within Zone 2 and Zone 3, there are fewer EFH designations and EFH appears to be correlated with depth, which limits the presence of many demersal and pelagic species that are more commonly associated with habitat over the continental shelf and along the shelf break.

Figure 13. New England and Mid-Atlantic Essential Fish Habitat Designations of the Area of Analysis

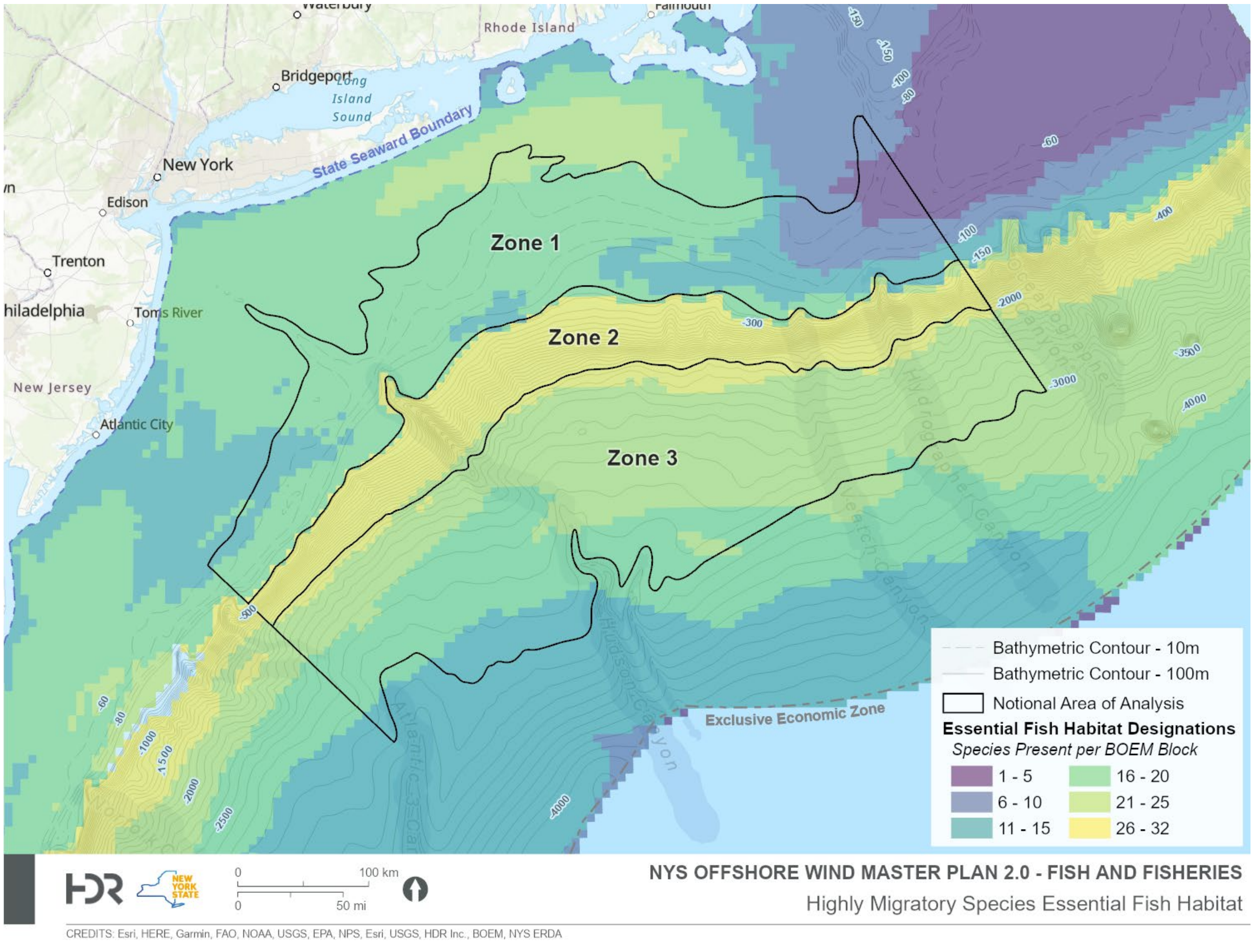
Source: NOAA 2023b.



Zone 1 has the fewest HMS EFH designations by species, while Zone 2 has the highest number of HMS EFH designations; most occur along the shelf break in Zone 2 (Figure 14). The second-highest number of HMS EFH designations by species within the AoA occur in Zone 3, with most designations occurring in the middle and northeast part of the Zone (NOAA 2023b).

Figure 14. Highly Migratory Species Essential Fish Habitat Designations of the Area of Analysis

Source: NOAA 2023b.

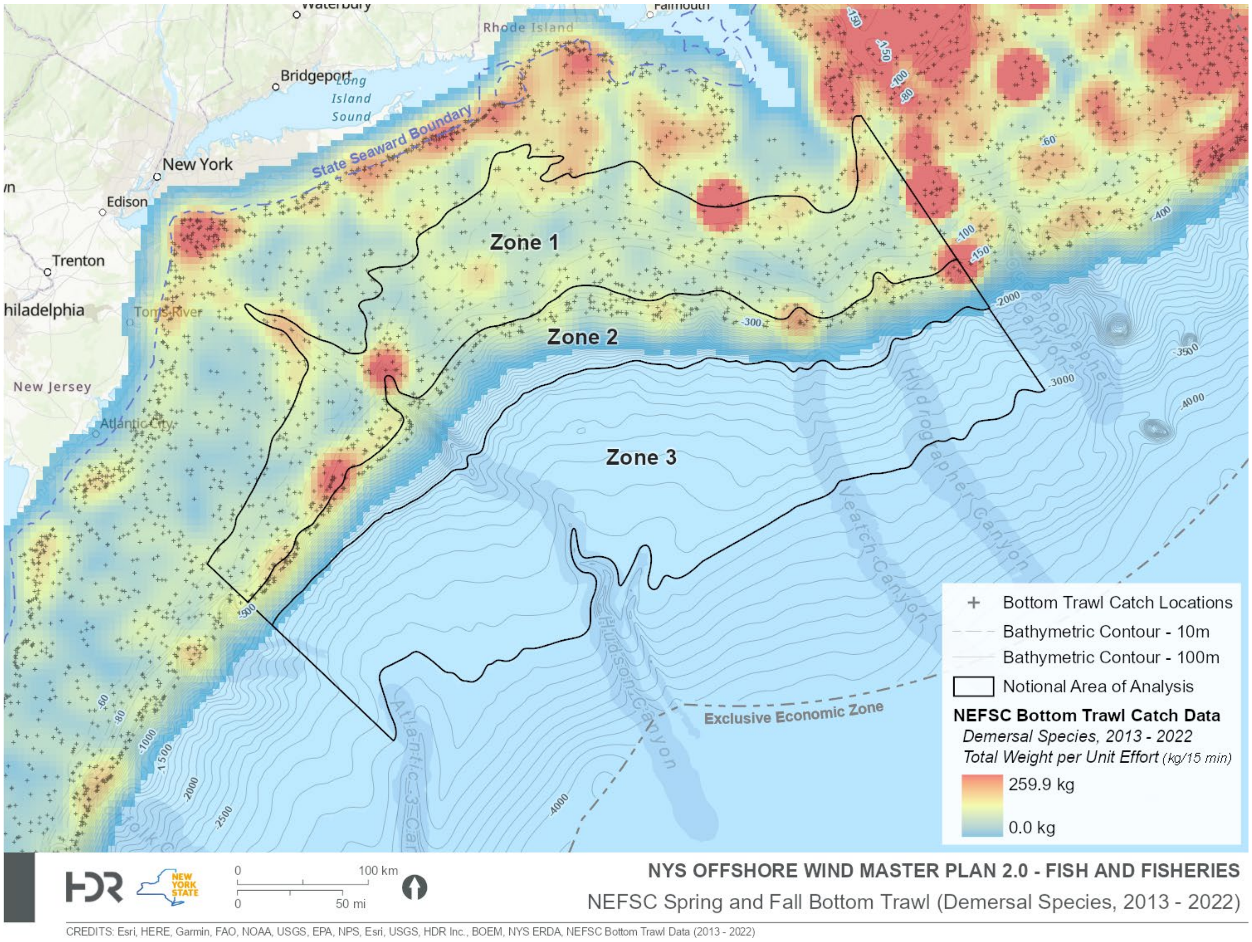


3.4.2 Demersal Species

The highest combined biomass of demersal fish species within the AoA in the NEFSC Spring and Fall Bottom Trawl Survey from 2013 through 2022, summed across years, occurs in three locations along the edge of the shelf break (in Zones 1 and 2) and a fourth location on the nearshore side of Zone 1 (Figure 15). Along the edge of the continental shelf, the three hot spots are the top of Toms, Middle Toms and Hendrickson canyons, the top of Hudson Canyon, and on edge of Oceanographer Canyon; along the nearshore side of Zone 1, the fourth hot spot is offshore of Rhode Island (NEFSC 2023a,b). The biomass hotspot on the edge of Oceanographer Canyon occurs both within and outside of the AoA. The list of demersal species for this study was compiled to align with species summaries created by Curtice et al. (2019) that were used in the Master Plan.

Figure 15. Demersal Species Biomass within the Area of Analysis

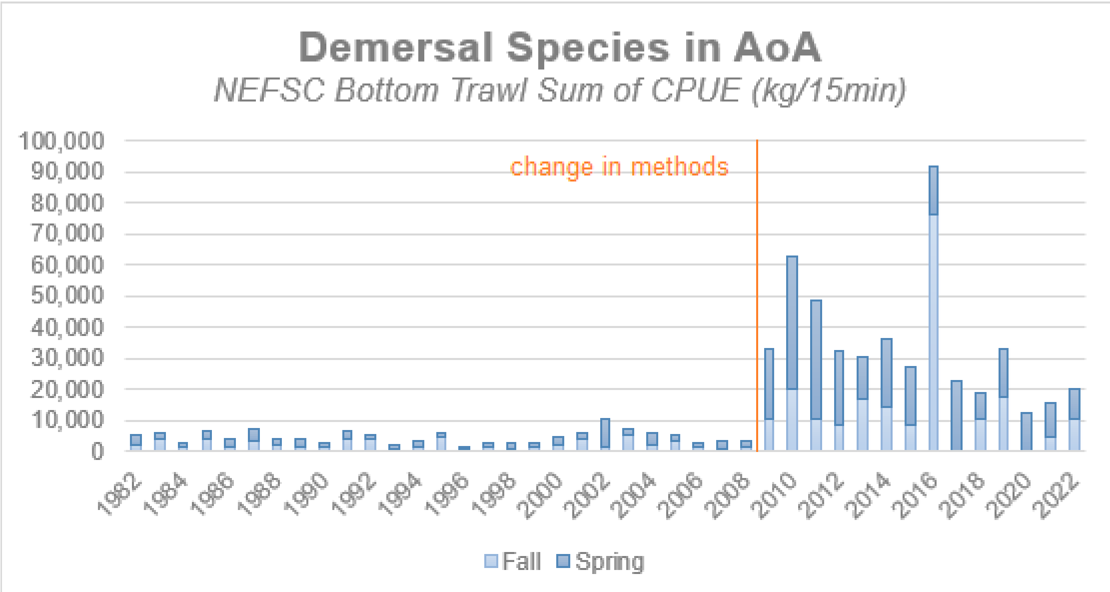
See endnote[1] for included species.



Demersal species catch per unit effort (CPUE) within the AoA remained relatively stable from 1982 through 2008, according to the combined Spring and Fall NEFSC Bottom Trawl data (Figure 16). From 2010 through 2022, a decline in demersal species CPUE is evident, with one exception in 2016 when a large haul of haddock was recorded in the Fall Trawl data. The NEFSC replaced their standardized research vessel and survey gear at the end of 2008, which increased CPUE in subsequent surveys (Miller et al. 2010).

Figure 16. Demersal Species Catch Per Unit Effort within the Area of Analysis from 1982 through 2022

See endnote[2] for included species.

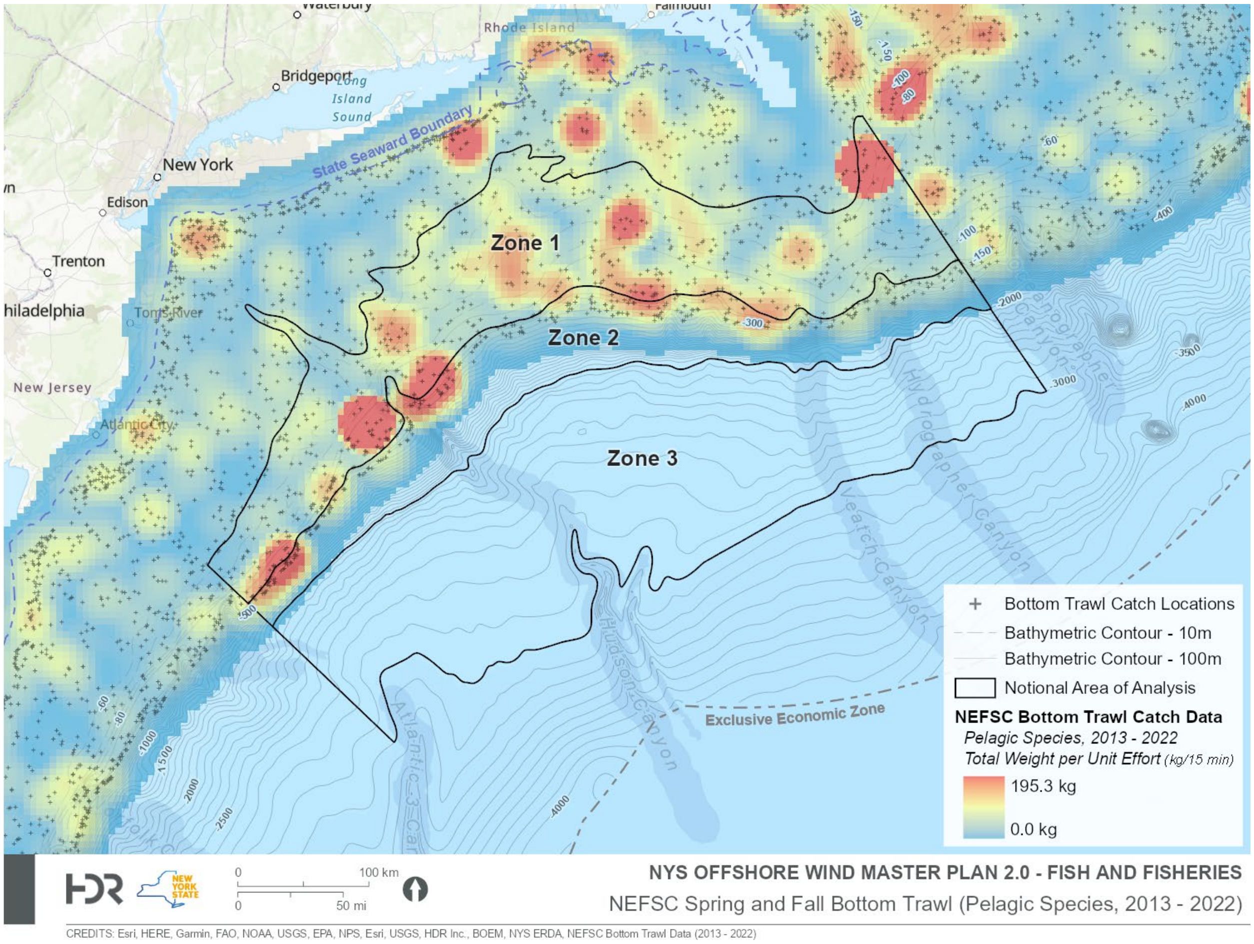


3.4.3 Pelagic Species

The highest combined biomass of pelagic forage species within the AoA in the NEFSC Spring and Fall Bottom Trawl Surveys from 2013 through 2022, summed across years, occurred in four locations. One of the locations is the Nantucket Shoal on the continental shelf in the northeast side of Zone 1. Three other locations of high biomass occur along the edge of the continental shelf outside of Wilmington Canyon, within Hudson Canyon, and outside of Hudson Canyon in Zones 1 and 2 (Figure 17) (NEFSC 2023a,b). The list of pelagic forage species for this study was compiled to align with species summaries created by Curtice et al. (2019) that were used in the Master Plan.

Figure 17. Pelagic Forage Species Biomass within the Area of Analysis

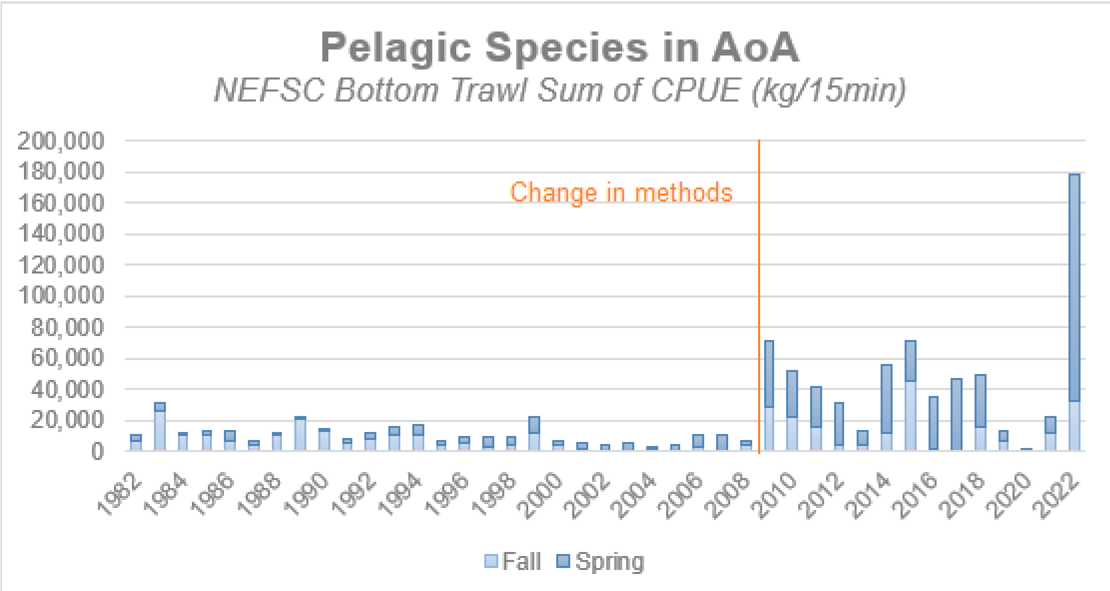
See endnote[3] for included species.



According to data from the combined Spring and Fall NEFSC Bottom Trawl Survey, pelagic species CPUE within the AoA remained relatively stable from 1982 through 1999 and decreased slightly from 2000 through 2008 (Figure 18). The combined Spring and Fall CPUE from 2009 through 2021 are relatively similar, except for a decline in 2013 and a decline from 2019 through 2021. During 2022, the Fall Bottom Trawl Survey recorded an exceptionally high CPUE, compared to previous years. The NEFSC replaced their standardized research vessel and survey gear at the end of 2008, which increased CPUE in subsequent surveys (Miller et al. 2010).

Figure 18. Pelagic Species Catch per Unit Effort within the Area of Analysis from 1982 through 2022

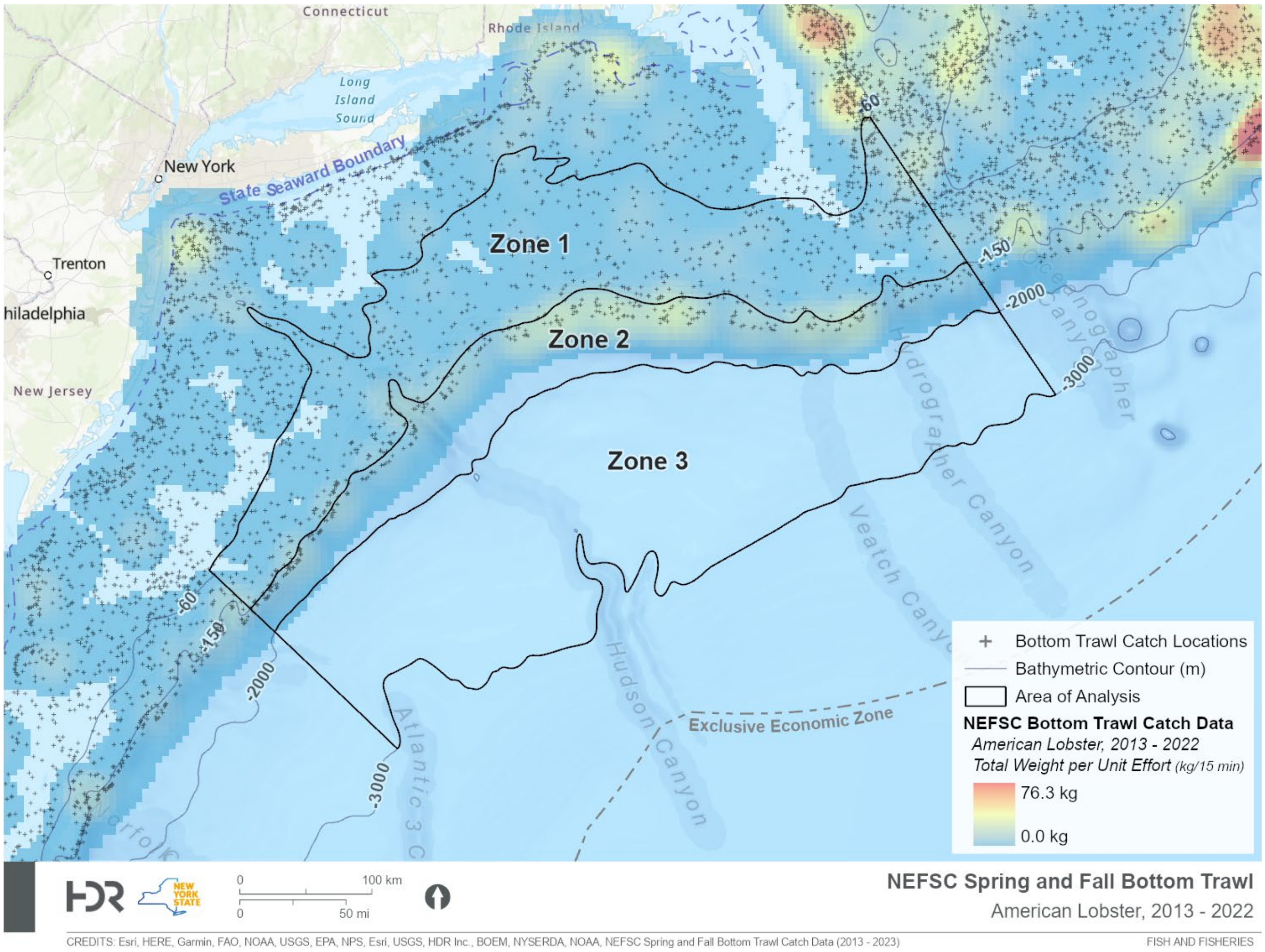
See endnote[4] for included species.



3.4.4 Shellfish Fisheries

American lobster were primarily collected within Zone 2 of the AoA during the NEFSC Spring and Fall Bottom Trawl Surveys from 2013 through 2022 (Figure 19) (NEFSC 2023a,b). The combined total weight per unit effort of American lobster was approximately 38 kilograms summed across the years surveyed. Few lobsters were caught elsewhere; however, some data gaps exist in Zone 1. Parts of Zone 2 and all of Zone 3 do not have data available due to the gear limitations of the NEFSC Spring and Fall Bottom Trawl Surveys (NOAA 2023a,b).

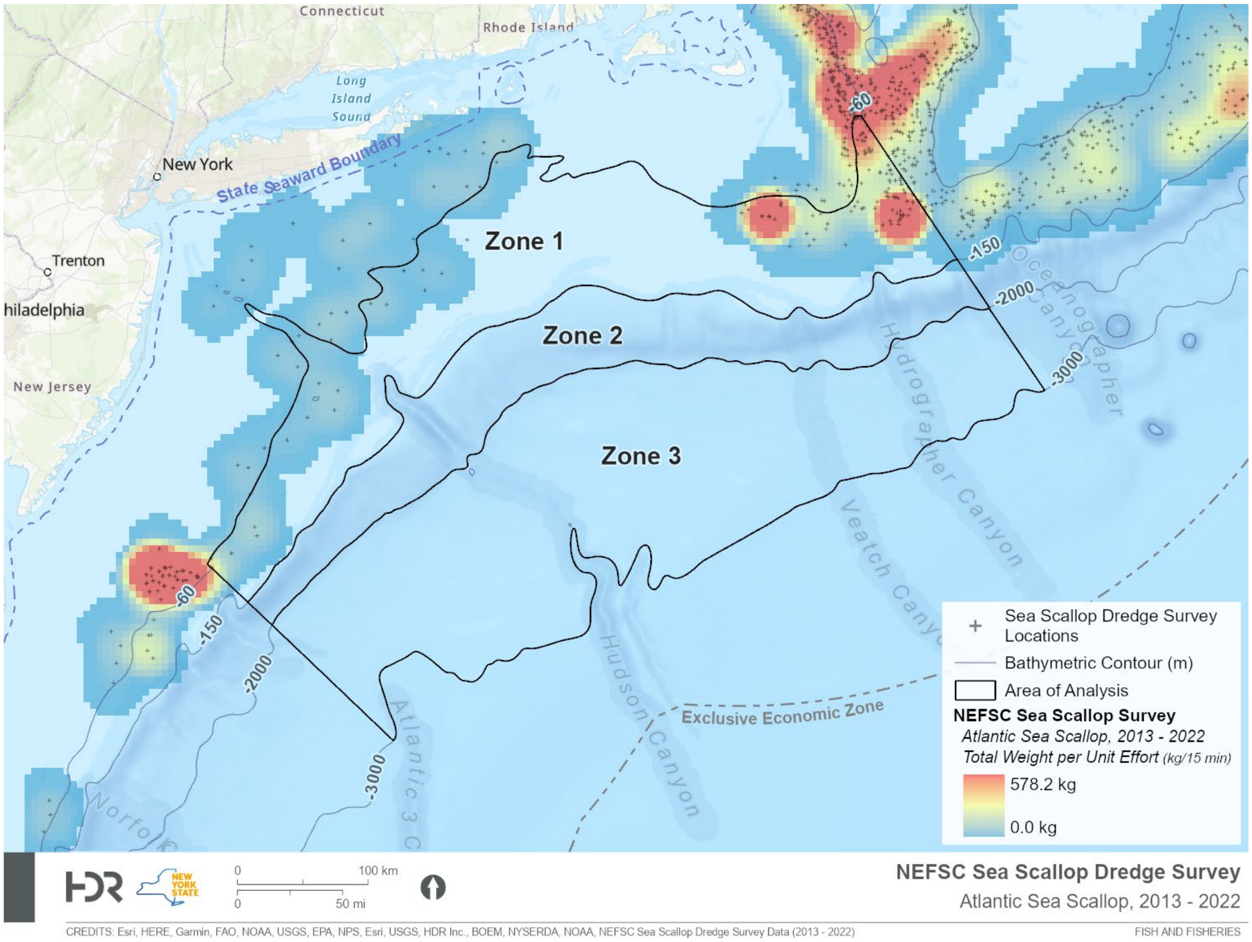
Figure 19. American Lobster Biomass (NEFSC Spring and Fall Bottom Trawl Survey) within the Area of Analysis



During the NEFSC Sea Scallop Dredge Survey from 2013 through 2022, sea scallops were primarily collected within Zone 1, in the northeast section of the AoA (Figure 20) (NEFSC 2023d). The highest combined total weight per unit effort for Atlantic Sea scallop was 578.1 kilograms summed across years. Few scallops were collected elsewhere in the AoA. A large portion of Zone 2 and all of Zone 3 do not have data available due to the gear limitations of the survey (NOAA 2023a,b).

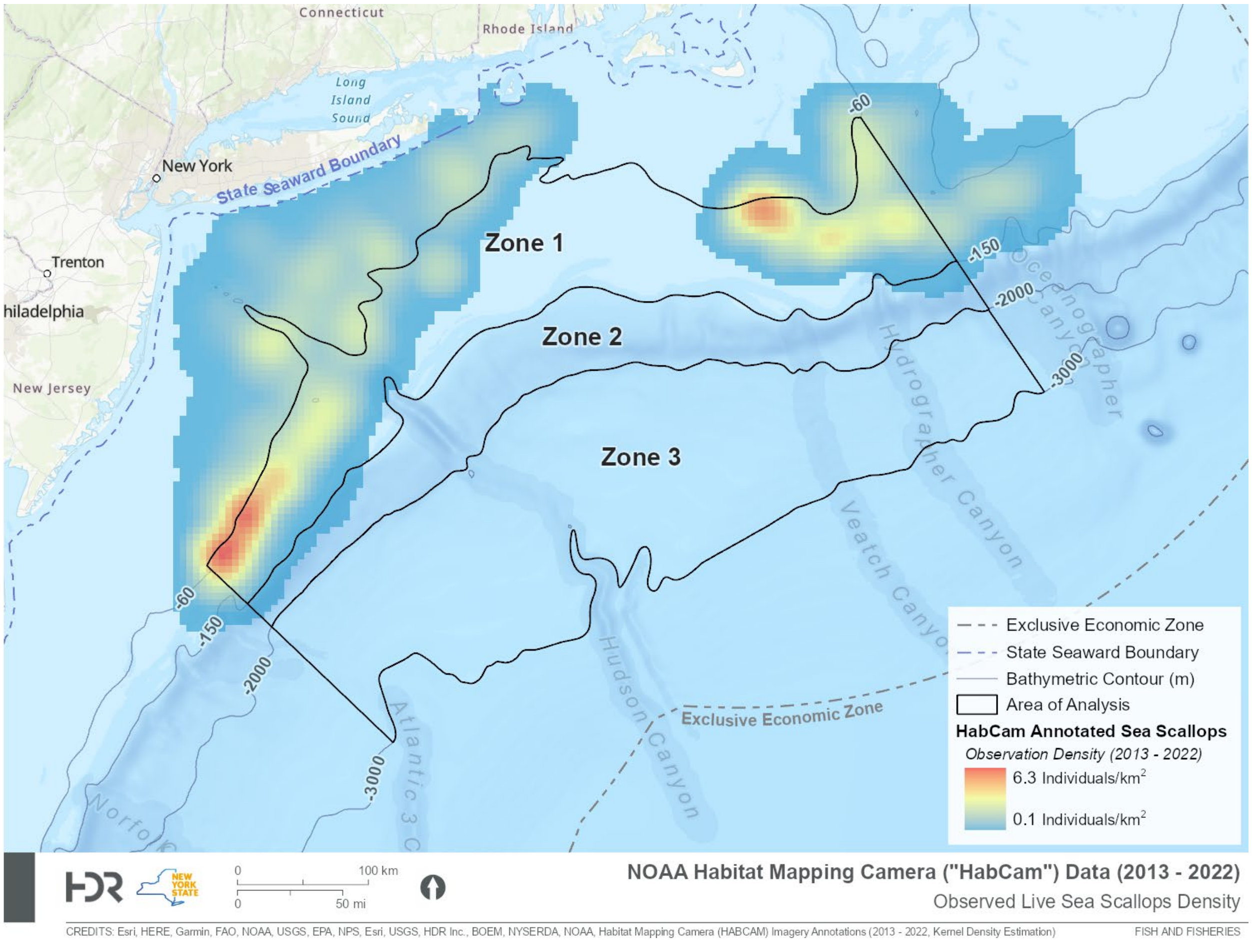
Figure 20. Sea Scallop Biomass (NEFSC Sea Scallop Dredge Survey) within the Area of Analysis

Note: The NEFSC Scallop Dredge Survey was conducted by Virginia Institute of Marine Science (VIMS), a scallop survey partner, from 2015 through 2022.



During the NEFSC Sea Scallop HabCam Survey from 2013 through 2022, the greatest sea scallop density occurred on the west side of Zone 1, and within the northeast section of Zone 1 (Figure 21) (NEFSC 2023f). The highest estimated density of Atlantic sea scallop was 6.3 individuals per square kilometer summed across years. Moderate scallop density is evident along the shoreward side of Zone 1 from New Jersey to Long Island. Moderate densities are also evident near the Nantucket Shoals. A large portion of Zone 2 and all of Zone 3 do not have data available due to survey equipment limitations (NOAA 2023f).

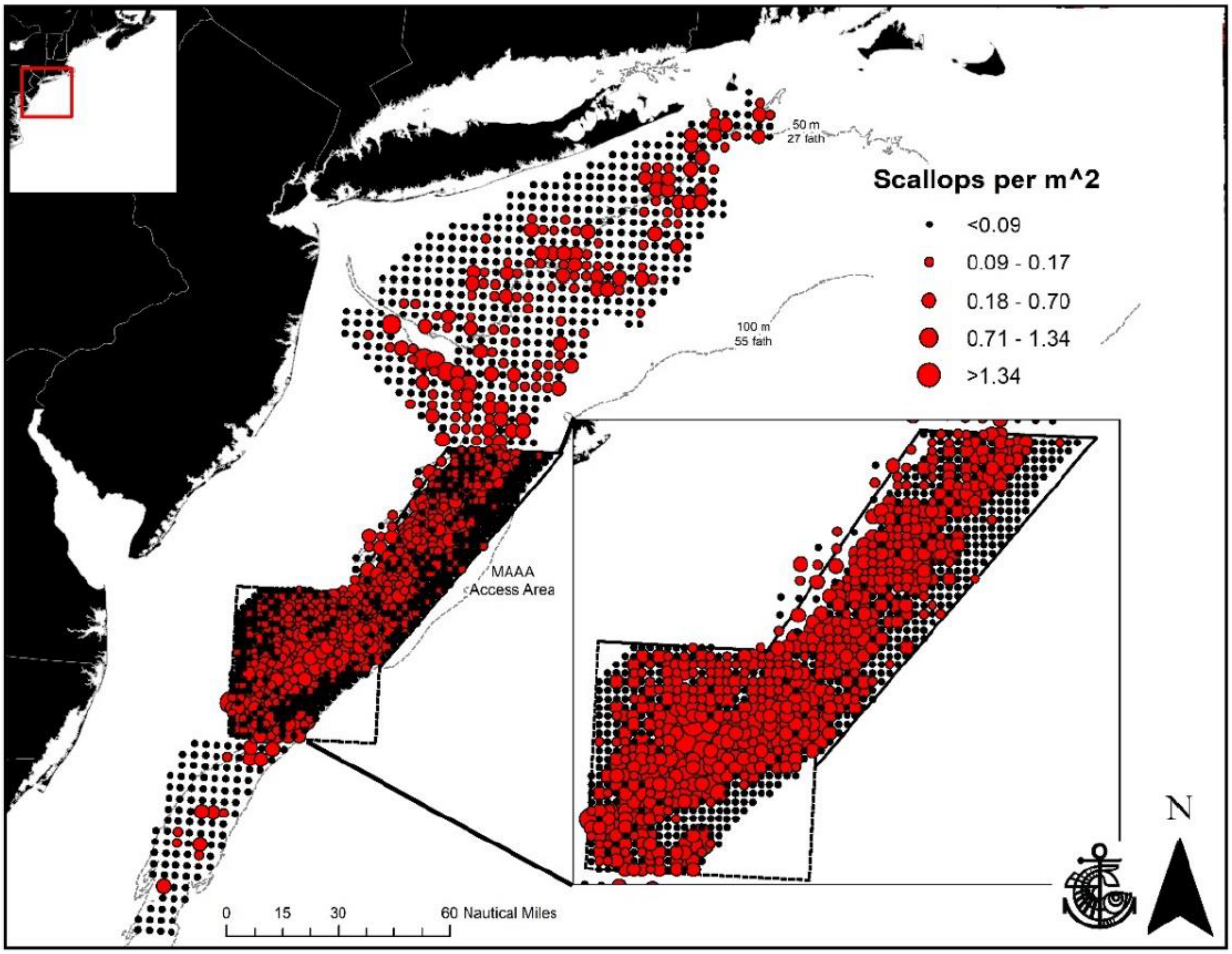
Figure 21. Estimated Sea Scallop Density (NEFSC Sea Scallop HabCam Survey) within the Area of Analysis



During the SMAST Sea Scallop Drop Camera Survey in 2019, the greatest sea scallop density occurred on the west side of Zone 1 along the Hudson Canyon (AoA boundaries estimated) (Figure 22) (Bethoney and Stokesbury 2019). The highest estimated density of scallops was greater than 1.34 individuals per square meter. Moderate scallop density was evident along the shoreward edge of Zone 1 off the coast of Long Island (Bethoney and Stokesbury 2019). Data for Zone 2 and Zone 3 of the AoA were not available from the survey.

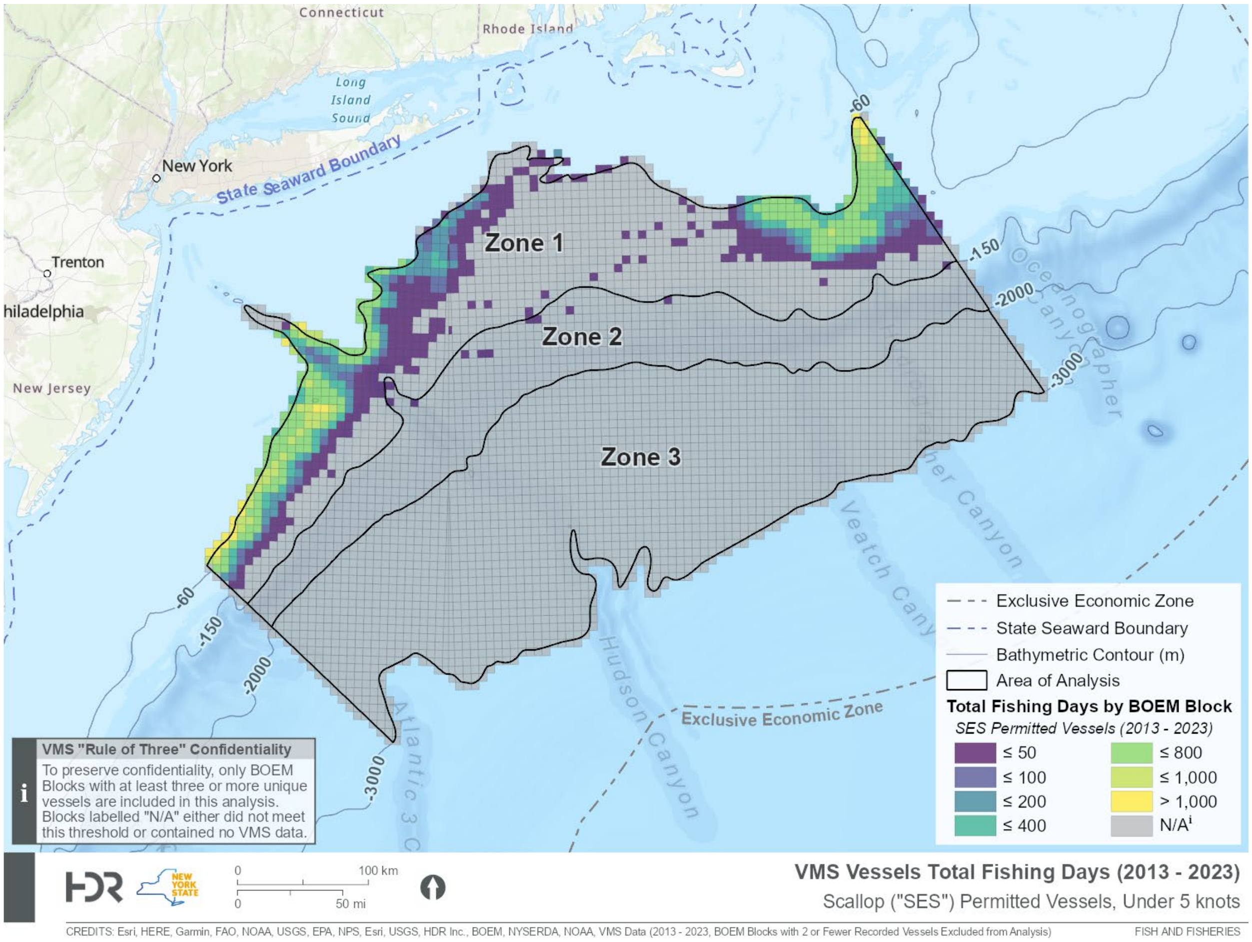
Figure 22. Sea Scallop Density (SMAST Drop Camera Survey) in the Mid-Atlantic region in 2019

Source: Bethoney and Stokesbury 2019.



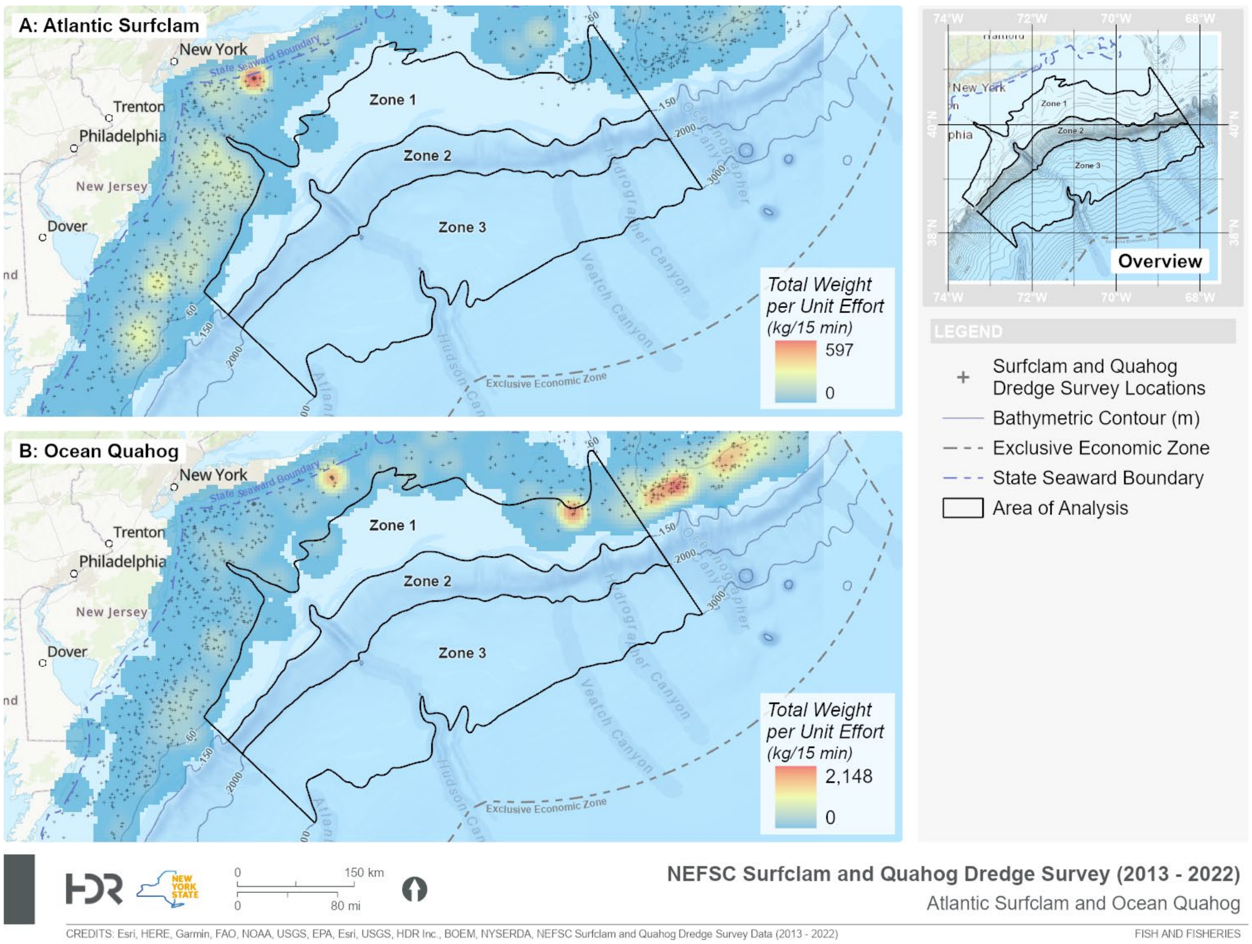
The highest number of sea scallop (SES) Plan permitted VMS fishing vessels traveling less than 5 knots within the AoA from 2013 through 2023 occurred on the east side of Zone 1 near Georges Bank and the Nantucket Shoals (Figure 23). A moderate number of SES VMS fishing vessels occurred on the west side of Zone 1 near Hudson Canyon and along the shoreward edge. Few SES permitted VMS fishing vessels traveling less than 5 knots occurred elsewhere in the AoA.

Figure 23. Map of Sea Scallop (SES) Plan Permitted Vessel Density (VMS) within the Area of Analysis (2013-2023)



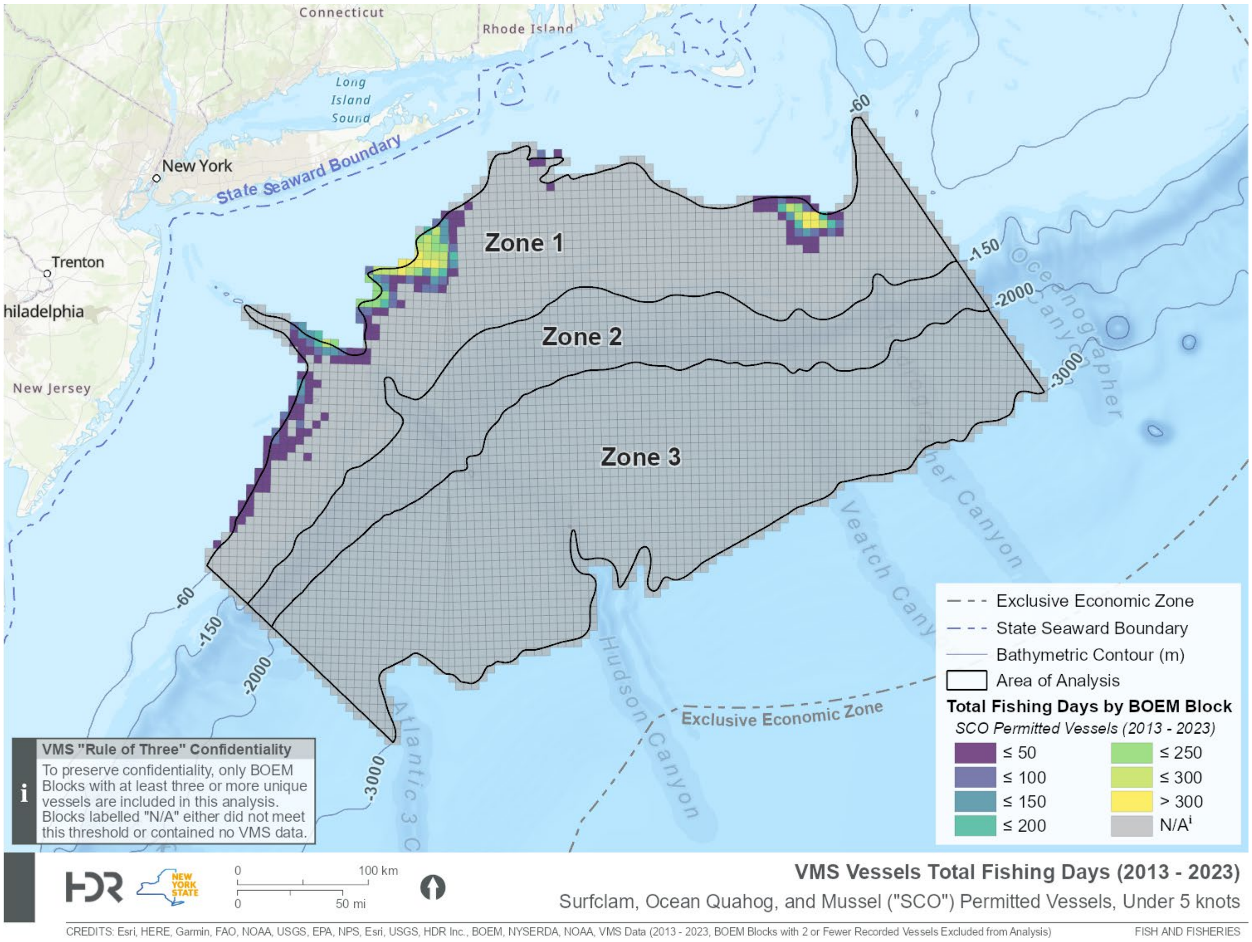
Few Atlantic surfclam were collected within the AoA during the NEFSC Atlantic Surfclam and Ocean Quahog Survey from 2013 through 2022 (panel A of Figure 24) (NEFSC 2023c). There was a low concentration of Atlantic surfclam in the southwest section of Zone 1 along the edge of the AoA boundary; however, no surfclam were collected elsewhere. Ocean quahog were concentrated in the northeast section of Zone 1 during the same time period (panel B of Figure 24). The highest combined total weight per unit effort of ocean quahog was 2,147.9 kilograms across all years. Few Atlantic surfclam and ocean quahog were collected elsewhere within the AoA from 2013 through 2022.

Figure 24. Map of Atlantic Surfclam (Panel A) and Ocean Quahog (Panel B) Biomass within the Area of Analysis



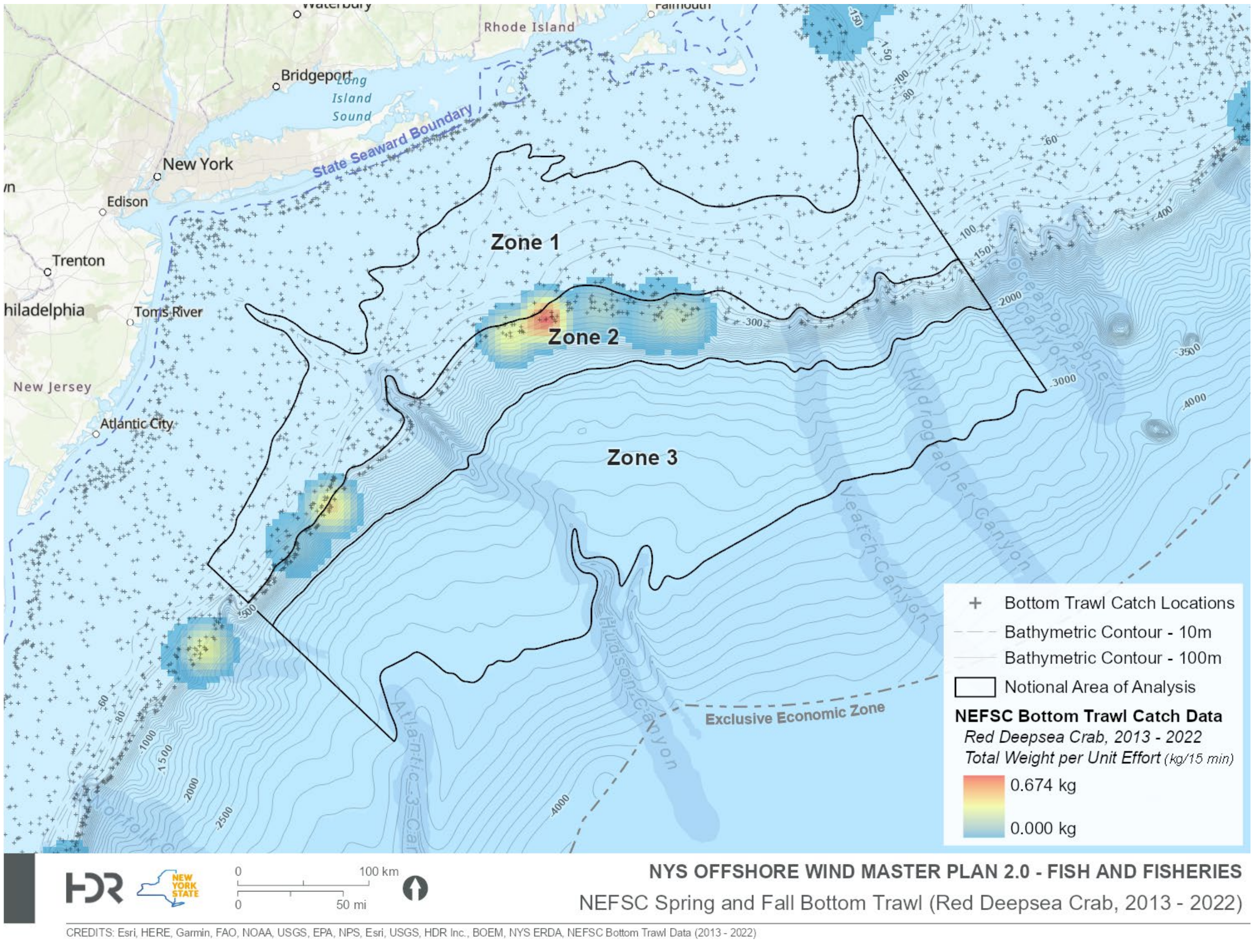
The highest number of Atlantic Surfclam, Ocean Quahog, and Mussel (SCO) Plan permitted VMS fishing vessels traveling less than 5 knots within the AoA from 2013 through 2023 occurred on the shoreward edge of the east side of Zone 1, near the Nantucket Shoals (Figure 25). Another vessel hot spot occurs on the shoreward edge in Zone 1 off the coast of Long Island. A moderate number of SCO VMS fishing vessels occurred in Zone 1 near the Hudson Canyon. Few SCO permitted VMS fishing vessels traveling less than 5 knots occurred elsewhere in the AoA.

Figure 25. Map of Atlantic Surfclam, Ocean Quahog, and Mussel (SCO) Plan Permitted Vessel Density (VMS) Within the Area of Analysis (2013–2023)



From 2013 to 2022, the highest biomass of deep-sea red crab in the combined NEFSC Spring and Fall Bottom Trawl Survey data occurred within the middle of the shelf break in Zone 1 and Zone 2 of the AoA across years (Figure 26). The second-highest deep-sea red crab biomass occurred near Toms, Middle Toms, and Hendrickson canyons, near the southwest side of Zone 1 and Zone 2 along the shelf break. No deep-sea red crab were caught in the remainder of Zone 1 on the continental shelf due to the habitat preference of this deepwater species. Deep-Sea Red Crab is one of the federally managed FMPs within the AoA.

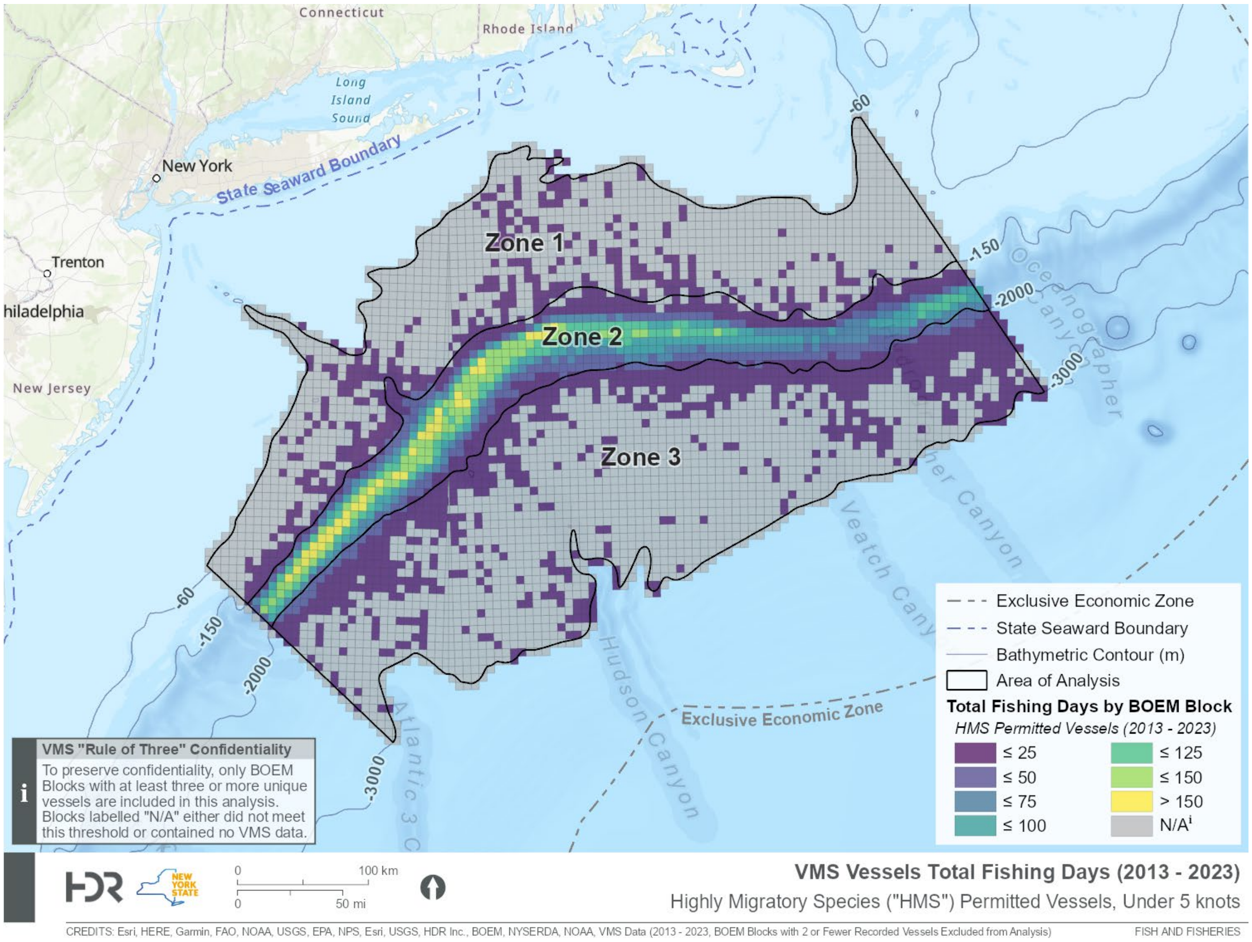
Figure 26. Deep-Sea Red Crab Biomass within the Area of Analysis



3.4.5 Finfish Fisheries

The HMS FMP comprises migratory finfish species, such as Atlantic tunas, swordfish, sharks, and billfish, as described in section 3.3.1.3. The highest number of HMS Plan permitted VMS fishing vessels traveling less than 5 knots within the AoA from 2013 through 2023 occurred throughout Zone 2 along the continental shelf, especially within the west half of the zone (Figure 27). Few HMS Plan permitted VMS fishing vessels traveling less than 5 knots occurred elsewhere in the AoA.

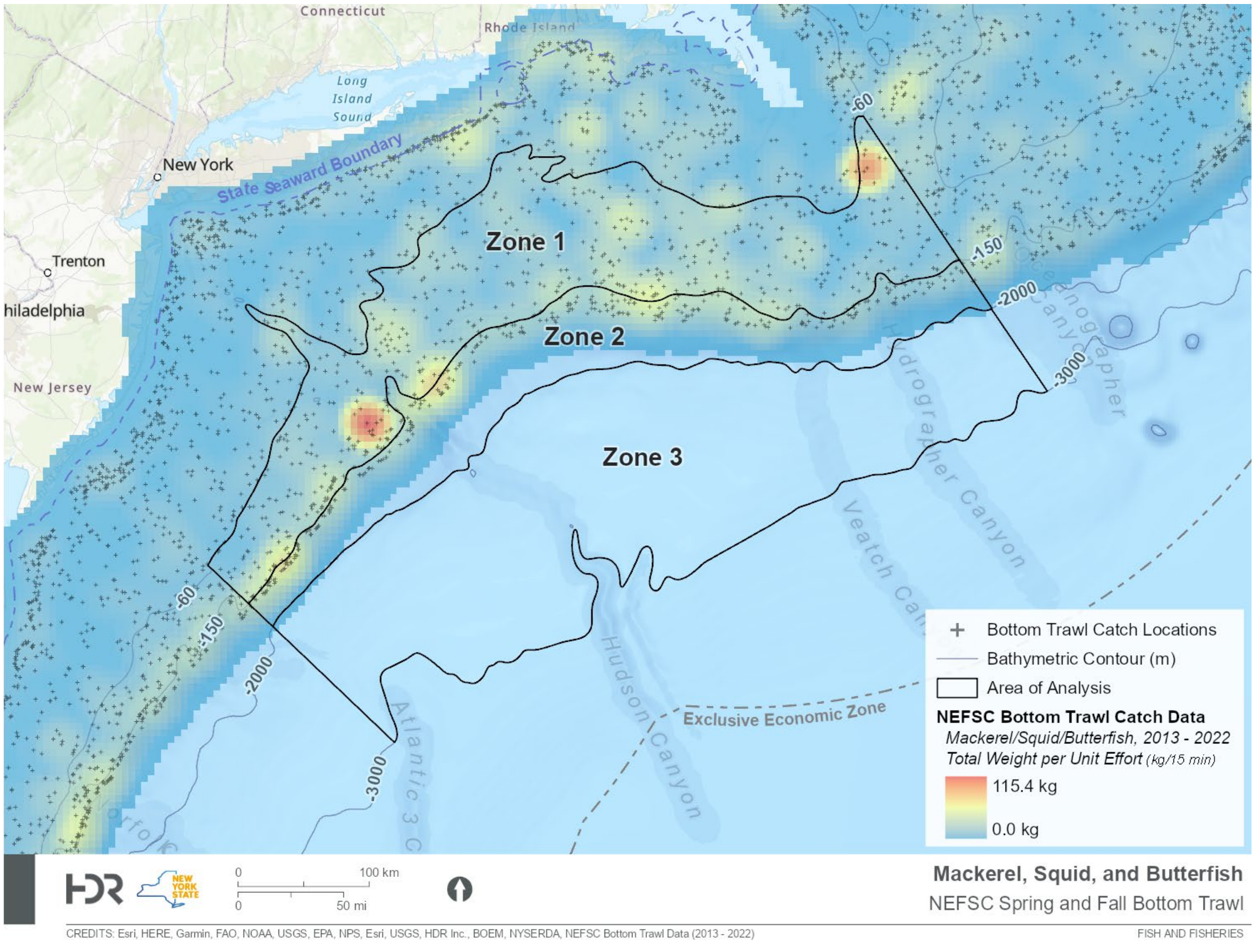
Figure 27. Map of Highly Migratory Species (HMS) Plan Permitted Vessel Density (VMS) within the Area of Analysis (20132023)



The combined biomass for the Mackerel, Squid, and Butterfish FMP in the Spring and Fall NEFSC Bottom Trawl Survey was highest in northeast part of Zone 1 and near Hudson Canyon (Figure 28). Patchiness in biomass occurred elsewhere throughout Zone 1. Within Zone 2, Mackerel, Squid and Butterfish FMP biomass was highest along the shelf break.

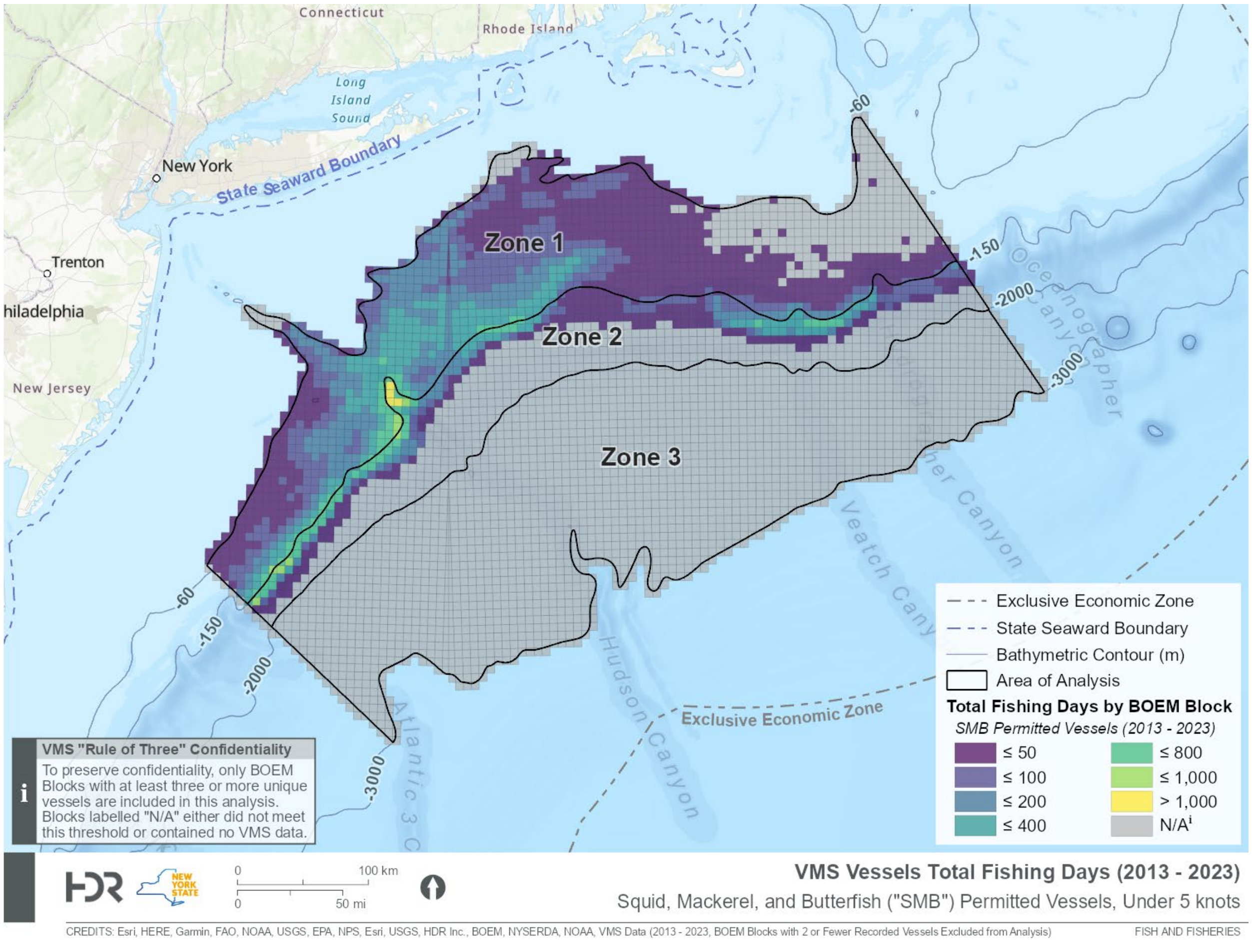
Figure 28. Mackerel, Squid, and Butterfish Biomass within the Area of Analysis

Note: The Mackerel, Squid and Butterfish FMP includes Atlantic mackerel (*Scomber scombrus*), Atlantic chub mackerel (*Scomber colias*), longfin (Loligo) squid, shortfin (Illex) squid, and Atlantic butterfish (*Peprilus triacanthus*).



The highest number of Squid, Mackerel, and Butterfish (SMB) Plan permitted VMS fishing vessels traveling less than 5 knots within the AoA from 2013 through 2023 occurred in Zone 1 and Zone 2 near and within the Hudson Canyon (Figure 29). A moderate number of VMS fishing vessels occurred throughout the west side of Zone 1 and along most of the shelf break in Zone 1 and Zone 2.

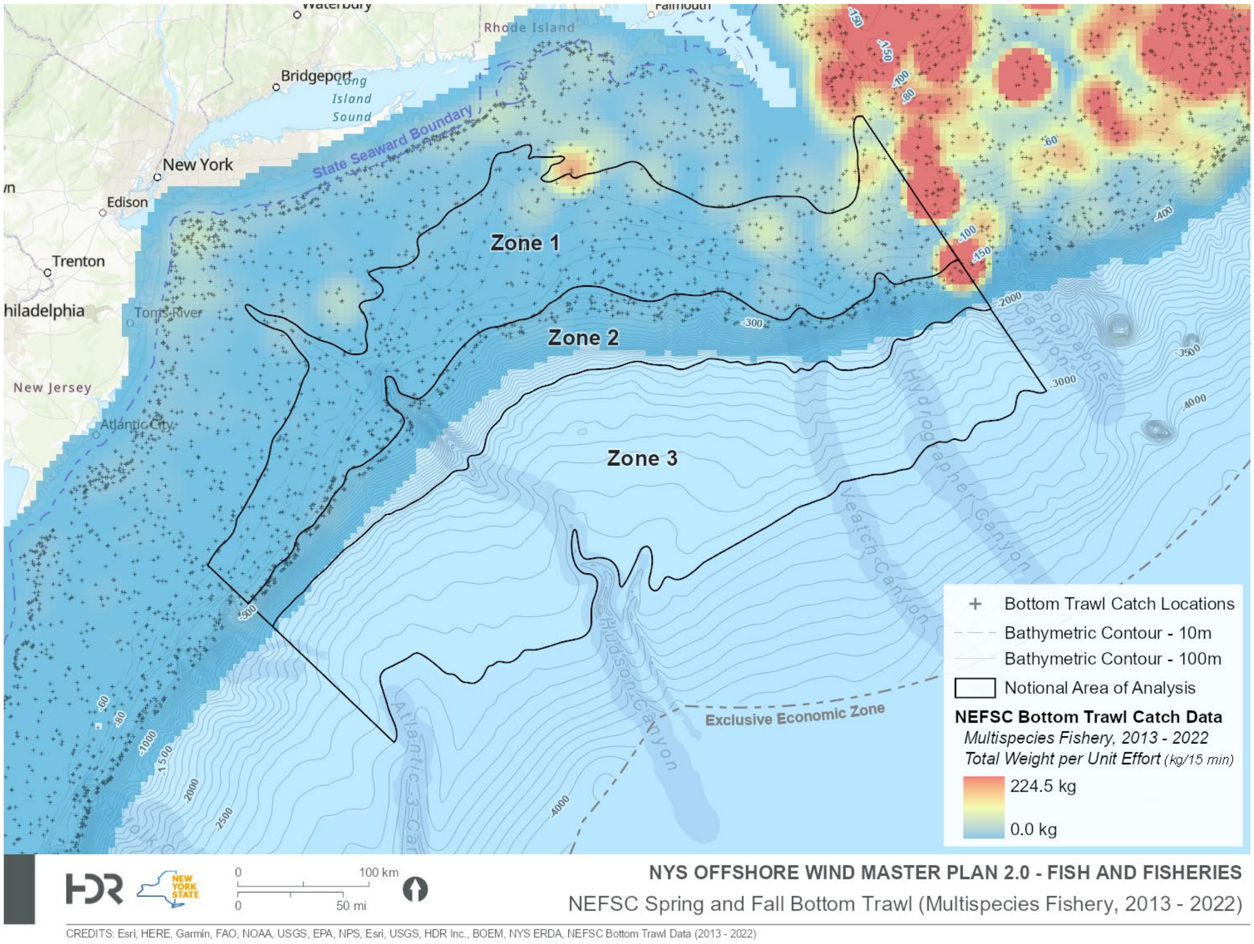
Figure 29. Map of Squid, Mackerel, and Butterfish (SMB) Plan Permitted Vessel Density (VMS) within the Area of Analysis (2013–2023)



The combined biomass for the Northeast Multispecies Complex in the NEFSC Spring and Fall Bottom Trawl Surveys from 2013 to 2022, summed across years, is notably low within the AoA, except for two hot spots along the northeast edge of Zone 1 and Zone 2, and one hot spot on the nearshore side of Zone 1 near Rhode Island (Figure 30). The highest Northeast multispecies biomass occurs just outside of Oceanographer Canyon in Zone 1 and Zone 2, and in the Nantucket Shoal in Zone 1.

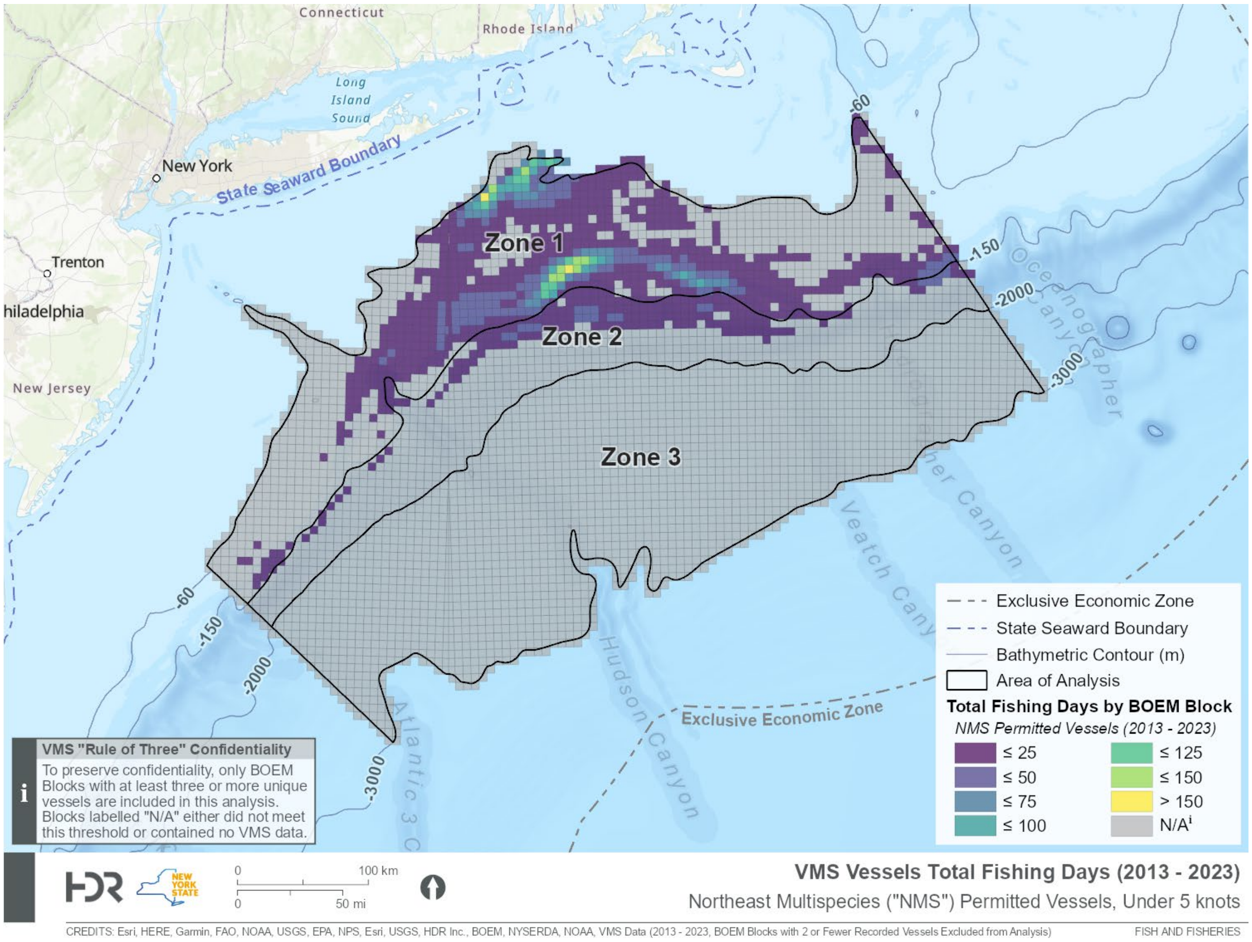
Figure 30. Northeast Multispecies Complex Biomass within the Area of Analysis

See endnote[5] for included species.



The highest number of Northeast Multispecies (NMS) Plan permitted VMS fishing vessels traveling less than 5 knots within the AoA from 2013 through 2023 occurred in Zone 1 off the coast of eastern Long Island and seaward near the edge of the continental shelf (Figure 31). A moderate number of VMS fishing vessels also occurred along the eastern edge of the AoA at the boundary of Zone 1 and Zone 2 along the shelf break. Few Northeast Multispecies Plan permitted VMS fishing vessels traveling less than 5 knots occurred elsewhere in the AoA.

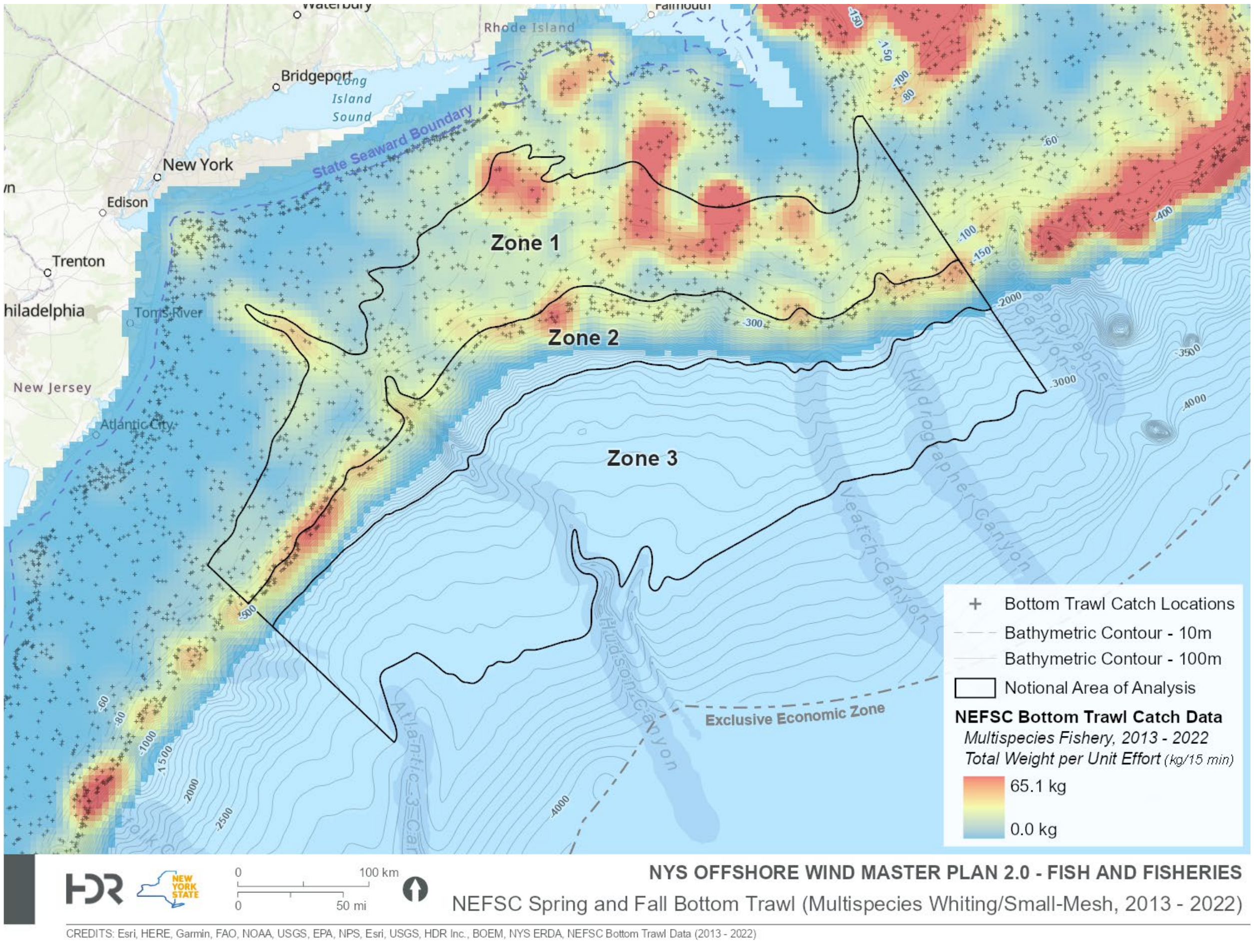
Figure 31. Map of Northeast Multispecies (NMS) Plan Permitted Vessel Density (VMS) within the Area of Analysis (2013–2023)



From 2013 to 2022, the combined biomass for the Small-mesh Multispecies complex represented in the NEFSC Spring and Fall Bottom Trawl Surveys, summed across years, is highest on the nearshore side of Zone 1 of AoA, offshore of Long Island, New York, and Rhode Island, and along the central edge and southwest edge of the continental shelf at the boundary of Zones 1 and 2 (Figure 32). The Small-mesh Multispecies Complex is managed under the broader Northeast Multispecies Complex and includes “whiting” (silver hake and offshore hake) and red hake (NOAA 2023zi).

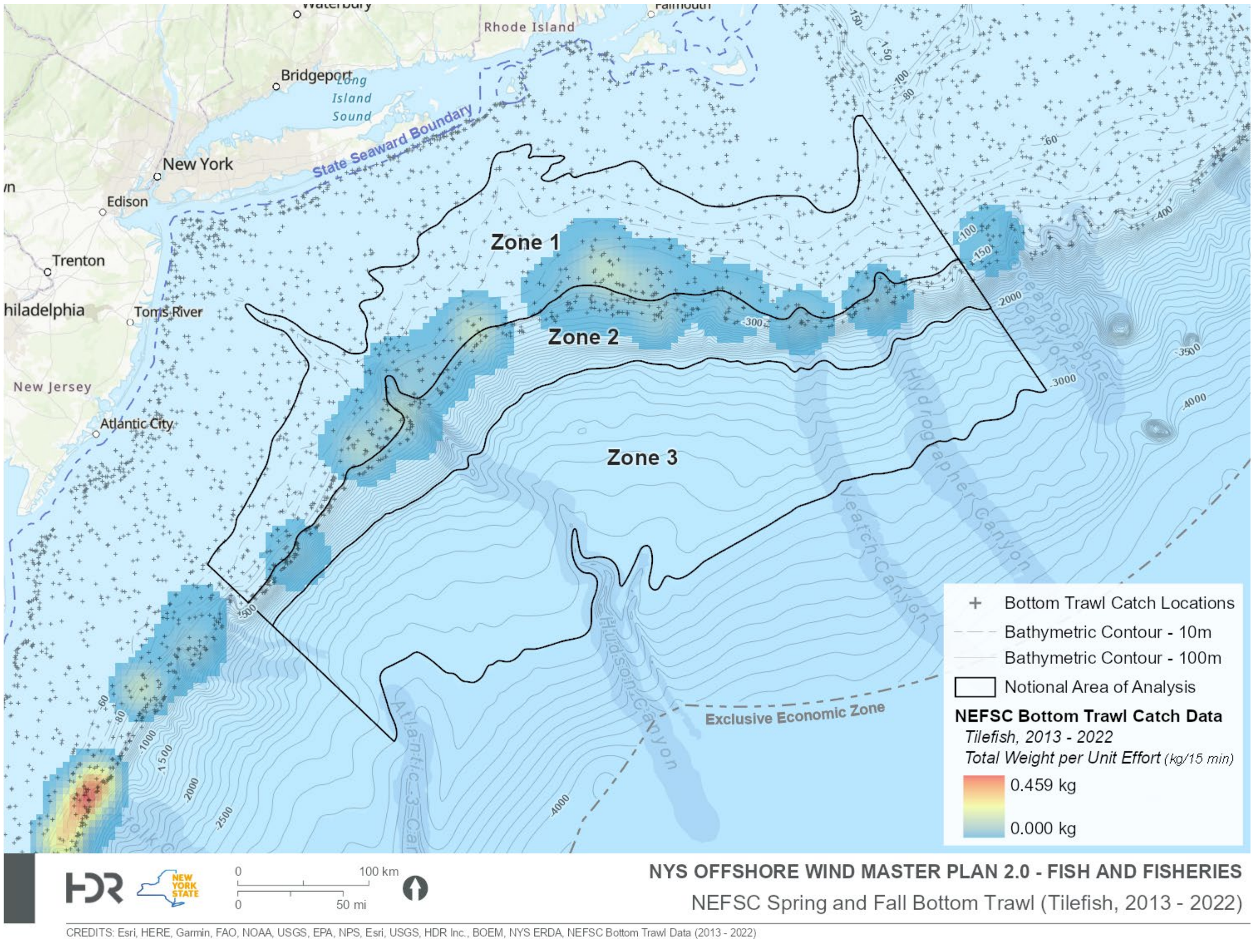
Figure 32. Small-Mesh Multispecies (Whiting) Complex Biomass within the Area of Analysis

Note: The Small-mesh Multispecies Complex includes silver hake, offshore hake, and red hake



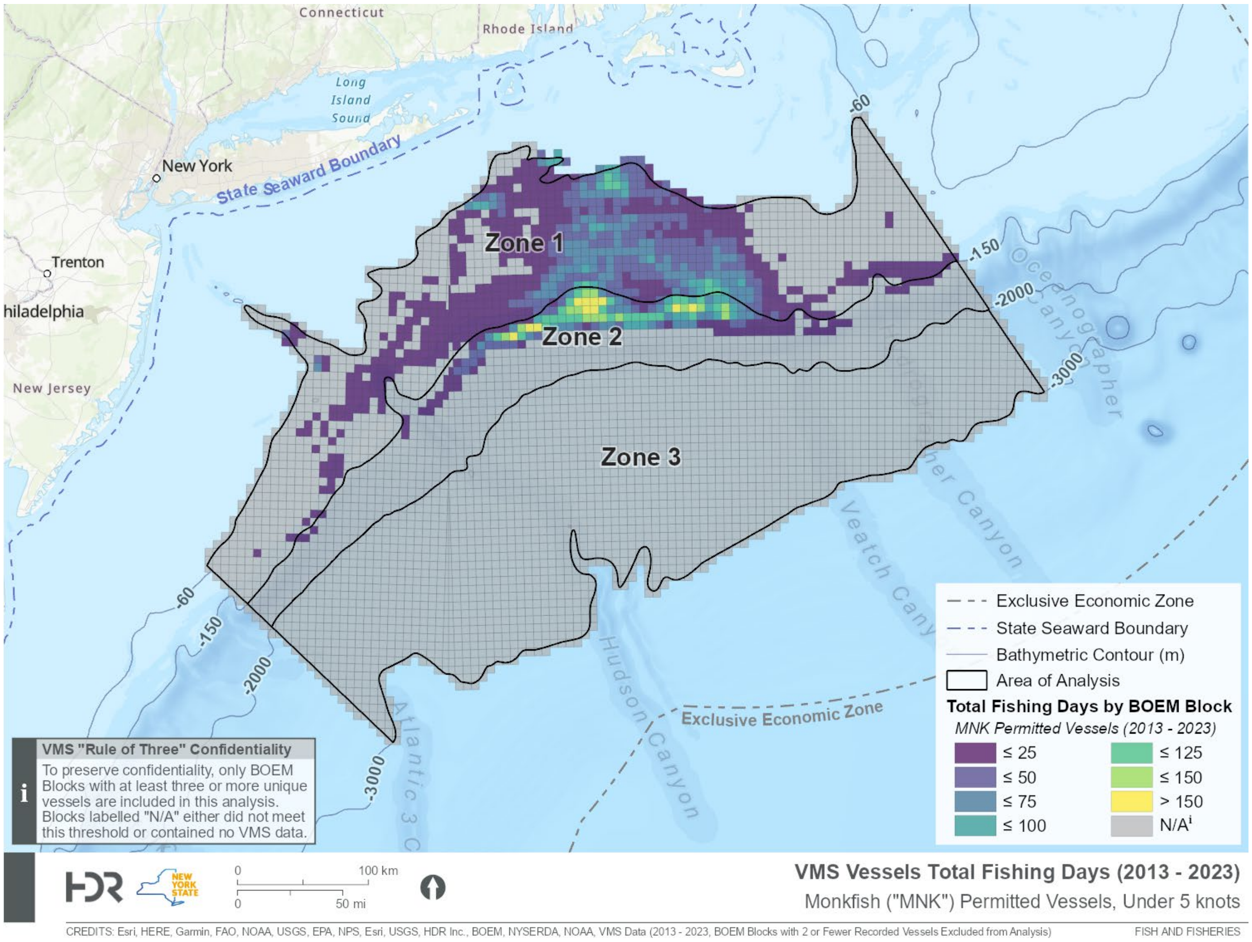
Few tilefish (golden tilefish and blueline tilefish) were caught in the combined NEFSC Spring and Fall Bottom Trawl Surveys from 2013 to 2022; however, the distribution map clearly shows that the highest tilefish biomass occurs along the shelf break in Zone 1 and Zone 2 (Figure 33). No tilefish were caught within the shallower waters of the continental shelf over the 10-year period due to the habitat preference of this deepwater species. Golden and Blueline Tilefish comprise the federally managed Tilefish FMP within the AoA.

Figure 33. Golden and Blueline Tilefish Biomass within the Area of Analysis



The highest number of Monkfish (MNK) Plan permitted VMS fishing vessels traveling less than 5 knots within the AoA from 2013 through 2023 occurred in the middle of Zone 2, seaward of the shelf break (Figure 34). A moderate number of VMS fishing vessels occurred throughout the middle of Zone 1 off the coast of Rhode Island. Few MNK permitted VMS fishing vessels traveling less than 5 knots occurred elsewhere in the AoA.

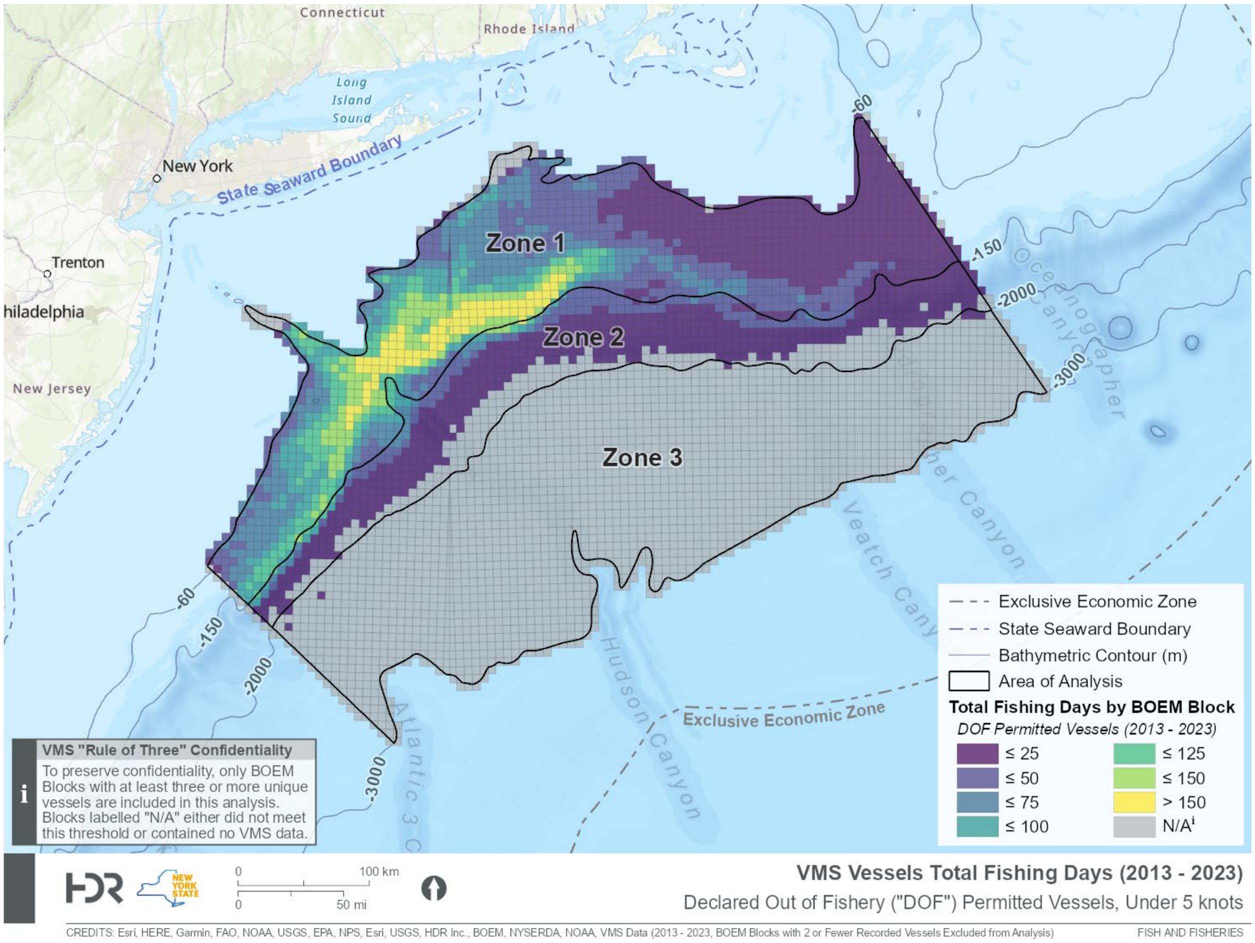
Figure 34. Map of Monkfish (MNK) Plan Permitted Vessel Density (VMS) within the Area of Analysis (2013-2023)



3.4.6 Declared Out of Fishery

Declared Out of Fishery (DOF) is a term used to identify all non-days-at-sea fisheries, such as whiting, summer flounder, scup, black sea bass, American lobster, and Jonah crab. The highest number of DOF VMS fishing vessels traveling less than 5 knots within the AoA from 2013 through 2023 occurred within the middle and west half of Zone 1 on the outer continental shelf, with a high number of DOF vessels evident near Hudson Canyon (Figure 35). Few DOF VMS fishing vessels traveling less than 5 knots occurred elsewhere in the AoA.

Figure 35. Map of Declared Out of Fishery (DOF) Vessel Density (VMS) within the Area of Analysis from 2013 through 2022



4 Stressors Associated with Each Phase of Deepwater Offshore Wind Development

A review of the current literature and stressors associated with fixed and floating OSW platforms for each phase of construction is provided in this section. There was particular focus on potential stressors associated with deepwater floating wind platforms and anchored turbine technologies, and updated information on the stressors to fish and fisheries discussed in the Master Plan that also impact the deepwater environment (NYSERDA 2017). An overview of the stressors identified for this study is provided in Table 9 and specifics of each stressor are discussed by development phase in further detail below. Refer to the Master Plan for information on the on stressors impacting nearshore waters.

NYSERDA is concurrently preparing a study of deepwater OSW technology to support future development within the AoA (NYSERDA, 2025). This study of technical concepts will be used to inform stakeholders and assist the federal government in siting deepwater OSW in the region. Worldwide deepwater wind technology is still in its infancy with fewer than 20 projects constructed; however, the number of planned projects is over 40 and climbing (NYSERDA, 2025). In the United States, floating technology is preferred in locations deeper than 60 meters and the demand for deepwater projects is especially keen given the spatial limits of the continental shelf (approximately 20 miles wide on the West Coast and 75 miles wide on the East Coast) as well as the visual constraints and fisheries resource impacts that may be more concentrated in nearshore areas.

Potential stressors to fish and fisheries from deepwater wind farms include both temporary and potentially long-term impacts, similar to those identified for projects in shallower waters. Temporary impacts that may result from wind farm pre-construction surveys and construction activities include fish displacement from noise/vibration activities, seabed disturbance, habitat alteration, and increased vessel traffic in the region that may inhibit fishing or disturb fish in and near project areas. Permanent impacts from wind farm operations include the loss of fishing grounds, potential for loss of gear due to entanglement in wind farm infrastructure, and the potential for navigation risk near and within wind farms, which may preclude fishing activities in the area (NYSERDA, 2025).

Table 9. Potential Stressors of Offshore Wind Development on Fish and Fisheries Resources by Species Group

Species / Group Affected	Stressor / Impact								
	Noise	UXO Detonation	Bottom Disturbance	EMF/Heat	New Structures (includes Habitat Conversion)	Scouring Around Seafloor Structures	Changes in Water Quality	Changes to Oceanographic Dynamics	Vessel Traffic
Highly Migratory Species	• Juveniles and adults expected to avoid construction noise (Andre et al. 2011; Mooney et al. 2020; Hawkins 2022). • Once construction is complete, operational noise is minimal compared to other phases (NYSERDA 2017; Farr et al. 2021; SEER 2022a). • Few data on vibration effects.	• Potential for physical injury and mortality to fish, depending upon distance from source (Popper et al. 2014; Hannay and Zykov 2022).	• Likely to avoid active construction areas and few impacts expected from bottom disturbance.	• Potential migratory and spawning impacts from EMF (Maxwell et al. 2022; Methratta et al. 2023; NOAA 2023e). • Elasmobranchs are species most likely impacted by EMF (Maxwell et al. 2022; Methratta et al. 2023; NOAA 2023e).	• Open-water habitat converted to artificial reef habitat; potential for increased prey species (Gill et al. 2020; Farr et al. 2021; Maxwell et al. 2022).	• Significant impacts from scouring and bottom disturbance are not expected.	• More research is necessary on potential impacts to fish species from changes to water quality associated with OSW (Wegner et al. 2017).	N/A	• Most HMS are expected to avoid construction areas; however, vessel strikes could occur to individuals (Gill et al. 2020; Farr et al. 2021; Maxwell et al. 2022). • Floating wind construction often takes place onshore, then platforms are moved offshore; likely to reduce vessel traffic compared to fixed platforms (Maxwell et al. 2022).

Table 9 continued

Species / Group Affected	Noise	UXO Detonation	Bottom Disturbance	EMF/Heat	New Structures (includes Habitat Conversion)	Scouring Around Seafloor Structures	Changes in Water Quality	Changes to Oceanographic Dynamics	Vessel Traffic
	Stressor / Impact								
Demersal Species	• Mating/ courtship; communication, e.g., Atlantic cod and haddock (Mooney et al. 2020; Hawkins 2022; NOAA 2023e). • Flounder spp. susceptible to vibration on seafloor; impacts to higher trophic levels (Sigray and Andersson 2011; Popper et al. 2022). • Juveniles and adults expected to avoid construction noise (Andre et al. 2011; Mooney et al. 2020; Hawkins 2022). • Once construction is complete, operational noise is minimal compared to other phases (NYSERDA 2017; Farr et al. 2021; SEER 2022a). Few data on vibration effects.	• Potential for physical injury and mortality to fish, depending upon distance from source (Popper et al. 2014; Hannay and Zykov 2022).	• Potentially compromised forging, reproduction, and shelter (NOAA 2023e). • Temporary feeding and spawning habitat disruption (Dernie et al. 2003). • Floating wind mooring lines generate bottom disturbance (Maxwell et al. 2022).	• Benthic species may avoid areas of increased heat. • EMF impacts presumed minimal; only within adjacent water; minimal impacts on Atlantic halibut. • Potential impacts to haddock if larvae are affected (Cresci et al. 2022).	• Structure colonization; increased food availability Farr et al. 2021; Roach et al. 2022). • Potential increased/shift populations due to fishing trawl avoidance of OSW platforms. • Habitat created by temporary in-water structures is removed during decommissioning (Miller et al. 2013; SEER 2022b).	• Floating wind mooring lines generate bottom disturbance (Maxwell et al. 2022). • Seabed trenching may impact demersal species habitat; potential reduction in soft-bottom habitat (Sun et al. 2020; Maxwell et al. 2022).	• More research is necessary on potential impacts to fish species from changes to water quality associated with OSW (Wegner et al. 2017).	• Potential changes to vertical mixing that may cause impacts to water column; more research is necessary for community level effects (van Berkel et al. 2020; Christiansen et al. 2022).	• Most fish avoid vessels Maxwell et al. 2022). • Floating wind construction often takes place onshore, then platforms are moved offshore; likely to reduce vessel traffic compared to fixed platforms (Maxwell et al. 2022).

Table 9 continued

Species / Group Affected	Stressor / Impact								
	Noise	UXO Detonation	Bottom Disturbance	EMF/Heat	New Structures (includes Habitat Conversion)	Scouring Around Seafloor Structures	Changes in Water Quality	Changes to Oceanographic Dynamics	Vessel Traffic
Small Pelagic Species	• Mating/ courtship; avoidance behavior (Andre et al. 2011; Mooney et al. 2020; Hawkins 2022). • Juveniles and adults expected to avoid noise. However, pelagic species inhabit variable depths; more susceptible to various noise sources (Hawkins 2022). • Once construction is complete, operational noise is minimal compared to other phases (NYSERDA 2017; Farr et al. 2021; SEER 2022a).	• Potential for physical injury and mortality to fish, depending upon distance from source (Popper et al. 2014; Hannay and Zykov 2022).	• Gas bladder issues; low DO Wegner et al. 2017). • Temporary feeding and spawning habitat disruption (Dernie et al. 2003).	• Minimal heat impacts; 2C increase in temp within 20cm of seafloor. • Impacts are not well studied and need to be addressed (NOAA 2023e).	• Structure colonization; increased food availability Farr et al. 2021; Roach et al. 2022). • Habitat created by temporary in-water structures is removed during decommissioning (Miller et al. 2013; SEER 2022b).	N/A	• More research is necessary on potential impacts to fish species from changes to water quality associated with OSW; potential toxin suspension when seafloor is disturbed (Wegner et al. 2017).	• Changes to currents and upwelling zones may impact the presence of pelagic forage species (van Berkel et al. 2020; Christiansen et al. 2022).	• Many juvenile and adult fish are expected to avoid construction areas; injury may occur to some individuals, but impacts are expected to be minor (Maxwell et al. 2022). • Floating wind construction often takes place onshore, then platforms are moved offshore; likely to reduce vessel traffic compared to fixed platforms (Maxwell et al. 2022).

Table 9 continued

Species / Group Affected	Stressor / Impact								
	Noise	UXO Detonation	Bottom Disturbance	EMF/Heat	New Structures (includes Habitat Conversion)	Scouring Around Seafloor Structures	Changes in Water Quality	Changes to Oceanographic Dynamics	Vessel Traffic
Invertebrate Species	• Once construction is complete, operational noise is minimal. • Few data on vibration effects; longfin squid are affected by particle motion (Mooney et al. 2010). • Sea scallop affected by pile-driving noise; however, pile driving is primarily limited to cable tie-ins for floating wind (Farr et al. 2021; Maxwell et al. 2022.	N/A	• Decreased fertilization, reproduction, feeding, and respiration; habitat disruption (Dernie et al. 2003).	• Lobster and crab: minimal attraction/ avoidance behavior from EMF; locational shifts possible (Cresci et al. 2022; NOAA 2023e). • More research is needed; few impacts studied (NOAA 2023e).	• New structural habitat for colonization Farr et al. 2021; Roach et al. 2022). • Habitat created by temporary in-water structures is removed during decommissioning (Miller et al. 2013; SEER 2022b).	• Potential reduction in soft-bottom habitat (NOAA 2023e).	• Potential toxin suspension when seafloor is disturbed; more research is necessary on potential impacts to fish species from changes to water quality associated with OSW (Wegner et al. 2017).	• Changes to currents and tides can influence distribution of larval shellfish; more research is necessary (van Berkel et al. 2020; NOAA 2023e).	N/A
Eggs and larvae	• Unable to escape noise / vibratory effects (Sigray and Andersson 2011; Popper et al. 2022. • Few data on vibration effects.	• Potential for physical injury and mortality to fish, depending upon distance from source (Popper et al. 2014; Hannay and Zykov 2022).	• Temporary spawning habitat disruption (Dernie et al. 2003). • Potential mortality to fish eggs and larvae (Wegner et al. 2017).	• Potentially unaffected by EMF (Krzysztof et al. 2021); but needs further study (NOAA 2023e).	• Potential for increased spawning habitat for fish (Methratta et al. 2023).	• Potential reduction in soft-bottom habitat (NOAA 2023e).	• Potential toxin suspension when seafloor is disturbed; more research is necessary on potential impacts to fish species from changes to water quality associated. with OSW (Wegner et al. 2017).	• Changes to currents and tides can influence larval distribution; more research is necessary (van Berkel et al. 2020; NOAA 2023e).	N/A

Table 9 continued

Species / Group Affected	Stressor / Impact								
	Noise	**UXO Detonation**	**Bottom Disturbance**	**EMF/Heat**	**New Structures (includes Habitat Conversion)**	**Scouring Around Seafloor Structures**	**Changes in Water Quality**	**Changes to Oceanographic Dynamics**	**Vessel Traffic**
Fishing Industry	• Temporarily required to avoid construction zones. • Species displacement; however, species may return after construction is complete (ten Brink and Dalton 2018). • Once construction is complete, operational noise is minimal compared to other phases (NYSERDA 2017; Farr et al. 2021; SEER 2022a).	• Potential for physical injury and mortality to fish, depending upon distance from source (Popper et al. 2014; Hannay and Zykov 2022). This could impact the presence and survival of targeted species for fisheries.	• Temporarily required to avoid construction zones. • Species displacement (Lindeboom et al 2011; ten Brink and Dalton 2018; Farr et al. 2021; NOAA 2023e).	• Potential impacts to migratory species may impact historical distribution and fishing success (Maxwell et al. 2022; Methratta et al. 2023; NOAA 2023e).	• Loss of fishing grounds (Maxwell et al. 2022). • Fishing gear / cable obstructions; especially mobile gear fishing (NOAA 2023e). • Temporarily required to avoid construction zones. • Potential species displacement (Methratta et al. 2023).	• Potential species displacement (NOAA 2023e).	N/A	• Changes to currents and tides can influence distribution of forage species for higher trophic levels; more research is necessary to determine community level effects to fisheries (van Berkel et al. 2020; NOAA 2023e).	• Potential for congestion and travel delays (NOAA 2023e). • Floating wind construction often takes place onshore, then platforms are moved offshore; likely to reduce vessel traffic compared to fixed platforms (Maxwell et al. 2022).

4.1 Pre-Construction

The activities associated with the pre-construction phase of OSW include reconnaissance surveys of bathymetric and geophysical features, studies of the seabed substrate, and surveys to identify habitats and species. The stressors to fish and fisheries that are associated with the pre-construction phase of OSW projects are bottom disturbance, potential unexploded ordnance (UXO) detonation, noise, and vessel traffic.

4.1.1 Bottom Disturbance

Geotechnical surveys that disturb benthic habitat, such as sediment cores, may reduce the amount of habitat available to demersal species. Vessel moorings may also cause bottom disturbance. Demersal fish species are expected to be primarily impacted by benthic disturbances; however, impacts are expected to be localized and temporary (NJDEP 2010). Depending on the extent of the disturbance, benthic recovery can occur in 64 to 208 days in soft sediments (Dernie et al. 2003). Demersal fish egg and larvae mortality may occur during bottom disturbance, but impacts are expected to be limited to the footprint of bottom disturbing surveys and represent only a small portion of the available habitat within the AoA. The potential for impacts to fish and fisheries from bottom disturbance is greatest in Zone 1 and Zone 2 of the AoA, where EFH and sensitive habitats have been identified on the continental shelf and along the shelf break.

4.1.2 Unexploded Ordnance Detonation

The noise generated by underwater explosions can cause physical injury and mortality to fish (Popper et al. 2014; Hannay and Zykov 2022). Damage to the swim bladder and gastrointestinal tract has been documented within the literature and mortality can occur. Standardized noise thresholds have been set to prevent injury to fish from underwater explosions and those standards should be reviewed during pre-construction UXO detonations. The noise thresholds are the same for all fish species and range from 229 to 234 decibels (dB). The potential for mortality is directly related to proximity of the blast (Popper et al. 2014; Hannay and Zykov 2022).

As the distance from the source of the underwater explosion increases, the chances of a recoverable injury to fish species also increases (Popper et al. 2014; Hannay and Zykov 2022). Fish injury depends upon how a species utilizes their swim bladder; for example, species that utilize swim bladders for hearing may have a higher likelihood for injury than species that do not use swim bladders for hearing. The literature is unclear regarding physical distances for recoverable injury to fish species, but individuals only tens of meters away from an underwater explosion may eventually recover (Popper et al. 2014; Hannay and Zykov 2022). UXO detonation could potentially impact any zone where UXO are located.

4.1.3 Noise

Pre-construction surveys often use multibeam and side-scan sonar to map benthic habitat within OSW lease areas. Limited research has been conducted on the effects of sonar and echosounders on fish and fisheries (Mooney et al. 2020). Since many sonar frequencies cannot be perceived by fish species, it is presumed those frequencies cannot affect fish (Popper et al. 2007; Mooney et al. 2020). Few studies have explored the impact of low-frequency sonar on fishes; however, research suggests that exposure to high levels may damage fish hearing (Popper et al. 2007; Mooney et al. 2020). Mid-frequency active sonar (MFA) has been extensively studied and is not expected to negatively impact fish species behavior, nor cause injury or harm (Mooney et al. 2020).

The increased presence of vessels conducting pre-construction surveys within the planned OSW sites is expected to increase ambient noise levels. The sound generated by vessel traffic has been shown to decrease the presence of fish that actively avoid undesirable sound (Andre et al. 2011). The noise generated by marine vessels is directly related to the speed at which vessels travel (NOAA 2023e); therefore, slow moving or stationary marine vessels with deployed survey gear are not expected to generate as much noise as vessels traveling to and from survey locations. While pre-construction surveys are temporary in nature and not expected to create long-term changes to ambient ocean noise, intermittent noise generated by marine vessels has been shown to affect haddock and cod, two fish species that utilize sound for communication (Mooney et al. 2020; Hawkins 2022; NOAA 2023e). Displaced fish species or those avoiding noise created by pre-construction surveys are expected to return to the area when surveys are complete. Vessel noise has the potential to impact Zone 1 the most, where the water depth is shallowest; however, noise will impact most species in the vicinity of marine vessels.

4.1.4 Vessel Traffic

Vessel strikes are a concern for marine species that spend time at or near the surface and may result in injury or death to an affected individual (Maxwell et al. 2022). Vessel strikes are primarily a concern for marine mammals because fish exhibit faster reaction times or tend to avoid moving vessels entirely (NYSERDA 2017; Maxwell et al. 2022). One fish species that is susceptible to vessel strikes that has been documented in the literature and occurs within the AoA is the Atlantic sturgeon (Brown and Murphy 2010; Balazik et al. 2012; NYSERDA 2017). Most documented vessel strikes of Atlantic sturgeon occur within rivers and estuaries and are expected to be more common in narrow waterways with shallow water where the species has difficulty avoiding vessels (NYSERDA 2017). Vessel strikes are expected to occur from fast moving boats and pre-construction surveys are generally conducted methodically at slower speeds. Vessel strikes have the potential to impact Zone 1 the most where the water depth is shallowest, but strikes may occur anywhere near a marine vessel.

Travel delays and congested travel routes are a concern of the fishing industry and shipping industry (NOAA 2023e). Short-term travel delays and congestion may occur, given the increased presence of marine vessels that are necessary for the pre-construction surveys. Increased vessel presence may increase navigational risks (Maxwell et al. 2022). Marine vessels will need to avoid areas of active pre-construction surveys, which could increase congestion elsewhere. This could pose safety challenges for fishing vessels since gear deployment limits vessel maneuverability.

Pre-construction surveys are not expected to necessitate a high number of marine vessels that would significantly impede other vessel traffic.

4.2 Construction

Construction activities that are expected to impact fish and fisheries most within the AoA during OSW include dredging, pile driving, anchor placement and mooring, the replacement of soft substrate with hard-bottom, and vessel presence within the construction zone. Construction activities vary by the type of platform being installed. The construction of fixed OSW platforms involves pile-driving and a considerable amount of seabed disturbance and habitat conversion when compared to floating OSW platforms that utilize moorings with a smaller seabed footprint. Floating platforms can be constructed on the shore and transported to the desired location, which reduces the impacts associated with in-water construction of fixed offshore wind platforms (Maxwell et al. 2022). However, as described in section 4.2.1, the mooring anchors required for offshore wind turbines create habitat disturbance.

The stressors to fish and fisheries associated with the construction of OSW platforms are noise, vessel traffic, bottom disturbance, and changes in water quality. Disruptions to fishing operations within the vicinity of the construction may also occur. The potential for new in-water structures to impact vessel traffic and fishing operations after construction is complete is discussed in section 4.3. However, these potential impacts may also occur during construction once platforms and cables are being established. Best management practices (BMPs), construction site safety plans, and seasonal avoidance of construction activity can help reduce impacts to fish and fisheries or, in some cases, eliminate them (NYSERDA 2017).

4.2.1 Bottom Disturbance

Demersal fish species living within the bottom water and benthic habitat will be subjected to changes in the seabed that occur during pile driving (fixed wind platforms), excavation and dredging, and anchoring and mooring of floating wind platforms and construction vessels. Impacts to bottom habitat include physical disturbance of the seabed, sediment plumes or turbidity, and the release of toxins from the sediment generated from construction activities. The impact to fish species will vary depending upon the construction activity, time of year, and the composition of substrate present at a particular construction site (Bergstrom et al. 2013; NYSERDA 2017). Bottom disturbance has the potential to impact Zone 1 and Zone 2 the most, where EFH and sensitive habitats have been identified on the continental shelf and along the shelf break.

Benthic habitat will be altered and disturbed during the construction of footings for fixed OSW platforms, the placement of anchors that are used to secure floating platforms, and the placement of underwater power cables. Sediment plumes are generated during each of these activities and the settling of suspended sediments poses significant mortality risks to fish eggs and larvae, and injury to demersal fish species (Wegner et al. 2017). Dredging activities can be very harmful to demersal fish species and the early life-stages of fishes. To date, most studies on the impacts of dredging have focused on the risks associated with suspended sediments (e.g., reduced dissolved oxygen and burial). Prioritizing research that collects data within the affected environment and focuses on all life stages of the affected species has been suggested (Wegner et al. 2017).

Seabed preparation for cable installation (fixed platforms and substations) and dredging activities will physically alter benthic habitat by disturbing substrate and pushing or relocating boulders (BOEM 2022b). Boulder relocation can disturb fish and shellfish habitat, but also may potentially impact fishing activities since boulders pose a risk for mobile fishing gear and could cause loss or damage to gear. The location of boulders is sometimes known by fishing vessels, which normally avoid them; if boulders are moved, this could increase the potential for gear loss. Some OSW construction projects have cited the need to clear a path of up to 98 feet wide to accommodate cable installations (BOEM 2022b). Cable protection such as crushed rock, concrete mattresses and concrete slabs can alter benthic habitat. Demersal fish and shellfish species that utilize benthic habitat for foraging, reproduction, and shelter will be impacted by these activities. Demersal fish species are expected to utilize other nearby suitable habitat and return to the area when construction is completed. Some individuals or colonies (i.e., shellfish) may re-establish in new locations. Impacted habitat will be in the immediate vicinity of cable footprints and only affect a small portion of available benthic habitat within the AoA. Benthic habitat is expected to recover following disturbance activities and recolonization will occur after construction is complete (NYSERDA 2017). Some soft bottom habitat that is replaced with hard structures may provide habitat for additional species (native, non-native, or invasive), but potentially displace others (Lindeboom et al 2011; ten Brink and Dalton 2018; Farr et al. 2021; NOAA 2023e). Refer to section 4.3.3 for more information.

4.2.2 Noise

The risk of noise impacts from OSW to marine species is highest during the construction phase of the project (NYSERDA 2017; SEER 2022a). The distinction between sound and vibration is important when identifying the effect of noise on different marine species (Mooney et al. 2020; NOAA 2023e). Vibrations cause sound waves, which generate “particle motion” and changes occur to pressure (Popper and Hawkins 2018; Mooney et al. 2020; NOAA 2023e). Particle motion primarily affects fish and invertebrate species, while mammals are affected by pressure (Farr et al. 2021; NOAA 2023e). Construction noise could potentially impact Zone 1 the most, where the water depth is shallowest; however, noise may impact any zone where construction takes place.

Studies of longfin squid have demonstrated that the species is affected by particle motion rather than changes in pressure (Mooney et al. 2010); such is the case for many species of fish. Noise generated from a variety of construction activities, including impact hammering, dredging, underwater detonation, and vessel traffic, have the potential to be detrimental to many fish species (Hawkins 2022; Methratta et al. 2023). Demersal species, such as summer flounder, and early life stages that spend time in contact with the seabed, may be especially vulnerable to the vibration caused by impact hammering (Sigray and Andersson 2011; Popper et al. 2022). Individuals occupying habitat in the immediate vicinity of in-water construction activities are most at risk (NOAA 2023e), including invertebrate species that live on and within seabed sediments (Roberts and Elliott 2017). One benefit of floating wind platforms is that construction of the platform itself can take place onshore rather than within the aquatic environment;

following assembly, platforms are moved offshore into place (Maxwell et al. 2022). This type of construction reduces marine vessel traffic and noise impacts typically associated with the construction of fixed OSW platforms (Maxwell et al. 2022).

Researchers have pointed to a need for more research and publications on the hearing of marine fishes (Hawkins 2022; Methratta et al. 2023). The distance that sound travels is dependent upon environmental factors such as depth, temperature, and salinity, but it can also be affected by different types of sediment, bathymetry, and other ambient noise from marine vessels or machinery (NOAA 2023e). Pelagic species traveling through different locations may be particularly vulnerable to noise from construction activities, since exposure might occur from a variety of sources in a variety of locations (Hawkins 2022). Future studies of the impact of sound on fish may need to be carried out *in situ* to account for environmental and anthropogenic variables (Hawkins 2022).

The sound generated by vessel traffic during construction activities in the marine environment has been shown to decrease the presence of fish and cause injury to many other marine species (Andre et al. 2011). The noise generated by marine vessels is directly related to the speed at which a given vessel travels (NOAA 2023e). The effect of noise on fish varies by the species, life stage, and time of year. For example, Atlantic cod are known to use sound throughout their spawning season (Rowe and Hutchings 2006; Mooney et al. 2020; Hawkins 2022); therefore, any noise generated by construction activities (e.g., pile driving; vessel traffic) during this critical time may negatively impact spawning behavior (Mooney et al. 2020; Hawkins 2022; NOAA 2023e). Haddock also use sound for communication and males produce specific sounds to attract females during the spawning season (Hawkins 2022). Both species are important to commercial and recreational fisheries.

Juvenile cod HAPC has been identified in a small part of Zone 1 within the AoA, offshore of Cape Cod, Massachusetts. Atlantic cod EFH is present for all life stages in Zone 1 of the AoA and for eggs and larvae in Zone 2 of the AoA. No EFH has been identified for cod in Zone 3.

As noted in the previous section, construction of floating wind platforms takes place onshore; platforms are then moved offshore into place (Maxwell et al. 2022). This type of construction reduces marine vessel traffic and the noise associated with the construction of fixed OSW platforms (Maxwell et al. 2022) and is a likely benefit of this type of technology. Adult and juvenile fish species are expected to avoid active construction zones where increased vessel traffic occurs.

Pile driving noise can be very intense within the marine environment and increases with proximity to the source. The sound can travel variable distances in the surrounding water column, depending upon environmental factors. Pile driving noise is more of a concern with the construction of fixed wind platforms, which require the use of support foundations, rather than floating platforms that are held in place with anchors (Farr et al. 2021; Maxwell et al. 2022). However, pile driving is sometimes required for cable tie-ins that are necessary for floating platforms. The particle motion generated by the sound of impact hammering may cause shellfish to become stunned or cause impaired movement; a "flight response" may occur in some individuals (NOAA 2023e). The use of bubble curtains during pile driving has been shown to reduce the distance that sound travels and mitigate the effect of vibrations on fish and their surrounding environment (SEER 2022a; NOAA 2023e).

Atlantic sea scallop has been shown to display shell closure response when exposed to vibrations and noise caused by impact hammering; juveniles are the most sensitive life stage; however, subadult and adult scallops also exhibit closure response (Jezequel et al. 2022). The coughing behavior of sea scallop has been shown to be affected by pile driving noise; changes occurred more often in juveniles. Further research is needed to understand the broader impacts of pile driving and other construction activities on scallop fisheries and the economy (Jezequel at al. 2022).

Pile driving noise has been shown to cause complications with the avoidance response and foraging behavior of longfin squid in recent studies, but spawning behavior is not known to be affected (Jones et al. 2021; Stanley at al. 2021; NOAA 2023e). Jones et al. (2021) observed that longfin squid were less likely to successfully capture prey in the presence of pile driving noise, and that squid will sometimes abandon their hunt entirely. This may be attributed to the use of particle motion by longfin squid to detect prey and escape predation (Mooney et al. 2010). Low- and mid-frequency sound is produced during pile driving and by marine vessel traffic, which has been shown to affect the hearing of cephalopods (Andre et al. 2011). Researchers have documented the development and progression of lesions within the auditory organs of octopus and squid after exposure to low-frequency sound over a period. Information on the topic is limited and further study is needed to fully understand the impact of low-frequency sound on all marine species, especially when considering increased vessel traffic and human activity that has occurred in the ocean over time (Andre et al. 2011). Longfin inshore squid are known to inhabit deep water in the

Mid-Atlantic Bight during winter and spring, then move to shallower water in the fall (Hatfield and Cadrin 2002). Review of standardized data from 1967 through 1998 has indicated that the Mid-Atlantic Bight provides spawning habitat for longfin squid, as evidenced by substantial numbers of juvenile squid during the spring (Hatfield and Cadrin 2002). Noise from pile driving or other construction activities could impact squid in the vicinity (Jones et al. 2021; Andre et al. 2011).

Surveyed anglers have expressed concerns about pile driving related to OSW construction; however, while fish fled the area during construction operations, anglers note that fish returned when construction was complete (ten Brink and Dalton 2018). Many individuals from the commercial fishing industry noted no impact to fishing operations following the construction of the Block Island Wind Farm (ten Brink and Dalton 2018). More research is necessary to understand community level effects of noise on fish and fisheries (NOAA 2023e).

4.2.3 Vessel Traffic

As discussed in the pre-construction section above, vessel strikes are a concern for marine species that spend time at or near the surface and primarily impact marine mammals because fish exhibit faster reaction times or tend to avoid moving vessels entirely (NYSERDA 2017; Maxwell et al. 2022). Vessel strikes have the potential to impact Zone 1 the most, where the water depth is shallowest; however, strikes may occur in any Zone with marine vessels.

The Atlantic sturgeon is one fish species of concern regarding vessel strikes; however, most documented vessel strikes of Atlantic sturgeon occur within rivers and estuaries and are expected to be more common in narrow waterways, with shallow water, where the species has difficulty avoiding vessels (Brown and Murphy 2010; Balazik et al. 2012; NYSERDA 2017). One benefit of floating wind platforms is that construction of the platforms takes place onshore before the turbines are moved into place. (Maxwell et al. 2022). This reduces the number of marine vessels needed in the water and reduces the likelihood of vessel strikes that typically occur during the construction of fixed wind platforms (Maxwell et al. 2022).

Travel delays and congestion may occur, given the increased presence of marine vessels that are necessary for the construction phase of the project. Fishing and non-fishing vessels will be restricted to specific travel routes to avoid OSW construction. Construction of floating OSW platforms and cable arrays is expected to create complications with fishing operations (Maxwell et al. 2022). Currently, it is unknown what the spacing of floating turbines will be within the AoA. Turbines spaced farther apart are likely to pose greater challenges to navigation than those spaced more closely together because of extended array cables and a larger construction footprint. Marine vessels will need to avoid active construction zones and seek other travel corridors, which is likely to create congestion and additional navigational challenges. Increased vessel traffic increases the risk of collision with other vessels and creates complications with fishing gear deployment.

Delays and congestion will presumably be localized. The number of marine vessels associated with the OSW project will decrease when construction is completed. Travel delays have been a concern of the fishing industry and shipping industry (NOAA 2023e); however, since some construction of floating OSW platforms takes place onshore, it is expected to require fewer vessels than typically needed for comparatively sized fixed platform OSW projects (Maxwell et al. 2022). Additional safety challenges for fishing vessels may occur since fishing gear deployment limits vessel maneuverability. The extent of travel delays and safety risks resulting from OSW construction activities will depend upon the location and spacing of OSW platforms and array cables (see section 4.3.3.4).

4.2.4 Changes in Water Quality

During the construction of footings for fixed OSW platforms, the placement of anchors that are used to secure floating platforms, and the placement of underwater power cables, sediment plumes are generated and toxins that were trapped within the sediment are sometimes released (Wegner et al. 2017). Changes in water quality may occur in any zone where mooring and anchoring takes place. Researchers have pointed out the need for more studies to assess the type of toxins present within marine sediments and the concentration of the toxins, which can vary by location (Wegner et al. 2017). The impact of toxin release on fish species and specific life stages should be considered in future studies. It has been suggested that studies take place *in situ* to account for environmental variation; studies should be life stage specific (Wegner et al. 2017).

The potential for fuel and oil spills increases as more marine vessels are present within the AoA. Chemicals used for construction may accidentally spill into the water and unsecure plastic garbage and debris may sometimes fall into the water (NYSERDA 2017). Oil and petroleum products can be toxic to fish and may cause fish kills depending upon the volume of the spill; petroleum products are especially toxic to early life-stages of fishes (Barron et al. 2004). Fish may ingest garbage they mistake as food, sometimes causing mortality (Derraik 2002). Construction vessels are expected to adhere to BMPs that include spill prevention and spill response plans, which decrease the likelihood of a spill (NYSERDA 2017). Increased vessel presence within the AoA is expected to be primarily associated with the construction phase of OSW and would therefore be temporary.

4.3 Post-Construction (Operations)

Stressors to fish and fisheries during the operations phase of OSW include noise, vessel traffic, bottom disturbance, scouring around seafloor structures, new in-water structures, EMF, changes in oceanographic dynamics, and changes in water quality.

4.3.1 Bottom Disturbance

Fixed OSW platforms generally do not physically create seabed disturbance or sediment suspension during operation; however, floating OSW platforms may generate suspended sediment when mooring lines disturb the seabed (Maxwell et al. 2022). The mooring lines used to secure floating OSW platforms to anchors on the seabed can be manipulated by currents, tide cycles, and waves, which may cause seabed scouring and sediment suspension into the water column (Maxwell et al. 2022). Demersal species that utilize benthic habitat, which could be impacted from scouring and seabed disturbance include skate species, summer flounder, halibut, lobster, crab, and scallops. Bottom disturbance could potentially impact Zone 1 and Zone 2, where EFH and sensitive habitats have been identified on the continental shelf and along the shelf break; however, these stressors may impact any zone where platforms are located.

4.3.2 Scouring Around Seafloor Structures

It has been suggested that floating OSW platforms may cause greater changes to sedimentation than fixed platforms because of scouring caused by wave action on anchors and mooring lines (Maxwell et al. 2022). Substrate scouring may occur as the mooring lines of floating OSW platforms drag across the seabed and ocean currents pass over anchors. Seabed “trenching” at the location where anchor chains and mooring lines contact the seabed has been documented in the literature (Sun et al. 2020; Maxwell et al. 2022). Scouring around seafloor structures has the greatest potentially to impact fish and fisheries in Zone 1 and Zone 2, where EFH and sensitive habitats have been identified on the continental shelf and along the shelf break; however, these stressors may impact any zone where platforms are located.

Increased sedimentation may impact demersal fish species by altering their habitat and causing burial or reduced water quality (NOAA 2023e). Various species of fish utilize soft-bottom habitat for shelter and spawning, so the addition of hard-bottom structure or changes to the substrate may impact the reproduction and survival of some species (e.g., Atlantic surfclam, Atlantic cod, sand lance) (NOAA 2023e). Scouring also occurs around the foundations of fixed OSW platforms; however, sedimentation appears to be more of a concern with floating platforms (Maxwell et al. 2022). Scour protection in the form of rocks, gravel, and other heavy hard substrates is often placed around the foundation of OSW platforms to reduce erosion and scouring, which has proven to be effective (NYSERDA 2017). One potential negative impact of scouring is a reduction of soft-bottom habitat and potential displacement of species that utilize soft-sediments (i.e., Atlantic surfclam, Atlantic cod).

4.3.3 New Structures

4.3.3.1 Loss of Fishing Grounds and Navigational Complications

The addition of floating OSW platforms and cable arrays into the marine environment is expected to create complications with fishing gear (Maxwell et al. 2022). All types of fishing gear are expected to be limited by floating OSW technology due to entanglement risk; however, complications with mobile gear, such as trawl nets and dredges is a primary concern (Maxwell et al. 2022). Fishing area loss, gear loss, and associated revenue losses are major concerns of the fishing industry. Fishing vessels are likely to avoid floating wind turbines and cable arrays to prevent hang ups, entanglement, and gear loss. For this reason, OSW has the potential to create areas of the ocean that cannot be fished (Maxwell et al. 2022); depending upon the location and spacing of wind turbines and cable arrays, sizeable portions of historical fishing grounds could be lost. Currently, it is unknown what the spacing of floating turbines will be within the AoA. Turbines spaced farther apart are likely to pose greater navigational challenges than those spaced more closely together. Coordination between developers and the fishing industry during the planning process of OSW projects may mitigate impacts to historical fisheries surveys[6] and also historical fishing grounds.

4.3.3.2 Habitat Conversion

One of the primary concerns of scientists and the fishing industry related to OSW is the impact of replacing natural marine soft-sediment with hard-bottom habitat and complex artificial structures. Floating and fixed wind platforms attract many species of fish and can potentially improve the diversity and abundance of fish species (Farr et al. 2021). Studies have shown that structure-oriented marine species utilize the habitat provided by the foundations, moorings, and cables of wind flatforms and are often found living on the submerged structure and within the surrounding environment (Farr et al. 2021; Roach et al. 2022; NOAA 2023e). New structures located on the continental shelf and along the shelf break in Zones 1 and 2 could potentially have the greatest impact because of the variety of sensitive habitats located within each Zone. Cable protection such as crushed rock, concrete mattresses and concrete slabs can alter benthic habitat.

The moorings and anchors used on floating OSW platforms provide attachment points for many invertebrate species and provide refuge and foraging opportunities for fishes and shellfish (Farr et al. 2021; Roach et al. 2022). Researchers have noted concentrations of structure-oriented species within the vicinity of floating and fixed OSW platforms (Farr et al. 2021; NOAA 2023e); however, fixed platforms tend to provide greater surface area for attachment. Many fish species that live within the structural habitat provided by OSW platforms feed upon invertebrates sharing the same habitat as those fish. Small fish that prey upon invertebrates are often food for fish at higher trophic levels, so the increased availability of these forage species around OSW platforms can impact the health and survival of larger marine predators (NOAA 2023e). On one hand, predatory fishes such as HMS may find greater food availability near OSW platforms; however, those same species may be subjected to other risks in the vicinity of the platforms (e.g., entanglement, EMF, vessel strikes) (Gill et al. 2020; Farr et al. 2021; Maxwell et al. 2022). The commercial fishing community has expressed concern that a greater abundance of predators within the vicinity of OSW platforms may pose additional risk to the survival of the early life stages of some species, such as juvenile lobsters (NOAA 2023e). Other concerns include increased predation of the lower trophic level fishes that are concentrated around the submerged wind platform structure and increased fishing pressure on a variety of species that frequent the platforms, including predators (Gill et al. 2020).

In-water structure provides various species of fish, shellfish, and other invertebrates with complex habitat; some of those species (e.g., bivalves) filter water and provide forage to other marine species (Raoux et al. 2017; ten Brink and Dalton 2018; Roach et al. 2022). The “reef effect,” documented in the literature, has been shown to increase habitat availability for a wide range of species such as scup, cod, black sea bass, and shellfish (Raoux et al. 2017; ten Brink and Dalton 2018; Roach et al. 2022). One study has shown that lobster size structure was unaffected by the construction and post-construction phases of an OSW farm over a six-year period when compared to pre-construction surveys; however, lobster CPUE increased during the same study (Roach et al. 2022).

The addition of wind platforms and structural habitat in the offshore marine environment may cause fish communities to shift their preferred locations to new habitat provided by OSW platforms and create declines in fish abundance at locations they once preferred (Methratta et al. 2023). While this may negatively impact the commercial fishing industry due to the exclusion of commercial fishing gear by OSW platforms, small scale recreational fishing generally uses light tackle methods and may benefit from the structural habitat provided by OSW. Recreational anglers have noted an increase in the diversity of fish species that occur within the vicinity of offshore wind platforms, noting that new species have been observed that were not present prior to construction of the turbines (ten Brink and Dalton 2018). For example, the presence of cod has been noted alongside the Block Island Wind Farm by anglers, which were generally uncommon to the fishing waters prior to the platform installation (ten Brink and Dalton 2018). Other species noted by anglers that appear to be attracted to the structural habitat provided by the Block Island Wind Farm include summer flounder, black sea bass, striped bass, tautog (*Tautoga onitis*), mahi (*Coryphaena hippurus*), triggerfish (*Balistidae spp.*), and sea robin (*Triglidae spp.*) (ten Brink and Dalton 2018). Several of these species have designated EFH within the AoA.

The presence of hard-bottom habitat and additional in-water structure provided by OSW platforms has been shown to provide attachment points for blue mussels (NOAA 2023e) and some studies have suggested that structural habitat provided by offshore wind turbines has primarily impacted filter feeders (Lindeboom et al 2011; ten Brink and Dalton 2018). One study of blue mussels has shown that filter feeders consume bivalve larvae (LeBlanc et al. 2007). The impact of OSW on clam and scallop survival is currently unknown because no studies have focused on either group of shellfish (NOAA 2023e). Offshore structural habitat may attract some species, such as black seabass, but reduce habitat availability for species requiring soft substrates, such as Atlantic surfclam (Farr et al. 2021; NOAA 2023e). A recent study has indicated a potential decline in primary productivity over time, as additional habitat is created by OSW platforms for filter feeders (Slavik et al. 2019; van Berkel et al. 2020). More research is needed to understand the long-term impact of habitat conversion on marine species as OSW takes place (NOAA 2023e).

The functioning of food webs is a concern of scientists and the fishing community, and few studies have addressed this topic in the literature related to OSW. Food web functionality can be impacted by the artificial reef effect produced by the introduction of submerged structures into the marine environment. Researchers have noted that high concentrations of filter feeders can lead to an increase in benthic organic matter as individuals excrete waste, die, and decompose (Aurore et al. 2017). Organic matter provides food for detritivores, which attract higher trophic level predators (Lindeboom et al. 2011; Aurore et al.

2017). Filter feeders also attract meso-predators that are food for higher trophic levels and apex predators (Aurore et al. 2017; Raoux et al. 2017; ten Brink and Dalton 2018). Current research has predicted a localized benefit to higher trophic levels and apex predators over time, through this bottom-up effect, which could benefit commercial and recreational fisheries targeting predatory species (such as HMS), and ecotourism (Lindeboom et al. 2011; Aurore et al. 2017); however, more research is needed to account for the net effect of impact producing factors on fish and fisheries and how the effects vary by location.

Sand lance, for example, have been described as one of the most important forage species in the Northern Hemisphere, but little is known about their ecology and susceptibility to the stressors associated with OSW in the Atlantic Ocean (Staudinger et al. 2020). Sand lance depend upon sandy substrates for shelter and survival, which could be impacted by the addition of structural habitat to offshore waters. Currently, it is unknown how sand lance might respond to competition with other forage species that might be attracted to new structures in the offshore environment (Staudinger et al. 2020). More evidence is necessary to link bottom-up effects to OSW; observational studies should be used in conjunction with laboratory studies (NOAA 2023e).

Another concern within both the scientific and fishing community is the effect of OSW platforms on the survival and establishment of non-native species (Gill et al. 2020; Farr et al. 2021). Changes to the marine environment, including habitat conversion from soft-sediment to hard-bottom, could potentially allow non-native species to survive and become established (Viola et al. 2018; NOAA 2023e). There is a need for future scientific research to address this topic of concern.

4.3.3.3 Secondary Entanglement

Secondary entanglement is one of the primary impacts associated with the operational phase of floating wind platforms and is related to the complex power cable arrays that are necessary to connect floating platforms together and then transfer power to substations connected to shoreline tie-ins (Maxwell et al. 2022). Researchers have identified secondary entanglement as a stressor with the potential to impact populations of marine species. The main concern is that fishing gear (e.g., nets, fishing line, fishhooks, and plastic garbage) will become tangled in power cable arrays and accumulate over time, creating a risk for fish to be caught in the mass of lost gear and trash (Maxwell et al. 2022). Dead or injured fish that become entangled in the mass of debris can attract predators, which may also become trapped, exacerbating the problem. Biocide is sometimes used by the OSW industry to reduce the accumulation of marine debris within power cable arrays, but the use of chemicals within the marine environment adds additional risks to be considered. Further research is needed to assess the impact of secondary entanglement on fish populations as floating OSW platform technology continues to advance (Maxwell et al. 2022).

4.3.3.4 Impingement, Entrainment, and Thermal Stress

Offshore power converter stations are necessary to transfer power over long distances (greater than 30 miles) and connect OSW farms to shoreline tie-ins (Ryndzionek and Sienkiewicz 2020; Middleton and Barnhart 2022). The use of high-voltage direct current (HVDC) systems at offshore substations allows energy developers to convert the alternating current (AC) power that is generated by wind turbines to direct current (DC) power, which travels more efficiently over long distances and minimizes energy loss (Middleton and Barnhart 2022). Heat is produced during the conversion process and cooling systems are necessary to prevent damage to the system components (WHG 2021; Middleton and Barnhart 2022). To date, limited information exists on cooling intake technologies for offshore HVDC systems, and many are still under development (Middleton and Barnhart 2022).

In open loop cooling systems, seawater is used to remove the heat produced by HVDC systems (WHG 2021; Middleton and Barnhart 2022). The seawater is pumped through an intake and filtered, then circulated through a heat exchanger; heated water is then expelled back into the ocean (WHG 2021; Middleton and Barnhart 2022). Discharged water is expected to create localized impacts to ocean currents and generate a thermal plume that varies by tide cycle and season (WHG 2021). Although limited information is currently available about these offshore cooling systems, power plant thermal discharge and the impact of thermal stress on fishes has been widely researched (Schubel et al. 1977; Gibbons et al. 1978; Beitinger et al. 1999). Cooling water thermal discharge is regulated by the Environmental Protection Agency (EPA) under the Clean Water Act (CWA) section 316(a), which sets discharge requirements to ensure the protection of aquatic ecosystems (USEPA 2008). The EPA also regulates the discharge of produced water from offshore oil and gas wells.

As HVDC cooling technology continues to be developed, mitigation measures have been implemented to reduce the potential impact of thermal stress associated with these systems on fishes. A reduction in intake and discharge volume can reduce impacts to fish that are occur with open loop cooling systems.

Juvenile fish, larvae, and eggs (ichthyoplankton) have the potential to become impinged[7] and entrained[8] on or within the filtration screens of water intake structures (Foster et al. 2013; Middleton and Barnhart 2022). Backflushing systems are often used to clean entrained debris from the filters; however, larval fish and egg mortality is common (Middleton and Barnhart 2022). The location of intake structures within the water column is expected to impact the number of fish species impinged and entrained on intake screens, as well as intake volume (Foster et al. 2013; Middleton and Barnhart 2022). It is difficult to quantify the extent of ichthyoplankton mortality associated with water intake structures and how this might impact fish populations and food for other species. Power plant cooling water intake structure impingement and entrainment is regulated under CWA section 316(b), and similar regulations have been proposed for OSW intake structures (Middleton and Barnhart 2022). The impact of ichthyoplankton impingement and entrainment by HVDC cooling water intake systems will be better understood as the technology develops. OSW projects are subject to §316(a) and §316(b) regulations if they use a cooling water intake structure with a design intake flow of greater than two million gallons per day and use at least 25% of the total water for cooling purposes. For example, at the time this study was released, Sunrise Wind Project off the coasts of Massachusetts, New York, and Rhode Island, had a draft National Pollution Discharge Elimination System (NPDES) permit that limits effluent flow, effluent discharge temperature and through-screen velocities. Biological monitoring of ichthyoplankton is also a requirement of the draft permit, to document potential entrainment of finfish and lobster eggs and larvae.

The heat produced from underwater power cables is a concern for fish and temperature thresholds have been set by some government agencies to protect demersal species within proximity (NYSERDA 2017). To date, most studies on the impact of heat generated from power cables have addressed buried cables at varying depths within the sediment; however, the power cable arrays of floating OSW turbines are dynamic and located within the water column. At present, no studies have been conducted on the impact of underwater power cables on shellfish (NOAA 2023e). Future studies will need to address the long-term exposure of fish and shellfish to the heat produced by floating OSW high-voltage power cable arrays within the marine environment. The impact of heat produced by buried power cables on fishes was reviewed in the Master Plan.

4.3.4 Noise

The ambient noise generated by the operation of wind turbines is comparatively much lower than noise produced by commercial marine vessels (NOAA 2023e) and considerably lower than other phases of OSW, such as construction (SEER 2022a). The operation of wind turbines is often accompanied by noise regulations, so OSW operational noise is expected to have minor impacts on the marine environment

(NYSERDA 2017; Farr et al. 2021). However, noise levels vary depending upon environmental conditions, the distance from the noise emitting source, the presence of other noise generating machinery, and the size of the wind turbine being studied; therefore, it can be difficult to predict the impact of noise on marine fishes (Tougaard et al. 2020; NOAA 2023e). Furthermore, a general lack of species-specific data concerning the impacts of OSW operational noise on fish has been a concern of the fishing industry and scientific community (Farr et al. 2021; Popper et al. 2022). Fish use sound for communication, foraging, and during predator/prey interactions, therefore additional anthropogenic sound within the marine environment could affect the survival of a given species (Popper et al. 2022; Methratta et al. 2023).

Atlantic cod larvae have been shown to swim toward the sound emitted from the operation of OSW platforms, which may impact larval distribution (Cresci et al. 2023). Currently, it is unclear how other life stages of Atlantic cod react to the operational sound of OSW platforms and the broader impact of this attraction on the species; it has been suggested that further study is needed to determine how cod populations might be affected (Cresci et al. 2023).

The noise generated by floating OSW platforms may travel different distances than fixed platforms that are closer to shore (Farr et al. 2021) or be perceived differently by marine life in deep water. Studies have shown that operational noise generated by fixed OSW platforms can travel a few kilometers from the source under quiet ambient conditions; however, it is currently unknown how noise generated by floating platforms will travel in deeper waters (Tougaard et al. 2020; Maxwell et al. 2022). The recent use of larger wind turbines has raised noise concerns (Farr et al. 2021) and will need to be addressed in future studies. The effect of moorings on sound travel also needs further study since different types of moorings are likely to affect sound travel in different ways (Maxwell et al. 2022). More research is necessary to assess the impact of wind turbine operational noise on fish species; particularly the noise generated by floating platforms (Farr et al. 2021; Maxwell et al. 2022). Operational noise could potentially impact Zone 1 the most where the water depth is shallowest; however, noise may impact any species in the vicinity of OSW platforms.

4.3.5 Vessel Traffic

The stressors associated with vessel traffic during the post-construction (operations) phase of OSW are similar to those described above for the pre-construction and construction phases. The stressors to fish and fisheries associated with vessel traffic are vessel strikes and transit delays or congestion resulting from an increased number of vessels within the AoA. The operations phase of the project is expected to require less OSW vessels than during the construction phase and limited to maintenance vessels. Fishing and non-fishing vessels will be restricted to specific travel routes to avoid OSW platforms; congestion may occur, and vessel transit time may be affected. This could pose safety challenges for fishing vessels since gear deployment limits vessel maneuverability and vessels with gear deployed will have difficulty adjusting course to avoid other vessels. The extent of marine vessel travel route modifications to avoid wind platforms will depend upon the location and spacing of platforms and array cables (see section 4.3.3.4). Vessel strikes of fish may potentially impact Zone 1 the most, where the water depth is shallowest; however, strikes may occur anywhere near a marine vessel. Refer to section 4.1.4 and section 4.2.3 for additional information on the stressors associated with vessel traffic.

4.3.6 Electromagnetic Fields

The impact of EMF generated from OSW power cables on many species of fish and shellfish is not well known (Maxwell et al. 2022). The effects appear to be species and life stage specific (Farr et al. 2021). While some studies have been conducted on the effects of EMF generated by buried cables, it is unknown how the suspended power cable arrays associated with floating wind turbines might affect fish species within the deepwater environment (Maxwell et al. 2022). Some studies have indicated that EMF exposure can cause locational shifts in crab and lobster populations (Cresci et al. 2022; NOAA 2023e), while others have shown no impact to the behavior of juvenile European lobster (*Homarus gammarus*) (Hutchison et al. 2020). Currently, no studies exist on the impact of EMF on the scallop and clam fisheries in the United States, and more information is needed to understand potential effects of EMF on all shellfish species (NOAA 2023e).

A recent study of haddock larvae concluded that most larvae exposed to B-fields (static electric fields that are produced by OSW cables) during an experiment exhibited decreased swimming performance (Cresci et al. 2022). Haddock larvae use magnetoreception and the Earth's magnetism to orient themselves while swimming, so EMF exposure could have a negative impact on haddock distribution and survival if larvae are unable to reach their preferred suitable habitat (Cresci et al. 2022).

The impact of EMF on fish with electro and magnetoreception is not well understood, and the migratory patterns of some species could be affected (Maxwell et al. 2022; Methratta et al. 2023; NOAA 2023e). Many elasmobranchs (e.g., sharks, skates, rays) are HMS that rely upon electroreception for travel. Elasmobranchs also utilize electroreception to find their prey and EMF could potentially attract electroreceptive species or force them away from the source (Copping et al. 2016; Farr et al. 2021; NOAA 2023e). As shown in Figure 27, HMS are most commonly fished for in Zone 2; therefore, if development were to occur in this Zone, the potential effects may be highest where occurrence is highest.

EMF could also affect the directional senses of electroreceptive fishes and potentially impact their normal foraging and reproductive behavior; migration patterns could also become altered (Farr et al. 2021; NOAA 2023e). Little skate, for example, exhibited changes to their swimming behavior when exposed to EMF, including impacts to swimming speed, proximity to the seabed, and total distance traveled (Hutchison et al. 2020; Cresci et al. 2022). Reductions in the bycatch of shark species have been observed in some studies when EMF deterrent devices are deployed during fishing operations; however, other studies have shown no impact of EMF devices on shark species. Future research needs to address the impact of EMF on elasmobranchs, particularly with respect to floating cable arrays (Maxwell et al. 2022).

The impact of EMF on small pelagic fishes is not well studied. More research is necessary to understand the community level effects of EMF related to OSW on fish and fisheries (NOAA 2023e).

The effect of EMF on the early life stages of fishes is not well understood but is gaining attention in recent years (Krzysztof et al. 2021). The effect of magnetic fields on developing fish eggs and larvae varies by species, development stage, the type of magnetic field, field strength, and the duration of exposure needs more study (NOAA 2023e). HVDC systems and cables generate static magnetic field (SMF), while AC cables emit EMF: each type of field affects fishes differently (Krzysztof et al. 2021). SMFs have been demonstrated to impact the heart rate of developing embryos and larvae of some species, while others have exhibited longer hatching times; some species appear unaffected by SMF (Krzysztof et al. 2021). The survival of different species of fish larvae appears unaffected by SMF and EMF in laboratory experiments. SMF has been shown to increase the consumption of oxygen in the developing embryos of some fish species, which appears to be development stage specific. More research is needed to understand the long-term impact of SMF and EMF exposure on the early life stages of fishes and how magnetic fields might impact fish on the population level (Krzysztof et al. 2021).

4.3.7 Changes to Oceanographic Dynamics

Overall, the potential impact of offshore wind platforms on ocean currents and circulation is not well studied (NOAA 2023e). A recent study has shown that offshore turbine platforms can cause changes to hydrodynamics and potentially impact oceanic processes (Daewel et al. 2022). One study in the North

Sea has indicated the potential for trophic cascade due to changes in phytoplankton biomass following the installation of OSW platforms and subsequent hydrodynamic alterations. Phytoplankton biomass could be impacted by changes in water column mixing, upwelling processes, and wave action, creating the potential for trophic cascade (Daewel et al. 2022). Changes to phytoplankton biomass may negatively affect the survival of fish larvae which depend upon phytoplankton for food. In turn, this could negatively impact the fisheries associated with those fish species. The impact of changes to annual phytoplankton biomass related to OSW on commercially important invertebrate species such as scallops, clams, and squid has not been well studied; a concern noted by the fishing industry (NOAA 2023e). Other concerns associated with changes to wave action that may result from fixed OSW wind platforms include impacts to carbon cycling; however, these effects are presumed to be less pronounced with respect to floating wind turbines (Farr et al. 2021; Daewel et al. 2022).

Stressors to fishes on the local scale which could result from changes to hydrodynamic processes include temperature changes, nutrient availability, vertical mixing, and excessive turbulence; however, studies of these stressors specifically related to OSW are sparse and it has been suggested that additional study is needed (van Berkel et al. 2020). Changes to water column mixing have been noted within the vicinity of OSW platforms as eddies and turbulence occur downstream of turbines (van Berkel et al. 2020). Changes to upwelling can be localized or occur on regional scales, depending upon the size and location of the wind farm (van Berkel et al. 2020). OSW platforms create changes to temperature and salinity within the water column and affect upwelling zones through changes to vertical mixing caused by wind wakes (van Berkel et al. 2020; Christiansen et al. 2022). Impacts to coastal upwelling can cause changes to primary production, which may affect the abundance of forage species for higher trophic levels. Recent research has suggested that water column mixing influences aggregations of forage species that provide food to higher tropic levels (Goetsch 2023). Changes to upwelling can be localized or occur on regional scales, depending upon the size and location of the wind farm (van Berkel et al. 2020). It is unclear how prey species aggregations may be impacted by changes to water column mixing and subsurface processes that are caused by the addition of wind platforms to the marine environment.

Changes to oceanographic dynamics could potentially impact the cold pool, a prominent seasonal stratification process that occurs on the continental shelf in Zone 1. Future studies would add value to our understanding of the potential impact of OSW on ocean stratification with respect to the cold pool, as this process provides habitat for cold water species such as yellowtail flounder, ocean quahog, and Atlantic sea scallop, which are important to fisheries (Sullivan et al. 2005; Friedland et al. 2022; NOAA 2023e). To date, many studies of OSW impact to hydrodynamics have taken place in Europe where regional oceanic processes differ from those of the Mid-Atlantic Bight (NOAA 2023e). Future local research could assess potential changes to the cold pool and other processes in the mid-Atlantic region such as the formation of the Gulf Stream warm core rings (NOAA 2023e; Silver et al. 2023) and coastal upwelling and water column mixing that occurs within the submarine canyons of Zone 2.

Pelagic fish egg and larval dispersion could potentially be impacted by changes to hydrodynamic processes on a regional scale. A study in the North Sea has indicated that hydrodynamics play an important role in larval transport and the recruitment of some demersal species (NOAA 2023e). Given the importance of hydrodynamics for larval transport, changes to hydrodynamics can result in larvae settling within habitat that is unsuitable for survival. The extent of shifts in larval and egg dispersal resulting from hydrodynamic changes associated with OSW requires further study, especially with consideration to the implications for fisheries (van Berkel et al. 2020). Hydrodynamic modeling of impacts associated with the Massachusetts-Rhode Island OSW areas have shown that water column mixing, temperature, and changes to currents could potentially occur; larval transport could be impacted by OSW (BOEM 2021c).

Modeling of sea scallop larval transport is under development to assess the potential impact of OSW on the regional dispersal of sea scallop larvae in the Gulf of Maine, Southern New England, and Mid-Atlantic Bight (Chen et al. 2020; NOAA 2023e). Preliminary results indicate that wind turbine generators could change the dispersal of scallop larvae in Southern New England and impact scallop abundance in the Nantucket Lightship Closed Area (Chen et al. 2020; NOAA 2023e). According to NOAA (2023e), the study suggests that future wind development within the region could intensify the changes observed in larval dispersal. BOEM (2021c) utilized modeling to assess potential local and regional changes to hydrodynamic processes caused by OSW and the resulting impact to the transportation of larval sea scallop, silver hake, and summer flounder. The results show that structures associated with OSW alter ocean temperature, current magnitude, and wave height, which may impact subpopulations of fish species (NOAA 2023e). Researchers have recommended that more research be conducted to address how changes to oceanographic processes caused by OSW may impact larval transport and distributional shifts, including any associated impacts to fish, shellfish, and fisheries (van Berkel et al. 2020; NOAA 2023e). BOEM is currently conducting a study to model potential changes to local and regional oceanographic processes caused by OSW in the Mid-Atlantic Bight and the final report is due December 31, 2023 (BOEM 2023e).

4.3.8 Changes in Water Quality

One impact that is associated with the bottom disturbance created by floating OSW platform mooring lines is the suspension of contaminants that may be stored within benthic sediments (Maxwell et al. 2022). The suspension of sediment and contaminants can impact demersal species that utilize benthic habitat for foraging, shelter, and depositing eggs (Wenger et al. 2017; Maxwell et al. 2022). Biocide is sometimes used by the OSW industry to reduce the accumulation of marine debris within power cable arrays; however, the use of biocide carries the additional risk of toxicity to fish, depending on the chemicals used (Maxwell et al. 2022). Corrosion preventative chemicals are used to maintain the functionality of wind turbines and their associated structures within the saltwater environment (Methratta et al. 2023). Anti-corrosives can be toxic to organisms and may contaminate sediments if they leach into the water (Kirchgeorg et al. 2018; Methratta et al. 2023). Changes in water quality could potentially occur in any zone where mooring and anchoring takes place, or in the vicinity of OSW platforms.

4.4 Decommissioning

Stressors to fish and fisheries that occur during the decommissioning phase of OSW include noise and vibration, vessel traffic, changes in water quality, and habitat conversion.

4.4.1 Noise

The removal of temporary in-water structures that were used during construction is expected to create noise within the marine environment. The removal of footings, anchors, scour protection, and spuds used to secure construction barges will generate noise, as well as the vessels necessary to remove them. The noise generated from these activities is expected to be similar to the noise generated during construction; however, fewer noise generating activities are expected to occur during decommissioning. Similar to other phases of OSW, noise may potentially impact Zone 1 the most where the water depth is shallowest; however, noise may impact any species in the vicinity of OSW decommissioning activities. Refer to the section 4.2.2 for a discussion of the impact of noise to fish and fisheries.

4.4.2 Vessel Traffic

Stressors to fish and fisheries associated with vessel traffic during the decommissioning phase of OSW projects are vessel strikes, congestion, transit delays, and navigational risks. Vessel strikes of fish may potentially impact Zone 1 the most, where the water depth is shallowest; however, any species within proximity to marine vessels could be impacted. Decommissioning is expected to require a higher number of vessels than during the operations phase of OSW and other marine vessels will be restricted to specific travel routes to avoid wind platforms and decommissioning activities. This could pose safety challenges for fishing vessels since gear deployment limits vessel maneuverability and vessels with gear deployed will have difficulty adjusting course to avoid other vessels. These stressors are further discussed above for the pre-construction, construction, and pos-construction phases of the project. Refer to section 4.1.4, section 4.2.3, and section 4.3.5 for additional information on vessel traffic.

4.4.3 Changes in Water Quality

Water quality stressors to fish and fisheries associated with the decommissioning phase of OSW projects are vessel discharge, spills, and release of toxins from sediments. Changes in water quality could potentially occur in any zone where mooring and anchoring takes place, or in the vicinity of any vessel discharge. These stressors have been described above for the construction phase of the project. Refer to section 4.2.4 for information on water quality stressors.

4.4.4 Habitat Conversion

As discussed above for the post-construction phase, the addition of hard structure to the marine environment will create habitat for structure-oriented species (Lindeboom et al 2011; Aurore et al. 2017; ten Brink and Dalton 2018; Farr et al. 2021 NOAA 2023e). As temporary in-water structures are removed during the decommissioning phase of OSW projects, the new habitat that was created by these structures is disturbed and, in some cases, entirely disappears (Miller et al. 2013; SEER 2022b). Partial decommissioning is one option that leaves some in-water structures intact and preserves the "artificial reef effect" created by these structures (SEER 2022b). The net effect of OSW structures should be evaluated during decommissioning to assess the positive and negative impact of structure removal on fish and fisheries.

Restoration may be considered during the decommissioning phase of OSW. Habitat that has been altered during construction could decrease habitat for some species but increase habitat for others (Lindeboom et al 2011; Aurore et al. 2017; ten Brink and Dalton 2018; Farr et al. 2021; Roach et al. 2022; NOAA 2023e). A careful approach during the decommissioning phase could help restore habitat that was disturbed during construction, while preserving new habitat that was created. Habitat conversion could potentially impact locations along the continental shelf and the shelf break the most, in Zone 1 and Zone 2, where sensitive marine habitat is located. Refer to section 4.3.3.2 for discussion of the artificial reef effect associated with OSW platforms.

5 Existing Guidance for Avoiding, Minimizing, and Mitigating Impacts

This section discusses current guidance that developers can utilize to reduce potential risk and impacts to fish and fisheries during the stages of OSW. While this section provides general guidance, project specific mitigation measures may be required to lessen the impact of certain stressors to specific species within a project area. This section summarizes the general literature review of the guidance for avoiding, minimizing, and mitigating impacts from a variety of sources and consultations. Guidelines summarized from regulatory documents are subject to change over time, and new guidance or regulations may also arise after publication of this study.

In addition, developers should consult with the State, NOAA, and BOEM for up-to-date regulatory recommendations or requirements at the time of project planning and development. This is not meant to create new guidance documents or suggest modifications to already-existing guidance. Table 10 summarizes the guiding principles presented in the Master Plan for fixed OSW platforms in shallow water areas of a depth less than 60 meters (NYSERDA 2017).

5.1 Federal Implementation of Guiding Principles

BOEM provides guidance and recommendations to prospective OSW lessees to ensure regulatory compliance and to minimize impacts to fish and fisheries resources in the Atlantic OCS (BOEM 2019). BOEM requires pre-construction surveys to assess the baseline conditions of the bathymetry, substrate type, biota, and socioeconomic resources at a proposed OSW site that identify the ecosystem services potentially impacted by all phases of OSW projects. Fisheries surveys are required to identify key species and habitats within the lease area, including demersal and pelagic species that occur in each location. BOEM consults with federal and state agencies to ensure resources within the lease area are documented and that lessees adhere to various regulatory requirements, including those under the National Environmental Policy Act (NEPA), the MSFCMA, and Section 7 of the ESA (BOEM 2019).

For all ESA-listed species under NMFS jurisdiction within OSW wind lease locations, BOEM consults with NMFS for guidance. Within the AoA of this study, these species include Atlantic sturgeon and giant manta (BOEM 2023a). During project-specific consultations, NMFS may propose measures to avoid, minimize, and mitigate impacts to ESA-listed species that are specific to each project, but also general best practices. For example, NMFS has issued ESA Section 7 Consultation Biological Opinions for the South Fork Wind Project (2021) and Ocean Wind 1 Project (2023).

Table 10. Avoidance, Minimization, and Mitigation Measures for Fixed Offshore Wind Platforms Discussed in the Master Plan

Source: NYSERDA 2017.

Construction Phase	Guidelines, Strategies, and Approaches to Avoiding, Minimizing and Mitigating Impacts from the Master Plan	Agency and/or Guideline (as applicable)
Pre-construction	•Work with fishing industry to minimize conflicts with construction and operations; utilize various forms of communication and work toward outcomes that balance the needs of fisheries activities and energy development (BOEM 2013; BOEM 2015; MAFMC 2014; Lipsky et al. 2016; VCZMP 2016).	• BOEM, 30 CFR 585.627(a)(7), Construction and Operations Plan; Mitigation Measures for Wind Energy Atlantic Outer Continental Shelf (BOEM 2013).
	• Use fisheries liaisons and committees to effectively communicate concerns (BOEM 2013; BOEM 2015; Ecology and Environment 2014; Moura et al. 2015; VCZMP 2016).	• BOEM, 30 CFR 585.627(a)(7), Construction and Operations Plan; Mitigation Measures for Wind Energy Atlantic Outer Continental Shelf (BOEM 2013).
	• Increase communication transparency by sharing the decision-making process with stakeholders and how their input is incorporated (FLOWW 2015; MAFMC 2014; Lipsky et al. 2016; VCZMP 2016).	• BOEM, Mitigation Measures for Wind Energy Atlantic Outer Continental Shelf (BOEM 2013).
	• Communications should occur frequently, be adaptive, optimize transparency, with additional communication provided to existing councils and commissions including the MRAC, MAFMC, NEFMC, and ASMFC (BOEM 2013; BOEM 2015; Hooker 2014; Lipsky et al. 2016; MAFMC 2014; VCZMP 2016).	• BOEM, Mitigation Measures for Wind Energy Atlantic Outer Continental Shelf (BOEM 2013).
	• Hire and involve members of the fishing industry to assist with planning, survey development, and monitoring. Hire locally, valuing and utilizing traditional and local expert knowledge including the encouragement of fishers' presence during surveys (BOEM 2013; Gray et al. 2016; Lipsky et al. 2016; MAFMC 2014; Petruny-Parker et al. 2015).	• BOEM, Mitigation Measures for Wind Energy Atlantic Outer Continental Shelf (BOEM 2013).
	• Consider local impacts to shipyard accessibility, fuel supply, and congestion; and other activities that may interact with fishing operations (BOEM 2013; Ecology and Environment 2014).	• BOEM, Mitigation Measures for Wind Energy Atlantic Outer Continental Shelf (BOEM 2013; Ecology and Environment 2014).
	• Consult with fishers to contribute information on project siting, turbine location, spacing, and inter-array and transmission cabler routes (BOEM 2013; Moura et al. 2015; VCZMP 2016).	• BOEM, Mitigation Measures for Wind Energy Atlantic Outer Continental Shelf (BOEM 2013).
	• Avoid highly valuable fishing grounds, particularly during best fishing opportunities throughout the year and during vulnerable times for specific species (BOEM 2013; Hooker 2014; MAFMC 2014; Moura et al. 2015; VCZMP 2016; Gray et al. 2016).	• BOEM, Mitigation Measures for Wind Energy Atlantic Outer Continental Shelf (BOEM 2013).

Table 10 continued

Construction Phase	Guidelines, Strategies, and Approaches to Avoiding, Minimizing and Mitigating Impacts from the Master Plan	Agency and/or Guideline (as applicable)
Construction	•Use safety protocols to reduce accidents, potential loss of equipment that can impact fisheries including fuel spills or gear snags (BOEM 2013; BOEM n.d.; VCZMP 2016). •Bury cables to avoid entanglement with fishing gear; inspect cables periodically for appropriate coverage (BOEM 2013; Hooker 2014; BOEM n.d.; Petruny-Parker et al. 2015; Moura et al. 2015). •Develop protocols to reduce scour, sedimentation, plumes, and noise (Ecology and Environment 2014). •Develop a health and safety plan, and communication protocol including designating an emergency response organization and identify individuals responsible for implementing safety plans; develop protocols and plans for search-and-rescue or salvage operations and practice and train emergency drills (BOEM n.d.; Ecology and Environment 2014; MAFMC 2014; VCZMP 2016). • Lighting towers should be included for safety during low visibility, visible to all approaching vessels; include radar reflections, AIS, and additional safety features on turbines such as cell towers, helipads, or VHF functions (VCZMP 2016, Moura et al. 2015). •Develop a plan for settlement funds to alleviate fishing disruptions and ensure that eligible fishers receive proper compensation (BOEM 2013; Ecology and Environment 2014; FLOWW 2015; Gray et al. 2016; Lipsky et al. 2016; Moura et. al 2015; VCZMP 2016. •Evaluate historical fishing locations, revenue, and develop a plan to avoid fishing industry losses including financial losses due to spatial restrictions and pressure on other fishing grounds by displaced fishers (BOEM 2013; Ecology and Environment 2014; FLOWW 2015; Gray et al. 2016; Lipsky et al. 2016; Moura et. al 2015; VCZMP 2016) •Promote tourism and recreational fishing to help enhance the industry (Moura et. al. 2015).	• BOEM, Mitigation Measures for Wind Energy Atlantic Outer Continental Shelf (BOEM 2013). • BOEM, Mitigation Measures for Wind Energy Atlantic Outer Continental Shelf (BOEM 2013). • BOEM, Mitigation Measures for Wind Energy Atlantic Outer Continental Shelf (BOEM 2013; Ecology and Environment 2014). • BOEM, Mitigation Measures for Wind Energy Atlantic Outer Continental Shelf (BOEM 2013). • BOEM, Mitigation Measures for Wind Energy Atlantic Outer Continental Shelf (BOEM 2013). • BOEM, Mitigation Measures for Wind Energy Atlantic Outer Continental Shelf (BOEM 2013). • BOEM, Mitigation Measures for Wind Energy Atlantic Outer Continental Shelf (BOEM 2013). • BOEM, Mitigation Measures for Wind Energy Atlantic Outer Continental Shelf (BOEM 2013).

Table 10 continued

Construction Phase	Guidelines, Strategies, and Approaches to Avoiding, Minimizing and Mitigating Impacts from the Master Plan	Agency and/or Guideline (as applicable)
Post-construction (Operations)	•Facilitate environmental monitoring to ensure compliance and address any associated impacts; ensure that mitigation is effective, and restoration is complete (BOEM 2013; Ecology and Environment 2014).	• BOEM, Mitigation Measures for Wind Energy Atlantic Outer Continental Shelf (BOEM 2013).
	•Develop procedures for surveys, monitoring, and maintenance including specifics for weather events, identification of safety zones, and incorporate an adaptive management approach (Gray et al. 2016; VCZMP 2016; Ecology and Environment 2014).	• BOEM, Mitigation Measures for Wind Energy Atlantic Outer Continental Shelf (BOEM 2013).
	•Design habitat enhancements that benefit commercial and recreational species (BOEM 2013; Moura et al. 2015).	• BOEM, Mitigation Measures for Wind Energy Atlantic Outer Continental Shelf (BOEM 2013).
Decommissioning	•Coordinate equipment removal and decommissioning with the fishing industry to avoid conflicts (BOEM 2013; Gray et al. 2016).	• BOEM, Mitigation Measures for Wind Energy Atlantic Outer Continental Shelf (BOEM 2013).

Since the Master Plan was released in 2017, there have been several additional guidance documents and recommendations published by federal and state agencies, as well as non-governmental organizations. Some of the guidance and best practices included in the Master Plan have been revised or refined. In addition, measures for activities related to wind development in deep water (floating wind technology) were not reviewed in the Master Plan but are summarized here.

The guidance for avoiding, minimizing, and mitigating impacts to fish and fisheries, divided by project phases (general guidance, pre-construction, construction, post-construction, and decommissioning) with consideration to the stressors described in section 6 of this Fish and Fisheries Data Aggregation Study report are presented in Table 11.

Table 11. Avoidance, Minimization, and Mitigation Measures for Offshore Wind Platforms

Note: Best practices in **bold** pertain to floating offshore wind platforms.

Construction Phase	Guidelines, Strategies, and Approaches to Avoiding, Minimizing and Mitigating Impacts Updates	Agency and/or Guideline (as applicable)
	• Study the migratory routes of HMS to assess behavioral changes that might occur following construction and installation of floating platforms and array cables (NRDC 2023).	• As recommended by Natural Resource Defense Council (2023).
	• Consider surveys for eels and elasmobranchs susceptible to EMF impacts (NRDC 2023).	• As recommended by Natural Resource Defense Council (2023).
	• Prioritize studies for Atlantic sturgeon and other ESA listed species; also, evaluate forage species (NRDC 2023).	• As recommended by Natural Resource Defense Council (2023).
	• Analyze potential changes to habitat due to floating turbines along the continental slope and impacts to fish and fisheries (NREL 2020; NRDC 2023).	• As recommended by Natural Resource Defense Council (2023).
	• Anticipate potential changes to surveys and adjust methods to account for limited access near platforms (ROSA 2021).	• ROSA Offshore Wind Monitoring Framework and Guidelines.
	• Plans must show proposed OSW activities on the outer continental shelf will not greatly impose upon other area uses (BOEM 2022c).	• As outlined by BOEM pursuant to 30 CFR Part 585 (BOEM 2022c).
	• Provide descriptions of social and economic conditions of various fisheries potentially impacted by OSW activities on the outer continental shelf (BOEM 2022c).	• As outlined by BOEM pursuant to 30 CFR Part 585 (BOEM 2022c).
	• Propose ways to avoid, minimize, reduce, and eliminate environmental impacts related to OSW activities; include proposal of environmental monitoring plans (BOEM 2022c).	• As outlined by BOEM pursuant to 30 CFR Part 585 (BOEM 2022c).
	• Fisheries Compensation Funds should be established in the event OSW causes losses to the fishing industry, as outlined by BOEM for other OSW projects (BOEM 2021a; BOEM 2022c; BOEM 2023d)	• As outlined by BOEM pursuant to 30 CFR Part 585 (BOEM 2022c), and for other OSW projects (BOEM 2021a; BOEM 2023d).

Table 11 Continued

Construction Phase	Guidelines, Strategies, and Approaches to Avoiding, Minimizing and Mitigating Impacts Updates	Agency and/or Guideline (as applicable)
Construction	Conduct environmental monitoring throughout the construction phase to identify impacts from OSW (ROSA 2021). • Evaluate soft-bottom habitat, which may be disturbed or replaced by the installation of turbines. Many species rely upon soft substrates for survival and impacts must be considered (NRDC 2023). • Study the migratory routes of HMS to assess behavioral changes that might occur following construction and installation of floating platforms and array cables (NRDC 2023). • Consider surveys for eels and elasmobranchs susceptible to EMF impacts (NRDC 2023). • Prioritize studies for Atlantic sturgeon and other ESA listed species; also, evaluate forage species (NRDC 2023).	• ROSA Offshore Wind Monitoring Framework and Guidelines. • As recommended by Natural Resource Defense Council (2023). • As recommended by Natural Resource Defense Council (2023). • As recommended by Natural Resource Defense Council (2023). • ESA Section 7; as recommended by Natural Resource Defense Council (2023).
Post-Construction (Operations)	• Operations manuals should reflect routine maintenance records that document environmental conditions, electrical system operations, etc. (ABS 2020; Amaechi et al. 2022). • Monitor the ecological recovery throughout the first year of operations to inform and implement necessary sampling schedule (ROSA 2021). • Use biological indicators to monitor changes to the ecosystem to ensure sustainable practices are implemented with ocean development (NYSDEC 2017; Dvarskas n.d.; NYSDEC 2021). • Evaluate soft-bottom habitat, which may be disturbed or replaced by the installation of turbines. Many species rely upon soft substrates for survival and impacts must be considered (NRDC 2023). • Study the migratory routes of HMS to assess behavioral changes that might occur following construction and installation of floating platforms and array cables (NRDC 2023). • Consider surveys for eels and elasmobranchs susceptible to EMF impacts (NRDC 2023). • Prioritize studies for Atlantic sturgeon and other ESA listed species; also, evaluate forage species (NRDC 2023).	• Project management guidelines outlined by Amaechi et al. (2022). • ROSA Offshore Wind Monitoring Framework and Guidelines. • As outlined by the New York State Department of Environmental Conservation Ocean Action Plan (NYSDEC 2017; NYSDEC 2021). • As recommended by Natural Resource Defense Council (2023). • As recommended by Natural Resource Defense Council (2023). • As recommended by Natural Resource Defense Council (2023). • ESA Section 7; as recommended by Natural Resource Defense Council (2023).

Table 11 continued

Construction Phase	Guidelines, Strategies, and Approaches to Avoiding, Minimizing and Mitigating Impacts Updates	Agency and/or Guideline (as applicable)
Decommissioning	• Re-use and recycle structures, parts, and equipment whenever possible; consider alternate methods of disposal to reduce environmental impacts (Topham and McMillan 2017). • Continue to monitor the ecological recovery of OSW platform sites and cable locations after decommissioning is complete (Topham and McMillan 2017). • Continue to use biological indicators to monitor changes to the ecosystem compared to baseline conditions to ensure sustainable practices are implemented with ocean development (NYSDEC 2017; Dvarskas n.d.; NYSDEC 2021). • Cable and structure removal will disturb the seabed; care must be taken to minimize habitat disturbance (Ramachandran et al. 2021). • Decommissioning should be considered during project design to simplify removal and minimize environmental impacts; floating foundations have a simpler decommissioning process than fixed-bottom platforms, but weather conditions in the offshore environment must be considered (Topham and McMillan 2017; Ramachandran et al. 2021).	• Offshore wind decommissioning recommendations in Topham and McMillan (2017). • Offshore wind decommissioning recommendations in Topham and McMillan (2017). • As outlined by the New York State Department of Environmental Conservation Ocean Action Plan (NYSDEC 2017; NYSDEC 2021). • Decommissioning recommendations in Ramachandran et al. (2021). • Offshore wind decommissioning recommendations in Topham and McMillan (2017) and Ramachandran et al. (2021).

In addition to the guidance presented in Table 11, the following practices are recommended based upon actions from recent OSW determinations:

- Establish biological indicators of environmental change using sensitive biota or specific environmental parameters and monitor changes for offshore development (BOEM 2023a; ROSA 2021; NRDC 2023).
- Participate in scientific studies and data collection on the impacts of OSW, including involvement in historical federal fisheries surveys, as outlined by BOEM in the Record of Decision (ROD) for South Fork Wind and Ocean Wind 1 projects (BOEM 2021a; BOEM 2023d).
- Periodic survey reviews are recommended to be completed to evaluate the effectiveness of the monitoring process (BOEM 2021a; ROSA 2021; BOEM 2023d).
- Public access to monitoring data should be considered; prioritize transparency of monitoring activities and results. Information sharing has been recommended by BOEM for other OSW projects (BOEM 2021a; BOEM 2023d; NRDC 2023).
- Fisheries Compensation Funds should be established in the event OSW causes losses to the fishing industry, as outlined by BOEM for other OSW projects (BOEM 2021a; BOEM 2023d).

6 Knowledge Uncertainties, Data Gaps, and Future Considerations

The commitment by BOEM to deploy 30 gigawatts (GW) of OSW energy by the year 2030 and 15 GW of floating OSW capacity by 2035 has triggered rapid succession of OSW energy development in U.S. waters. As of early 2023, there existed two demonstration-scale projects operating in federal and state U.S. waters (offshore Virginia and Rhode Island), and two utility-scale projects in federal waters approved by BOEM (offshore Massachusetts and Rhode Island). With recent OSW energy auctions, over two dozen lease areas are planned for the Atlantic, including several lease areas offshore of New Jersey (NJBPU 2020). This rapid advancement has led BOEM to prepare its first draft programmatic environmental impact statement (PEIS) for the six proposed lease areas in the New York Bight. A focused, regional cumulative analysis is part of this PEIS and will likely be central to future regional planning processes. To address cumulative impacts, the Vineyard Wind Final Environmental Impact Statement assessed "impacts that could result from the incremental impact of the Proposed Action and action alternatives when combined with past, present, or reasonably foreseeable activities, including other future offshore wind activities" (BOEM 2021b). Accompanying the cumulative effects of development comes a high level of uncertainty generated from incomplete information in the past, present, and future. Uncertainty is defined as lack of confidence in results often due to missing data and unreliable information, low sample sizes, or high variability (Walker et al. 2003; USEPA 2011).

6.1 Knowledge Uncertainties

6.1.1 Future Fisheries Surveys

One concern of the commercial fishing industry and scientific community regarding the impact of OSW is that future fisheries studies will be difficult to compare to historical ongoing studies (note: the scientific community includes NMFS, which is the federal agency that regulates fishing operations) (Gill et al. 2020; Hare et al. 2022; Methratta et al. 2023). The fishing industry has raised concerns that few spatial regulations exist for OSW developers, so the rapid development of OSW, especially floating turbines accompanied by complex cable arrangements, may result in large areas of the ocean that are unfishable or unable to be surveyed in future fisheries studies (Methratta et al. 2023; NOAA 2023e).

The installation of underwater structures, cables, and mooring lines to the marine environment has the potential to create issues for fishing vessels and crews by creating hazard zones with a higher potential for gear hang-ups or personal injury; sampling these locations is difficult (Maxwell et al. 2022; NOAA 2023e). If fish are attracted to the new structural habitat provided by wind turbines in the offshore environment and change their holding locations (Aurore et al. 2017; Farr et al. 2021), it is possible that fisheries surveys could "miss" portions of a population as vessels avoid wind platforms over safety concerns and gear complications (NOAA 2023e). In this scenario, fisheries surveys may inaccurately assess the status of a fishery since the data will not capture the entire population nor survey the same historical locations as previous studies (Methratta et al. 2023; NOAA 2023e). This is a concern not only with the installation of fixed turbines, but also with floating offshore wind platforms because the presence of cable arrays and mooring lines create complications for the deployment of fishing gear and scientific monitoring equipment (Farr et al. 2021; Maxwell et al. 2022; Methratta et al. 2023).

Fisheries surveys may need to be redesigned and methods may require re-evaluation to account for sampling the new habitat created by OSW platforms (Methratta et al. 2023). Investment into the research required for new survey designs and methods may be necessary to ensure that fisheries are accurately sampled, and that new data are compatible with historical surveys (Methratta et al. 2023). Scientists have highlighted the importance of new research methods to continue compiling life history data on fishes, which is especially important as OSW continues throughout the United States. (Methratta et al. 2023). Additionally, coordination between developers and the fishing industry during the planning process of OSW projects may mitigate impacts to historical fisheries surveys (BOEM 2013; BOEM 2015; MAFMC 2014; Lipsky et al. 2016; VCZMP 2016; NYSERDA 2017).

6.1.2 Historical Fishing Grounds

The loss of historical fishing grounds and associated effort displacement is a major concern of the fishing industry. The placement of wind turbines and cable arrays has the potential to reduce the availability of fishing locations, especially with respect to mobile fishing gear (e.g., dredges) and long line fishing gear (NOAA 2023e). Gear loss and damage due to entanglement or "hanging up" with OSW platforms and array cables causes additional cost for fishing operations and leads to revenue losses. Fishing vessels must avoid wind turbine platforms and cable arrays, which increases fishing pressure within other areas of the ocean (NOAA 2023e). Based upon stakeholder feedback, other major concerns of the fishing industry include potential collisions with wind turbines, potential radar interference, the decreased availability of port space, reduced quotas, and the possibility of additional fishing regulations to mitigate impacts to fish and fish habitat potentially caused by OSW. To date, the spacing of future floating OSW turbines, the mooring type, and the associated array cable configuration in the Mid-Atlantic is unknown.

6.1.3 Fishing Industry Employment, Operations, and Revenue

There are knowledge uncertainties on the potential long-term impacts from OSW on the fishing industry, specifically with floating technology. The potential impact of OSW on future employment within the fishing industry is unknown: to date, no published peer reviewed studies have evaluated if job losses or worker displacement will occur as OSW continues (NOAA 2023e). Currently, no peer reviewed studies have assessed the ability of fishing industry workers to transfer their skills to other areas of employment, or the willingness of industry workers to learn a new profession and change careers should job losses occur (NOAA 2023e). Final Environmental Impact Assessments (FEIS) for Empire Wind, Sunrise Wind, and others, estimate loss of revenue and discuss related impacts to the fishing industry (BOEM 2023f and BOEM 2023g); however, the AoA is much larger than the wind energy areas assessed in the FEIS, so loss of revenue doesn't align with the goals of this study. Additionally, floating technology is expected to have a larger footprint than fixed technology and has the potential to impact both local fishing operations and the broader offshore commercial industry. These potential impacts are not well documented in the scientific literature and warrant further study (NOAA 2023e).

The NYSERDA Overview of Offshore Wind Opportunities for Experienced Mariners Study (2021) was conducted to address some uncertainties in the potential for job losses or career displacement within the fishing industry that may result from OSW. The study examined the skillsets and qualifications of mariners and fishing industry employees to determine which of their skills are transferrable to OSW industry jobs (NYSERDA 2021). The study provides a starting point to addressing fishing industry employment concerns related to OSW and offers insight into the important skills and qualifications of fishing industry workers (NYSERDA 2021).

To date, few studies have been conducted to evaluate the effect of changes to fishery landings that may result from OSW. Many ports located along the Mid-Atlantic and New England coastline are heavily dependent upon the fisheries potentially impacted by offshore wind development. In addition to potential job losses, decreases in fishery landings have the potential to impact local communities that rely upon the revenue generated by fisheries, including any associated shoreline services, and even global seafood supply chains. Responsible OSW should consider the economic value of fisheries and consider the existing usage of the proposed lease area is not negatively impacted by future development (NOAA 2023e).

6.1.4 Vessel Traffic

Vessel traffic, congestion, and travel delays are another concern of the fishing industry and shipping industry (NOAA 2023e). With the large number of wind lease construction projects underway in the New England and Mid-Atlantic regions, offshore travel can become restricted as vessels must avoid active construction zones and areas with existing OSW platforms (BOEM 2020; USCG 2020; NOAA 2023e). While non-fishing vessels may readily avoid OSW platforms, additional safety challenges arise for fishing vessels since gear deployment limits vessel maneuverability. This could become compounded as vessel density increases in certain locations to avoid OSW platforms. The USCG conducted a study of offshore vessels routes and the potential for improving waterway access with consideration to OSW in the New England region (USCG 2020; NOAA 2023e). Future consideration by the USCG and other agencies will need to address concerns of the fishing and shipping industry and potentially establish new vessel corridors or travel guidelines to alleviate navigational issues presented by wind lease development, especially as more wind farms are approved and construction continues (USCG 2020). A Maritime Assessment of vessels and supply chains is included in the collection of spatial studies.

6.1.5 Fisheries Tourism

Many shoreline communities are concerned about the impact that OSW might have on tourism (Glasson et al. 2022). Some individuals feel that visible platforms might negatively impact tourism, while others have concerns of negative consequences for the environment, which may lead to reductions in tourism. Deepwater OSW platforms would likely not be visible from shore; therefore, they do not cause the same visual impact as fixed-bottom platforms. Some individuals have noted enhanced fishing opportunities from the addition of structural habitat in the offshore environment (Smythe et al. 2021), which may have a net benefit to local tourism. Anglers that were interviewed about their opinions on the impact of the Block Island Wind Farm on recreational fishing indicated they felt the wind farm enhanced their fishing experience by providing structural habitat for fish species and increasing the presence of fish in the vicinity of the wind platforms (Smythe et al. 2021). Floating OSW platforms provide some structural habitat since the platform itself is secured with mooring lines and anchors (Farr et al. 2021); however, the foundations of fixed platforms provide greater surface area.

Note that floating OSW platforms and cable arrays present navigational challenges and safety risks which may be unfavored by anglers. The Block Island Wind Farm consists of five turbines positioned in a straight line. Floating OSW platforms could potentially be positioned in grid patterns or consist of a greater number of turbines. As at the time this Fish and Fisheries Data Aggregation Study was written, the proposed platform configuration was not known.

Glasson et al. (2022) reviews a variety of studies conducted on the impact of OSW on tourism and recreation, primarily in the United Kingdom (UK), and results indicate either no relationship, or only positive effects. The benefits include environmental education, site-seeing, and tourism enhancement initiatives started by OSW developers (Glasson et al. 2022). Notably, mixed feelings were expressed by anglers about the location of wind platforms; many prefer platforms that are not visible from the shoreline (Smythe et al. 2021), which is one benefit of deepwater platforms.

6.1.6 Hydrodynamic and Oceanographic Changes

The hydrodynamic and oceanographic changes associated with OSW platforms are discussed above in section 4.3.7. As more offshore wind farms are constructed into the foreseeable future, these impacts may become compounded, depending upon the number of wind platforms, their location, and spacing. Changes to upwelling may occur on regional scales, cumulatively, depending upon the size and spacing of wind platforms. Ocean stratification could potentially be impacted, including the regional cold pool process which provides habitat for cold water species important to fisheries (e.g., yellowtail flounder, ocean quahog, and Atlantic sea scallop) (Sullivan et al. 2005; Friedland et al. 2022; NOAA 2023e). Additional research is necessary to understand how future OSW might impact the formation of the Gulf Stream warm core rings in the Mid-Atlantic region (NOAA 2023e; Silver et al. 2023). Changes to upwelling may also impact primary production (van Berkel et al. 2020), which could cause community level effects as the abundance of forage species changes. The placement of OSW structures could potentially disrupt natural patterns of larval dispersal (Chen et al. 2020; BOEM 2021c; NOAA 2023e); however, it is unclear how changes to dispersal patterns may impact fish and fisheries over time (van Berkel et al. 2020). More research would improve understanding of how fish communities might be impacted by the hydrodynamic changes associated with OSW (van Berkel et al. 2020; NOAA 2023e).

6.1.7 Climate Change

Offshore wind is expected to produce a tremendous amount of energy for the State and help achieve the requirement of 70%renewable energy by the year 2030. The installation of OSW turbines within the New York Bight is expected to reduce the use of fossil fuels and slow the impacts of climate change by reducing carbon emissions. Rising ocean surface temperature has been identified as one of the primary causes of changes to marine ecosystems (Portner and Peck 2010). Distributional changes to fish and shellfish populations associated with climate change have been documented within the AoA and many places worldwide (Portner and Peck 2010; NYSERDA 2017). At the time of this Fish and Fisheries Data Aggregation Study report, the combined impact of OSW and distributional shifts of fish species within the AoA is uncertain. If distributional shifts in cold-temperate and warm-temperate species of the Mid-Atlantic Bight continue to move northward and into deeper water over time (Walsh 2015), some species that were previously absent from the AoA, or transient, may become more common; conversely, species that are common may shift or emigrate elsewhere. This could mean that the stressors associated with OSW will potentially impact new species to the region but have less effect on those moving away. Over time, reductions in greenhouse gas emissions are predicted to slow the rate of rising ocean temperatures and reduce ocean acidification, which is expected to have a net benefit to fish and fisheries (Portner and Peck 2010; NOAA 2023m). Investment in renewable energy technology and sustainable infrastructure is necessary to preserve ecosystem services, stimulate economic growth, and build toward an energy independent future (NYSERDA 2023b).

6.1.8 Future Wind Projects

The impact of future wind projects to the AoA with consideration to existing wind leases in the Mid-Atlantic region is uncertain. At the time this Fish and Fisheries Data Aggregation Study report was released, floating OSW lease siting has not occurred; therefore, the location of future floating platforms following this study are unknown. Several OSW areas have been sited offshore of New Jersey, Massachusetts (NJBPU 2020), Virginia, and Rhode Island. Stressors to fish and fisheries from additional wind platforms in the Mid-Atlantic are the same as those described in this study; however, the stressors could potentially become compounded depending upon the number, location, and spacing of new wind lease sites with respect to existing leases. Careful planning is recommended to reduce impacts to vessel travel corridors, historical fishing grounds, and important fish habitat.

6.2 Data Gaps

The literature review and data analysis conducted for this study provide valuable insight into the historical distribution of fish species within Zones 1 and 2 of the AoA. No temporal gaps were identified; however, although historical fishery surveys cover most of Zone 2 (estimated 70%), there are several submarine canyons and other potentially sensitive habitat along the edge of the continental shelf that are difficult to survey and largely unexplored due to deepwater and bathymetric complexity (NMFS 2017). Bottom trawl survey data do not capture the full extent of species present within the submarine canyon HAPCs, nor along the shelf break. Similarly, these studies do not include surveys of Zone 3 due to the limitations of bottom trawl sampling equipment and the extreme water depth beyond the shelf break.

NOAA Fisheries Observer data were used to address some spatial data gaps for the Environmental Sensitivity Analysis; however, these data generally account for only a small portion of all fishery trips; therefore, coverage is limited (GARFO 2023d). Additionally, these data were limited due to federal confidentiality procedures, so data gaps are still evident in Zone 3. In general, there is a need for additional data on the fish species potentially impacted in Zone 3, including Atlantic HMS for which EFH has been identified. The addition of floating turbines and cable arrays to Zone 3 may introduce stressors to the environment which can potentially impact HMS that utilize deepwater habitat for seasonal migrations (Maxwell et al. 2022; Methratta et al. 2023; NOAA 2023e). Additional data and research could provide insight on how HMS use this habitat.

In addition to the lack of data on fish species distribution in Zone 3, the extent of commercial and recreational fishing activity in the offshore waters seaward of the shelf break was not fully captured in this study. Notably, few AIS data were available in this study for the offshore waters of Zone 3. As discussed in section 3.3.4, the limitations of AIS data include gaps in vessel tracking data at distances greater than 12 miles from shore because many vessels turn off the AIS device at this distance. Additionally, fishing vessels sometimes record their AIS vessel type as “Other,” which are not captured in the data for fishing vessel tracks (NYSERDA 2017).

6.3 Future Considerations

The following general recommendations are provided to initiate discussions and coordination, to provide added value, and to help achieve greater clarity for avoiding and minimizing potential conflicts with deepwater OSW:

- Much of the available literature on the stressors to fish and fisheries associated with OSW have echoed the importance of future studies to be conducted *in situ* to account for environmental variability and anthropogenic factors that cannot be captured in laboratory experiments, nor by comparisons between OSW farms (Wegner et al. 2017; Hawkins 2022; Methratta et al. 2023; NOAA 2023e). Observational studies could be used to help achieve greater certainty or clarity on how OSW may impact resources over time.
- The installation of floating wind platforms and cable arrays in the offshore environment has the potential to create areas of the ocean that are unable to be surveyed due to survey gear entanglement risk and safety risk to crew members (Methratta et al. 2023; NOAA 2023e). Fisheries surveys are important to stock assessments, population monitoring, and informing managers of regulatory needs. Future surveys can be modified to avoid wind platforms and new methods can be developed to avoid entanglement risk; however, modified surveys may inaccurately assess the status of a fishery if the data are not directly comparable to historical survey data (Methratta et al. 2023; NOAA 2023e). New survey designs and methods may be necessary to ensure that fisheries are accurately sampled, and that new data are comparable to historical surveys (Methratta et al. 2023). Coordination between developers and the fishing industry during the planning process of OSW projects may mitigate impacts to historical fisheries surveys (BOEM 2013; BOEM 2015; MAFMC 2014; Lipsky et al. 2016; VCZMP 2016; NYSERDA 2017). One consideration is potentially siting OSW platforms outside the path of historical survey transects and historical sampling locations to avoid complications with ongoing studies and ensure that future fisheries surveys utilize historical routes.
- Effort displacement and lost revenue is a major concern of the fishing industry and should be considered during project planning. When a section of the ocean can no longer be fished because of the placement of wind turbines and cable arrays, fishing pressure increases within other areas of the ocean (NOAA 2023e). Stakeholders have indicated that additional major concerns of the fishing industry include the risk of collision with wind turbines, potential radar interference, potential difficulties for Coast Guard rescue operations, the decreased availability of port space, and the potential for additional fishing regulations to mitigate potential impacts to fish populations caused by OSW. Gear loss and damage due to entanglement or "hanging up" with OSW platforms and array cables causes additional cost for fishing operations and leads to revenue losses. Floating OSW platforms are expected to exclude all types of fishing gear, especially mobile fishing gear such as trawl nets and dredges (Maxwell et al. 2022). Fishery compensation funds can help recoup lost revenue; however, careful planning should be considered ahead of development to prevent risk. Coordination with the commercial fishing industry during the OSW siting process may help reduce impacts to historical fishing locations.
- Federal agencies have stressed the importance of preliminary and baseline studies of the habitat, species, life stages, and fisheries available throughout the AoA (ROSA 2021; BOEM 2023a; NOAA 2023e; NRDC 2023). These additional studies may include more granular data to improve habitat mapping, species distribution assessments, and larval dispersal patterns. Locations shoreward of the AoA should also be considered for study since cable tie-ins and additional construction may be necessary to support OSW. For example, stakeholders have recommended avoiding impacts to Submerged Aquatic Vegetation (SAV) that could potentially occur along the cable route to shoreline tie-ins.

- Coordination with commercial fisheries during the planning process could provide additional clarity on how fisheries are utilized within the AoA and help develop strategies for reducing impacts. As evidenced in this study, many fisheries occur and even overlap within the AoA; therefore, fisheries may need to be considered equally when project layout discussions (cabling, turbine layout etc.) are taking place.
- The AoA overlaps with a portion of the existing Northeast Multispecies FMP Georges Bank cod management area and the newly proposed Southern New England cod stock area (McBride and Smedbol 2022). These stock areas pose potential conflict with OSW in the region and should be considered during the planning process of future projects. Stock management areas are crucial for preserving spawning grounds, allowing the recovery of depleted stock, and ensuring sustainable cod populations with a thriving fishing industry (McBride and Smedbol 2022). Future fisheries studies of OSW impacts in the AoA should consider these cod stock areas.
- Recent research prioritization has identified the importance in increasing our knowledge about the potential impacts and stressors to fish and fisheries within the AoA (NOAA 2023e). These studies may include assessing the impact of HVDC substation impingement and entrainment to larval fish; determining community level impacts of habitat conversion; understanding the response of fish species to EMF produced by cable arrays; and assessing the response of fisheries to additional fishing pressure created by new areas of the ocean that are restricted from fishing (ROSA 2021; NOAA 2023e; NRDC 2023).
- The combined impact of OSW and distributional shifts of fish species due to climate change within the AoA is uncertain. Distributional shifts in cold-temperate and warm-temperate species of the Mid-Atlantic Bight have been noted with a northward trend and into deeper water over time (Walsh 2015). This could mean that the stressors associated with OSW will potentially impact new species to the region but have less effect on those moving to different locations. It may also mean that areas assessed as low risk at the time this study was released could be higher risk in the future as species shift, or vice versa. Understanding these trends and potential shifts in species would improve knowledge of future impacts to fish and fisheries.
- Continued biological monitoring should be considered to assess impacts to fish and fisheries associated with OSW (NOAA 2023e). Addressing the current gaps in deepwater technology research and the understanding of many of the associated potential stressors could help achieve better understanding of short and long-term impacts to the ecosystem and lead more responsible development of OSW.
- The BMPs, avoidance, minimization and mitigation measures described in this study were those in place at the time of its publication. It is important to recognize that BMPs evolve with iterative OSW projects and as new information becomes available, such as their effectiveness. BMPs are also driven by the permitting process and may change with updatedagency guidelines.

- The NOAA EFH, NEFSC Bottom Trawl Survey, NEFSC Scallop Dredge Survey, NEFSC HabCam, and NEFSC Atlantic Surfclam and Ocean Quahog data sets provide sufficient coverage of Zone 1 to assess the potential impact of OSW to fish habitat, fish species, and some species targeted by commercial and recreational fisheries. Based upon these data, Zone 1 demonstrates the use of habitat by many life stages of demersal, pelagic, and HMS species. Also evident is widespread biomass for demersal and pelagic species, including concentrations of commercial and recreational species such as mackerel, butterfish, offshore hake, and silver hake (whiting), tilefish, American lobster, sea scallops, and clams (section 3.4). Concentrations of deepwater fisheries species occur along the shelf break and at the head of the submarine canyons in Zone 1, as well as near the edge of the Nantucket Shoals. VMS data indicate the presence of a variety of permitted fishing vessels along the continental shelf and near the canyons on the continental slope. AIS data also indicate heavy commercial fishing vessel traffic off the southwest side of Nantucket Shoals in Zone 1 (Figure 9). Although these data are useful for identifying the presence of fish species and commercial fishing vessels, additional surveys of bathymetry and fish habitat could enhance our knowledge of habitat diversity within Zone 1. Refer to the Environmental Sensitivity Analysis (NYSERDA, 2025) for additional information on fish and fisheries risk in Zone 1.
- Biomass concentrations of several commercial and recreational fish species were evident in Zone 2 of the AoA, including American lobster, deep-sea red crab, Northeast Multispecies complex, and tilefish. High density of these important deepwater fisheries species occur along the shelf break and within the submarine canyons of Zone 2. Note that bottom trawl survey data of lobster, crab, and tilefish are limited by sampling gear type; additional surveys specific to these species should be considered to augment future OSW assessments. Additionally, the highest number of HMS EFH-designations within the AoA occur in Zone 2; however, biomass data on HMS within the AoA are limited (section 3.4). A review of the NEFSC Large Pelagics survey data indicates HMS recreational fishing effort concentration along the outer continental shelf, especially along the shelf-break in Zone 2 (section 3.3.7.8) (NOAA 2023zk). Data from the NMFS HMS Logbook Program indicate HMS logbook effort is concentrated along the shelf-break in Zone 2 (section 3.3.7.9) (NOAA 2023zl). Additional surveys on HMS presence within Zone 2 would improve our understanding of HMS presence and how to reduce risk. VMS data indicate the use of Zone 2 by several different permitted fishing vessels: HMS, Monkfish, and Squid, Mackerel, Butterfish permitted vessels frequently use Zone 2. Illex squid dominates the Squid, Mackerel, and Butterfish fishery within Zone 2 (GARFO 2023e). Additional data on fishing vessel usage within Zone 2 can improve our understanding of how the fishing industry utilizes the zone and help avoid potential conflicts. Refer to the Environmental Sensitivity Analysis (NYSERDA, 2025) for additional information on fish and fisheries risk in Zone 2.

- Zone 3 demonstrates habitat for several HMS; however, species biomass data in Zone 3 were limited. While NOAA Fisheries Observer data provide insight into some species targeted by commercial and recreational fishing operations in Zone 3, these data are sparse and account for only a small percentage of all fishery trips (GARFO 2023d). Data from the NEFSC Large Pelagics survey indicate some HMS recreational fishing effort seaward of the shelf break in Zone 3; however, data generally appear sparse (section 3.3.7.8) (NOAA 2023zk). A review of the NMFS HMS Logbook Program data indicate HMS logbook effort is low throughout Zone 3 (section 3.3.7.9) (NOAA 2023zl). VMS data within Zone 3 were sparse. HMS are known to use deepwater habitat seaward of the shelf break during seasonal migrations; therefore, additional surveys and data on fish species presence within Zone 3 of the AoA would enhance our knowledge of potential risk to those species. Refer to the Environmental Sensitivity Analysis (NYSERDA, 2025) for additional information on fish and fisheries risk in Zone 3.

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Appendix A: Engagement Memorandum

Offshore Wind Planning in the New York Bight: Fish and Fisheries Data Aggregation Study

Engagement Memorandum

Prepared for:

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NYSERDA Report 25-07-Appendix A NYSERDA Contract 155561 February 2025

Notice

Abstract

The Fish and Fisheries Data Aggregation Study was conducted to provide information about the environmental factors related to offshore wind energy development in the Mid-Atlantic Bight in waters greater than 60 meters deep. The objective is to identify areas of high environmental risk for the siting of offshore wind energy development by using up-to-date scientific knowledge and stakeholder engagement. One of five desktop studies, the Fish and Fisheries Data Aggregation Study compiles and analyzes existing data on fish habitat, fish species, and commercial and recreational fisheries in the Area of Analysis (AoA) that may be sensitive to offshore wind development (OSW). The elements that were analyzed include Essential Fish Habitat (EFH), Habitat Areas of Particular Concern (HAPC), Endangered Species Act (ESA) listed species, fish species counts and biomass, fishing vessel presence and usage of the AoA, and targeted commercial and recreational fisheries within the AoA. The stressors that were considered include noise, vessel traffic, physical habitat alterations, changes to water quality; changes to oceanographic dynamics, and the implications of new structures in the offshore environment to commercial and recreational fisheries. The findings suggest the AoA is within the range of some threatened and endangered species and encompasses many important commercial and recreational fisheries that could be impacted by OSW. The stressors to fish and fisheries vary by location, habitat, and species. Future considerations are provided to help achieve greater clarity for avoiding and minimizing potential conflicts with deepwater OSW.

Keywords

fish, fisheries, offshore wind, deep water, assessment, stressors, receptor, sensitivity, risk, best practices

Acknowledgments

We thank the Project Advisory Committee (PAC) and New York State Fisheries Technical Working Group (F-TWG) and all Fish and Fisheries Study reviewers for volunteering their time toward providing advice on data sources and study review. We also acknowledge the data providers and authors cited whose research and effort contributed to this study.

Table of Contents

Acronyms and Abbreviations

AoA	Areas of Analysis
BWFA	Blue Water Fishermen's Association
BOEM	Bureau of Ocean Energy Management
CBI	Consensus Building Institute
EMF	Electromagnetic Field
ft	feet
F-TWG	Fisheries-Technical Working Group
GFWA	Gloucester Fishermen's Wives Association
HABCAM	Habitat Camera
m	meters
MCFA	Maine Coast Fishermen's Association
MFP	Massachusetts Fishermen's Partnership
NEYFA	New England Young Fishermen's Alliance
NHCFA	New Hampshire Commercial Fishermen's Association
nm	nautical mile
NOAA	National Oceanic and Atmospheric Administration
NMFS	National Marine Fisheries Service
NYSERDA	New York State Energy Research Development Authority
OSW	Offshore Wind
RODA	Responsible Offshore Development Alliance
ROSA	Responsible Offshore Science Alliance
SMAST	University of Massachusetts Dartmouth School of Marine Science & Technology
VIMS	Virginia Institute of Marine Science
WEA	Wind Energy Area

Executive Summary

In 2019, New York's historic Climate Leadership and Community Protection Act (Climate Act) was signed into law, requiring the State to achieve 100% zero-emission electricity by 2040 and to reduce greenhouse gas emissions 85% below 1990 levels by 2050. The law specifically mandates the development of 9,000 megawatts (MW) of offshore wind energy by 2035, building upon its previous goal of 2,400 MW of offshore wind energy by 2030. The New York State Energy Research and Development Authority (NYSERDA) is charged with advancing these goals.

Since the early 2000s, offshore wind development off New York's coast has advanced in relatively shallow areas in the New York Bight, on the Outer Continental Shelf (OCS). As offshore wind (OSW) development continues to mature and offshore wind lease areas are developed in deeper waters, the size and type of offshore wind components are likewise expected to grow, and the project footprint will change as the use of floating OSW technology begins to be deployed. This may result in changes in the types of potential effects and interactions seen to date for fixed-bottom offshore wind projects. The objectives of this Fish and Fisheries Data Aggregation Study were to identify areas of high-environmental risk that should not be considered further for the siting of deepwater OSW development and incorporate the best-available scientific information into the risk reduction process.

Three zones comprise the Area of Analysis (AoA): Zone 1 is on the continental shelf (60–150 meters deep), Zone 2 is at the shelf break and slope (150–2,000 meters deep), and Zone 3 overlaps the continental rise (2,000–3,000 meters deep). Five desktop environmental studies compile and analyze existing data on resources in the AoA that may be sensitive to OSW development.

The most current publicly available data and survey data provided by federal agencies were used to inform the Fish and Fisheries Data Aggregation Study of the potential stressors and conflict with OSW in the AoA. Three receptor groups were analyzed: fish habitat, fish species, and commercial and recreational fisheries. The elements that were analyzed within each receptor group include Essential Fish Habitat (EFH), Habitat Areas of Particular Concern (HAPC), Endangered Species Act (ESA) listed species, fish species counts and biomass, fishing vessel presence and usage of the AoA, and targeted commercial and recreational fisheries within the AoA. Several stressors to each of these receptor groups were considered, including vessel traffic; physical habitat alterations, which may displace some species but create new habitat for others; changes to oceanographic dynamics; changes to water quality; and the implications of new structures in the offshore environment to commercial and recreational fisheries. Knowledge uncertainties were identified that include impacts to future fisheries studies, impacts to historical fishing grounds, fishing industry employment, operations, revenue, impacts to vessel traffic, hydrodynamic processes, tourism, climate change, and the potential impact of additional future wind projects within the AoA. The findings suggest the AoA is within the range of some threatened and endangered species and encompasses many important commercial and recreational fisheries that could be impacted by OSW. Future considerations are provided to help achieve greater clarity for avoiding and minimizing potential conflicts with deepwater OSW.

1 Introduction

The Fish and Fisheries Data Aggregation Study evaluates potential areas for deepwater offshore wind development within a specific geographic area of analysis (AoA). It includes three zones extending outward from the 60-meter (m; 197 feet [ft]) depth contour to the 3,000-meter (9,843 ft) contour.

The purpose of this Area of Analysis Fisheries Engagement Memorandum is to identify and review current stakeholder sentiment on offshore wind development by analyzing fishing industry comments made during public comment notices, capture research gaps identified by the industry, and consider future engagement strategies from Fisheries-Technical Working Group (F-TWG) members and others in the industry related to the general advancement of offshore wind as areas further from shore are being considered for development.

Tetra Tech reviewed previous work and fishing industry comments made to the Bureau of Ocean Energy Management (BOEM) to illustrate the industry's concerns with deepwater wind infrastructure in other regions. Tetra Tech, along with support from Consensus Building Institute (CBI) and Cadmus, facilitated stakeholder engagement through "office hour" sessions to identify themes underlying general concerns with deepwater wind infrastructure beyond 60 meters (m) as well as to identify gaps in fisheries group representation. The four "office hour" sessions provided the fishing industry a platform to discuss their concerns with deepwater wind technology. Input from those sessions is captured in this memorandum, as an appendix to the Fish and Fisheries Data Aggregation Study. This memorandum consolidates the information reviewed as presented in the office hours, compiles feedback, and identifies knowledge gaps and future studies.

1.1 Area of Analysis

The AoA is fully described within section 1.2 of the New York State Energy Research and Development Authority (NYSERDA) Fish and Fisheries Data Aggregation Study and includes approximately 35,670 square miles of ocean area, compared to the Master Plan AoA of 14,569 square miles, extending from the coast of Cape Cod south to the southern end of the New Jersey (Figure 1). It includes three zones extending outward from the 60 m (197 ft) depth contour, which ranges between 15 and 50 nautical miles (nm) from shore to the 3,000 m (9,843 ft) contour, which ranges from 140 to 160 nm from shore. While offshore wind infrastructure will not be built across the entire AoA, the spatial studies will analyze this broad expanse to provide a regional context for these resources and ocean uses. Findings from the spatial studies will be used to support the identification of areas that present the greatest opportunities and least risk for siting deepwater offshore wind projects.

- Zone 1 is from 60 m (197 ft) to 150 m (492 ft) deep.
- Zone 2 is from 150 m (492 ft) to 2,000 m (6,561 ft) deep.
- Zone 3 is from 150 m (492 ft) to 3,000 m (9,842 ft) deep.

1.2 Floating Infrastructure Key Characteristics

Worldwide, deepwater wind technology is primarily concentrated on floating designs, as deep water fixed foundations have not been developed, in depths beyond 59 m (194 ft). The majority of the AoA would require floating wind infrastructure. Floating wind platforms are different from fixed-foundations and consist of different submerged platform designs with suspended mooring lines and anchors. Anchor type and mooring line radius change with each design type. Inter-array cables connecting each turbine will be suspended in the water column and likely not buried into the seabed. For a more detailed view on the current state of floating offshore wind technology NYSERDA commissioned a report that details fixed and floating OSW infrastructure technology and potential environmental impacts.[1]

1.3 Office Hours

Four, two-hour long office hours were hosted by Tetra Tech on behalf of NYSERDA, specifically for fishing industry representatives in the Northeast and mid-Atlantic states. The four office hours occurred on Thursday, June 1, 2023 from 4:00–6:00 p.m., Monday, June 26, 2023 from 12:00–2:00 p.m., Wednesday, July 19, 2023 from 5:00–7:00 p.m., and Tuesday, August 15, 2023 from 6:00–8:00 p.m. These office hours served as a forum to discuss the following:

- The three deepwater zones being considered by NYSERDA.
- Differences between fixed and floating infrastructure.
- Concerns the fishing industry has had with floating wind in other region.
- Types of fisheries and gear used in the three zones.
- Concerns and priorities of Northeast and mid-Atlantic fisheries.
- Types of work products that could be considered to address current or future needs.
- Future study needs to address data gaps to enhance future offshore wind considerations made by BOEM.

2 Fisheries within the Area of Analysis

Target fisheries and gear used in the AoA were identified in the Northeast Ocean Data Portal and comments were provided by National Marine Fisheries Service (NMFS). Table 1 lists this information.

Table 1.Target Fisheries and Gear Type

	Zone 1	Zone 2	Zone 3
Target Fishery	-Black Sea Bass a -Bluefish -Fluke b -Golden Tilefish b -Groundfish -Jonah Crab b -Lobster b -Monkfish -Ocean Quahog a -Pelagics (Herring/Mackerel/Squid) -Scallop a -Scup a -Skate a -Squid/Mackerel/Butterfish -Summer Flounder a -Surfclam a -Whiting a -Other	-Black Sea Bass a -Deep-Sea Red Crab -Fluke b -Golden Tilefish b -Jonah Crab b -Lobster b -Monkfish a -Ocean Quahog a -Pelagics (Herring/Mackerel/Squid) -Scup a -Skate a -Squid/Mackerel/Butterfish -Summer Flounder a -Surfclam a -Whiting a	-Red Crab (added from Office Hour 2 input) -Tuna, Triggerfish, and Mahi-Mahi (added from Office Hour 4 input)
Gear Type	-Bottom Trawl <65 ft -Bottom Trawl >65 ft -Dredge -Gillnet -Longline -Pots and Traps	-Bottom Trawl <65 ft -Bottom Trawl >65 ft -Longline -Pots and Traps -Other	-Longline -Other

[a] Provided by NMFS feedback.

[b] Comments from National Oceanographic and Atmospheric Administration (NOAA) Proposed Hudson Canyon Sanctuary.

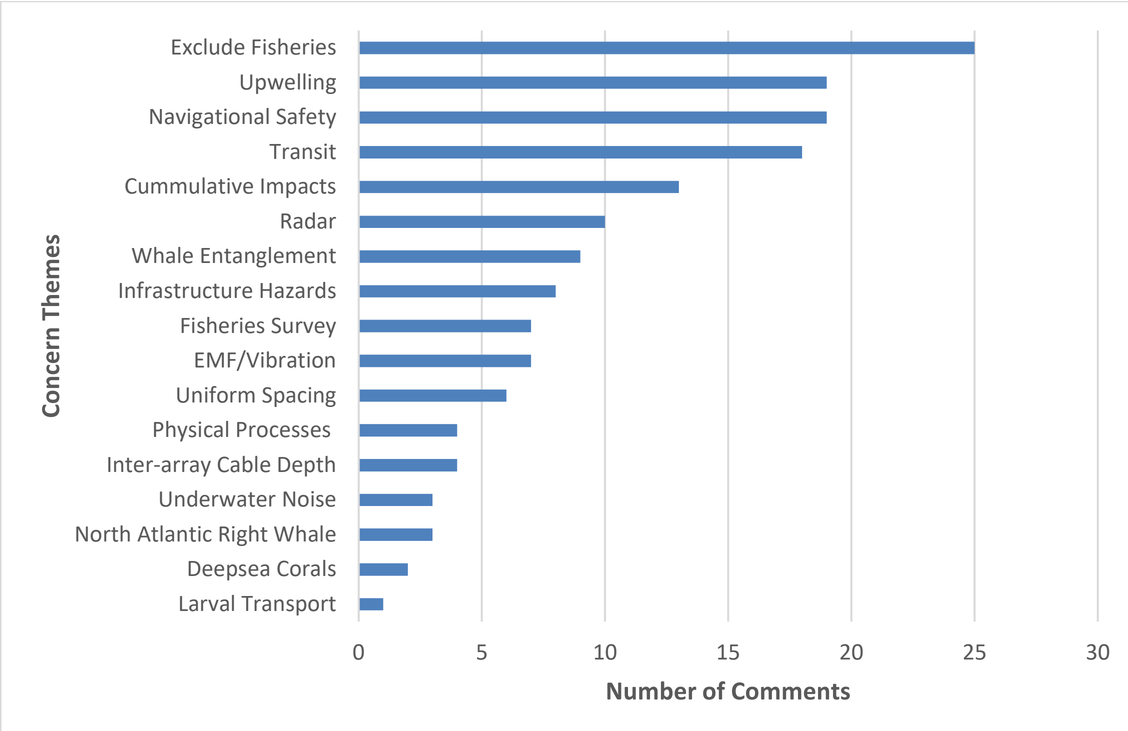
3 Synthesis of Past Efforts and Concerns

Tetra Tech reviewed fishing industry input from past efforts to capture existing industry concerns with floating wind infrastructure in other regions. This was used as a tool to indicate fishing industry concerns with floating wind elsewhere and was not used to extrapolate or pre-determine what concerns might be in the three zones of the AoA. The purpose of this review was also to listen to what the fishing industry had already mentioned as important issues and to test if the comments and topical areas are still relevant as development for offshore wind moves further offshore.

Comments reviewed are summarized by high-level topical groupings in Figure 1, from the following past efforts (all comments from the documents below can be found in the sources linked in the footnotes on this page):

- NYSERDA OSW Master Plan[2]
- Discussions with members of New York State's Fisheries Technical Working Group
- Responsible Offshore Development Alliance (RODA) Research Priorities[3]
- RODA Impact Fees for Commercial Fishing from Offshore Wind Development: Considerations for a National Framework[4]
- NOAA Notice of Intent to Conduct Scoping and to Prepare a Draft Environmental Impact Statement for the Proposed Hudson Canyon National Marine Sanctuary[5]
- BOEM New York Bight Call for Information and Nominations[6]
- BOEM New York Bight Wind Lease Sale[7]
- Fisheries Survival Fund's efforts to letters for the BOEM Massachusetts Request for Interest[8] and BOEM Commercial Wind Lease Issuance for Rhode Island and Massachusetts[9] that influenced the removal of scallop areas from the MA-RI Wind Energy Areas
- BOEM Gulf of Maine Request for Information for Draft Call Area[10]
- Gulf of Maine Fisheries Working Group
- BOEM Central Atlantic Draft Wind Energy Areas[11]
- BOEM California Call for Information and Nominations[12]
- BOEM California (PACW-1) Proposed Sale Notice[13]
- BOEM Oregon Request for Information and Nominations[14]

Figure 1. Fishing Industry Comment Synthesis from Floating/Deepwater Offshore Wind



Tetra Tech reviewed the above sources and input from fishing industry representatives for general environmental or fishing operation concerns with floating wind infrastructure. Geographic-specific concerns for a certain fishing ground or protected area were not included when reviewing input from different regions. The following Northeast and Mid-Atlantic fishing industry representatives offered their comments during one or more of the above-mentioned public comment periods:

- Atlantic Offshore Lobstermen’s Association
- Fisheries Survival Fund
- Garden State Seafood Association
- Gloucester Fishermen's Wives Association (GFWA)
- Kavanagh Fisheries
- Long Island Commercial Fishing Association
- Maine Fisheries Working Group
- Massachusetts Fishermen's Partnership (MFP)
- Massachusetts Lobstermen’s Association
- Massachusetts Seafood Collaborative
- Mid-Atlantic Fishery Management Council
- National Coalition for Fishing Communities
- National Marine Fisheries Service
- New England Fishery Management Council
- Northeast Seafood Coalition
- Responsible Offshore Development Alliance (RODA)

- Responsible Offshore Science Alliance (ROSA)
- Seafreeze Ltd.
- Surfside Foods, LLC
- The Blue Water Fishermen's Association (BWFA)
- The Maine Coast Fishermen's Association (MCFA)
- The Maine Lobstermen's Association
- The New England Young Fishermen's Alliance (NEYFA)
- The New Hampshire Commercial Fishermen's Association (NHCFA)
- XII Northeast Fishery Sector Inc.

NMFS provided specific high-level comments regarding this study during the New York State Fisheries Technical Working Group discussion. NMFS concerns addressed the following topics but are not to be considered official agency positions but rather additional topics to be considered within the context of this effort:

- Impacts on the cold pool process (an annual band of cooler bottom water created by thermal stratification that facilitates the distribution of many species).
- Impacts on the Frank R. Lautenberg Deep-Sea Coral Protection Area and the Georges Bank Coral Protection Area, which comprise substantial portions of Zones 2 and 3.
- An emphasis on the importance of underwater canyons for fisheries.
- Impacts on shelf break habitats for marine mammals in Zones 1 and 2.
- The premise that Zone 3 habitat usage is not well known or studied.

The comment synthesis from the above sources provided 18 high level topical themes that fishermen are concerned with as offshore wind moves into deeper water and likely will require floating technology to be used. Some themes overlap with concerns seen in fixed-bottom wind (i.e., radar interference and cumulative impacts). The following is a snapshot of the concern and themes regarding floating infrastructure already seen in these past comments from other regions. This does not mean that only the highest frequency concerns will be considered; rather, it is simply to illustrate what past concerns were provided by the fishing industry for floating wind infrastructure. The themes based on concerns and examples of content from participant comments are as follows:

<u>Exclusion of Fisheries</u>: Concerns regarding the potential exclusion of fisheries was the primary theme in the comment synthesis, with 25 comments.

i.e., "The Council expects that BOEM or another agency would prohibit the use of some or all fishing gear in designated [floating] wind energy lease areas for safety and liability reasons. The socioeconomic impacts of these exclusions to Council-managed fisheries and other parts of the human environment may be significant."

Upwelling: Upwelling was singled out from physical processes due to its frequency of input, with 19 comments.

i.e., "New studies recently released indicate that commercial offshore wind farms on the West Coast will impact the upwelling conditions that help sustain life in the Pacific Ocean. Altering the upwelling could have dramatic impacts on fisheries and the ecosystem."

Navigational Safety: Concerns regarding the safety of vessels navigating within a lease area, with 19 comments.

i.e., "It is incumbent upon BOEM to…..carefully assess how offshore wind (OSW) arrays will affect safety and life at sea."

Transit: Concerns focused on ensuring areas solely for vessels to transit through lease areas, with 18 comments.

i.e., "To determine where and what size areas will be needed for transit, BOEM should execute coastwide co-production of knowledge with United States Coast Guard and vessel operators in the Central Atlantic region and conduct explicit modeling that includes fishing vessel movement patterns, funneling, and traffic changes."

Cumulative Impacts: Concerns focused on how lease areas and possibly proposed areas could further impact uses nearshore, with 13 comments.

i.e., "BOEM must consider the cumulative impacts of multiple projects in the region. Modeling, environmental review, and leasing decisions should consider cumulative impacts with these projects starting with this phase."

Radar: Concerns regarding radar interference from wind structures, with 10 comments.

i.e., "Marine radar used in the U.S. will no longer be functional within a windmill because of multiple false targets, and/or masking. The Department of Energy catalogued these issues in their 2020 webinar series.[15] The U.S. Coast Guard's Search and Rescue Operations (SAR-OPS) modeling that exists will no longer be effective because the HF Coastal Oceans Dynamic Applications Radar (CODAR) radar used in the model will no longer be functional."

Whale Entanglement: Concerns about whales becoming entangled in floating infrastructure, with nine comments.

i.e., "The commercial crab fishery is being forced to comply with very restrictive gear regulations. The layout of the OSW farms are far more of a threat to whales than crab pots ever were."

Infrastructure Hazards: Concerns regarding all operational safety related to all floating infrastructure, with eight comments.

i.e., "Development beyond the shelf break will be problematic if a myriad of export cables start coming over the shelf edge. These will not be able to be buried, either from a practical standpoint not to mention the fact that they would be laid on top of a deep sea coral protection area. Therefore, we would lose access due to exposed cables carrying thousands of electrical volts."

Fisheries Survey: Concerns relating to floating infrastructure disrupting scientific surveys that influence fisheries management, with seven comments.

i.e., "As the wind farm footprint and attached cable routes will likely constitute a navigational obstruction and no/reduced fishing zone, these projects may well create serious data consistency problems for scientists charged with developing necessary stock assessments."

Electro-Magnetic Fields (EMF)/Vibration: Concerns around EMF/vibration emitted from infrastructures and impacting the marine environment, with seven comments.

i.e., "The fishing industry stakeholders remain concerned about the potential impacts of electromagnetic fields (EMF) generated by these cables on fishery species, which is an area of ongoing scientific study."

Uniform Spacing: Concerns over consistent grid layouts and spacing, with six comments.

i.e., "In general, we supports requirements for shared transmission infrastructure, consistent spacing and orientation of turbines and transit lanes, and a standard mooring configuration across lease sites, since continuity and conformity will make it easier for existing ocean users to navigate turbine installations."

Physical Processes: Concerns about all physical processes except upwelling, including circulation, stratification, cold pool, inland weather, etc., with four comments.

i.e.. “Further analysis must be conducted to understand the hydrodynamic effects of buildout along the shelf, to the naturally occurring cold and warm core rings, and consequential impacts to productivity and larval dispersal. Recently, a new study[16] found that offshore wind projects in the North Sea are strongly influencing flow and stratification of the water column and primary production. Significant shifts to ecosystem function should not be taken lightly and must be further investigated to understand what potential irreparable changes we may be making to our highly productive marine environments.”

Inter-Array Cable Depth: Concerns focused on the need to determine cable depths to ensure consistency for a wind farm grid and for fishermen with specific gear, with four comments.

i.e., “BOEM should also establish minimum depth requirements for dynamic cable designs (i.e., inter-array cables) throughout the project footprint.”

Underwater Noise: Concerns regarding underwater noise impacting the marine environment, with three comments.

i.e., “The extra noise generated by OSW turbines and their associated vessel traffic may lead to cumulative noise impacts on marine mammals in these areas, negatively affecting their behavior and feeding patterns.”

North Atlantic Right Whale: Concerns with any interaction or impact with North Atlantic Right Whales, with three comments.

i.e., “We are particularly concerned with the impact of offshore wind on endangered North Atlantic right whales. Any negative impacts on this species will result in direct regulatory impacts on Maine’s lobster fishery.”

Deepsea Corals: Concerns with deepsea corals being disturbed by wind infrastructure, with two comments.

i.e., “we caution about development along the shelf break and encourage New York State to limit the scope of Zones 2 and 3 to exclude areas encompassed within the Frank R. Lautenberg Deepsea Coral Protection Area and the Georges Bank Coral Protection Area, an area identified for protection through a transparent and extensive stakeholder-driven process led by the Mid-Atlantic Fishery Management Council.”

<u>Larval Transport</u>: Concerns about wind infrastructure disturbing larval transport, with 1 comment.

i.e., "The Chen et al. (2020) study[17] overall findings would indicate that impacts in the New York Bight should be expected to have similar effects on the aggregation and advection of scallop larvae. Maps from this study show that larval flows are affected over an area wider than the five-mile buffer sought. Notably, BOEM itself has acknowledged the effects of wind turbine arrays on hydrodynamics and ocean current patterns, as well as the resulting impacts on scallop larval dispersion and settlement."[18]

4 Input and Feedback from Office Hours

Tetra Tech provided the information from sections 1.0–3.0 during each of the four office hours sessions to members of the fishing community that chose to attend. Open discussions were held to determine if these 18 concern themes aligned with local Northeast or mid-Atlantic fishing industry concerns, if there were any priority concerns, and if there were any additional/replacement themes to consider; that input was captured in Table 2.

5 Knowledge Gaps and Future Studies

Fishing industry input from the four office hours identified knowledge gaps and potential future studies that NYSERDA, BOEM, or other entities could focus on to improve understanding of the AoA and enhance and improve future planning efforts., these include:

- The increasing need to assess and fully understand the cumulative effects of existing OSW leases.
- Lack of knowledge and studies of the benthic habitat in Zone 3.
- Unknown potential impacts of OSW development to oceanographic processes.
- Understand how a potential disruption to oceanographic/hydrodynamic systems, oxygen depletion, and larval transport could impact fisheries.
- Determine the minimum distance between floating OSW turbines, to decrease the potential excluded footprint.
- Need for a cost-benefit study for the overall economics of developing OSW in the AoA.

Table 2. Input received from fishermen during the four "office hour" sessions

Office Hours no.1 (3 attendees)	Office Hours no. 2 (8 attendees)	Office Hours no. 3 (14 attendees)	Office Hours no. 4 (12 attendees)
• All prior comments are important, no ranking suggested. • Review NOAA Proposed Hudson Canyon Sanctuary comments. • Concern with potential impacts across multiple oceanographic processes and their effects elsewhere. • The process of evaluating further areas for OSW is moving too quickly, as the impacts of currently leased projects has not yet occurred. • Add comments from the scallop industry from the New York Bight OSW development process. • Larval transport to be added to concern themes, with consideration of two studies[a,b] that modeled impacts on larval transport. • The inter-array cables will effectively prevent trawling and similar types of fishing activity and bottom surveys. • Themes from NYB comments need to be incorporated into the synthesis. • The cumulative impacts of OSW that are not captured by the comment synthesis and area exclusion (to fishing) could have extreme impacts on the scallop industry. • Floating will be a different 3D footprint in the water column than fixed. • Economic drivers need to be considered, especially the potential liability risks vessels may face when operating near OSW developments. • Importance of Hudson Canyon for fishing interests, advocated against any efforts to restrict fishing in this area. • Need to include fishing families and communities in these groups in the discussions about OSW development. • Make information and data more accessible by providing a map file that	• Highlighted concerns represent those of highest interest, especially exclusion of fisheries, upwelling, and oceanic processes. Many of the concern themes are interrelated. • It is essential to understand the ways in which the potential deepwater OSW infrastructure could exclude fisheries from operating in and around areas of development. • Which platform designs and inter-array cable depths are most commonly used or preferred in other floating OSW installations? • How will areas of deepwater coral habitats be included in the assessment, specifically will they be off-limits for development and mooring? • Importance of Zone 1 considerations for scallop fishing interests. Include the Fisheries Survival Fund (FSF) letters for the MA RFI and RI/MA Environmental Assessment that influenced the communication of information to remove scallop areas from the MA-RI WEAs. • Scallop fishing is heavily area dependent and could be severely impacted by area exclusions. Scallop grounds in Zone 1 that have previously been ruled out by BOEM in past conversations are now a part of the identified AoA. Scallop grounds are increasingly found at deeper depths than previously thought. There are concerns about impacts on scallop fishing within Zone 2 as well. The scallop fishing industry has also encountered more clapper scallops recently, which should be explored further. • The type of mooring system used by deepwater OSW could influence constraints with fishing interests (e.g., potential to prevent trawling or bottom dredging). • Mid-Atlantic groups seem to be underrepresented in those that have provided comments during the comment periods.	• Request to assess floating OSW options with turbines sited as close as possible, to minimize the exclusion areas for fisheries (potential consideration for future work product?). • Considerable commercial pelagic longline fishing in Zone 2 and Zone 3 determined by oceanic processes. Need distinction between bottom longline and pelagic longline interests. Anything outside of 100 fathoms in depth is a potential area where pelagic longline gear is used. • General agreement with NMFS concerns that there is a lack of knowledge and studies around the benthic habitats in Zone 3. • Did NMFS have concerns about cumulative impacts on species from already existing leases? Underwater noise is under-emphasized in the comment synthesis. • Distinction between navigational safety for non-fishing vessels and active fishing vessels. Once a vessel deploys its fishing gear, it does not have the same operational capabilities as other non-active fishing vessels, this is an important distinction to understand when discussing navigation around OSW developments. • Concerns with prioritizing the different comment themes against each other and ranking them. The primary concern should be the cumulative impacts of OSW development. • The greatest area of concern are the impacts on fishing in Zone 1. • Number of turbines required to meet 9 gigawatts depends on technology and size. • New York State is working with 11 other states, developers, and interest groups	• Ensure NYSERDA's contractors are coordinating on inputs from these office hour sessions, for incorporation into the Fish/Fisheries Study. The Draft Fish and Fisheries Study suggests fishing will return to areas of deepwater OSW after development is complete, which is difficult to believe given the nature of floating wind technology. • Ensure that the Fish/Fisheries Study contractor is utilizing all appropriate data sources, particularly for scallop surveys (e.g., NEFSC Scallop Dredge Survey, Virginia Institute of Marine Science (VIMS) Dredge Survey, University of Massachusetts Dartmouth School of Marine Science & Technology [SMAST] drop camera survey, and Habitat Camera [HABCAM] survey). • The only survey that is consistently surveying Zone 1 and parts of Zone 2 is the VIMS survey, which covers the entirety of the Mid-Atlantic. • Concern about cumulative impacts with deepwater AoA and existing lease areas, wind energy areas, and call areas. • Stakeholders agreed that an estimated $1.2 billion loss over 10 years is an underestimate of impact on the fishing industry. • Concern that deepwater wind technologies and associated cables/chains across the water column will entirely preclude any mobile gear from fishing within a floating wind farm. • During NYSERDA's original Master Planning effort, the goal was least risk (to fishermen) and greatest opportunity (for wind development); concern that this new planning effort does not have that same approach in mind. • Concern about stakeholder burnout from all of the engagement efforts, with little avoidance of impacts to show for that effort. • Need to consider disruption to oceanographic/hydrodynamic systems, oxygen depletion, and larval transport and how that might impact fisheries. • Need a cost-benefit study for the overall economics of developing the AoA. • Need to consider the potential for whale entanglement (primary and secondary). • Compensatory mitigation will be a necessary part of developing the AoA, if mobile gear types are precluded from fishing – potentially up to entire boat/permit buybacks if necessary. • Concern about New York State leading the charge for potential development of the AoA, located in federal waters. Why is New York State not considering development in State waters? • Longline fishing is important within Zone 3 significant interests in the AoA; needs additional consideration. NYSERDA needs to continue to focus on longline comments. • The eastern boundary of the map is fished much deeper than the area south of Long Island. Scallop fishery gets very deep, the further east you go. • Zone 1 is important to the scallop fishery. Most scallops are harvested to 37-38 fathoms, but scallop populations that contribute to the spawning biomass can be found to 50 fathoms or deeper. Consider development that is deeper than where scallops are encountered. Scallops can be found out to deeper depths towards the eastern edge of the AoA, and it is possible that the range that scallops are found may move due to future oceanographic changes.

Office Hours no.1 (3 attendees)	Office Hours no. 2 (8 attendees)	Office Hours no. 3 (14 attendees)	Office Hours no. 4 (12 attendees)
shows the geographic range of the AoA and providing data in fathoms and miles.	• Considerable interest in the potential to install cell receivers on OSW infrastructure to extend cell service at sea. • Continued concerns with radar interference, navigation issues, and collision with platforms. • The type of mooring system used by deepwater OSW could heavily influence the level of support from recreational fishing interests. Long line fishing industry has considerable concerns about deepwater OSW development. The Bluewater Fishermen's Association should be contacted for additional information. • Importance of studying oceanographic processes and the potential impacts to these processes from OSW development. • Concern that floating platforms would effectively prevent bottom dredging fishing near arrays, making the location of facilities important for fishing interests, especially those that are area dependent. • Concerns that NYS is considering development in federal waters to meet state clean energy goals and is not adequately or seriously considering near shore developments that would have significantly less impacts on commercial fisheries. • Did NMFS provide feedback about the impact on fisheries in addition to their other concerns? • Concerns with impacts of deepwater OSW development on the upwelling process. The placement of OSW platforms on or near ocean canyon areas could have significant impacts on this process, and on fishery health. • The Transit Lane Workshop associated with the New England OSW developments was not sufficient and it should not be emulated. • The final boundary of the proposed Hudson Canyon Sanctuary will have great impact on areas that are available for OSW development. It will be challenging to get	to develop a regional compensation framework across the region for compensation that accounts for losses associated with OSW. NYSERDA is the signing party for OSW contracts.	• What are the potential distances between floating wind platforms? • Concern that process is moving too fast, without seriously considering input from the fishing industry. The international examples of OSW are all near-shore developments. It is uncertain what the net impacts of near-shore development are without considering what the net impacts of both near-shore and deepwater developments will be. Deepwater OSW might not be developed for several years, along with the dynamic changes in ocean conditions, fisheries may shift, further complicating the situation. • Many fisheries that could provide relief to the fishing industry, as environmental changes unfold, are not included on the list of fisheries in the AoA. Zone 3 has tuna, triggerfish, and mahi-mahi, which could all provide relief to fishing interests looking for other resources to harvest. • Several fisheries in Zone 3 could provide relief to scallop fleet/other fisheries if ocean changes push them to change behavior. • Radical shifts are occurring in water temperature and currents. The historical data for where fisheries occur are not sufficient for understanding where they might move to in the future, and what strategies will have to shift to accommodate these changes. • It is fundamentally important to have a program that provides resilience to the fishing industry given the many uncertainties identified. The funding for resilience programs for the fishing industry should be put in place as soon as possible. • The mitigation amounts being discussed are far too low. If something reduces scallop harvesting by 50% in a year, that's roughly a $100 million loss. The development of resilient fisheries should be a focus. • Future habitat suitability should be considered, but there is a need to look at everything and consider worst case scenarios. Floating wind will preclude mobile gear use within the array. We are unsure if any fisheries would be able to work within a floating array. There is a need to preserve the areas that are necessary for the fisheries to operate. • The goal of the Master Plan was to identify areas with least risk and greatest opportunity, it seemed the fishing industry input was not seriously considered. Now the industry is being asked for more input on potential developments in a massive geographic area. Why is the NOAA sanctuary included in the AoA? • None of the AoA is within NYS waters, and NYS has no claim on federal waters. Continuing to solicit input from the fishing industry, only to ignore it, creates significant anger with stakeholders, and it is getting tiresome hearing about more studies, work products, research initiatives, etc. when feedback doesn't seem to be seriously considered. NYS needs to make concrete statements about how it plans to avoid impacts on fisheries and vessels that are permitted to fish in federal waters. • Any development in Zone 3 will require transmission cables that cross the continental shelf break in Zone 2. Due to the nature of the shelf, especially the strong currents, export cables would not likely be buried effectively precluding fishing activities in these areas. This will have especially pronounced impacts on fisheries that are constrained to the shelf edge, such as Illex squid. If anchors or cables disrupt the water conditions in these areas, the fishery could suffer significant disruptions. The ecosystems and hydrology of the area are incredibly dynamic, and it is unpredictable what will happen if the developments alter the oceanographic processes, but the impacts could be catastrophic.

Office Hours no.1 (3 attendees)	Office Hours no. 2 (8 attendees)	Office Hours no. 3 (14 attendees)	Office Hours no. 4 (12 attendees)
	energy from deepwater OSW back to shore around areas of exclusion.		• What are the costs of power from deepwater OSW? Are there cost-benefit studies being conducted? Given that this is unproven technology, does it make financial sense to consider these developments? • It seems that whale entanglement wouldn't be as acute a concern as habitat disruption, noise pollution, etc. • One stakeholder expressed interest in providing comments to the Fish and Fisheries Study that will highlight studies about larval transport. • Is there consideration for a NYS sponsored buyout option/financial impact mitigation. If NYS is going to, by design, enact policies that restrict or eliminate business, there should be serious discussions about financial compensation. • Consider the addition of oxygen depletion to the list of issues being evaluated. Impacts on larval transport, sargassum movement, fish congregation, predation, and underwater noise could be caused by deepwater OSW development and are all important to consider. Oxygen depletion has been observed in the North Sea, and it seems to be related to the development of OSW, although the mechanism is currently unknown. The oceanographic processes being discussed are incredibly dynamic and difficult to understand, and the impacts of development are very uncertain. • Why is NYS not pursing OSW in State waters as it could be done quicker and with less political opposition. The export cables would also be shorter and there would be less impact on deepwater fisheries. The examples of OSW in Europe are mostly near-shore developments. • Viewsheds are not protected by federal law and shouldn't be given more weight than fishing industry interests. Federally permitted vessels from other states should not be impacted by NYS developments. • NYS needs to consider the net impacts of all policies that impact fishing interests. Electricity prices, fossil fuel prices, and exclusion of fisheries due to OSW development need to be considered together when trying to understand how to build resilience for the fishing industry. The situation is incredibly dynamic, changes are coming fast, and it seems that no one is really considering the long-term implications of all of these policies and environmental changes on the fishing industry. Are there attempts to solicit input from fishing interests in other states? Additional Recommendations from F-TWG Meeting on September 22, 2023: • General agreement from F-TWG with comments/input raised during Office Hours sessions. • Acknowledge and Incorporate calculations of cumulative space occupancy by OSW, as coastal state/federal clean energy goals increase. Acreage of ocean continues to become taken up by OSW leases, which are effectively lost by the fishing industry. • Discussion and further understanding of how percentage of fisheries exposure impacts the actual small profit margins of fishing vessels, with understanding how this may cumulatively affect the industry.

[a] Chen, C., L. Zhao, P. He, R.C. Beardsley, and K. Stokesbury. 2020. Assessing Potential Impacts of Offshore Wind Facilities on Regional Sea Scallop Laval and Early Juvenile Transports. Report for 2020 Scallop RSA Share Day. NOAA Grant No. NA19NMF450023. Available at: https://s3.amazonaws.com/nefmc.org/16.a-UMASSD_WHOI_short_report_05-19_2020_revision.pdf .

[b] https://www.boem.gov/sites/default/files/environmental-stewardship/Environmental-Studies/Atlantic/Atlantic-Studies-Plan/AT-19-04.pdf.

[c] Input and recommendations received during the F-TWG meeting on September 22, 2023.

Endnotes

[1] New York State Energy Research and Development Authority (NYSERDA). 2025. "Offshore Wind Planning in the New York Bight: Deepwater Wind–Technical Concepts Study," NYSERDA Report Number 25-11. Prepared by Tetra Tech, Boston, MA. nyserda.ny.gov/publications

[2] Visit https://www.nyserda.ny.gov/All-Programs/Offshore-Wind/About-Offshore-Wind/Master-Plan for all content relevant to the Offshore Wind Master Plan.

[3] The Responsible Offshore Wind Development Alliance Research Priorities of 2022. https://rodafisheries.org/wp-content/uploads/2021/12/RODA-Research-Priorities_vDec1-1.pdf

[4] Impact fees for commercial fishing from offshore wind development as considerations for a national framework. https://rodafisheries.org/wp-content/uploads/2021/12/RODA-Impact-Fees-Report_Dec21.pdf

[5] Notice of intent to conduct scoping and to prepare a draft environmental impact statement for the proposed Hudson Canyon National Marine Sanctuary. https://www.regulations.gov/docket/NOAA-NOS-2022-0053 regards a

[6] For information and nominations for the New York Bight, visit https://www.regulations.gov/docket/BOEM-2018-0004/comments?pageNumber=6

[7] Atlantic Wind Lease Sale 8 for commercial leasing for wind power on the Outer Continental Shelf in the New York Bight. https://www.regulations.gov/document/BOEM-2021-0033-0001/comment?pageNumber=6

[8] Requests for interest for commercial leasing for wind power on Outer Continental Shelf Offshore Massachusetts. https://www.regulations.gov/document/BOEM-2010-0063-0001

[9] Commercial wind lease issuance and site assessment activities on the Atlantic Outer Continental Shelf: Offshore Rhode Island and Massachusetts. https://www.regulations.gov/document/BOEM-2012-0048-0001/comment?filter=fisheries%20sur

[10] Request for information: commercial leasing for wind power development on the Gulf of Maine Outer Continental Shelf; request for nominations. https://www.regulations.gov/document/BOEM-2023-0025-0001

[11] Notice for comment on Central Atlantic Draft Wind Energy Areas. https://www.regulations.gov/docket/BOEM-2022-0072/comments

[12] Notice for comment on Central Atlantic Draft Wind Energy Areas. https://www.regulations.gov/docket/BOEM-2018-0045

[13] Pacific Wind lease sale for commercial leasing for wind power on the Outer Continental Shelf in California as a proposed sale notice. https://www.regulations.gov/docket/BOEM-2022-0017/comments?pageNumber=4

[14] Request for information and nominations: commercial leasing for wind energy development on the Outer Continental Shelf Offshore Oregon. https://www.regulations.gov/document/BOEM-2022-0009-0001

[15] Offshore Wind Turbine Radar Interference Mitigation webinar presentations. https://www.energy.gov/eere/wind/articles/offshore-wind-turbine-radar-interference-mitigation-wtrim-webinar-presentations

[16] Offshore wind farms research supporting projection to impact primary production and bottom water deoxygenation in the North Sea. https://www.nature.com/articles/s43247-022-00625-0

[17] The assessment of potential impacts of offshore wind facilities on regional Sea Scallop laval and early juvenile transports. https://tethys.pnnl.gov/sites/default/files/publications/Assessing_potential_impacts_offshore_wind_sea_scallop_laval_juvenile_transports.pdf

[18] Hydrodynamic modeling, particle tracking and agent-based modeling of larvae in the Mid-Atlantic Bight.https://tethys.pnnl.gov/sites/default/files/publications/BOEM_2021-049.pdf

Appendix B. List of Data Sources

The data sources consulted for this study are presented in Table B-1 below.

Table B-1. Data Sources Analyzed for the Fish and Fisheries Data Aggregation Study

Fish and Fisheries Data Sources			
Attribute	**Citation**	**Source Link**	**How/Why Used**
Essential Fish Habitat	National Oceanic and Atmospheric Administration (NOAA). 2023b. "Essential Fish Habitat – Data Directory," NOAA Fisheries. National Oceanic and Atmospheric Administration.	https://www.habitat.noaa.gov/application/efhinventory/index.html	Atlantic Highly Migratory Species EFH map; Mid-Atlantic and New England EFH map; Habitat Areas of Particular Concern (HAPC).
Canyons and Seamounts	National Oceanic and Atmospheric Administration (NOAA). 2023i. "Northeast Canyons and Seamounts Marine National Monument," National Oceanic and Atmospheric Administration.	https://www.fisheries.noaa.gov/new-england-mid-atlantic/habitat-conservation/northeast-canyons-and-seamounts-marine-national	Northeast Canyons and Seamounts National Monument map; sensitive habitat.
Hudson Canyon	National Oceanic and Atmospheric Administration (NOAA). 2023h. "Proposed Designation of Hudson Canyon National Marine Sanctuary," National Oceanic and Atmospheric Administration.	https://sanctuaries.noaa.gov/hudson-canyon/	Proposed Hudson Canyon Marine Sanctuary map; sensitive habitat.
Threatened and Endangered Species	National Oceanic and Atmospheric Administration (NOAA). 2023c. "The Greater Atlantic Region ESA Section 7 mapper," NOAA Fisheries. National Oceanic and Atmospheric Administration.	https://www.fisheries.noaa.gov/resource/map/greater-atlantic-region-esa-section-7-mapper	ESA-listed species and Critical Habitat - Greater Atlantic Region Section 7 map
Atlantic Sea Scallop Management Areas	National Oceanic and Atmospheric Administration (NOAA). 2018. "Sea Scallop Rotational Areas," National Oceanic and Atmospheric Administration, Greater Atlantic Regional Fisheries Office.	https://www.arcgis.com/home/item.html?id=2cd9626219624c47a7a938980d0834a2	Identify scallop management areas.
NOAA Fishing Footprint Data (Commercial)	National Oceanic and Atmospheric Administration (NOAA). 2023f. "Descriptions of Selected Fishery Landings and Estimates of Vessel Revenue from Areas: A Planning-Level Assessment," National Oceanic and Atmospheric Administration, Department of Commerce.	Refer to Appendix D.	Identify commercial fisheries that will be most impacted by OSW; recommended by Fisheries PAC.

Table B-1 continued

Fish and Fisheries Data Sources			
Attribute	**Citation**	**Source Link**	**How/Why Used**
NOAA Fishing Footprint Data (Recreational)	National Oceanic and Atmospheric Administration (NOAA). 2023g. "Descriptions of Selected Fishery Landings and Estimates of Recreational Party and Charter Vessel Revenue from Areas: A Planning-Level Assessment," National Oceanic and Atmospheric Administration, Department of Commerce.	Refer to Appendix D.	Identify recreational fisheries that will be most impacted by OSW; recommended by Fisheries PAC.
NOAA Fisheries Observer Data	National Oceanic and Atmospheric Administration (NOAA). 2023ze. 'Northeast Fisheries Observer Data", NOAA Fisheries. National Oceanic and Atmospheric Administration.	Confidential; available upon request to NOAA.	Identify commercial fishing locations and targeted species; recommended by Fisheries PAC.
Recreational Fisheries	New Jersey Department of Environmental Protection (NJDEP). 2022. "Prime Fishing Grounds of New Jersey," New Jersey Department of Environmental Protection Bureau of GIS.	Prime Fishing Grounds of New Jersey | Prime Fishing Grounds of New Jersey | NJDEP Open Data (arcgis.com)	Identify popular recreational fishing locations.
NOAA NEFSC Spring Bottom Trawl Survey	Northeast Fisheries Science Center (NEFSC). 2023a. "Spring Bottom Trawl Survey Data," NOAA National Centers for Environmental Information	https://www.fisheries.noaa.gov/inport/item/22561	Demersal species biomass; pelagic forage species biomass; Multispecies Fishery biomass; Small Multispecies/Whiting Fishery biomass; tilefish biomass; deep-sea red crab biomass; recommended by Fisheries PAC.
NOAA NEFSC Fall Bottom Trawl Survey	Northeast Fisheries Science Center (NEFSC). 2023b. "Fall Bottom Trawl Survey Data," NOAA National Centers for Environmental Information	https://www.fisheries.noaa.gov/inport/item/22560	Demersal species biomass; pelagic forage species biomass; Multispecies Fishery biomass; Small Multispecies/Whiting Fishery biomass; tilefish biomass; deep-sea red crab biomass; recommended by Fisheries PAC.
NEFSC Sea Scallop Survey	Northeast Fisheries Science Center (NEFSC). 2023d. "Atlantic Sea Scallop Survey Data," NOAA National Centers for Environmental Information	https://www.fisheries.noaa.gov/inport/item/22564	Atlantic sea scallop biomass data; recommended by Fisheries PAC.

Table B-1 continued

Fish and Fisheries Data Sources			
Attribute	**Citation**	**Source Link**	**How/Why Used**
NEFSC Atlantic Surfclam and Ocean Quahog Survey	Northeast Fisheries Science Center (NEFSC). 2023c. "Atlantic Surfclam and Ocean Quahog Survey Data," NOAA National Centers for Environmental Information	https://www.fisheries.noaa.gov/inport/item/22565	Atlantic surfclam and Ocean Quahog biomass data; recommended by Fisheries PAC
Commercial Fishing Vessels (AIS) Data	United States Coast Guard (USCG). 2023. "Automatic Identification System (AIS) data, 2018 – 2022," Navigation Center, United States Coast Guard, U.S. Department of Homeland Security.	Available upon request at: https://www.navcen.uscg.gov/automatic-identification-system-overview	Commercial/recreational species summary, Spring and fall biomass map (past 10 years)
Vessel Monitoring System (VMS) Data	National Oceanic and Atmospheric Administration (NOAA). 2023zf. 'Vessel Monitoring System (VMS) Data", NOAA Fisheries. National Oceanic and Atmospheric Administration.	Available upon request from NOAA.	AoA usage by fishing vessels.

Appendix C. Master List of Fish Species

The representative species of the AoA from the NEFSC Spring and Fall Bottom Trawl Surveys are presented in Table C-1 below. Note: the NEFSC Spring and Fall Bottom Trawl Surveys do not survey Zone 3 of the AoA.

Table C-1. Data Sources Analyzed for the Fish and Fisheries Data Aggregation Study

NEFSC Combined Spring and Fall Bottom Trawl Species (2013 – 2022)					
Common Name	**Scientific Name**	**Zone1 Catch (number of fish)**	**Zone 2 Catch (number of fish)**	**Total Catch (number of fish)**	**% Total Catch**
longfin squid	*Loligo pealeii*	444,219	204,253	648,472	27.23%
butterfish	*Peprilus triacanthus*	408,722	166,866	575,588	24.17%
sea scallop	*Placopecten magellanicus*	223,628	37	223,665	9.39%
spiny dogfish	*Squalus acanthias*	81,361	66,025	147,386	6.19%
haddock	*Melanogrammus aeglefinus*	43,185	80,467	123,652	5.19%
northern searobin	*Prionotus carolinus*	95,788	890	96,678	4.06%
scup	*Stenotomus chrysops*	74,679	12,763	87,442	3.67%
Gulf stream flounder	*Citharichthys arctifrons*	65,756	17,958	83,714	3.52%
silver hake	*Merluccius bilinearis*	50,560	16,927	67,487	2.83%
spotted hake	*Urophycis regia*	33,233	12,855	46,088	1.94%
northern shortfin squid	*Illex illecebrosus*	12,763	21,650	34,413	1.45%
Atlantic mackerel	*Scomber scombrus*	26,699	136	26,835	1.13%
fourspot flounder	*Hippoglossina oblonga*	16,819	9,141	25,960	1.09%
little skate	*Leucoraja erinacea*	24,428	175	24,603	1.03%
red hake	*Urophycis chuss*	17,172	5,547	22,719	0.95%
Atlantic herring	*Clupea harengus*	19,687	8	19,695	0.83%
black sea bass	*Centropristis striata*	11,521	235	11,756	0.49%
lanternfish	*Myctophidae*	205	10,816	11,021	0.46%
fawn cusk-eel	*Lepophidium profundorum*	6,441	4,029	10,470	0.44%
blackbelly rosefish	*Helicolenus dactylopterus*	105	7,898	8,003	0.34%
bristled longbeak	*Dichelopandalus leptocerus*	6,446	901	7,347	0.31%
northern sand lance	*Ammodytes dubius*	6,142	13	6,155	0.26%
shortnose greeneye	*Chlorophthalmus agassizi*	19	5,960	5,979	0.25%
chain dogfish	*Scyliorhinus retifer*	1,334	4,519	5,853	0.25%
goosefish	*Lophius americanus*	4,039	1,759	5,798	0.24%

Table C-1 continued

NEFSC Combined Spring and Fall Bottom Trawl Species (2013 – 2022)					
Common Name	Scientific Name	Zone1 Catch (number of fish)	Zone 2 Catch (number of fish)	Total Catch (number of fish)	% Total Catch
beardfish	*Polymixia lowei*	79	5,650	5,729	0.24%
winter skate	*Leucoraja ocellata*	4,643	325	4,968	0.21%
summer flounder	*Paralichthys dentatus*	2,866	410	3,276	0.14%
offshore hake	*Merluccius albidus*	166	2,986	3,152	0.13%
barndoor skate	*Dipturus laevis*	1,403	1,149	2,552	0.11%
alewife	*Alosa pseudoharengus*	2,368	63	2,431	0.10%
rosette skate	*Leucoraja garmani*	958	1,417	2,375	0.10%
striped searobin	*Prionotus evolans*	2,318	12	2,330	0.10%
scopionfishes/rockfishes	Scorpaenidae	210	1,865	2,075	0.09%
deepbody boarfish	*Antigonia capros*	978	927	1,905	0.08%
longspine snipefish	*Macroramphosus scolopax*	173	1,688	1,861	0.08%
American lobster	*Homarus americanus*	274	1,198	1,472	0.06%
American shad	*Alosa sapidissima*	1,270	128	1,398	0.06%
witch flounder	*Glyptocephalus cynoglossus*	153	1,093	1,246	0.05%
buckler dory	*Zenopsis conchifera*	80	1,135	1,215	0.05%
blueback herring	*Alosa aestivalis*	1,164	-	1,164	0.05%
smooth dogfish	*Mustelus canis*	326	653	979	0.04%
windowpane	*Scophthalmus aquosus*	973	2	975	0.04%
Atlantic rock crab	*Cancer irroratus*	714	97	811	0.03%
longhorn sculpin	*Myoxocephalus octodecemspinosus*	794	-	794	0.03%
ocean pout	*Zoarces americanus*	725	2	727	0.03%
round herring	*Etrumeus teres*	680	-	680	0.03%
Weitzmans pearlsides	*Maurolicus weitzmani*	121	473	594	0.02%
pink glass shrimp	*Pasiphaea multidentata*	6	565	571	0.02%
conger eels	Congridae	328	237	565	0.02%
Jonah crab	*Cancer borealis*	359	172	531	0.02%
tonguefishes	Symphurus	11	516	527	0.02%
bobtail squids/squids	Sepiolidae	393	121	514	0.02%
squat lobsters	Galatheidae	223	236	459	0.02%
longspine scorpionfish	*Pontinus longispinis*	12	383	395	0.02%
hakes	Merluccius	-	393	393	0.02%
silver rag	*Ariomma bondi*	220	122	342	0.01%
deepwater flounder	*Monolene sessilicauda*	1	325	326	0.01%

Table C-1 continued

NEFSC Combined Spring and Fall Bottom Trawl Species (2013 – 2022)					
Common Name	**Scientific Name**	**Zone1 Catch (number of fish)**	**Zone 2 Catch (number of fish)**	**Total Catch (number of fish)**	**% Total Catch**
grenadiers	Macrouridae	13	300	313	0.01%
true shrimps	Caridea	178	130	308	0.01%
chub mackerel	*Scomber japonicus*	13	250	263	0.01%
armored searobin	*Peristedion miniatum*	10	236	246	0.01%
streamer bass	*Hemanthias aureorubens*	-	237	237	0.01%
royal red shrimp	*Pleoticus robustus*	19	208	227	0.01%
yellowtail flounder	*Limanda ferruginea*	223	2	225	0.01%
longfin hake	*Phycis chesteri*	-	213	213	0.01%
greeneyes	Chlorophthalmus	-	198	198	0.01%
winter flounder	*Pseudopleuronectes americanus*	184	-	184	0.01%
bluefish	*Pomatomus saltatrix*	119	62	181	0.01%
deep-sea red crab	*Chaceon quinquedens*	-	174	174	0.01%
striated argentine	*Argentina striata*	4	142	146	0.01%
weakfish	*Cynoscion regalis*	103	2	105	0.00%
groupers/sea basses	Serranidae	27	75	102	0.00%
tilefish	*Lopholatilus chamaeleonticeps*	71	29	100	0.00%
gladiator box crab	*Acanthocarpus alexandri*	36	60	96	0.00%
sevenspine bay shrimp	*Crangon septemspinosa*	94	-	94	0.00%
blue runner	*Caranx crysos*	20	71	91	0.00%
white hake	*Urophycis tenuis*	48	37	85	0.00%
fourbeard rockling	*Enchelyopus cimbrius*	10	71	81	0.00%
sea raven	*Hemitripterus americanus*	77	1	78	0.00%
Atlantic moonfish	*Selene setapinnis*	51	18	69	0.00%
mantis shrimp	Stomatopoda	48	21	69	0.00%
flounders	Etropus	55	13	68	0.00%
hatchetfishes	Sternoptychidae	-	64	64	0.00%
yellowfin bass	*Anthias nicholsi*	2	59	61	0.00%
rough scad	*Trachurus lathami*	51	5	56	0.00%
longnose greeneye	*Parasudis truculenta*	-	55	55	0.00%
conger eel	*Conger oceanicus*	34	18	52	0.00%
bathyal swimming crab	*Bathynectes longispina*	4	46	50	0.00%
bulleye	*Cookeolus japonicus*	48	1	49	0.00%

Table C-1 continued

NEFSC Combined Spring and Fall Bottom Trawl Species (2013 – 2022)					
Common Name	**Scientific Name**	**Zone1 Catch (number of fish)**	**Zone 2 Catch (number of fish)**	**Total Catch (number of fish)**	**% Total Catch**
northern kingfish	*Menticirrhus saxatilis*	40	7	47	0.00%
spoonarm octopus	*Bathypolypus arcticus*	3	39	42	0.00%
flounders/soles	Pleuronectiformes	-	40	40	0.00%
Atlantic argentine	*Argentina silus*	-	40	40	0.00%
Atlantic hagfish	*Myxine glutinosa*	1	37	38	0.00%
Atlantic torpedo	*Torpedo nobiliana*	13	24	37	0.00%
horned whiff	*Citharichthys cornutus*	25	10	35	0.00%
spotfin dragonet	*Foetorepus agassizii*	2	27	29	0.00%
eels	Anguilliformes	21	7	28	0.00%
clearnose skate	*Raja eglanteria*	22	5	27	0.00%
swimming crabs	Portunidae	17	10	27	0.00%
sea lamprey	*Petromyzon marinus*	18	7	25	0.00%
cunner	*Tautogolabrus adspersus*	23	-	23	0.00%
worm eels/snake eels	Ophichthidae	12	11	23	0.00%
Atlantic cod	*Gadus morhua*	21	-	21	0.00%
barracudinas	Paralepididae	-	21	21	0.00%
sanddabs/whiffs	Citharichthys	13	6	19	0.00%
filefishes/triggerfishes	Balistidae	8	11	19	0.00%
ocean quahog	*Arctica islandica*	17	-	17	0.00%
batfishes	Ogcocephalidae	3	13	16	0.00%
blackfin goosefish	*Lophius gastrophysus*	5	10	15	0.00%
Atlantic batfish	*Dibranchus atlanticus*	-	15	15	0.00%
inshore lizardfish	*Synodus foetens*	14	-	14	0.00%
spider crabs	Majidae	6	8	14	0.00%
common octopus	*Octopus vulgaris*	6	8	14	0.00%
spider crabs	Majoidea	6	8	14	0.00%
codlings/deepsea codfishes	Moridae	1	12	13	0.00%
box crabs	Calappidae	6	5	11	0.00%
slender snipe eel	*Nemichthys scolopaceus*	5	6	11	0.00%
Atlantic croaker	*Micropogonias undulatus*	10	-	10	0.00%
pancake batfish	*Halieutichthys aculeatus*	9	1	10	0.00%
pinfish	*Lagodon rhomboides*	8	1	9	0.00%

Table C-1 continued

NEFSC Combined Spring and Fall Bottom Trawl Species (2013 – 2022)					
Common Name	**Scientific Name**	**Zone1 Catch (number of fish)**	**Zone 2 Catch (number of fish)**	**Total Catch (number of fish)**	**% Total Catch**
red dory	*Cyttopsis rosea*	-	9	9	0.00%
rainbowfishes	Labridae	5	3	8	0.00%
southern hake	*Urophycis floridana*	4	4	8	0.00%
bigeye scad	*Selar crumenophthalmus*	1	7	8	0.00%
ribbonfishes/cutlassfishes	Trichiuridae	-	8	8	0.00%
brown driftfish	*Ariomma melanum*	2	5	7	0.00%
gray triggerfish	*Balistes capriscus*	-	7	7	0.00%
western softhead grenadier	*Malacocephalus occidentalis*	-	7	7	0.00%
Atlantic cutlassfish	*Trichiurus lepturus*	6	-	6	0.00%
shortspine boarfish	*Antigonia combatia*	-	6	6	0.00%
lefteyed flounders	Bothidae	4	1	5	0.00%
codlings	Urophycis	2	3	5	0.00%
slender searobin	*Peristedion gracile*	2	3	5	0.00%
octopuses	Octopoda	-	5	5	0.00%
redeye gaper	*Chaunax stigmaeus*	-	5	5	0.00%
roughtail stingray	*Dasyatis centroura*	4	-	4	0.00%
cornetfish	Fistularia	2	2	4	0.00%
blunthead puffer	*Sphoeroides pachygaster*	2	2	4	0.00%
spiny searobin	*Prionotus alatus*	1	3	4	0.00%
arrow squid	*Loligo plei*	-	4	4	0.00%
blackmouthed alfonsin	*Hoplostethus mediterraneus*	-	4	4	0.00%
conejo	*Promethichthys prometheus*	-	4	4	0.00%
longnose grenadier	*Caelorinchus caelorhincus carminatus*	-	4	4	0.00%
northern puffer	*Sphoeroides maculatus*	3	-	3	0.00%
red cornetfish	*Fistularia petimba*	3	-	3	0.00%
bigeye	*Priacanthus arenatus*	2	1	3	0.00%
shrimps/prawns	Penaeus	1	2	3	0.00%
cardinalfishes	Apogonidae	-	3	3	0.00%
dragonfishes	Stomiidae	-	3	3	0.00%
blackmouth bass	*Synagrops bellus*	-	3	3	0.00%
deepwater dab	*Poecilopsetta beanii*	-	3	3	0.00%
shield bobtail	*Stoloteuthis leucoptera*	-	3	3	0.00%

Table C-1 continued

NEFSC Combined Spring and Fall Bottom Trawl Species (2013 – 2022)					
Common Name	**Scientific Name**	**Zone1 Catch (number of fish)**	**Zone 2 Catch (number of fish)**	**Total Catch (number of fish)**	**% Total Catch**
silver hatchetfish	*Argyropelecus aculeatus*	-	3	3	0.00%
Simonys frostfish	*Benthodesmus simonyi*	-	3	3	0.00%
smooth skate	*Malacoraja senta*	-	3	3	0.00%
viperfish	*Chauliodus sloani*	-	3	3	0.00%
pipefishes/seahorses	Syngnathidae	2	-	2	0.00%
margined snake eel	*Ophichthus cruentifer*	2	-	2	0.00%
offshore lizardfish	*Synodus poeyi*	2	-	2	0.00%
shortwing searobin	*Prionotus stearnsi*	2	-	2	0.00%
singlespot frogfish	*Antennarius radiosus*	2	-	2	0.00%
brotulas/cusk eels	Ophidiidae	1	1	2	0.00%
flying gurnard	*Dactylopterus volitans*	1	1	2	0.00%
highfin scorpionfish	*Pontinus rathbuni*	1	1	2	0.00%
planehead filefish	*Stephanolepis hispida*	1	1	2	0.00%
spotted driftfish	*Ariomma regulus*	1	1	2	0.00%
freckled stargazer	*Xenocephalus egregius*	-	2	2	0.00%
northern stargazer	*Astroscopus guttatus*	-	2	2	0.00%
jacks/pompanos	Carangidae	1	-	1	0.00%
stargazers	Uranoscopidae	1	-	1	0.00%
Atlantic bonito	*Sarda sarda*	1	-	1	0.00%
Atlantic halibut	*Hippoglossus hippoglossus*	1	-	1	0.00%
Atlantic saury	*Scomberesox saurus*	1	-	1	0.00%
Atlantic silverside	*Menidia menidia*	1	-	1	0.00%
bigeye soldierfish	*Ostichthys trachypoma*	1	-	1	0.00%
golden deepsea crab	*Chaceon fenneri*	1	-	1	0.00%
lady crab	*Ovalipes ocellatus*	1	-	1	0.00%
loggerhead seaturtle	*Caretta caretta*	1	-	1	0.00%
mackerel scad	*Decapterus macarellus*	1	-	1	0.00%
Norwegian shrimp	*Pontophilus norvegicus*	1	-	1	0.00%
round scad	*Decapterus punctatus*	1	-	1	0.00%
octopuses/squids	Cephalopoda	-	1	1	0.00%
codfishes	Gadidae	-	1	1	0.00%
bristlemouths/lightfishes	Gonostomatidae	-	1	1	0.00%

Table C-1 continued

NEFSC Combined Spring and Fall Bottom Trawl Species (2013 – 2022)					
Common Name	**Scientific Name**	**Zone1 Catch (number of fish)**	**Zone 2 Catch (number of fish)**	**Total Catch (number of fish)**	**% Total Catch**
grunts	Haemulidae	-	1	1	0.00%
albacores/tunas	Scombridae	-	1	1	0.00%
banded rudderfish	*Seriola zonata*	-	1	1	0.00%
goby flathead	*Bembrops gobioides*	-	1	1	0.00%
shortjaw lizardfish	*Saurida normani*	-	1	1	0.00%
baudroies/anglerfishes	Lophiiformes	-	-	-	0.00%
lizardfishes	Synodontidae	-	-	-	0.00%
puffers/blowfishes	Tetraodontidae	-	-	-	0.00%
Totals		**1,701,889**	**679,501**	**2,381,390**	**100.00%**

Appendix D. NOAA Fisheries Footprint Data Reports

D.1 Descriptions of Selected Fishery Landings and Estimates of Vessel Revenue from Areas: A Planning-level Assessment, Zone 1, Commercial Fisheries landings. Prepared By National Marine Fisheries Service

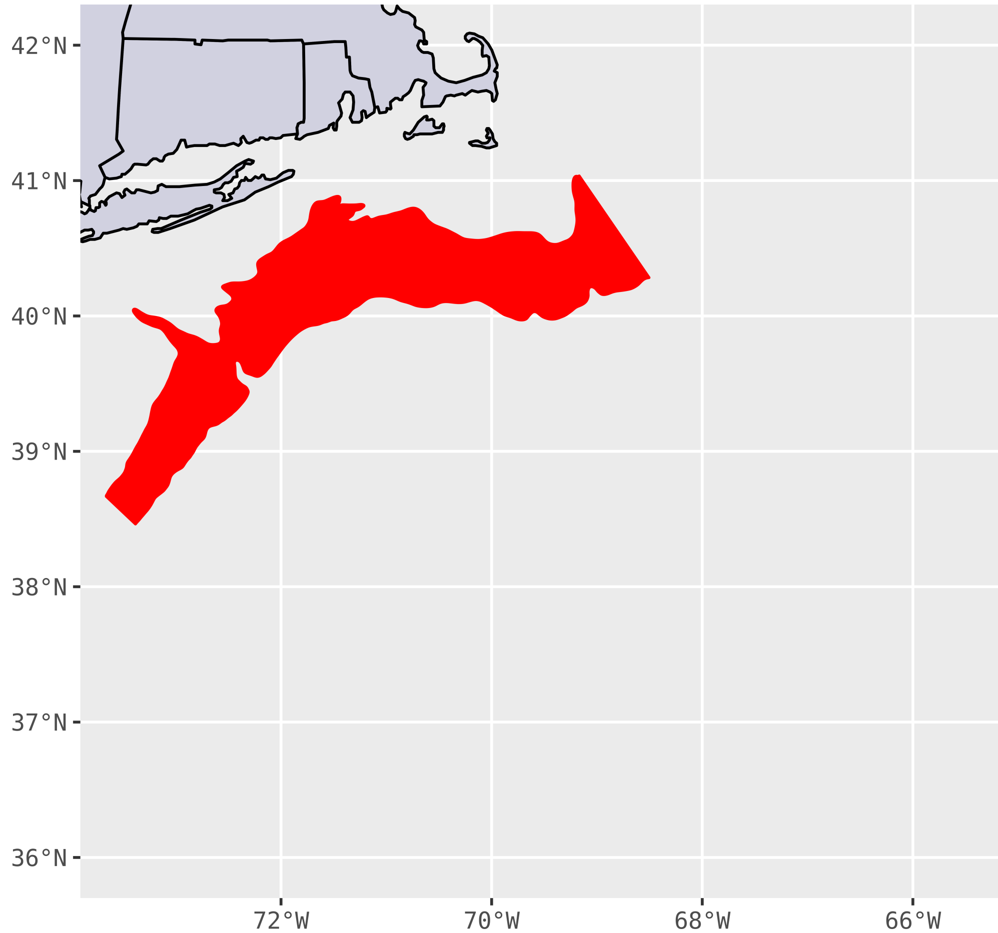
Back (https://www.fisheries.noaa.gov/resource/data/socioeconomic-impacts-atlantic-offshore-wind-development)

Descriptions of Selected Fishery Landings and Estimates of Vessel Revenue from Areas: A Planning-level Assessment

Prepared by:
National Marine Fisheries Service

October 04, 2023

Zone 1



Data sources:
Commercial Fisheries landings data, Vessel Trip Reports, and Surfclam/OceanQuahog Logbooks

In order to meet requirements of maintaining data confidentiality, these strata are presented individually. In addition, records that did not meet the rule of three (>=3 unique dealers and >= 3 unique permits), values were summarized as 'ALL OTHERS'.

Some caveats/notes:

- Values are reported in real 2021 dollars as calculated using the GDP Implicit Price Deflator (https://fred.stlouisfed.org/data/GDPDEF.txt).
- Pounds are reported in landed (dressed) pounds.
- Data summarized here is based on vessels that are required to provide federal VTRs for GARFO managed species (check here (https://media.fisheries.noaa.gov/2022-02/Socioeconomic-InfoNeeds-OSW-GARFO.pdf) for more information).
- Federal lobster vessels, with only lobster permits, do not have a VTR requirement. Many Atlantic Highly Migratory Species permitted vessels also do not have a VTR requirement. Trips with no VTR are not reflected in this summary.
- The ASMFC FMP includes the following species: American Lobster, Cobia, Atlantic Croaker, Black Drum, Red Drum, Menhaden, NK Sea Bass, NK Seatrout, Spot, Striped Bass, Tautog, Jonah Crab, and Pandalid Shrimp.

- The SERO FMP includes the following species: Amber Jack, Brown Shrimp, Dolphinfish, Greater Amberjack, Grouper, Grunts, Hogfish, King Mackerel, Long Tail Grouper, NK Porgy, Penaeid Shrimp, Red Grouper, Red Hind, Red Porgy, Red Snapper, Rock Hind, Sand Tilefish, Scamp Grouper, Snapper, Snowy Grouper, Spadefish, Spanish Mackerel, Speckled Hind, Spiny American Lobster, Triggerfish, Vermillion Snapper, Wahoo, Wreckfish, Yellowedge Grouper.
- There exist other fisheries in State waters that may not be reflected in data from federal sources (e.g. whelk, bluefish, and menhaden). It is recommended to query state agencies for additional data within state waters.
- All summaries presented here are built from percentages of a trip that overlapped spatially with the WEAs. These percentages were applied to landings and values for that trip and summed. This differs from simply using the self-reported VTR/clam logbook locations as those place all value from that trip at a single point. Use of the VTR raster model is more representative as smoothing reported locations reduces the effect of location inaccuracy.
- The information reported for 2020 should be interpreted with caution due to the generalized impacts the COVID-19 pandemic had across many fisheries in the Greater Atlantic Region resulting in reduced landings and lower prices; hence lower revenues as well as unusually low numbers of vessels that fished during the year.
- The number of small businesses changes over time both because of changes in affiliated ownership and fluctuations in revenue. For this reason, we use and report only the most recent three years' revenue in the Small Business Analysis section of this report, consistent with historical guidance provided by the Small Business Administration.
- Confidential data is listed as "Suppressed" or "All Others."

References

DePiper GS (2014) Statistically assessing the precision of self-reported VTR fishing locations. (https://repository.library.noaa.gov/view/noaa/4806)

Benjamin S, Lee MY, DePiper G. 2018. Visualizing fishing data as rasters. NEFSC Ref Doc 18-12; 24 p. (https://repository.library.noaa.gov/view/noaa/23030)

Most Impacted FMPs

We define “most impacted” as the FMPs deriving the most revenue from the area over the fourteen year analysis period of 2008 to 2021, indicating the highest potential for impact to industry from a reduction in fishing area. The top 5 FMPs by revenue in Zone 1 were Sea Scallop, Summer Flounder, Scup, Black Sea Bass, Mackerel, Squid, and Butterfish, ASMFC FMP and Surfclam, Ocean Quahog. Revenue values have been deflated to 2021 dollars. All numbers have been rounded to the nearest thousand. Specific figures on these FMPs within the area follow. See Table 5.1 for area totals for all FMPs and species.

Figure 1.1 Landings from Most Impacted FMPs, Zone 1

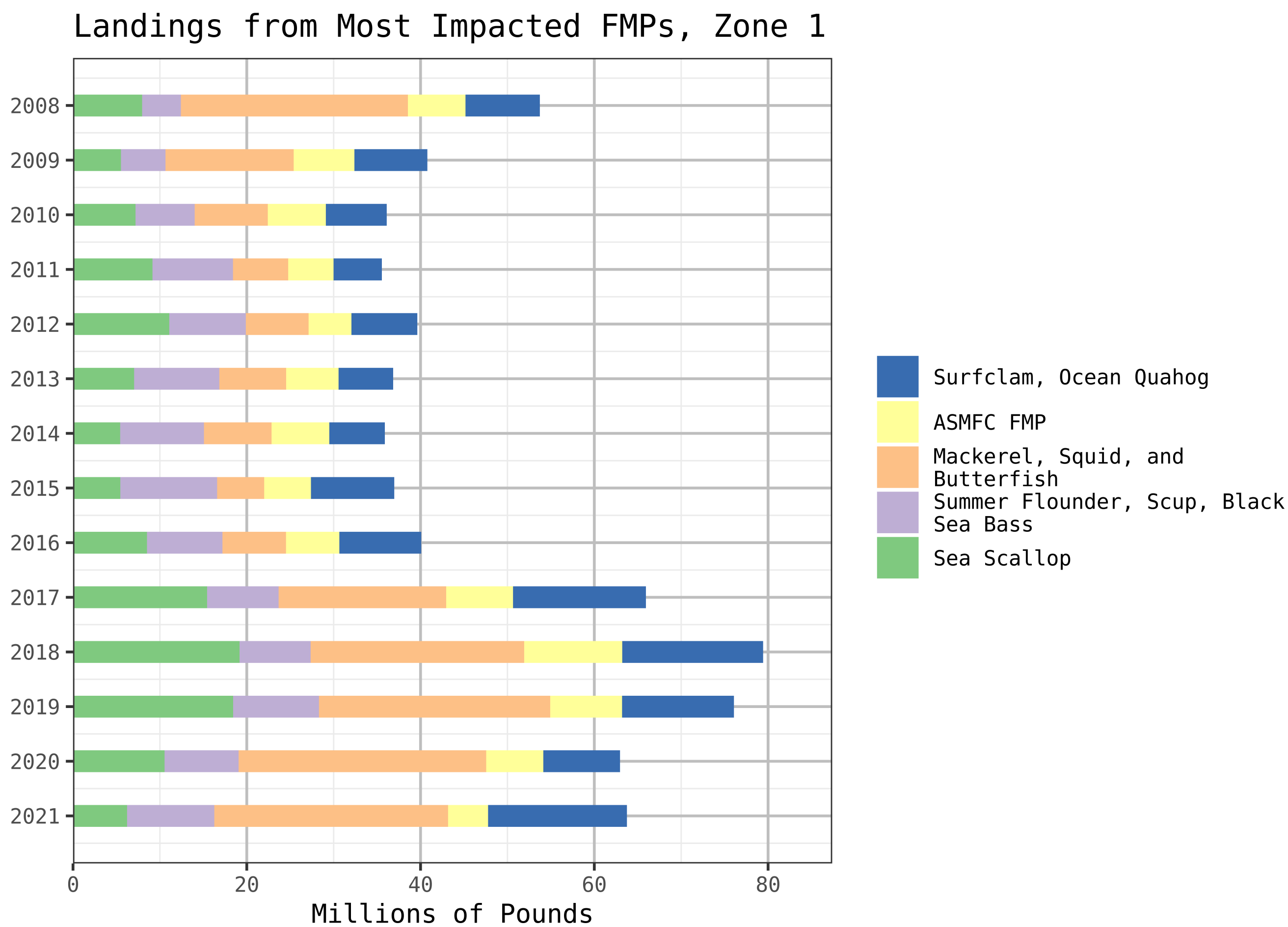


Table 1.1 Fourteen Year Total Landings (Pounds), Most Impacted FMPs, Zone 1

FMP	Fourteen Year Landings
Mackerel, Squid, and Butterfish	216,982,000
Surfclam, Ocean Quahog	137,978,000
Sea Scallop	137,104,000
Summer Flounder, Scup, Black Sea Bass	118,601,000
ASMFC FMP	93,085,000
Total	**703,750,000**

Figure 1.2 Revenue from Most Impacted FMPs, Zone 1

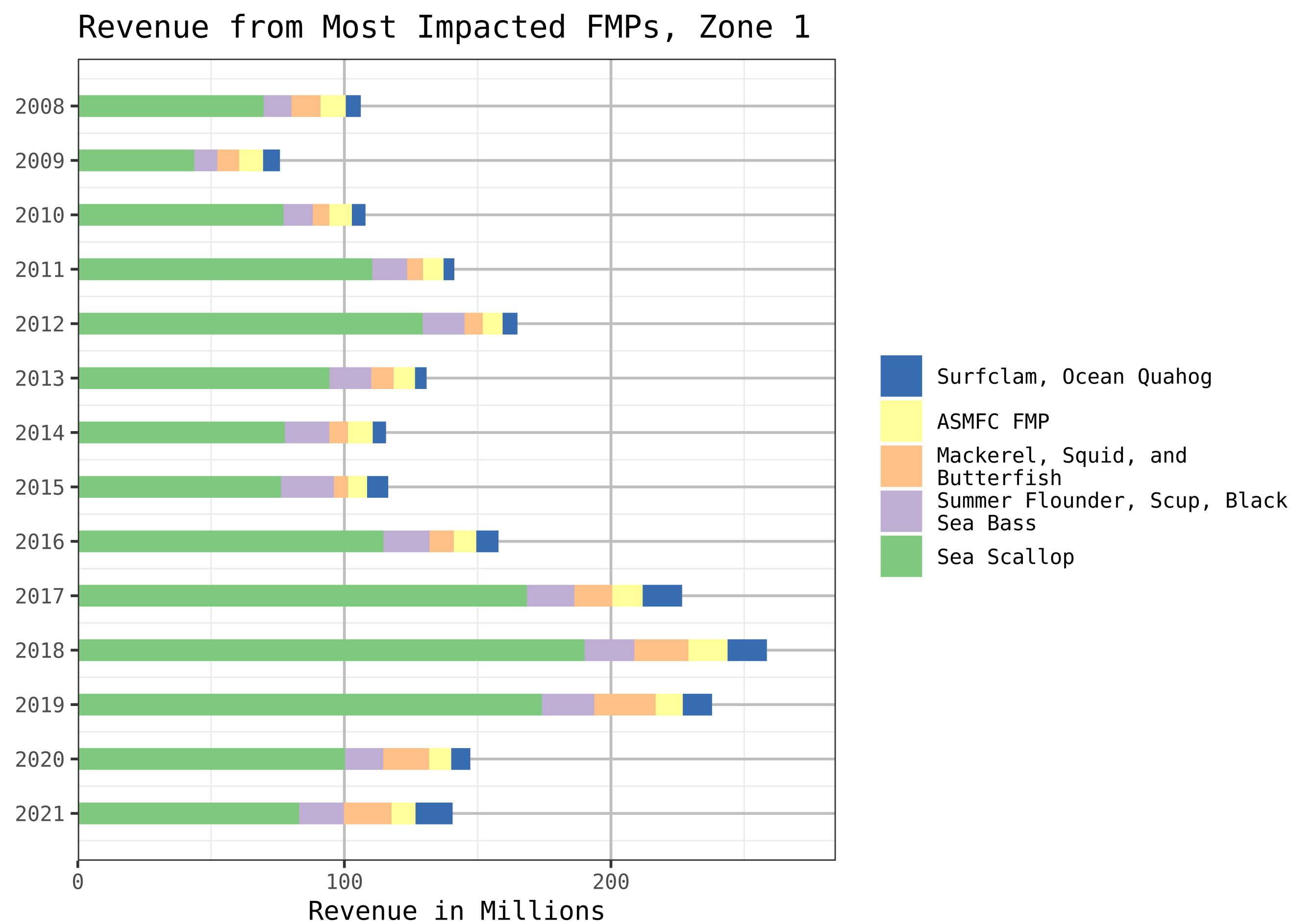


Table 1.2 Fourteen Year Total Revenue for Most Impacted FMPs, Zone 1

FMP	Fourteen Year Revenue
Sea Scallop	$1,509,186,000
Summer Flounder, Scup, Black Sea Bass	$215,930,000
Mackerel, Squid, and Butterfish	$160,324,000
ASMFC FMP	$128,439,000
Surfclam, Ocean Quahog	$114,040,000
Total	**$2,127,919,000**

Other Impacted FMPs

We analyzed other impacted FMPs separately in order to better visualize the estimated landings and revenues. The other impacted FMPs are: Atlantic Herring, Bluefish, Highly Migratory Species, Monkfish, No Federal FMP, Northeast Multispecies, SERO FMP, Skates, Small-Mesh Multispecies, Spiny Dogfish and Tilefish. and “No Federal FMP.” The category “No Federal FMP” contains a variety of species that are not federally regulated, such as: lobster, Jonah crab, smooth and chain dogfish, whelk, and menhaden, (there are close to 132 species without federal FMPs caught in the Zone 1 area)..Revenue values have been deflated to 2021 dollars. All numbers have been rounded to the nearest thousand. See Table 5.1 for area totals for all FMPs and species.

Figure 2.1 Landings from Other Impacted FMPs, Zone 1

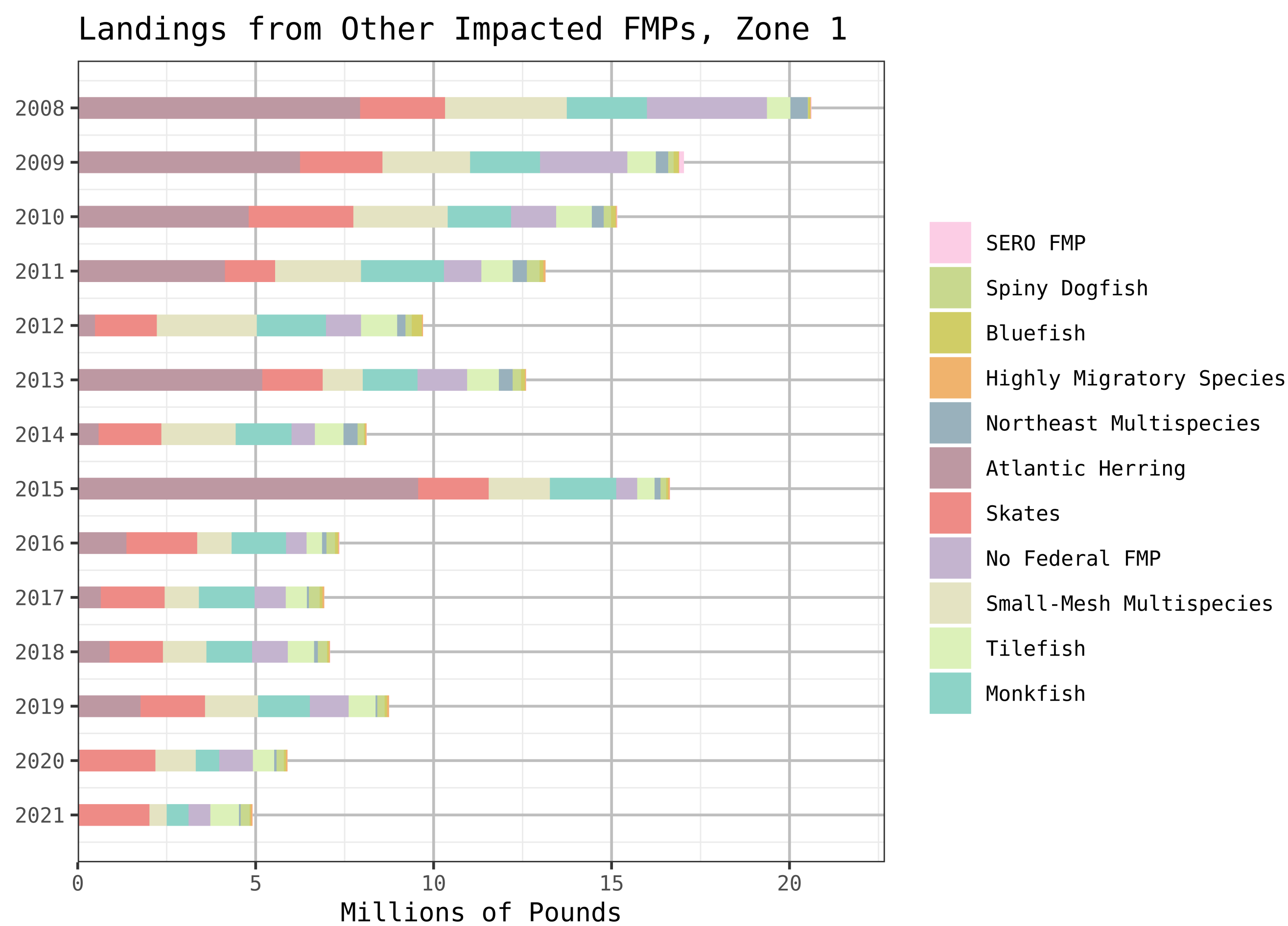


Table 2.1 Fourteen Year Total Landings (Pounds), Other Impacted FMP, Zone 1

FMP	Fourteen Year Landings
Atlantic Herring	43,680,000
Skates	27,464,000
Small-Mesh Multispecies	24,951,000
Monkfish	22,364,000
No Federal FMP	16,854,000
Tilefish	10,474,000
Northeast Multispecies	3,200,000
Spiny Dogfish	2,956,000
Bluefish	1,250,000
Highly Migratory Species	547,000

FMP	Fourteen Year Landings
SERO FMP	254,000
Total	**153,993,000**

Figure 2.2 Revenue from Other Impacted FMPs, Zone 1

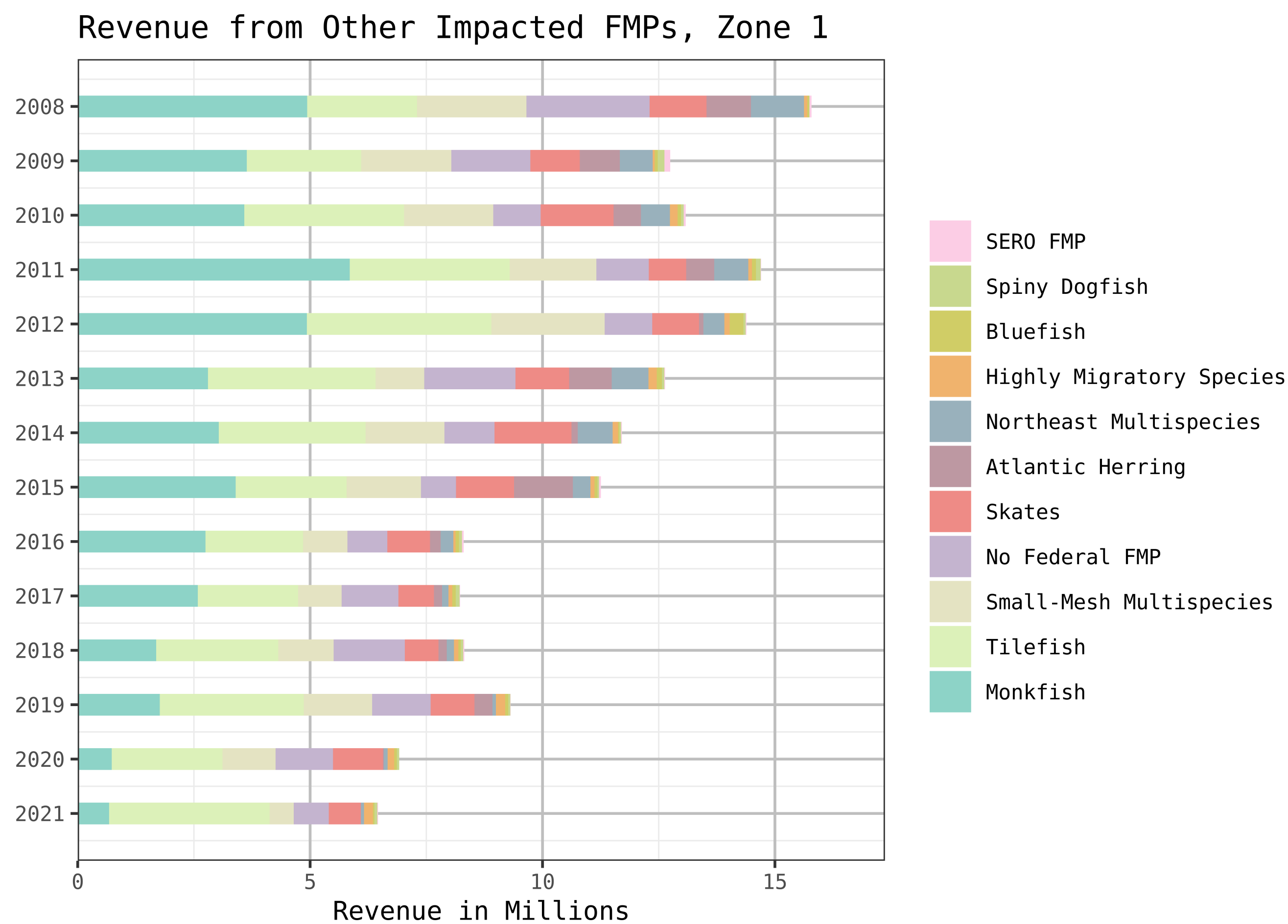


Table 2.2 Fourteen Year Total Revenue for Other Impacted FMPs, Zone 1

FMP	Fourteen Year Revenue
Monkfish	$42,376,000
Tilefish	$40,645,000
Small-Mesh Multispecies	$21,058,000
No Federal FMP	$18,178,000
Skates	$14,843,000
Atlantic Herring	$6,414,000
Northeast Multispecies	$6,353,000
Highly Migratory Species	$1,621,000
Bluefish	$1,116,000

FMP	Fourteen Year Revenue
Spiny Dogfish	$834,000
SERO FMP	$402,000
Total	**$153,842,000**

Most Impacted Species

We analyzed the top ten species due to their economic importance in the area and to isolate them from combined FMPs. The top ten species by revenue are: Sea Scallop, Summer Flounder, Longfin Squid, All Others, Jonah Crab, American Lobster, Scup, Illex Squid, Monkfish and Golden Tilefish. The category “All Others” refers to species with less than three permits or dealers impacted to protect data confidentiality.Revenue values have been deflated to 2021 dollars. All numbers have been rounded to the nearest thousand.See Table 5.1 for area totals for all FMPs and species.

Figure 3.1 Landings of Most Impacted Species, Zone 1

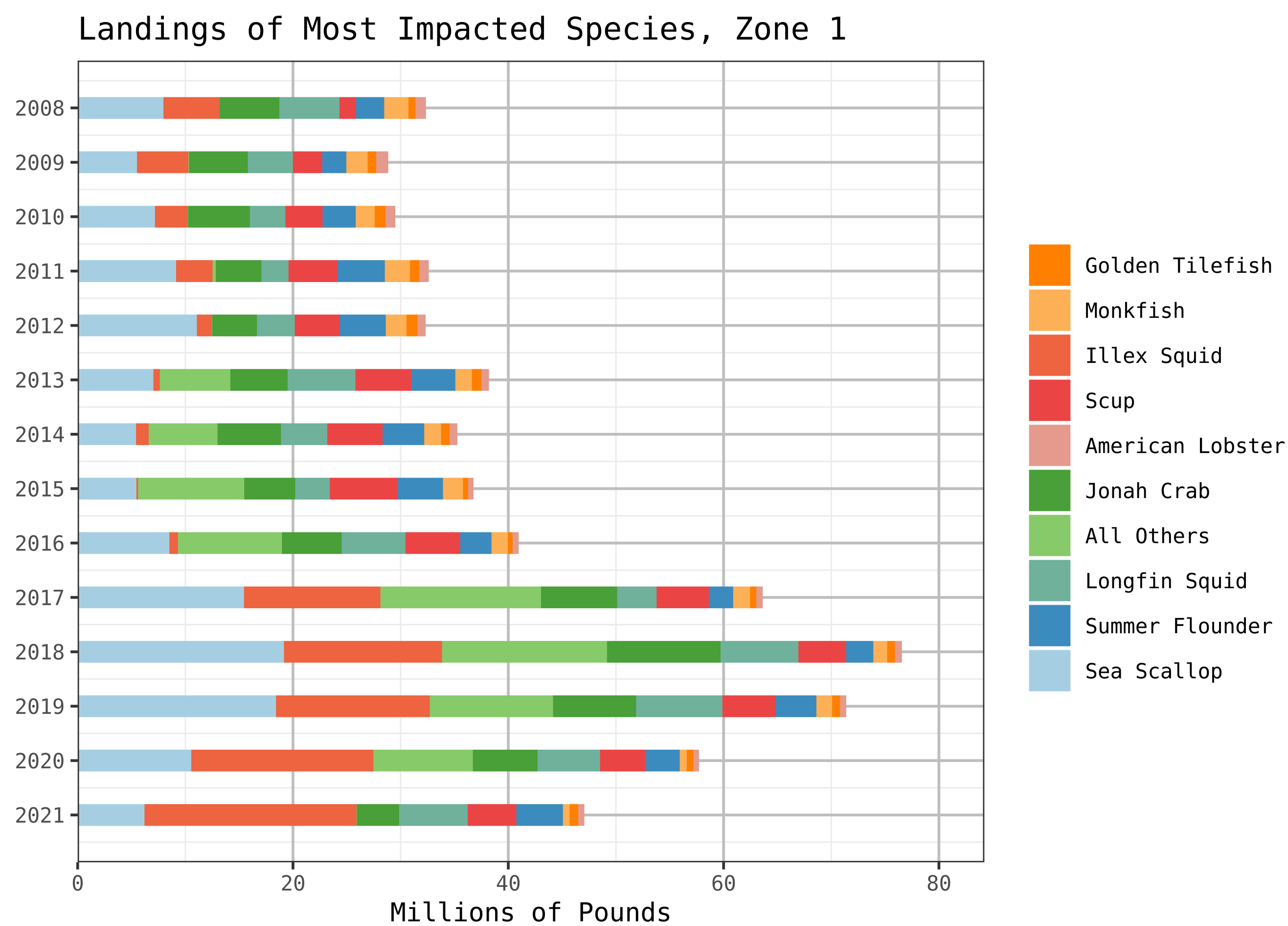


Table 3.1 Fourteen Year Total Landings (Pounds), Most Impacted Species, Zone 1

Species	Fourteen Year Landings

Species	Fourteen Year Landings
Sea Scallop	137,104,000
Illex Squid	98,792,000
All Others	83,818,000
Jonah Crab	81,974,000
Longfin Squid	69,867,000
Scup	61,204,000
Summer Flounder	47,721,000
Monkfish	22,354,000
Golden Tilefish	10,433,000
American Lobster	9,966,000
Total	**623,232,000**

Figure 3.2 Revenue of Most Impacted Species, Zone 1

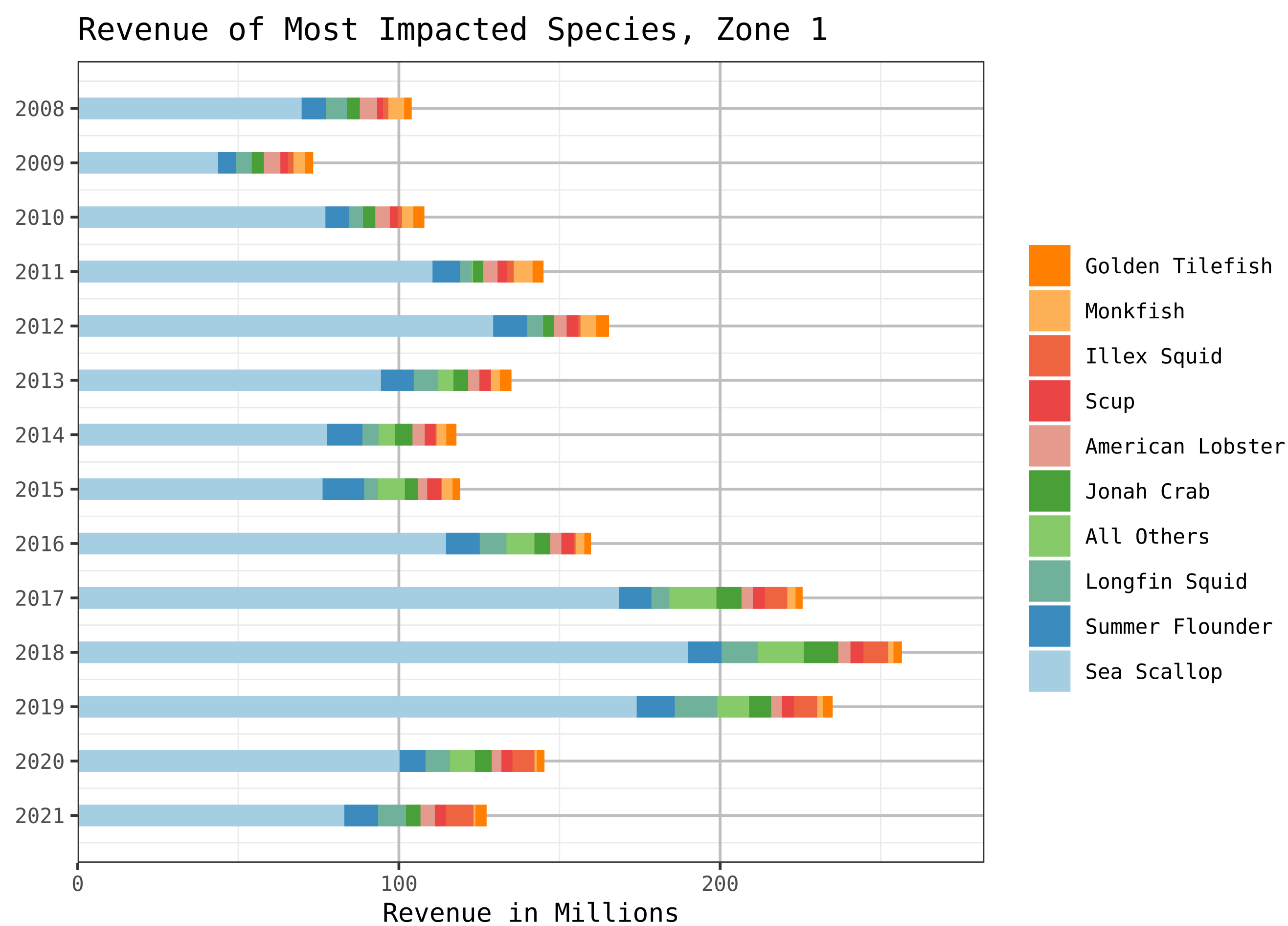


Table 3.2 Fourteen Year Total Revenue, Most Impacted Species, Zone 1

Species	Fourteen Year Revenue

Species	Fourteen Year Revenue
Sea Scallop	$1,509,186,000
Summer Flounder	$135,413,000
Longfin Squid	$95,699,000
All Others	$74,039,000
Jonah Crab	$72,408,000
American Lobster	$55,364,000
Scup	$46,794,000
Illex Squid	$45,776,000
Monkfish	$42,351,000
Golden Tilefish	$40,545,000
Total	**$2,117,575,000**

Select Gear Types

We analyzed select gear types to better understand the type of fishing occurring in Zone 1 . The select gear types are: Dredge-Other, Dredge-Clam, Dredge-Scallop, Gillnet-Sink, Gillnet-Other, Weir-Trap, Seine-Purse, Seine-Other, Handline, Hand-Other, Trawl-Bottom, Trawl-Midwater, Longline-Bottom, Longline-Pelagic, Pot-Other, and Pot-Lobster. The category “All Others” refers to species with less than three permits or dealers impacted to protect data confidentiality. Revenue values have been deflated to 2021 dollars. All numbers have been rounded to the nearest thousand.

Figure 4.1 Landings of Select Gear Types, Zone 1

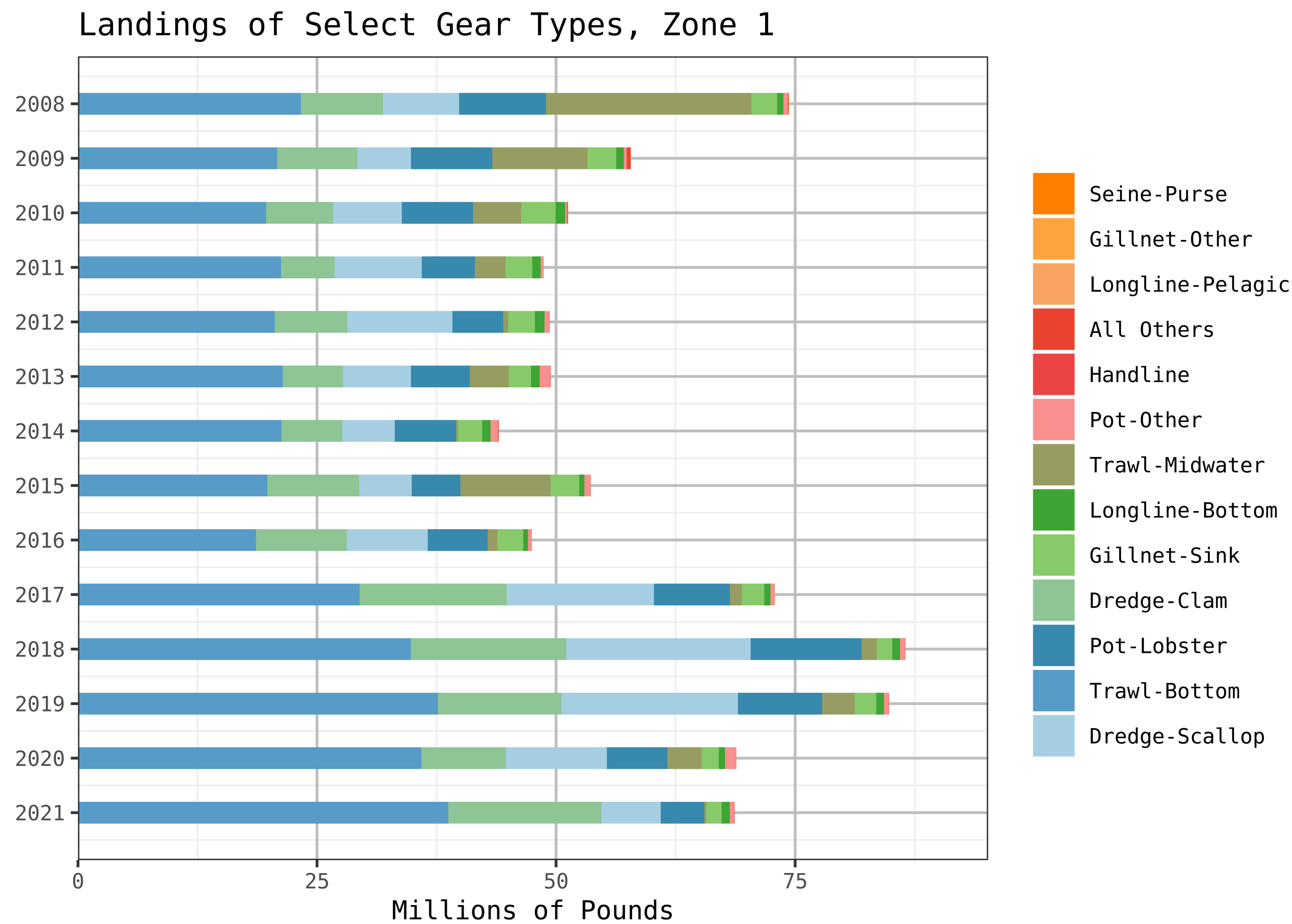


Table 4.1 Fourteen Year Total Landings (Pounds), Select Gear Types, Zone 1

Gear Type	Fourteen Year Landings
Trawl-Bottom	363,275,000
Dredge-Clam	138,419,000
Dredge-Scallop	137,245,000
Pot-Lobster	99,071,000
Trawl-Midwater	64,900,000
Gillnet-Sink	35,163,000
Longline-Bottom	10,850,000
Pot-Other	7,665,000
All Others	660,000
Handline	289,000
Longline-Pelagic	90,000
Gillnet-Other	82,000
Seine-Purse	34,000

Gear Type	Fourteen Year Landings
Total	**857,742,000**

Figure 4.2 Revenue from Select Gear Types, Zone 1

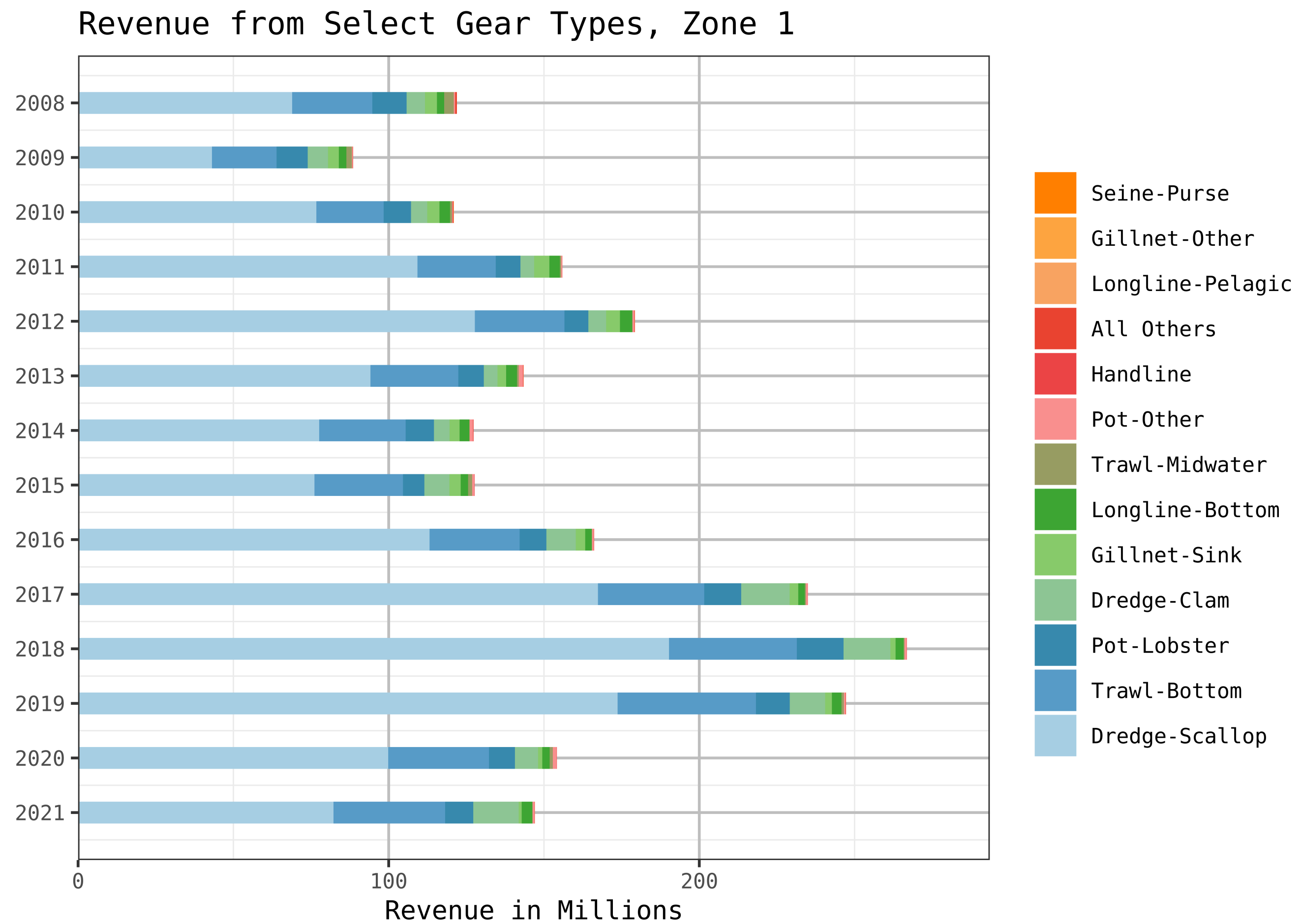


Table 4.2 Fourteen Year Total Revenue, Select Gear Types, Zone 1

Gear Type	Fourteen Year Revenue
Dredge-Scallop	$1,500,167,000
Trawl-Bottom	$424,241,000
Pot-Lobster	$133,584,000
Dredge-Clam	$118,928,000
Gillnet-Sink	$42,201,000
Longline-Bottom	$40,344,000
Trawl-Midwater	$10,458,000
Pot-Other	$9,054,000
Handline	$1,133,000
All Others	$1,100,000

Gear Type	Fourteen Year Revenue
Longline-Pelagic	$468,000
Gillnet-Other	$76,000
Seine-Purse	$5,000
Total	**$2,281,760,000**

Totals

The following table displays the given year total revenue and total landed pounds of all species by all gear types within the area. From 2008-2021, a total of 857.742 million pounds worth $2.282 billion were landed from within Zone 1. All numbers have been rounded to the nearest thousand.

Table 5.1 Fourteen Year Total Revenue and Landings (Pounds), Zone 1

Year	Revenue	Landings
2008	$121,986,000	74,347,000
2009	$88,581,000	57,814,000
2010	$120,994,000	51,270,000
2011	$155,956,000	48,700,000
2012	$179,309,000	49,337,000
2013	$143,475,000	49,453,000
2014	$127,309,000	44,007,000
2015	$127,687,000	53,619,000
2016	$166,148,000	47,440,000
2017	$234,944,000	72,874,000
2018	$266,849,000	86,532,000
2019	$247,260,000	84,822,000
2020	$154,183,000	68,849,000
2021	$147,079,000	68,677,000
Total	**$2,281,760,000**	**857,742,000**

Landings and Revenue by Port

The ten most impacted (by revenue) ports are listed below. These ports are estimated to receive the most revenue from fishing done within the Zone 1 area. The table below displays each port's revenue and landing breakdown. The table present the cumulative revenues and landings from 2008-2021. New Bedford receives the highest value of revenue of any port, with $1.152 billion from 2008-2021. All numbers have been rounded to the nearest thousand.

Table 6.1 Most Impacted Ports, by Revenue and Landings

City	State	Fourteen Year Revenue	Fourteen Year Landings
New Bedford	MA	$1,152,062,000	272,301,000
Cape May	NJ	$196,432,000	84,195,000
Point Judith	RI	$193,189,000	129,564,000
Point Pleasant	NJ	$95,306,000	54,022,000
Montauk	NY	$81,112,000	45,761,000
Newport News	VA	$69,753,000	12,105,000
Barnegat	NJ	$56,456,000	8,344,000
All Others		$52,961,000	7,047,000
Hampton	VA	$51,503,000	13,508,000
Stonington	CT	$33,083,000	9,687,000

Landings and Revenue by State

The following table displays total revenue and total landed pounds by state within the area. All numbers have been rounded to the nearest thousand.

Table 7.1 Most Impacted States, by Revenue and Landings

State	Fourteen Year Revenue	Fourteen Year Landings
MA	$1,227,601,000	321,185,000
NJ	$398,544,000	185,746,000
RI	$267,783,000	211,305,000
VA	$177,303,000	33,996,000
NY	$103,992,000	58,824,000
CT	$52,110,000	21,120,000
NC	$37,461,000	14,463,000

State	Fourteen Year Revenue	Fourteen Year Landings
MD	$12,245,000	6,752,000
DE	$655,000	206,000
ME	$563,000	2,828,000

Percentage of Revenue by Permit

We also analyzed the percentage of each permit's total commercial fishing revenue coming from within the Zone 1 area (see boxplots figures and tables below). Boxplots are important statistical summaries because they provide information about the distribution of the percentages. The boxplots below begin at the 1st quartile, or the value beneath which 25 percent of all observations fall. A thick line within the box identifies the median, the observation at which 50 percent of observations are above or beneath. The box ends at the 3rd quartile, or the observation beneath which 75 percent of observations fall. Nonparametric estimates of the minimum and maximum values are also indicated by the "whiskers" (dashed line terminating in a vertical line) that jut out from each side of the box. Any points outside of these whiskers are observations that are considered outliers. In our tables, however, the maximum values are inclusive of outliers. The first table below presents the minimum, 1st quartile, median, 3rd quartile, and maximum values for the area. These are the fourteen year revenue percentages. The following table represents the total number of outliers by year. The boxplots in the figures below further separate the area out by year.

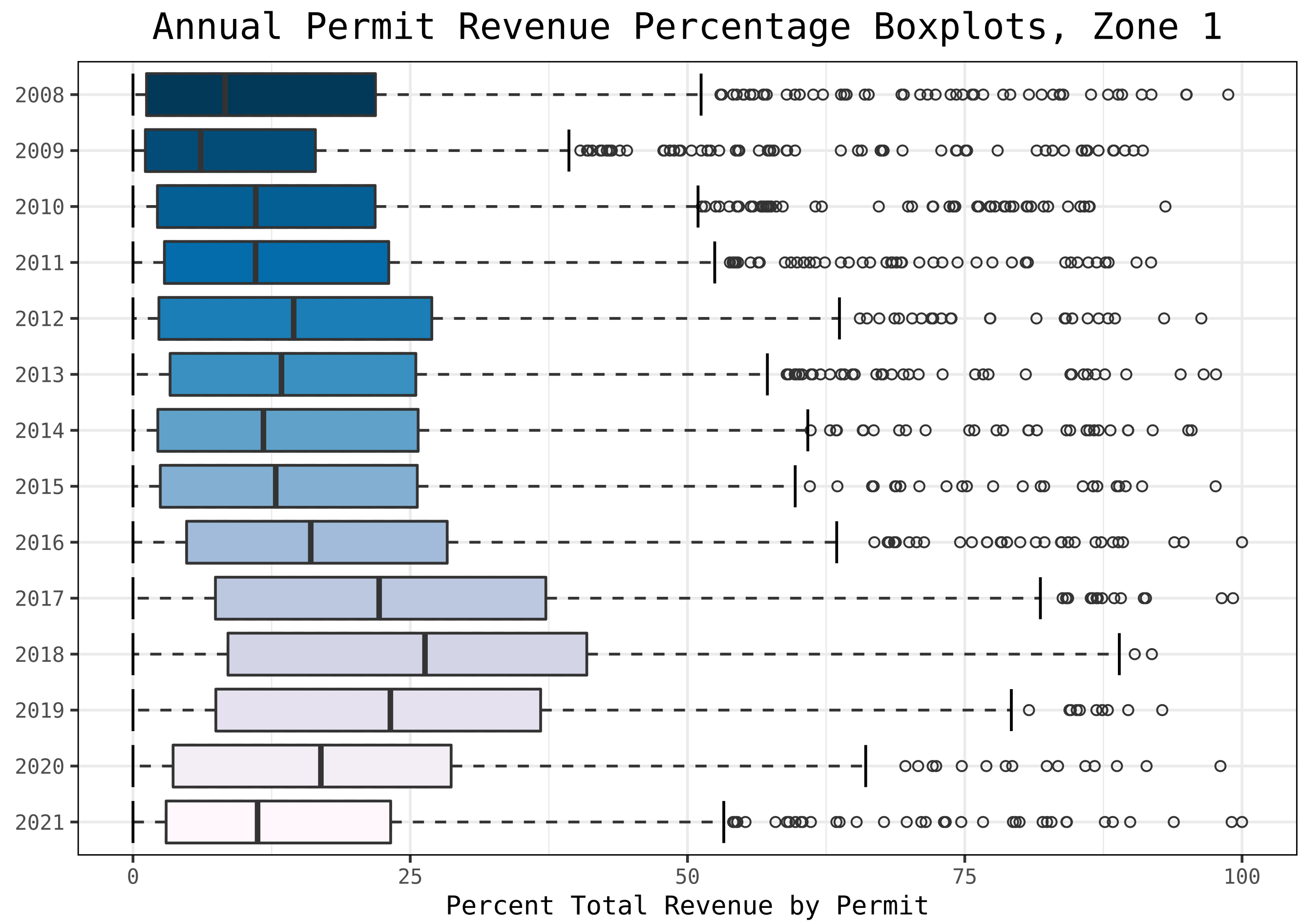
Table 8.1 Analysis of Fourteen Year Permit Revenue Percentage Boxplots, Zone 1

Min	1st Quartile	Median	3rd Quartile	Max
0%	3%	13%	28%	100%

Table 8.2 Fourteen Year Outlier Count, Zone 1

2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
49	64	49	46	25	39	29	24	31	15	2	11	15	38

Figure 8.1 Annual Permit Revenue Percentage Boxplots, Zone 1



Small Business Analysis

A business primarily engaged in commercial fishing is classified as a small business if it is independently owned and operated, is not dominant in its field of operation (including its affiliates) and has combined annual receipts not in excess of $11 million for all its affiliated operations worldwide. Small Business Administration principles of affiliation are used to define a business entity, meaning the following analysis is conducted upon unique business interests, which can represent multiple vessel permits. As such, this section presents the total number of entities, by business category, and the total revenue generated by that business category in Table 9.1. For those businesses with historical fishing within the Zone 1 area, Table 9.2 presents the revenue generated inside the Zone 1 area against the total revenue from those same entities. Revenue values have been deflated to 2021 dollars. All numbers have been rounded to the nearest thousand.

Table 9.1 Total number of entities engaged in federally managed fishing within the Northeast region, and their total revenue, by business category

Year	Business Type	Number of Entities	Revenue
2019	Large Business	11	$247,928,000
2019	Small Business	1,130	$799,249,000

Year	Business Type	Number of Entities	Revenue
2020	Large Business	11	$200,342,000
2020	Small Business	1,144	$684,526,000
2021	Large Business	11	$248,437,000
2021	Small Business	1,190	$849,039,000

Table 9.2 Revenue inside the Zone 1 area against total revenue from entities active inside the Zone 1 area, by business category

Year	Business Type	Number of Entities	Area Revenue	Total Revenue
2019	Large Business	11	$61,351,000	$247,928,000
2019	Small Business	445	$183,361,000	$668,392,000
2020	Large Business	11	$38,155,000	$200,342,000
2020	Small Business	459	$115,525,000	$584,588,000
2021	Large Business	11	$36,239,000	$248,437,000
2021	Small Business	458	$110,822,000	$702,044,000

Species Dependence

The tables below indicate the top ten species deriving the most revenue from the area by year. Additional information includes landings and effort (Days-at-Sea, or DAS) occurring within the area of interest as a percentage of totals generated by that species across the entire region for each year and the total number of trips and vessels from the area FMP, species, and port for each year. Trips with less than three permits or dealers have been removed to protect data confidentiality. The total number of trips, and number vessels taking those trips, represent an upper bound on the counts as it does not take into account the probability of these trips actually overlapping the area of interest, and identifies all the individuals who could be displaced by wind energy development. Therefore, also included is a count of trips and vessels weighted by the probability of overlap with the area of interest, to generate a more precise expected count of trips and vessels fishing within the area. The category “All Others” refers to gear type categories with less than three permits or dealers impacted to protect data confidentiality.

Table 10.1 Total and Expected Number of Trips and Vessels by Year, Zone 1

Year	Number of Trips	Number of Vessels	Expected Trips	Expected Vessels
2008	16,944	1,075	5,130	804
2009	16,252	994	4,611	695
2010	14,429	961	4,853	742
2011	14,953	893	4,622	707

Year	Number of Trips	Number of Vessels	Expected Trips	Expected Vessels
2012	14,720	910	4,662	737
2013	14,583	872	4,557	708
2014	13,493	869	4,256	652
2015	13,563	845	4,507	657
2016	16,376	853	5,405	705
2017	16,757	849	6,183	735
2018	16,094	844	6,421	743
2019	14,189	786	5,679	670
2020	13,562	792	5,028	650
2021	12,092	777	4,477	610

Table 10.2 Percentages of Total Revenue, Landings, and Days-at-Sea for Species of Interest, Zone 1, 2021

Species	Revenue as % of Total	Landings as % of Total	DAS as % of Total
Golden Tilefish	54.60	54.79	53.12
Ocean Quahog	52.17	56.43	47.74
Scup	45.08	44.50	36.59
Jonah Crab	39.20	38.87	19.65
Summer Flounder	38.80	45.57	34.30
Weakfish	36.58	35.72	54.22
Black Sea Bass	31.17	33.98	35.25
Offshore Hake	30.95	28.88	50.90
Illex Squid	28.82	28.93	29.57
Spot	28.47	40.38	6.23

Table 10.3 Total and Expected Number of Trips and Vessels by FMP, Zone 1, 2021

FMP	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
ASMFC FMP	1,860	196	109	595
Atlantic Herring	24	9	5	8
Bluefish	995	144	93	259
Highly Migratory Species	679	102	63	230

FMP	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Mackerel, Squid, and Butterfish	3,799	198	169	1,664
Monkfish	4,722	337	247	1,876
No Federal FMP	2,300	230	169	1,112
Northeast Multispecies	750	107	47	96
Sea Scallop	3,476	434	355	952
SERO FMP	212	71	45	90
Skates	2,890	177	146	1,274
Small-Mesh Multispecies	2,817	169	135	1,319
Spiny Dogfish	481	64	40	136
Summer Flounder, Scup, Black Sea Bass	4,883	289	227	2,056
Surfclam, Ocean Quahog	1,097	41	35	539
Tilefish	700	116	102	429

Table 10.4 Total and Expected Number of Trips and Vessels by Species, Zone 1, 2021

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Albacore Tuna	35	18	7	7
Am. Plaice Flounder	167	35	3	3
Amber Jack	10	4	4	6
American Eel	100	25	20	60
American Lobster	1,583	138	77	481
American Shad	7	4	3	6
Atlantic Halibut	100	31	2	2
Atlantic Herring	24	9	5	8
Atlantic Mackerel	594	111	75	268
Big Eye Tuna	49	18	9	11
Black Sea Bass	2,923	214	178	1,322
Blk Bellied Rosefish	4	3	2	2
Blue Crab	4	4	1	1
Bluefin Tuna	8	7	2	2

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Bluefish	995	144	93	259
Blueline Tilefish	100	38	27	54
Bonito	86	29	22	45
Butterfish	1,816	126	112	854
Channeled Whelk	171	13	9	17
Chub Mackerel	15	9	2	3
Clearnose Skate	23	11	7	14
Cobia	8	6	2	2
Cod	454	64	19	34
Conchs	8	5	2	2
Conger Eel	446	77	70	262
Cunner	20	11	6	8
Cusk	120	25	3	4
Dogfish Smooth	523	62	39	178
Dogfish Spiny	481	64	40	136
Dolphinfish	53	17	10	19
Fourspot Flounder	29	6	5	17
Golden Tilefish	657	108	98	406
Haddock	291	39	7	8
Horseshoe Crab	6	3	2	3
Illex Squid	474	36	32	165
John Dory	374	69	57	191
Jonah Crab	1,012	67	45	414
King Whiting	252	72	54	146
Knobbed Whelk	41	9	5	8
Little Tuna	28	17	11	13
Longfin Squid	3,177	177	159	1,440
Menhaden	17	8	1	1
Monkfish	4,719	337	247	1,874
NK Crab	28	6	NA	NA

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
NK Eel	55	16	NA	NA
NK Seatrout	77	27	NA	NA
NK Tilefish	19	12	NA	NA
Northern Kingfish	60	20	16	31
Ocean Quahog	528	16	16	335
Octopus	7	4	3	5
Offshore Hake	46	12	10	25
Other Fish	46	16	9	12
Pollock	255	41	7	9
Red Crab	51	6	4	7
Red Hake	1,323	120	94	653
Redfish	236	45	9	12
Ribbonfish	5	4	1	1
Rock Crab	19	6	4	7
Scup	2,740	190	161	1,239
Sea Robins	103	40	25	54
Sea Scallop	3,476	434	355	952
Silver Hake	2,494	153	127	1,171
Silver&Offshhake Mix	27	9	6	15
Skates	2,887	177	146	1,272
Skipjack Tuna	4	4	1	1
Spanish Mackerel	6	3	3	5
Spotted Hake	20	3	3	13
Spotted Weakfish	166	31	26	86
Squeteague Weakfish	966	112	102	638
Striped Bass	45	17	4	6
Summer Flounder	3,959	249	203	1,665
Surf Clam	568	32	26	204
Swordfish	86	28	17	29
Tautog	63	20	7	25

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Thresher Shark	6	3	2	2
Triggerfish	132	45	30	56
Wahoo	4	4	1	1
White Hake	305	54	13	17
Winter Flounder	367	52	20	38
Witch Flounder	229	48	13	26
Yellowfin Tuna	70	26	13	19
Yellowtail Flounder	170	30	8	13

Table 10.5 Total and Expected Number of Trips and Vessels by Port, Zone 1, 2021

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Atlantic City, NJ	660	22	19	182
Barnegat, NJ	440	33	25	105
Beaufort, NC	115	49	37	59
Belford, NJ	54	12	7	17
Cape May (County), NJ	4	3	2	2
Cape May, NJ	568	113	75	220
Chatham, MA	574	20	11	135
Chincoteague, VA	12	8	5	7
Fairhaven, MA	59	9	8	30
Gloucester, MA	51	14	2	2
Hampton Bay, NY	339	13	12	108
Hampton, VA	141	49	35	63
Harwich Port, MA	24	8	4	6
Harwichport, MA	143	4	3	18
Hyannis, MA	46	11	5	8
Little Compton, RI	155	8	7	75
Menemsha, MA	3	3	2	2
Montauk, NY	915	45	38	400
New Bedford, MA	2,198	367	288	1,032

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
New London, CT	136	6	6	32
Newport News, VA	96	52	29	43
Newport, RI	182	12	9	75
Ocean City, MD	50	13	10	29
Point Judith, RI	1,989	110	93	877
Point Pleasant, NJ	1,918	77	60	578
Provincetown, MA	3	3	1	1
Shinnecock, NY	216	17	12	74
Stonington, CT	256	16	16	102
Wanchese, NC	15	5	4	6
Westport, MA	52	4	3	10

Table 10.6 Percentages of Total Revenue, Landings, and Days-at-Sea for Species of Interest, Zone 1, 2020

Species	Revenue as % of Total	Landings as % of Total	DAS as % of Total
American Eel	55.91	13.69	43.92
Golden Tilefish	46.65	46.42	49.75
Jonah Crab	46.24	46.61	26.02
Scup	44.19	39.54	32.88
Summer Flounder	36.79	38.36	31.81
Black Sea Bass	36.13	35.13	32.22
Butterfish	33.32	33.34	31.07
Spotted Seatrout	30.32	28.15	44.38
Longfin Squid	28.81	28.78	31.13
Illex Squid	26.49	27.06	23.77

Table 10.7 Total and Expected Number of Trips and Vessels by FMP, Zone 1, 2020

FMP	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
ASMFC FMP	1,788	174	101	594
Atlantic Herring	63	18	7	8
Bluefish	1,225	158	111	377

FMP	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Highly Migratory Species	595	89	56	174
Mackerel, Squid, and Butterfish	3,653	197	176	1,501
Monkfish	5,365	380	291	2,091
No Federal FMP	2,124	212	157	975
Northeast Multispecies	908	120	59	133
Sea Scallop	4,894	453	390	1,761
SERO FMP	106	44	27	40
Skates	3,491	197	154	1,316
Small-Mesh Multispecies	2,924	176	146	1,301
Spiny Dogfish	640	53	34	118
Summer Flounder, Scup, Black Sea Bass	4,880	296	236	1,963
Surfclam, Ocean Quahog	709	37	22	232
Tilefish	707	109	92	413

Table 10.8 Total and Expected Number of Trips and Vessels by Species, Zone 1, 2020

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Albacore Tuna	33	17	8	9
Am. Plaice Flounder	236	38	4	4
American Eel	91	26	20	45
American Lobster	1,551	132	78	482
Atlantic Halibut	173	36	4	4
Atlantic Herring	63	18	7	8
Atlantic Mackerel	743	110	91	321
Big Eye Tuna	31	14	6	6
Black Sea Bass	2,756	219	184	1,163
Blue Crab	3	3	2	2
Bluefin Tuna	9	9	4	4
Bluefish	1,225	158	111	377
Blueline Tilefish	104	41	28	52

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Bonito	106	35	22	39
Butterfish	1,768	137	116	788
Channeled Whelk	90	13	7	13
Chub Mackerel	21	15	4	5
Cod	545	74	20	33
Conchs	6	4	2	2
Conger Eel	551	86	74	314
Cunner	41	12	6	16
Cusk	69	25	4	4
Dogfish Smooth	437	50	30	123
Dogfish Spiny	640	53	34	118
Dolphinfish	21	10	6	8
Fourspot Flounder	37	7	6	19
Golden Tilefish	667	103	91	398
Haddock	401	51	9	12
Hermit Crab	3	3	1	1
Illex Squid	489	40	35	138
John Dory	320	70	58	159
Jonah Crab	1,003	63	50	460
King Mackerel	5	3	3	4
King Whiting	311	74	58	172
Knobbed Whelk	49	8	6	14
Little Tuna	24	11	6	10
Longfin Squid	2,919	177	161	1,283
Mako Shark	4	3	2	2
Mako Shortfin Shark	10	6	3	4
Mantis Shrimp	5	3	2	3
Menhaden	5	5	1	1
Monkfish	5,362	380	291	2,089
Mullets	19	7	5	10

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
NK Crab	62	11	NA	NA
NK Eel	95	23	NA	NA
NK Seatrout	42	20	NA	NA
Northern Kingfish	42	12	10	24
Offshore Hake	26	10	6	14
Other Fish	17	10	7	8
Pollock	285	43	9	15
Red Hake	1,505	122	105	655
Red Porgy	4	4	2	2
Redfish	255	45	13	20
Rock Crab	38	10	8	18
Sand Tilefish	4	3	2	2
Scup	2,546	193	165	1,054
Sea Raven	5	5	2	2
Sea Robins	77	29	18	42
Sea Scallop	4,894	453	390	1,761
Silver Hake	2,587	154	134	1,166
Silver&Offshhake Mix	25	11	8	11
Skates	3,476	196	153	1,310
Skipjack Tuna	5	4	2	2
Spanish Mackerel	15	4	3	5
Spot	3	3	2	2
Spotted Hake	39	5	5	18
Spotted Weakfish	128	26	20	67
Squeteague Weakfish	834	107	89	456
Striped Bass	24	14	3	3
Summer Flounder	4,010	254	209	1,587
Surf Clam	247	25	9	15
Swordfish	103	27	17	33
Tautog	54	15	6	12

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Triggerfish	47	21	13	16
White Hake	278	53	15	17
Winter Flounder	500	72	28	62
Witch Flounder	285	53	15	24
Yellowfin Tuna	43	17	9	13
Yellowtail Flounder	263	42	16	32

Table 10.9 Total and Expected Number of Trips and Vessels by Port, Zone 1, 2020

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Atlantic City, NJ	493	21	14	50
Barnegat, NJ	553	34	32	125
Beaufort, NC	110	50	31	46
Belford, NJ	66	7	7	21
Cape May, NJ	642	147	82	203
Chatham, MA	847	27	18	210
Chincoteague, VA	10	6	4	6
Fairhaven, MA	18	12	7	9
Gloucester, MA	70	16	4	6
Hampton Bay, NY	361	11	10	91
Hampton, VA	152	50	39	67
Harwichport, MA	210	11	11	88
Hyannis, MA	111	10	9	70
Little Compton, RI	218	10	9	110
Menemsha, MA	43	5	4	26
Montauk, NY	1,081	49	39	396
Nantucket, MA	45	5	2	25
New Bedford, MA	3,127	398	345	1,410
New London, CT	105	7	7	41
Newport News, VA	118	52	31	44
Newport, RI	207	12	8	80

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Ocean City, MD	48	8	6	22
Other Ny, NY	12	3	2	7
Point Judith, RI	1,869	123	102	837
Point Pleasant, NJ	1,950	81	57	687
Shinnecock, NY	152	12	8	48
Stonington, CT	221	17	16	88
Westport, MA	26	7	4	16
Wildwood, NJ	39	10	4	5

Table 10.10 Percentages of Total Revenue, Landings, and Days-at-Sea for Species of Interest, Zone 1, 2019

Species	Revenue as % of Total	Landings as % of Total	DAS as % of Total
Golden Tilefish	53.19	52.96	48.86
Jonah Crab	50.37	51.13	28.32
Scup	48.41	45.54	35.19
Summer Flounder	45.13	47.10	33.81
Black Sea Bass	42.62	42.78	35.46
Butterfish	33.55	33.36	32.73
Longfin Squid	29.14	29.59	34.19
Atlantic Sea Scallop	28.72	30.62	29.28
Spotted Seatrout	25.28	23.23	37.03
Spot	24.25	31.94	27.13

Table 10.11 Total and Expected Number of Trips and Vessels by FMP, Zone 1, 2019

FMP	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
ASMFC FMP	1,864	180	105	679
Atlantic Herring	72	21	12	17
Bluefish	1,219	155	104	377
Highly Migratory Species	649	94	65	196
Mackerel, Squid, and Butterfish	4,310	210	190	1,903

FMP	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Monkfish	5,920	421	327	2,402
No Federal FMP	2,446	222	167	1,178
Northeast Multispecies	941	127	71	179
Sea Scallop	4,398	439	377	1,648
SERO FMP	154	68	42	59
Skates	4,005	226	185	1,614
Small-Mesh Multispecies	3,350	173	146	1,564
Spiny Dogfish	648	70	44	148
Summer Flounder, Scup, Black Sea Bass	5,363	318	262	2,338
Surfclam, Ocean Quahog	911	42	32	432
Tilefish	817	112	98	454

Table 10.12 Total and Expected Number of Trips and Vessels by Species, Zone 1, 2019

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Albacore Tuna	26	13	6	6
Am. Plaice Flounder	183	27	3	3
Amber Jack	7	4	3	5
American Eel	135	27	21	66
American Lobster	1,514	133	81	505
American Shad	7	5	1	1
Atlantic Halibut	147	25	5	6
Atlantic Herring	72	21	12	17
Atlantic Mackerel	1,125	141	117	531
Big Eye Tuna	30	13	6	7
Black Sea Bass	2,667	230	196	1,295
Blackfin Goosefish	26	4	3	9
Blk Bellied Rosefish	7	6	4	4
Bluefin Tuna	9	6	3	5
Bluefish	1,219	155	104	377

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Blueline Tilefish	164	52	39	84
Bonito	116	38	26	52
Butterfish	2,279	144	130	1,065
Channeled Whelk	118	15	7	16
Chub Mackerel	21	11	4	6
Cod	463	62	21	39
Conger Eel	738	94	85	435
Cunner	64	14	5	13
Cusk	54	14	2	2
Dogfish Smooth	502	50	37	146
Dogfish Spiny	648	70	44	148
Dolphinfish	57	20	13	18
Fourspot Flounder	42	9	7	24
Golden Tilefish	741	101	89	416
Haddock	350	51	15	20
Harvest Fish	25	14	12	16
Illex Squid	548	44	37	147
John Dory	357	72	59	173
Jonah Crab	1,176	64	56	549
King Whiting	261	70	60	166
Knobbed Whelk	84	9	7	17
Little Tuna	17	10	6	8
Longfin Squid	3,493	186	176	1,643
Mako Shark	3	3	2	2
Mako Shortfin Shark	15	7	4	7
Menhaden	7	5	2	2
Monkfish	5,913	421	327	2,401
Mullets	17	5	4	11
NK Crab	97	11	NA	NA
NK Eel	86	28	NA	NA

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
NK Seatrout	27	14	NA	NA
Northern Kingfish	44	12	10	28
Offshore Hake	38	9	6	24
Other Fish	7	4	2	3
Pollock	251	37	5	8
Red Crab	43	6	5	7
Red Hake	1,776	125	110	806
Redfish	275	53	26	56
Rock Crab	68	17	11	34
Scup	2,762	200	178	1,225
Sea Robins	208	45	33	101
Sea Scallop	4,398	439	377	1,648
Silver Hake	3,027	161	136	1,423
Silver&Offshhake Mix	16	7	5	7
Skates	3,987	226	185	1,606
Skipjack Tuna	8	8	5	5
Spanish Mackerel	8	6	2	2
Spot	10	5	4	6
Spotted Weakfish	87	22	15	49
Squeteague Weakfish	770	101	89	475
Striped Bass	41	15	4	6
Summer Flounder	4,550	287	242	1,974
Surf Clam	343	29	21	102
Swordfish	90	26	17	26
Tautog	48	29	6	8
Triggerfish	71	36	21	28
Waved Whelk	18	4	2	2
White Hake	215	37	8	11
Winter Flounder	546	74	32	60
Witch Flounder	251	43	14	35

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Yellowfin Tuna	39	15	10	12
Yellowtail Flounder	331	47	19	39

Table 10.13 Total and Expected Number of Trips and Vessels by Port, Zone 1, 2019

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Atlantic City, NJ	454	24	21	197
Barnegat, NJ	518	39	34	146
Beaufort, NC	134	59	44	70
Boston, MA	26	7	3	6
Cape May, NJ	726	144	79	242
Chatham, MA	661	24	19	141
Chincoteague, VA	31	15	13	21
Fairhaven, MA	172	17	13	85
Gloucester, MA	65	12	2	6
Hampton Bay, NY	279	13	9	97
Hampton, VA	196	59	51	106
Harwichport, MA	164	9	6	44
Hobucken, NC	15	9	7	8
Hyannis, MA	45	6	4	12
Little Compton, RI	232	10	9	63
Montauk, NY	1,065	42	38	409
Morehead City, NC	5	3	3	4
New Bedford, MA	3,298	383	334	1,669
New London, CT	229	10	10	69
Newport News, VA	153	74	49	70
Newport, RI	221	11	8	89
North Kingstown, RI	34	3	3	12
Ocean City, MD	41	6	5	22
Point Judith, RI	2,445	129	111	1,068
Point Pleasant, NJ	1,718	77	61	569

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Sea Isle City, NJ	41	3	2	8
Shinnecock, NY	118	11	8	59
Stonington, CT	319	20	18	135
Wanchese, NC	19	9	5	7
Westport, MA	81	7	6	42

Table 10.14 Percentages of Total Revenue, Landings, and Days-at-Sea for Species of Interest, Zone 1, 2018

Species	Revenue as % of Total	Landings as % of Total	DAS as % of Total
Jonah Crab	58.66	58.85	32.95
Clearnose Skate	57.69	43.55	55.87
Golden Tilefish	48.98	49.70	49.24
Scup	46.46	41.14	34.72
Summer Flounder	44.33	47.11	34.13
Black Sea Bass	43.11	46.19	37.01
Weakfish	41.13	37.20	47.56
Spotted Seatrout	34.36	26.35	54.36
Atlantic Sea Scallop	33.14	33.45	31.05
Illex Squid	29.96	27.73	27.12

Table 10.15 Total and Expected Number of Trips and Vessels by FMP, Zone 1, 2018

FMP	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
ASMFC FMP	2,080	219	129	822
Atlantic Herring	140	34	16	39
Bluefish	906	162	101	303
Highly Migratory Species	555	85	54	157
Mackerel, Squid, and Butterfish	4,194	225	185	1,626
Monkfish	6,867	477	399	2,483
No Federal FMP	2,913	245	189	1,337
Northeast Multispecies	1,106	133	66	143

FMP	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Sea Scallop	5,705	489	443	2,435
SERO FMP	169	75	32	46
Skates	4,319	244	204	1,432
Small-Mesh Multispecies	3,373	177	151	1,395
Spiny Dogfish	649	82	50	142
Summer Flounder, Scup, Black Sea Bass	5,726	343	289	2,243
Surfclam, Ocean Quahog	1,175	40	30	569
Tilefish	996	137	118	551

Table 10.16 Total and Expected Number of Trips and Vessels by Species, Zone 1, 2018

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Albacore Tuna	5	5	2	2
Am. Plaice Flounder	139	32	4	4
Amber Jack	12	9	4	4
American Eel	199	34	27	93
American Lobster	1,620	147	95	625
American Shad	7	3	3	4
Atlantic Croaker	7	6	3	3
Atlantic Halibut	114	27	4	4
Atlantic Herring	140	34	16	39
Atlantic Mackerel	1,246	155	113	494
Big Eye Tuna	15	9	5	5
Black Sea Bass	3,103	247	214	1,328
Blk Bellied Rosefish	8	3	3	4
Bluefish	906	162	101	303
Blueline Tilefish	204	51	41	111
Bonito	40	28	9	10
Butterfish	2,308	152	129	901
Channeled Whelk	168	10	7	51

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Chub Mackerel	18	10	4	4
Clearnose Skate	63	23	20	38
Cobia	4	4	1	1
Cod	577	74	23	32
Conger Eel	869	113	93	457
Cunner	53	19	8	14
Cusk	22	13	1	1
Dogfish Smooth	492	55	36	131
Dogfish Spiny	649	82	50	142
Dolphinfish	31	14	10	16
Fourspot Flounder	50	9	7	22
Golden Tilefish	921	132	114	512
Haddock	416	60	21	26
Horseshoe Crab	4	3	2	2
Illex Squid	428	46	30	130
John Dory	580	89	74	247
Jonah Crab	1,374	78	62	664
King Whiting	416	87	67	215
Knobbed Whelk	127	14	11	45
Little Tuna	14	9	5	7
Longfin Squid	3,506	198	172	1,431
Menhaden	14	10	2	4
Monkfish	6,861	477	399	2,482
Mullets	30	8	6	13
NK Crab	93	12	NA	NA
NK Eel	117	43	NA	NA
NK Seatrout	40	23	NA	NA
Northern Kingfish	99	26	20	55
Offshore Hake	34	16	14	23
Other Fish	26	9	7	12

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Pollock	172	38	10	12
Red Crab	46	4	3	7
Red Hake	2,123	140	124	846
Red Porgy	9	6	4	5
Redfish	174	35	14	25
Rock Crab	30	9	5	8
Scup	3,077	223	190	1,205
Sea Raven	4	3	1	1
Sea Robins	270	47	35	145
Sea Scallop	5,705	489	443	2,435
Silver Hake	2,935	155	135	1,201
Skates	4,296	243	203	1,418
Spanish Mackerel	13	4	2	5
Spot	8	5	2	2
Spotted Hake	21	4	4	10
Spotted Weakfish	188	38	28	121
Squeteague Weakfish	1,030	137	112	609
Steelhead Trout	15	8	6	10
Striped Bass	51	26	9	12
Summer Flounder	4,514	299	256	1,776
Surf Clam	288	27	14	69
Swordfish	27	15	10	12
Tautog	86	32	12	20
Thresher Shark	11	6	2	2
Triggerfish	87	44	10	10
Waved Whelk	60	6	3	4
White Hake	141	40	12	14
Winter Flounder	803	78	31	57
Witch Flounder	223	47	17	35
Yellowfin Tuna	27	17	11	13

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Yellowtail Flounder	620	57	25	64

Table 10.17 Total and Expected Number of Trips and Vessels by Port, Zone 1, 2018

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Atlantic City, NJ	579	20	15	215
Barnegat, NJ	648	44	37	155
Beaufort, NC	158	71	57	102
Belford, NJ	126	13	9	39
Boston, MA	26	9	5	7
Cape May, NJ	799	143	96	285
Chatham, MA	928	34	32	372
Chincoteague, VA	46	16	12	26
Fairhaven, MA	87	10	9	35
Fall River, MA	20	6	5	17
Gloucester, MA	65	15	3	3
Hampton Bay, NY	277	13	10	50
Hampton, VA	171	57	45	87
Harwichport, MA	234	10	8	135
Hobucken, NC	19	9	6	10
Hyannis, MA	138	18	14	105
Little Compton, RI	154	10	10	65
Menemsha, MA	19	3	3	16
Montauk, NY	1,099	53	45	403
Morehead City, NC	9	5	5	6
Nahant, MA	7	6	3	3
New Bedford, MA	3,593	388	349	1,962
New London, CT	253	9	9	80
Newport News, VA	150	64	44	69
Newport, RI	229	12	10	75
Ocean City, MD	35	6	6	20

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Point Judith, RI	2,940	150	127	1,047
Point Pleasant, NJ	2,083	80	66	600
Provincetown, MA	15	5	5	14
Shinnecock, NY	94	14	8	32
Stonington, CT	278	24	22	118
Tiverton, RI	71	3	3	14
Wanchese, NC	11	4	4	7
Westport, MA	88	8	7	59
Wildwood, NJ	53	10	7	20

Table 10.18 Percentages of Total Revenue, Landings, and Days-at-Sea for Species of Interest, Zone 1, 2017

Species	Revenue as % of Total	Landings as % of Total	DAS as % of Total
Jonah Crab	52.29	51.40	21.93
Clearnose Skate	46.06	29.77	45.78
Summer Flounder	42.97	44.00	31.10
Golden Tilefish	41.62	41.82	50.57
Scup	40.84	37.51	32.39
Offshore Hake	39.13	33.90	44.93
Black Sea Bass	37.21	35.45	32.34
Spot	32.50	32.07	42.82
Butterfish	31.28	31.86	26.13
Atlantic Sea Scallop	30.19	30.25	27.63

Table 10.19 Total and Expected Number of Trips and Vessels by FMP, Zone 1, 2017

FMP	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
ASMFC FMP	2,022	235	131	735
Atlantic Herring	124	32	15	34
Bluefish	1,986	200	150	657
Highly Migratory Species	702	107	68	244

FMP	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Mackerel, Squid, and Butterfish	3,976	213	178	1,414
Monkfish	6,980	466	380	2,489
No Federal FMP	2,909	247	184	1,297
Northeast Multispecies	1,160	151	72	189
Sea Scallop	6,488	491	447	2,275
SERO FMP	265	89	51	78
Skates	4,300	239	194	1,506
Small-Mesh Multispecies	3,096	173	141	1,244
Spiny Dogfish	695	83	55	188
Summer Flounder, Scup, Black Sea Bass	5,810	352	287	2,174
Surfclam, Ocean Quahog	1,024	40	26	505
Tilefish	1,138	141	122	657

Table 10.20 Total and Expected Number of Trips and Vessels by Species, Zone 1, 2017

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Albacore Tuna	14	11	6	6
Am. Plaice Flounder	104	32	2	2
American Eel	168	27	18	66
American Lobster	1,565	159	89	546
American Shad	8	3	3	4
Atlantic Croaker	7	5	4	4
Atlantic Halibut	58	24	3	4
Atlantic Herring	124	32	15	34
Atlantic Mackerel	820	122	93	323
Barrelfish	3	3	2	2
Big Eye Tuna	6	4	1	1
Black Sea Bass	3,001	250	200	1,203
Blk Bellied Rosefish	7	3	3	4
Blue Back Herring	8	5	4	5

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Blue Crab	14	6	4	9
Bluefish	1,986	200	150	657
Blueline Tilefish	247	57	43	129
Bonito	85	39	14	23
Butterfish	2,201	136	115	798
Channeled Whelk	131	15	9	64
Chub Mackerel	9	6	5	6
Clearnose Skate	65	21	19	30
Cobia	4	4	1	1
Cod	602	99	35	57
Conger Eel	725	92	72	353
Crevalle	7	4	3	4
Cunner	53	17	5	5
Cusk	36	14	2	2
Dogfish Smooth	603	73	48	209
Dogfish Spiny	695	83	55	188
Dolphinfish	38	16	10	14
Fourspot Flounder	55	10	8	25
Golden Tilefish	1,084	133	118	629
Haddock	222	39	5	6
Illex Squid	316	30	25	93
John Dory	745	100	88	346
Jonah Crab	1,183	68	52	525
King Whiting	436	80	69	242
Knobbed Whelk	103	20	13	41
Little Tuna	24	15	8	11
Longfin Squid	3,465	193	168	1,258
Mako Shortfin Shark	8	7	4	4
Menhaden	25	12	5	5
Monkfish	6,973	466	380	2,484

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Mullets	34	9	8	13
NK Crab	57	12	NA	NA
NK Eel	137	35	NA	NA
NK Seatrout	77	27	NA	NA
NK Tilefish	27	4	NA	NA
Northern Kingfish	70	20	16	39
Offshore Hake	35	19	13	19
Other Fish	33	10	8	13
Pollock	171	40	7	8
Red Crab	36	6	4	6
Red Hake	2,018	129	108	822
Redfish	146	40	10	20
Rock Crab	33	8	4	9
Scup	3,111	228	182	1,160
Sea Robins	388	63	49	171
Sea Scallop	6,488	491	447	2,275
Silver Hake	2,678	157	127	1,066
Skates	4,281	239	194	1,499
Spanish Mackerel	5	3	2	3
Spot	5	5	3	3
Spotted Hake	27	3	3	11
Spotted Weakfish	132	34	25	71
Squeteague Weakfish	1,126	129	106	622
Striped Bass	74	29	11	13
Summer Flounder	4,158	306	258	1,627
Surf Clam	207	25	11	42
Swordfish	56	16	11	17
Tautog	86	32	7	24
Thresher Shark	14	4	3	5
Triggerfish	191	64	33	50

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
White Hake	143	48	14	18
White Perch	15	5	4	8
Winter Flounder	769	89	31	84
Witch Flounder	210	56	19	51
Yellowfin Tuna	25	14	8	10
Yellowtail Flounder	707	75	28	95

Table 10.21 Total and Expected Number of Trips and Vessels by Port, Zone 1, 2017

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Atlantic City, NJ	627	22	15	206
Barnegat, NJ	945	47	44	373
Beaufort, NC	122	54	42	72
Boston, MA	21	7	3	5
Cape May, NJ	1,064	158	121	352
Chatham, MA	890	31	28	266
Chincoteague, VA	52	17	12	26
Davisville, RI	16	4	3	6
Edgartown, MA	23	3	3	22
Fairhaven, MA	108	17	11	68
Gloucester, MA	52	12	4	5
Hampton Bay, NY	294	14	9	45
Hampton, VA	192	56	49	94
Harwichport, MA	408	16	15	259
Hyannis, MA	248	19	12	179
Little Compton, RI	175	7	7	78
Menemsha, MA	28	3	3	26
Montauk, NY	1,285	54	45	376
Morehead City, NC	6	4	3	4
Nantucket, MA	34	5	4	29
New Bedford, MA	3,110	384	329	1,360

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
New London, CT	269	13	11	109
Newport News, VA	143	66	50	69
Newport, RI	179	13	7	59
Ocean City, MD	44	8	7	27
Point Judith, RI	2,960	146	115	927
Point Pleasant, NJ	2,067	82	67	699
Sandwich, MA	115	3	3	16
Shinnecock, NY	106	11	9	41
Stonington, CT	215	20	19	69
Tiverton, RI	83	3	3	26
Wanchese, NC	32	14	12	20
Westport, MA	97	8	8	70
Wildwood, NJ	95	8	6	25

Table 10.22 Percentages of Total Revenue, Landings, and Days-at-Sea for Species of Interest, Zone 1, 2016

Species	Revenue as % of Total	Landings as % of Total	DAS as % of Total
Jonah Crab	44.67	43.70	20.19
Golden Tilefish	43.48	43.26	45.05
Scup	38.76	38.68	32.48
Offshore Hake	38.54	31.42	35.10
Summer Flounder	37.88	40.82	26.93
Black Sea Bass	34.27	34.79	34.54
Atlantic Chub Mackerel	25.42	28.87	8.46
Spotted Seatrout	22.28	22.64	35.98
Atlantic Sea Scallop	21.19	21.42	19.99
Red Hake	20.14	18.74	27.72

Table 10.23 Total and Expected Number of Trips and Vessels by FMP, Zone 1, 2016

FMP	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips

FMP	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
ASMFC FMP	1,976	237	123	658
Atlantic Herring	159	28	16	39
Bluefish	1,831	212	154	643
Highly Migratory Species	519	90	54	144
Mackerel, Squid, and Butterfish	4,200	242	196	1,470
Monkfish	6,980	508	383	2,414
No Federal FMP	2,541	247	177	1,090
Northeast Multispecies	1,261	145	70	139
Sea Scallop	6,407	508	440	1,899
SERO FMP	186	76	53	80
Skates	4,175	250	199	1,450
Small-Mesh Multispecies	2,828	173	140	1,123
Spiny Dogfish	614	77	42	126
Summer Flounder, Scup, Black Sea Bass	5,759	355	277	2,111
Surfclam, Ocean Quahog	896	35	21	307
Tilefish	812	118	101	426

Table 10.24 Total and Expected Number of Trips and Vessels by Species, Zone 1, 2016

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Albacore Tuna	13	6	4	5
Am. Plaice Flounder	106	34	2	2
American Eel	109	20	17	49
American Lobster	1,598	161	80	518
Atlantic Croaker	42	29	17	20
Atlantic Halibut	65	34	4	4
Atlantic Herring	159	28	16	39
Atlantic Mackerel	792	121	80	312
Big Eye Tuna	11	9	3	3
Black Sea Bass	2,194	232	198	970

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Blue Crab	31	9	6	19
Bluefish	1,831	212	154	643
Blueline Tilefish	208	59	39	89
Bonito	43	19	14	25
Butterfish	2,115	142	111	747
Channeled Whelk	190	12	7	69
Chub Mackerel	20	7	4	4
Clearnose Skate	72	19	16	36
Cod	850	112	39	68
Conchs	39	10	5	6
Conger Eel	717	96	76	383
Cunner	56	17	6	9
Cusk	24	16	2	2
Dogfish Smooth	459	62	40	124
Dogfish Spiny	614	77	42	126
Dolphinfish	30	12	10	15
Fourspot Flounder	57	6	5	16
Golden Tilefish	735	107	94	396
Haddock	270	48	6	6
Hickory Shad	5	3	3	4
Horseshoe Crab	3	3	1	1
Illex Squid	119	33	23	34
John Dory	596	103	83	263
Jonah Crab	1,071	68	51	476
King Whiting	294	80	59	168
Knobbed Whelk	63	12	6	24
Little Tuna	9	7	4	4
Longfin Squid	3,943	225	189	1,382
Mako Shortfin Shark	4	3	2	2
Menhaden	16	9	2	2

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Monkfish	6,952	508	383	2,406
Mullets	15	8	6	8
NK Crab	21	3	NA	NA
NK Eel	95	28	NA	NA
NK Seatrout	48	18	NA	NA
Northern Kingfish	21	12	6	10
Octopus	9	4	4	5
Offshore Hake	30	16	9	15
Other Fish	52	11	8	15
Pollock	175	42	4	5
Red Hake	2,006	126	104	782
Red Porgy	7	5	5	6
Redfish	99	36	7	9
Rock Crab	71	11	10	24
Scup	2,892	211	173	1,055
Sea Robins	248	55	37	107
Sea Scallop	6,407	508	440	1,899
Sheepshead	4	4	3	3
Silver Hake	2,422	159	130	990
Skates	4,153	250	199	1,440
Skipjack Tuna	4	4	3	3
Snowy Grouper	9	8	5	5
Spanish Mackerel	7	4	2	2
Spotted Hake	20	3	3	11
Spotted Weakfish	107	28	19	49
Squeteague Weakfish	884	112	88	450
Steelhead Trout	12	5	4	8
Striped Bass	58	26	6	7
Summer Flounder	4,825	320	256	1,775
Surf Clam	88	22	7	10

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Swordfish	24	11	6	7
Tautog	82	23	7	12
Thresher Shark	3	3	2	2
Triggerfish	106	44	29	45
Waved Whelk	39	5	3	7
White Hake	121	42	10	11
Winter Flounder	984	96	38	75
Witch Flounder	261	65	24	49
Yellowfin Tuna	17	13	7	8
Yellowtail Flounder	827	82	36	81

Table 10.25 Total and Expected Number of Trips and Vessels by Port, Zone 1, 2016

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Atlantic City, NJ	763	21	14	242
Barnegat, NJ	995	43	41	439
Beaufort, NC	93	46	38	58
Belford, NJ	159	13	12	61
Boston, MA	60	12	5	25
Cape May, NJ	1,026	158	109	333
Chatham, MA	837	33	29	302
Chincoteague, VA	45	19	14	23
Davisville, RI	30	3	3	8
Fairhaven, MA	110	21	13	52
Gloucester, MA	69	16	4	4
Hampton Bay, NY	290	10	6	41
Hampton, VA	249	64	55	116
Harwichport, MA	279	11	10	114
Hyannis, MA	155	13	11	69
Little Compton, RI	130	8	7	77
Menemsha, MA	8	3	2	2

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Montauk, NY	1,181	48	38	361
Morehead City, NC	9	5	4	6
New Bedford, MA	2,770	337	260	899
New London, CT	364	16	14	99
Newport News, VA	179	73	49	70
Newport, RI	198	13	8	68
Ocean City, MD	34	11	7	16
Oriental, NC	18	9	8	12
Point Judith, RI	2,919	125	100	936
Point Pleasant, NJ	1,904	92	65	558
Portland, ME	3	3	1	1
Sandwich, MA	121	3	3	22
Shinnecock, NY	126	17	8	31
Stonington, CT	229	21	20	91
Tiverton, RI	87	4	3	20
Wanchese, NC	28	10	9	15
Westport, MA	118	11	9	71
Wildwood, NJ	109	9	9	26

Table 10.26 Percentages of Total Revenue, Landings, and Days-at-Sea for Species of Interest, Zone 1, 2015

Species	Revenue as % of Total	Landings as % of Total	DAS as % of Total
Spot	61.95	54.75	43.10
Spotted Seatrout	47.27	47.28	59.96
Weakfish	42.74	38.76	44.18
Scup	42.12	45.87	34.39
Summer Flounder	41.31	43.73	27.82
Golden Tilefish	40.47	40.34	43.56
Jonah Crab	37.83	36.81	20.22
Black Sea Bass	35.61	35.62	38.02
Offshore Hake	26.52	32.44	47.94

Species	Revenue as % of Total	Landings as % of Total	DAS as % of Total
Red Hake	26.18	23.90	29.01

Table 10.27 Total and Expected Number of Trips and Vessels by FMP, Zone 1, 2015

FMP	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
ASMFC FMP	1,966	253	143	689
Atlantic Herring	180	36	26	82
Bluefish	1,698	210	146	462
Highly Migratory Species	594	106	58	133
Mackerel, Squid, and Butterfish	3,803	236	197	1,471
Monkfish	6,711	515	377	2,499
No Federal FMP	2,587	256	178	1,134
Northeast Multispecies	1,470	174	90	268
Sea Scallop	3,767	462	339	842
SERO FMP	116	60	39	55
Skates	4,438	262	200	1,730
Small-Mesh Multispecies	2,831	172	135	1,213
Spiny Dogfish	508	89	48	133
Summer Flounder, Scup, Black Sea Bass	5,247	329	268	2,047
Surfclam, Ocean Quahog	897	38	23	284
Tilefish	687	110	91	340

Table 10.28 Total and Expected Number of Trips and Vessels by Species, Zone 1, 2015

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Albacore Tuna	25	9	5	5
Am. Plaice Flounder	141	53	2	2
Amber Jack	3	3	2	2
American Eel	137	21	15	70
American Lobster	1,543	175	95	490
American Shad	3	3	2	2

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Atlantic Croaker	87	52	32	41
Atlantic Cutlassfish	6	5	4	4
Atlantic Halibut	98	42	7	7
Atlantic Herring	180	36	26	82
Atlantic Mackerel	745	116	87	388
Big Eye Tuna	62	19	11	15
Black Sea Bass	1,880	218	186	943
Blue Crab	18	7	6	9
Bluefin Tuna	5	4	2	2
Bluefish	1,698	210	146	462
Blueline Tilefish	160	47	35	64
Bonito	69	29	13	15
Butterfish	1,980	133	107	707
Channeled Whelk	176	19	9	38
Chub Mackerel	18	9	2	3
Cod	864	127	49	117
Conchs	60	14	4	5
Conger Eel	704	88	77	375
Cunner	42	15	5	7
Cusk	49	27	2	2
Dogfish Smooth	477	74	37	97
Dogfish Spiny	508	89	48	133
Dolphinfish	13	7	4	5
Fourspot Flounder	104	13	12	56
Golden Tilefish	626	103	87	316
Haddock	310	64	9	10
Harvest Fish	14	9	8	10
Horseshoe Crab	4	4	2	2
Illex Squid	70	26	17	24
John Dory	564	88	76	243

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Jonah Crab	1,090	72	56	485
King Whiting	247	74	62	161
Knobbed Whelk	82	15	9	25
Little Tuna	8	6	2	2
Longfin Squid	3,541	209	179	1,361
Mako Shortfin Shark	10	4	3	3
Menhaden	21	11	6	6
Monkfish	6,700	515	377	2,492
Mullets	13	7	5	5
NK Crab	17	9	NA	NA
NK Eel	100	25	NA	NA
NK Seatrout	35	17	NA	NA
NK Tilefish	18	3	NA	NA
Ns Squids	3	3	2	2
Octopus	3	3	2	2
Offshore Hake	40	15	12	19
Other Fish	44	19	14	21
Pollock	193	59	7	7
Red Hake	1,885	127	102	810
Redfish	118	49	6	7
Rock Crab	98	19	11	25
Sand Tilefish	5	4	3	4
Scup	2,799	210	176	1,112
Sea Raven	8	5	2	2
Sea Robins	244	52	31	74
Sea Scallop	3,767	462	339	842
Silver Hake	2,478	148	123	1,091
Skates	4,432	262	200	1,726
Spadefish	3	3	3	3
Spanish Mackerel	4	3	2	2

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Spot	28	8	6	19
Spotted Weakfish	95	24	21	67
Squeteague Weakfish	851	114	97	517
Striped Bass	45	24	5	5
Summer Flounder	4,401	297	247	1,700
Surf Clam	82	23	8	8
Swordfish	38	13	9	10
Tautog	59	23	10	13
Thresher Shark	4	4	1	1
Triggerfish	56	31	20	27
Wahoo	8	6	3	3
White Hake	194	76	21	33
White Perch	12	3	3	7
Winter Flounder	992	105	47	93
Witch Flounder	512	100	41	127
Yellowfin Tuna	57	20	11	18
Yellowtail Flounder	1,012	94	53	172

Table 10.29 Total and Expected Number of Trips and Vessels by Port, Zone 1, 2015

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Atlantic City, NJ	600	30	19	145
Barnegat, NJ	952	51	42	216
Beaufort, NC	115	52	45	75
Belford, NJ	86	11	6	20
Boston, MA	90	15	5	42
Cape May, NJ	577	131	90	191
Chatham, MA	320	23	19	118
Chincoteague, VA	55	22	17	35
Fairhaven, MA	112	17	13	63
Fall River, MA	4	3	2	3

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Gloucester, MA	43	16	4	10
Hampton Bay, NY	116	13	9	40
Hampton, VA	161	55	49	92
Harwichport, MA	169	7	6	66
Hyannis, MA	30	11	5	6
Little Compton, RI	152	8	6	74
Montauk, NY	1,094	48	40	411
Morehead City, NC	10	3	3	6
Nantucket, MA	4	3	1	1
New Bedford, MA	2,367	307	226	735
New London, CT	367	18	14	140
New Shoreham, RI	18	4	3	3
Newport News, VA	109	53	34	50
Newport, RI	232	14	10	80
Ocean City, MD	39	8	6	17
Point Judith, RI	2,825	124	92	930
Point Lookout, NY	12	3	3	4
Point Pleasant, NJ	1,732	87	59	499
Sandwich, MA	118	3	3	18
Shinnecock, NY	99	16	10	34
Stonington, CT	242	18	15	115
Tiverton, RI	60	3	3	17
Wanchese, NC	22	8	8	15
Westport, MA	162	7	7	122
Wildwood, NJ	27	6	4	7

Table 10.30 Percentages of Total Revenue, Landings, and Days-at-Sea for Species of Interest, Zone 1, 2014

Species	Revenue as % of Total	Landings as % of Total	DAS as % of Total
Spot	54.47	53.91	42.27
Golden Tilefish	48.29	49.16	45.49

Species	Revenue as % of Total	Landings as % of Total	DAS as % of Total
Jonah Crab	42.04	41.28	19.00
Offshore Hake	40.20	43.05	30.04
Scup	36.70	39.33	31.65
Summer Flounder	36.11	38.63	25.48
Spotted Seatrout	35.45	37.74	37.53
Black Sea Bass	33.41	33.62	31.46
Weakfish	31.45	29.78	38.19
Butterfish	30.15	31.95	23.77

Table 10.31 Total and Expected Number of Trips and Vessels by FMP, Zone 1, 2014

FMP	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
ASMFC FMP	2,551	267	153	838
Atlantic Herring	131	36	13	21
Bluefish	1,597	218	143	391
Highly Migratory Species	515	116	59	120
Mackerel, Squid, and Butterfish	3,666	235	199	1,377
Monkfish	6,975	574	409	2,375
No Federal FMP	2,770	289	197	1,170
Northeast Multispecies	1,804	219	112	325
Sea Scallop	3,332	469	327	651
SERO FMP	196	86	48	80
Skates	4,584	263	201	1,549
Small-Mesh Multispecies	2,962	193	142	1,216
Spiny Dogfish	563	98	51	130
Summer Flounder, Scup, Black Sea Bass	5,243	335	265	1,955
Surfclam, Ocean Quahog	853	31	21	211
Tilefish	879	112	96	459

Table 10.32 Total and Expected Number of Trips and Vessels by Species, Zone 1, 2014

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Albacore Tuna	33	19	10	14
Am. Plaice Flounder	239	61	5	5
American Eel	143	32	25	70
American Lobster	2,053	198	107	631
Atlantic Croaker	82	40	15	15
Atlantic Halibut	120	44	3	3
Atlantic Herring	131	36	13	21
Atlantic Mackerel	592	102	80	291
Big Eye Tuna	40	20	10	12
Black Sea Bass	2,116	223	188	933
Blue Crab	22	7	5	8
Bluefish	1,597	218	143	391
Blueline Tilefish	184	53	39	85
Bonito	59	29	11	14
Butterfish	2,011	141	106	729
Channeled Whelk	116	22	11	27
Chub Mackerel	42	15	10	11
Cod	1,006	144	56	115
Conchs	122	25	12	15
Conger Eel	799	101	80	396
Cunner	67	18	5	9
Cusk	99	33	3	5
Dogfish Smooth	381	68	36	76
Dogfish Spiny	563	98	51	130
Dolphinfish	76	26	16	33
Fourspot Flounder	90	12	10	52
Golden Tilefish	834	104	93	442
Haddock	482	75	14	18
Harvest Fish	5	4	4	4
Horseshoe Crab	3	3	2	2

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Illex Squid	125	20	15	32
John Dory	479	77	67	225
Jonah Crab	1,219	77	60	576
King Mackerel	4	3	2	2
King Whiting	324	85	62	179
Knobbed Whelk	31	19	7	11
Lightning Whelk	31	5	2	3
Little Tuna	10	7	3	3
Longfin Squid	3,462	220	187	1,289
Mako Shark	5	3	3	3
Mako Shortfin Shark	13	7	4	4
Menhaden	19	8	5	8
Monkfish	6,972	573	408	2,373
Mullets	9	5	4	6
NK Crab	34	6	NA	NA
NK Eel	174	34	NA	NA
NK Seatrout	75	31	NA	NA
Ns Squids	4	3	3	3
Octopus	7	3	2	2
Offshore Hake	39	19	14	20
Other Fish	23	12	7	9
Pollock	311	65	13	18
Red Hake	1,969	142	106	780
Redfish	229	48	7	12
Ribbonfish	5	4	3	3
Rock Crab	131	21	14	55
Sand Tilefish	3	3	2	2
Scup	2,572	219	179	1,029
Sea Raven	10	9	2	2
Sea Robins	233	53	34	77

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Sea Scallop	3,332	469	327	651
Silver Hake	2,535	165	124	1,062
Skates	4,570	263	201	1,542
Skipjack Tuna	5	4	1	1
Spanish Mackerel	14	7	6	10
Spot	18	9	5	7
Spotted Weakfish	102	26	17	61
Squeteague Weakfish	989	126	102	565
Striped Bass	54	29	7	10
Summer Flounder	4,469	304	241	1,621
Surf Clam	94	19	7	18
Swordfish	32	14	6	6
Tautog	84	23	9	23
Thresher Shark	5	4	1	1
Triggerfish	79	44	22	27
Waved Whelk	126	16	10	14
White Hake	367	88	31	50
White Perch	9	4	2	5
Winter Flounder	1,110	121	60	123
Witch Flounder	632	115	57	156
Yellowfin Tuna	82	35	19	32
Yellowtail Flounder	1,104	131	72	209

Table 10.33 Total and Expected Number of Trips and Vessels by Port, Zone 1, 2014

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Atlantic City, NJ	605	25	16	189
Barnegat, NJ	659	49	39	150
Beaufort, NC	78	37	32	53
Belford, NJ	74	11	7	28
Boston, MA	67	16	4	10

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Brielle, NJ	13	3	2	2
Cape May, NJ	594	111	75	218
Chatham, MA	424	20	19	121
Chincoteague, VA	77	23	19	43
Davisville, RI	57	4	4	17
Fairhaven, MA	152	16	11	82
Fall River, MA	30	4	3	24
Gloucester, MA	88	21	4	6
Hampton Bay, NY	138	12	10	41
Hampton, VA	103	36	31	57
Harwichport, MA	26	5	3	13
Hyannis, MA	19	8	3	3
Little Compton, RI	134	5	5	76
Montauk, NY	1,153	56	45	406
New Bedford, MA	2,191	311	209	625
New London, CT	326	19	17	117
Newport News, VA	133	50	36	55
Newport, RI	219	11	9	68
Ocean City, MD	41	6	6	23
Oriental, NC	20	6	6	13
Point Judith, RI	2,834	123	89	931
Point Lookout, NY	117	10	7	22
Point Pleasant, NJ	1,821	104	72	347
Portland, ME	5	4	1	1
Sandwich, MA	128	3	3	17
Shinnecock, NY	121	14	8	39
Stonington, CT	244	18	17	121
Tiverton, RI	66	7	3	12
Wanchese, NC	53	20	18	31
Westport, MA	260	9	9	175

Table 10.34 Percentages of Total Revenue, Landings, and Days-at-Sea for Species of Interest, Zone 1, 2013

Species	Revenue as % of Total	Landings as % of Total	DAS as % of Total
Golden Tilefish	51.92	51.96	46.31
Jonah Crab	45.74	45.94	17.69
Spot	41.26	46.83	52.90
Scup	36.77	35.74	32.05
Summer Flounder	34.09	36.39	24.18
Black Sea Bass	29.85	29.27	30.28
Butterfish	26.20	21.04	21.42
Longfin Squid	24.67	25.84	23.77
Weakfish	24.36	22.03	33.51
Offshore Hake	19.02	20.36	18.44

Table 10.35 Total and Expected Number of Trips and Vessels by FMP, Zone 1, 2013

FMP	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
ASMFC FMP	2,772	272	151	955
Atlantic Herring	158	35	25	45
Bluefish	1,869	232	166	629
Highly Migratory Species	527	113	56	125
Mackerel, Squid, and Butterfish	3,561	211	165	1,247
Monkfish	7,425	561	421	2,455
No Federal FMP	3,175	297	202	1,151
Northeast Multispecies	2,111	240	136	423
Sea Scallop	4,052	481	388	936
SERO FMP	301	99	58	100
Skates	4,655	263	195	1,478
Small-Mesh Multispecies	3,115	175	128	1,139
Spiny Dogfish	698	127	70	158
Summer Flounder, Scup, Black Sea Bass	5,450	362	280	1,910

FMP	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Surfclam, Ocean Quahog	879	31	21	204
Tilefish	810	139	120	449

Table 10.36 Total and Expected Number of Trips and Vessels by Species, Zone 1, 2013

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Albacore Tuna	27	18	10	11
Am. Plaice Flounder	265	60	3	3
American Eel	112	28	15	47
American Lobster	2,228	205	105	726
American Shad	14	8	3	3
Atlantic Croaker	37	30	4	4
Atlantic Halibut	140	53	6	6
Atlantic Herring	158	35	25	45
Atlantic Mackerel	361	88	63	150
Big Eye Tuna	22	16	6	7
Black Sea Bass	2,348	230	188	939
Blue Crab	8	5	3	5
Bluefish	1,869	232	166	629
Blueline Tilefish	149	51	38	67
Bonito	33	22	7	8
Butterfish	1,912	124	101	678
Channeled Whelk	131	26	12	16
Chub Mackerel	27	10	5	5
Cobia	4	4	2	2
Cod	1,307	151	72	188
Conchs	130	24	12	16
Conger Eel	926	99	82	390
Cunner	116	26	10	27
Cusk	99	38	4	5
Dogfish Smooth	417	60	28	85

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Dogfish Spiny	698	127	70	158
Dolphinfish	35	18	7	15
Escolar	3	3	1	1
Fourspot Flounder	119	11	10	63
Golden Tilefish	746	136	115	420
Grouper	5	4	2	3
Haddock	413	69	10	11
Illex Squid	100	28	17	22
John Dory	565	106	82	265
Jonah Crab	1,284	88	65	601
King Whiting	184	56	42	91
Knobbed Whelk	25	10	3	5
Lightning Whelk	66	6	4	9
Little Tuna	11	6	4	5
Longfin Squid	3,291	187	151	1,139
Mako Shark	5	4	2	2
Mako Shortfin Shark	19	13	5	6
Menhaden	13	5	2	2
Monkfish	7,423	561	421	2,454
Mullets	29	9	7	16
NK Crab	8	6	NA	NA
NK Eel	188	33	NA	NA
NK Seatrout	98	33	NA	NA
Northern Puffer	5	4	2	2
Octopus	24	6	5	16
Offshore Hake	58	25	15	28
Other Fish	27	10	8	11
Pollock	341	72	13	14
Red Hake	2,047	129	103	743
Redfish	227	58	10	11

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Ribbonfish	8	5	3	6
Rock Crab	145	23	19	70
Sand Tilefish	18	8	6	10
Sand-Dab Flounder	7	5	1	1
Scup	2,861	218	178	1,051
Sea Raven	19	7	3	4
Sea Robins	238	51	35	82
Sea Scallop	4,052	481	388	936
Silver Hake	2,665	149	110	977
Skates	4,649	263	195	1,475
Spanish Mackerel	11	9	5	5
Spot	23	14	5	6
Spotted Weakfish	133	34	19	64
Squeteague Weakfish	1,044	122	98	497
Striped Bass	72	31	12	20
Striped Sea Robin	20	5	4	7
Summer Flounder	4,611	325	252	1,613
Surf Clam	92	17	7	21
Swordfish	40	18	7	7
Tautog	125	37	14	34
Thresher Shark	10	8	4	4
Triggerfish	215	61	37	62
Wahoo	5	4	2	3
Waved Whelk	250	17	11	45
White Hake	378	90	32	54
White Perch	9	6	4	4
Winter Flounder	739	105	40	67
Witch Flounder	849	112	57	206
Yellowfin Tuna	32	18	8	12
Yellowtail Flounder	1,450	163	95	310

Table 10.37 Total and Expected Number of Trips and Vessels by Port, Zone 1, 2013

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Atlantic City, NJ	497	25	14	132
Barnegat, NJ	658	51	41	164
Beaufort, NC	21	15	9	9
Belford, NJ	46	9	4	20
Boston, MA	49	12	2	5
Cape May, NJ	564	114	83	216
Chatham, MA	385	24	21	165
Chilmark, MA	52	7	6	49
Chincoteague, VA	105	27	23	56
Davisville, RI	67	4	4	18
Fairhaven, MA	105	13	10	41
Fall River, MA	38	4	3	33
Gloucester, MA	66	19	5	8
Hampton Bay, NY	154	12	8	32
Hampton, VA	158	42	35	77
Harwichport, MA	27	4	3	9
Hyannis, MA	8	6	3	3
Little Compton, RI	181	10	8	110
Montauk, NY	1,469	58	54	519
Nantucket, MA	7	3	1	1
New Bedford, MA	2,579	341	265	740
New London, CT	382	17	16	112
New Shoreham, RI	22	4	2	2
Newport News, VA	235	63	51	111
Newport, RI	328	29	14	86
Ocean City, MD	27	7	6	13
Point Judith, RI	2,965	116	95	909
Point Lookout, NY	230	9	9	51
Point Pleasant, NJ	1,909	89	65	398

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Portland, ME	5	3	1	1
Sandwich, MA	110	4	4	24
Shinnecock, NY	221	18	13	79
Stonington, CT	237	15	14	124
Tiverton, RI	85	4	4	24
Wanchese, NC	9	6	3	3
Westport, MA	229	9	9	128
Wildwood, NJ	30	7	4	11

Table 10.38 Percentages of Total Revenue, Landings, and Days-at-Sea for Species of Interest, Zone 1, 2012

Species	Revenue as % of Total	Landings as % of Total	DAS as % of Total
Golden Tilefish	60.56	60.08	46.60
Jonah Crab	46.38	45.84	19.48
Scup	38.26	36.30	33.36
Summer Flounder	33.71	36.62	24.66
Black Sea Bass	28.11	27.17	32.02
Spot	27.45	30.87	46.26
Offshore Hake	25.05	24.26	31.52
Atlantic Mackerel	22.88	17.14	22.48
Butterfish	21.24	18.05	23.26
Red Hake	20.06	17.70	29.90

Table 10.39 Total and Expected Number of Trips and Vessels by FMP, Zone 1, 2012

FMP	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
ASMFC FMP	2,735	305	171	884
Atlantic Herring	111	27	11	20
Bluefish	2,699	259	191	971
Highly Migratory Species	539	121	58	132
Mackerel, Squid, and Butterfish	3,841	234	185	1,348

FMP	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Monkfish	7,374	589	424	2,508
No Federal FMP	2,859	295	198	1,096
Northeast Multispecies	1,488	247	124	265
Sea Scallop	4,635	492	407	1,108
SERO FMP	371	102	67	145
Skates	4,461	280	206	1,516
Small-Mesh Multispecies	3,084	169	132	1,170
Spiny Dogfish	702	126	56	117
Summer Flounder, Scup, Black Sea Bass	5,324	373	292	1,872
Surfclam, Ocean Quahog	876	31	23	253
Tilefish	806	138	109	447

Table 10.40 Total and Expected Number of Trips and Vessels by Species, Zone 1, 2012

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Albacore Tuna	45	20	11	15
Am. Plaice Flounder	276	65	4	4
Amber Jack	10	6	3	5
American Eel	138	28	18	61
American Lobster	2,334	247	132	721
American Shad	16	6	6	10
Atlantic Croaker	19	14	4	4
Atlantic Halibut	76	42	3	3
Atlantic Herring	111	27	11	20
Atlantic Mackerel	536	93	57	199
Big Eye Tuna	38	11	5	5
Black Sea Bass	2,355	226	184	950
Blk Bellied Rosefish	7	5	2	3
Blue Crab	13	4	2	6
Bluefish	2,699	259	191	971

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Blueline Tilefish	133	45	29	61
Bonito	55	23	14	19
Butterfish	1,907	131	103	694
Cancer Crab	8	4	3	3
Channeled Whelk	39	18	8	14
Chub Mackerel	19	11	5	5
Cobia	3	3	1	1
Cod	858	133	44	81
Conchs	96	16	7	15
Conger Eel	823	83	65	381
Cunner	101	19	7	19
Cusk	104	40	4	7
Dogfish Smooth	407	75	33	95
Dogfish Spiny	702	126	56	117
Dolphinfish	51	14	8	24
Fourspot Flounder	196	15	12	89
Golden Tilefish	758	131	105	424
Haddock	375	73	8	8
Horseshoe Crab	8	4	4	7
Illex Squid	109	22	15	24
John Dory	579	96	80	251
Jonah Crab	1,222	91	66	565
King Mackerel	5	3	2	3
King Whiting	181	56	41	114
Knobbed Whelk	17	6	3	11
Little Tuna	19	8	5	7
Longfin Squid	3,610	216	177	1,256
Mako Shark	16	6	2	2
Mako Shortfin Shark	32	13	4	4
Menhaden	12	8	2	2

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Monkfish	7,374	589	424	2,508
Mullets	23	14	9	10
NK Crab	18	7	NA	NA
NK Eel	135	28	NA	NA
NK Seatrout	63	25	NA	NA
Ocean Quahog	792	16	16	222
Octopus	16	5	5	11
Offshore Hake	64	21	15	27
Other Fish	33	16	10	19
Pollock	293	74	11	18
Red Crab	37	6	4	7
Red Hake	2,107	134	108	810
Redfish	220	70	12	13
Rock Crab	172	36	23	86
Sand Tilefish	17	5	4	4
Sand-Dab Flounder	9	4	3	3
Scup	2,721	215	177	981
Sea Raven	16	7	2	3
Sea Robins	356	56	36	97
Sea Scallop	4,635	492	407	1,108
Sheepshead	5	4	3	3
Silver Hake	2,674	138	109	1,009
Skates	4,457	279	205	1,513
Spanish Mackerel	4	3	2	2
Spot	11	8	3	3
Spotted Weakfish	93	28	20	47
Squeteague Weakfish	913	119	90	431
Striped Bass	55	30	11	12
Summer Flounder	4,541	337	261	1,571
Surf Clam	84	19	9	32

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Swordfish	85	20	11	18
Tautog	82	26	13	13
Thresher Shark	4	4	1	1
Triggerfish	262	73	53	101
Wahoo	10	6	1	1
Waved Whelk	72	6	3	4
White Hake	322	90	23	34
Winter Flounder	179	75	18	18
Witch Flounder	651	103	42	120
Yellowfin Tuna	61	23	13	17
Yellowtail Flounder	924	166	82	145

Table 10.41 Total and Expected Number of Trips and Vessels by Port, Zone 1, 2012

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Atlantic City, NJ	459	32	19	160
Barnegat, NJ	570	50	43	168
Barnstable, MA	15	4	2	6
Beaufort, NC	17	12	8	9
Belmar, NJ	17	3	2	2
Brielle, NJ	99	4	4	20
Cape May, NJ	717	147	105	250
Chatham, MA	213	18	17	139
Chincoteague, VA	104	19	18	65
Davisville, RI	26	3	3	9
Fairhaven, MA	137	17	14	57
Fall River, MA	38	3	3	30
Freeport, NY	12	4	3	10
Gloucester, MA	96	36	5	10
Hampton Bay, NY	130	10	8	33
Hampton, VA	200	36	33	106

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Harwichport, MA	77	4	3	16
Little Compton, RI	150	11	6	72
Montauk, NY	1,483	64	55	493
Morehead City, NC	5	3	3	3
Nantucket, MA	9	3	2	7
Neptune, NJ	35	6	3	7
New Bedford, MA	2,757	348	251	740
New London, CT	364	17	16	141
New Shoreham, RI	23	3	1	1
Newport News, VA	306	70	56	145
Newport, RI	306	23	13	113
Ocean City, MD	82	12	6	39
Point Judith, RI	2,660	109	86	864
Point Lookout, NY	269	13	10	68
Point Pleasant, NJ	1,975	97	72	384
Portland, ME	7	4	1	1
Sandwich, MA	95	4	4	20
Shinnecock, NY	257	19	14	80
Stonington, CT	234	20	18	125
Tiverton, RI	83	4	4	27
Wanchese, NC	17	10	8	12
Westport, MA	169	8	7	102

Table 10.42 Percentages of Total Revenue, Landings, and Days-at-Sea for Species of Interest, Zone 1, 2011

Species	Revenue as % of Total	Landings as % of Total	DAS as % of Total
Jonah Crab	55.65	56.23	19.38
Golden Tilefish	52.00	51.95	45.62
Scup	38.17	37.38	32.46
Offshore Hake	34.72	29.40	32.50
Spot	33.41	30.64	38.66

Species	Revenue as % of Total	Landings as % of Total	DAS as % of Total
Black Sea Bass	26.36	24.34	25.54
Summer Flounder	26.26	28.82	20.21
Weakfish	21.87	19.57	37.15
Monkfish	19.44	23.40	12.73
Butterfish	18.52	17.91	20.94

Table 10.43 Total and Expected Number of Trips and Vessels by FMP, Zone 1, 2011

FMP	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
ASMFC FMP	2,730	302	170	930
Atlantic Herring	171	41	25	58
Bluefish	2,181	241	170	655
Highly Migratory Species	503	116	58	120
Mackerel, Squid, and Butterfish	3,417	231	189	1,248
Monkfish	6,905	556	384	2,548
No Federal FMP	2,838	286	204	1,133
Northeast Multispecies	1,564	222	109	312
Sea Scallop	4,673	500	379	830
SERO FMP	258	76	43	83
Skates	4,491	295	203	1,686
Small-Mesh Multispecies	2,814	176	137	1,165
Spiny Dogfish	774	115	73	245
Summer Flounder, Scup, Black Sea Bass	5,423	369	283	2,075
Surfclam, Ocean Quahog	777	26	19	181
Tilefish	945	131	108	543

Table 10.44 Total and Expected Number of Trips and Vessels by Species, Zone 1, 2011

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Albacore Tuna	15	11	2	2
Am. Plaice Flounder	279	72	8	9

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
American Eel	172	30	24	71
American Lobster	2,245	228	120	704
American Shad	26	11	6	8
Atlantic Croaker	34	25	8	8
Atlantic Halibut	44	26	1	1
Atlantic Herring	171	41	25	58
Atlantic Mackerel	522	100	78	268
Bay Scallop	13	3	2	5
Big Eye Tuna	21	12	4	5
Black Drum	6	6	2	2
Black Sea Bass	2,206	231	177	868
Blue Crab	6	6	3	3
Bluefin Tuna	6	4	3	3
Bluefish	2,181	241	170	655
Blueline Tilefish	118	36	24	61
Bonito	47	24	11	15
Butterfish	1,767	137	108	679
Channeled Whelk	98	18	10	64
Chub Mackerel	4	3	2	3
Cobia	6	5	2	2
Cod	933	144	54	136
Conchs	125	12	7	63
Conger Eel	657	91	67	288
Cunner	112	18	10	22
Cusk	135	40	6	7
Dogfish Smooth	401	78	39	91
Dogfish Spiny	774	115	73	245
Dolphinfish	42	18	9	20
Fourspot Flounder	93	8	7	38
Golden Tilefish	899	122	103	521

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Grouper	5	5	2	2
Haddock	472	79	13	15
Hammerhead Shark	7	6	3	3
Harvest Fish	13	8	7	8
Illex Squid	227	35	26	46
John Dory	583	89	78	264
Jonah Crab	1,254	100	72	599
King Whiting	173	51	37	97
Knobbed Whelk	67	11	7	56
Lightning Whelk	22	3	1	1
Little Tuna	10	9	4	4
Longfin Squid	3,103	209	173	1,141
Mako Shortfin Shark	9	6	3	4
Menhaden	13	9	5	6
Monkfish	6,905	556	384	2,548
Mullets	20	10	7	9
NK Crab	13	6	NA	NA
NK Eel	150	32	NA	NA
NK Seatrout	34	18	NA	NA
Ocean Quahog	701	19	17	175
Offshore Hake	108	27	18	50
Other Fish	15	11	7	8
Pollock	352	78	14	14
Red Hake	1,736	130	103	669
Red Porgy	5	4	1	1
Redfish	185	60	6	6
Rock Crab	224	36	24	113
Sand Tilefish	15	4	4	8
Sand-Dab Flounder	34	21	8	8
Scup	2,753	222	191	1,180

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Sea Raven	36	10	3	3
Sea Robins	380	65	45	131
Sea Scallop	4,673	500	379	830
Silver Hake	2,470	150	120	1,036
Skates	4,489	295	202	1,685
Southern Flounder	11	4	3	4
Spadefish	3	3	1	1
Spanish Mackerel	9	7	4	4
Spotted Weakfish	101	26	20	62
Squeteague Weakfish	830	113	88	414
Steelhead Trout	27	9	8	13
Striped Bass	53	32	14	20
Summer Flounder	4,802	344	263	1,865
Surf Clam	76	14	4	6
Swordfish	52	18	9	12
Tautog	85	28	11	13
Thresher Shark	9	8	3	3
Triggerfish	173	40	27	48
White Hake	384	93	38	70
Winter Flounder	292	101	22	23
Witch Flounder	596	103	44	142
Yellowfin Tuna	38	21	11	13
Yellowtail Flounder	1,019	154	66	203

Table 10.45 Total and Expected Number of Trips and Vessels by Port, Zone 1, 2011

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Atlantic City, NJ	479	25	18	71
Barnegat, NJ	868	51	45	214
Barnstable, MA	7	4	3	3
Beaufort, NC	22	11	5	6

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Belford, NJ	122	15	8	42
Brielle, NJ	74	7	4	5
Cape May, NJ	792	156	93	193
Chatham, MA	178	18	16	123
Chincoteague, VA	65	12	12	31
Fairhaven, MA	76	14	10	37
Fall River, MA	56	4	4	35
Freeport, NY	46	4	4	20
Gloucester, MA	111	22	6	7
Hampton Bay, NY	92	10	7	17
Hampton, VA	166	41	33	69
Harwichport, MA	18	4	2	3
Little Compton, RI	156	9	8	88
Montauk, NY	1,430	58	48	516
Nantucket, MA	90	7	3	66
New Bedford, MA	2,320	323	221	639
New London, CT	278	16	13	122
New Shoreham, RI	46	4	1	1
Newport News, VA	292	76	51	93
Newport, RI	221	22	12	86
North Kingstown, RI	84	5	5	19
Ocean City, MD	110	11	8	51
Oriental, NC	22	13	7	8
Point Judith, RI	2,584	101	87	925
Point Lookout, NY	395	15	11	82
Point Pleasant, NJ	2,160	118	77	466
Sandwich, MA	103	4	4	21
Shinnecock, NY	345	24	13	81
Stonington, CT	223	19	18	107
Tiverton, RI	68	3	3	34

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Wanchese, NC	84	33	26	46
Waretown, NJ	46	3	3	27
Westport, MA	225	12	11	174
Wildwood, NJ	35	6	5	10

Table 10.46 Percentages of Total Revenue, Landings, and Days-at-Sea for Species of Interest, Zone 1, 2010

Species	Revenue as % of Total	Landings as % of Total	DAS as % of Total
Jonah Crab	58.16	57.83	21.73
Golden Tilefish	53.68	54.24	46.25
Scup	39.55	42.44	31.89
Spot	28.73	30.99	30.86
Summer Flounder	24.87	24.94	19.02
Black Sea Bass	23.52	22.11	22.67
Longfin Squid	19.44	19.84	23.25
Ocean Quahog	17.67	19.31	15.73
Weakfish	17.56	14.22	40.05
Monkfish	16.43	21.36	13.16

Table 10.47 Total and Expected Number of Trips and Vessels by FMP, Zone 1, 2010

FMP	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
ASMFC FMP	3,162	341	184	1,118
Atlantic Herring	284	55	36	102
Bluefish	1,867	225	158	713
Highly Migratory Species	394	108	46	69
Mackerel, Squid, and Butterfish	3,163	236	182	1,336
Monkfish	6,649	617	401	2,543
No Federal FMP	2,644	304	194	1,122
Northeast Multispecies	1,635	297	169	353
Sea Scallop	3,906	484	350	768

FMP	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
SERO FMP	180	68	40	66
Skates	3,613	296	201	1,342
Small-Mesh Multispecies	2,881	184	150	1,368
Spiny Dogfish	456	95	47	110
Summer Flounder, Scup, Black Sea Bass	5,226	427	303	2,156
Surfclam, Ocean Quahog	832	28	20	232
Tilefish	1,095	135	113	637

Table 10.48 Total and Expected Number of Trips and Vessels by Species, Zone 1, 2010

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Albacore Tuna	24	10	5	5
Am. Plaice Flounder	303	86	9	9
American Eel	129	25	19	49
American Lobster	2,677	267	147	879
American Shad	19	8	4	6
Atlantic Croaker	16	12	3	3
Atlantic Halibut	50	32	1	1
Atlantic Herring	284	55	36	102
Atlantic Mackerel	706	137	100	373
Big Eye Tuna	31	11	6	6
Black Sea Bass	1,768	251	183	715
Blackfin Tuna	3	3	2	2
Blk Bellied Rosefish	3	3	1	1
Blue Crab	14	10	6	9
Bluefin Tuna	7	4	2	2
Bluefish	1,867	225	158	713
Blueline Tilefish	143	48	34	77
Bonito	61	26	12	14
Butterfish	1,826	145	122	826

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Channeled Whelk	84	15	6	42
Cod	925	161	54	94
Conchs	74	10	7	43
Conger Eel	786	104	80	379
Cunner	90	25	10	16
Cusk	104	47	5	5
Dogfish Smooth	260	66	24	36
Dogfish Spiny	456	95	47	110
Dolphinfish	59	20	12	28
Fourspot Flounder	114	11	10	43
Golden Tilefish	1,060	131	112	619
Haddock	425	90	14	15
Harvest Fish	6	4	2	2
Horseshoe Crab	3	3	3	3
Illex Squid	201	42	29	44
John Dory	434	81	66	203
Jonah Crab	1,571	102	78	731
King Whiting	199	46	30	96
Knobbed Whelk	44	7	6	41
Little Tuna	5	5	2	2
Longfin Squid	2,735	201	154	1,173
Mako Shark	13	5	3	3
Mako Shortfin Shark	21	12	5	6
Menhaden	34	11	2	2
Monkfish	6,649	617	401	2,543
NK Eel	121	34	NA	NA
NK Herring	3	3	NA	NA
NK Seatrout	24	14	NA	NA
NK Tilefish	39	23	NA	NA
Northern Sea Robin	6	4	2	3

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Ocean Pout	5	5	3	3
Ocean Quahog	789	19	18	229
Offshore Hake	120	29	20	48
Other Fish	16	11	6	7
Pollock	310	88	13	14
Red Crab	36	8	4	6
Red Hake	1,946	142	114	875
Red Porgy	7	4	3	4
Redfish	209	66	11	13
Rock Crab	304	37	22	148
Sand Tilefish	10	6	4	6
Sand-Dab Flounder	184	32	13	19
Scup	2,690	237	197	1,305
Sea Raven	53	15	7	12
Sea Robins	247	48	34	103
Sea Scallop	3,906	484	350	768
Silver Hake	2,524	152	132	1,248
Skates	3,613	296	201	1,342
Skipjack Tuna	7	5	1	1
Southern Flounder	25	10	6	7
Spanish Mackerel	9	5	3	4
Spot	8	3	3	4
Spotted Weakfish	88	26	19	50
Squeteague Weakfish	754	96	82	443
Steelhead Trout	5	4	2	2
Striped Bass	80	37	13	34
Striped Sea Robin	4	3	2	2
Summer Flounder	4,583	383	274	1,912
Surf Clam	42	14	2	3
Swordfish	64	14	8	10

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Tautog	75	35	12	17
Thresher Shark	10	9	1	1
Triggerfish	57	24	10	11
Wahoo	10	7	3	3
White Hake	433	109	44	95
Winter Flounder	231	102	23	28
Witch Flounder	582	128	62	135
Wolffishes	16	11	1	1
Yellowfin Tuna	53	23	14	18
Yellowtail Flounder	1,026	218	114	204

Table 10.49 Total and Expected Number of Trips and Vessels by Port, Zone 1, 2010

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Atlantic City, NJ	226	21	13	60
Barnegat, NJ	572	52	39	135
Barnstable, MA	19	7	3	4
Beaufort, NC	30	13	8	9
Belford, NJ	147	15	9	55
Boston, MA	25	11	1	1
Brielle, NJ	23	3	3	11
Cape May, NJ	725	145	78	153
Chatham, MA	366	26	21	268
Chilmark, MA	14	6	4	5
Chincoteague, VA	40	14	12	24
Fairhaven, MA	80	13	10	37
Fall River, MA	49	5	4	34
Freeport, NY	52	8	5	14
Gloucester, MA	91	27	6	6
Hampton Bay, NY	36	7	5	11
Hampton, VA	142	39	34	59

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Harwichport, MA	42	5	5	11
Little Compton, RI	155	11	10	96
Montauk, NY	1,323	58	51	491
Nantucket, MA	113	18	7	63
Neptune, NJ	7	3	1	1
New Bedford, MA	2,791	331	240	762
New London, CT	120	15	11	53
New Shoreham, RI	52	8	5	17
Newport News, VA	249	67	38	57
Newport, RI	294	19	16	124
North Kingstown, RI	81	6	5	12
Ocean City, MD	172	10	8	77
Oriental, NC	23	16	9	10
Point Judith, RI	2,661	119	99	1,129
Point Lookout, NY	189	10	6	44
Point Pleasant, NJ	1,683	98	59	386
Sandwich, MA	109	4	4	43
Sea Isle City, NJ	54	3	3	12
Shinnecock, NY	474	24	22	139
Stonington, CT	307	19	19	147
Tiverton, RI	112	4	3	35
Wanchese, NC	54	25	17	23
Waretown, NJ	55	3	3	13
Westport, MA	199	11	10	149
Wildwood, NJ	34	6	5	9

Table 10.50 Percentages of Total Revenue, Landings, and Days-at-Sea for Species of Interest, Zone 1, 2009

Species	Revenue as % of Total	Landings as % of Total	DAS as % of Total
Jonah Crab	58.28	56.49	22.31
Golden Tilefish	47.81	47.44	46.22

Species	Revenue as % of Total	Landings as % of Total	DAS as % of Total
Scup	40.95	42.88	32.22
Spot	31.63	31.04	35.98
Offshore Hake	27.30	26.00	30.32
Summer Flounder	25.03	23.44	18.88
Butterfish	24.54	24.11	24.99
Ocean Quahog	22.24	23.37	17.17
Longfin Squid	20.15	20.12	24.57
Black Sea Bass	17.98	18.07	27.39

Table 10.51 Total and Expected Number of Trips and Vessels by FMP, Zone 1, 2009

FMP	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
ASMFC FMP	3,273	371	199	1,135
Atlantic Herring	299	51	36	97
Bluefish	2,015	235	154	624
Highly Migratory Species	383	103	42	66
Mackerel, Squid, and Butterfish	3,632	256	198	1,365
Monkfish	7,235	646	399	2,459
No Federal FMP	2,706	323	188	1,113
Northeast Multispecies	1,712	249	138	402
Sea Scallop	5,532	552	338	564
SERO FMP	221	69	44	73
Skates	3,130	311	201	1,107
Small-Mesh Multispecies	3,227	191	144	1,298
Spiny Dogfish	462	102	53	106
Summer Flounder, Scup, Black Sea Bass	5,577	430	288	1,943
Surfclam, Ocean Quahog	851	28	20	265
Tilefish	845	110	97	480

Table 10.52 Total and Expected Number of Trips and Vessels by Species, Zone 1, 2009

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Albacore Tuna	13	8	4	4
Am. Plaice Flounder	289	96	16	18
American Eel	104	22	17	44
American Lobster	2,835	289	149	953
American Shad	37	12	9	20
Atlantic Croaker	47	34	7	9
Atlantic Halibut	65	36	6	6
Atlantic Herring	299	51	36	97
Atlantic Mackerel	854	132	102	430
Big Eye Tuna	16	9	2	2
Black Sea Bass	1,147	208	133	488
Blue Crab	10	10	2	2
Bluefish	2,015	235	154	624
Blueline Tilefish	69	33	22	31
Bonito	27	20	6	7
Brown Shrimp	19	7	5	6
Butterfish	1,831	145	114	761
Channeled Whelk	97	25	12	41
Clearnose Skate	5	3	1	1
Cobia	4	4	1	1
Cod	853	167	58	130
Conchs	100	15	5	36
Conger Eel	606	89	69	308
Cunner	120	17	5	11
Cusk	98	50	6	6
Dogfish Smooth	275	72	28	44
Dogfish Spiny	462	102	53	106
Dolphinfish	40	15	7	16
Fourspot Flounder	107	12	11	42
Golden Tilefish	808	105	93	464

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Haddock	267	95	13	13
Harvest Fish	7	7	3	3
Horseshoe Crab	6	6	1	1
Illex Squid	152	26	17	29
John Dory	322	70	56	149
Jonah Crab	1,597	99	74	788
King Whiting	168	49	32	81
Knobbed Whelk	31	6	3	25
Lightning Whelk	34	5	2	2
Little Tuna	12	8	4	4
Longfin Squid	3,178	228	179	1,223
Mako Shark	4	4	1	1
Mako Shortfin Shark	14	11	3	3
Menhaden	13	7	4	4
Monkfish	7,235	646	399	2,459
Mullets	8	6	2	2
NK Crab	12	6	NA	NA
NK Eel	148	31	NA	NA
NK Flounders	8	6	NA	NA
NK Porgy	48	19	NA	NA
NK Seatrout	20	13	NA	NA
NK Tilefish	39	20	NA	NA
Ns Squids	3	3	1	1
Ocean Pout	51	15	4	5
Ocean Quahog	753	15	15	251
Offshore Hake	198	34	20	82
Other Fish	7	5	3	5
Other Shellfish	10	8	4	4
Pollock	248	101	21	22
Red Crab	42	8	6	11

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Red Hake	2,092	139	112	833
Redfish	141	63	8	9
Rock Crab	449	45	31	257
Sand Tilefish	15	6	6	8
Sand-Dab Flounder	660	91	54	145
Sculpins	6	6	3	3
Scup	2,320	226	181	991
Sea Raven	55	11	5	9
Sea Robins	228	56	36	79
Sea Scallop	5,532	552	338	564
Silver Hake	2,877	152	128	1,203
Skates	3,129	310	201	1,107
Southern Flounder	32	16	9	12
Spanish Mackerel	10	8	3	3
Spot	11	6	4	6
Spotted Weakfish	99	30	19	49
Squeteague Weakfish	712	122	86	374
Striped Bass	68	44	15	16
Summer Flounder	5,025	392	264	1,718
Surf Clam	94	16	7	12
Swordfish	67	13	8	11
Tautog	90	41	18	27
Triggerfish	82	23	12	14
White Hake	377	118	47	98
Winter Flounder	890	152	71	164
Witch Flounder	648	145	73	193
Wolffishes	60	33	3	3
Yellowfin Tuna	32	16	6	10
Yellowtail Flounder	1,061	162	80	206

Table 10.53 Total and Expected Number of Trips and Vessels by Port, Zone 1, 2009

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Atlantic City, NJ	338	23	14	97
Barnegat, NJ	537	51	36	147
Barnstable, MA	19	5	3	3
Beaufort, NC	18	11	4	4
Belford, NJ	200	16	7	66
Boston, MA	39	13	2	2
Cape May, NJ	1,147	182	87	200
Chatham, MA	212	25	19	153
Chilmark, MA	33	6	6	12
Chincoteague, VA	41	18	9	13
Fairhaven, MA	90	12	9	59
Fall River, MA	80	7	4	39
Freeport, NY	259	10	5	17
Gloucester, MA	69	16	4	4
Hampton Bay, NY	41	4	4	16
Hampton, VA	154	41	30	49
Little Compton, RI	121	11	9	63
Montauk, NY	1,544	55	41	477
Nantucket, MA	44	8	2	32
New Bedford, MA	2,189	313	208	728
New London, CT	124	16	11	51
New Shoreham, RI	74	6	3	21
Newport News, VA	233	69	29	35
Newport, RI	324	23	17	134
North Kingstown, RI	97	5	5	24
Ocean City, MD	162	20	7	48
Oriental, NC	23	15	8	8
Point Judith, RI	2,915	125	92	1,130
Point Lookout, NY	1,031	22	17	56

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Point Pleasant, NJ	2,214	96	69	339
Sandwich, MA	89	5	5	36
Sea Isle City, NJ	33	4	4	6
Shinnecock, NY	659	31	25	198
Stonington, CT	256	21	18	115
Tiverton, RI	71	3	3	27
Wanchese, NC	63	25	14	22
Westport, MA	136	9	9	104
Woods Hole, MA	11	5	5	6

Table 10.54 Percentages of Total Revenue, Landings, and Days-at-Sea for Species of Interest, Zone 1, 2008

Species	Revenue as % of Total	Landings as % of Total	DAS as % of Total
Jonah Crab	57.54	57.30	19.28
Golden Tilefish	47.72	47.82	45.37
Offshore Hake	38.74	37.80	40.87
Scup	36.91	37.93	38.62
Butterfish	35.14	33.53	30.79
Spot	35.12	38.14	38.79
Atlantic Mackerel	30.65	31.12	40.12
Summer Flounder	25.53	25.03	20.62
Red Hake	22.90	22.59	30.88
Silver Hake	22.07	23.33	29.66

Table 10.55 Total and Expected Number of Trips and Vessels by FMP, Zone 1, 2008

FMP	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
ASMFC FMP	3,301	385	215	1,135
Atlantic Herring	302	52	40	113
Bluefish	1,383	221	130	325
Highly Migratory Species	374	84	36	53

FMP	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Mackerel, Squid, and Butterfish	3,880	261	213	1,540
Monkfish	8,657	717	501	2,810
No Federal FMP	2,978	333	211	1,266
Northeast Multispecies	2,561	308	166	459
Sea Scallop	6,320	627	437	1,145
SERO FMP	169	59	32	64
Skates	3,487	312	202	1,057
Small-Mesh Multispecies	3,131	199	162	1,426
Spiny Dogfish	175	56	14	21
Summer Flounder, Scup, Black Sea Bass	5,188	432	306	1,881
Surfclam, Ocean Quahog	847	26	16	285
Tilefish	875	124	101	485

Table 10.56 Total and Expected Number of Trips and Vessels by Species, Zone 1, 2008

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Albacore Tuna	11	7	3	3
Am. Plaice Flounder	372	106	16	18
American Eel	78	21	17	44
American Lobster	2,935	315	176	990
American Shad	25	10	8	16
Atlantic Croaker	21	19	7	7
Atlantic Halibut	93	44	3	3
Atlantic Herring	302	52	40	113
Atlantic Mackerel	974	142	118	582
Big Eye Tuna	25	11	5	6
Black Drum	8	6	2	2
Black Sea Bass	2,226	251	196	982
Blk Bellied Rosefish	4	3	2	2
Blue Back Herring	5	4	3	3

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Blue Crab	21	7	5	15
Bluefin Tuna	5	5	1	1
Bluefish	1,383	221	130	325
Blueline Tilefish	43	29	10	10
Bonito	33	16	7	8
Brown Shrimp	7	4	2	4
Butterfish	1,960	162	140	957
Channeled Whelk	147	23	12	47
Cod	1,020	187	66	116
Conchs	124	17	8	36
Conger Eel	585	95	74	316
Cunner	114	23	9	14
Cusk	121	45	4	5
Dogfish Smooth	270	52	19	30
Dogfish Spiny	175	56	14	21
Dolphinfish	50	15	7	22
Fourspot Flounder	165	14	12	53
Golden Tilefish	845	111	96	479
Haddock	451	116	20	21
Harvest Fish	21	10	7	10
Horseshoe Crab	6	5	2	2
Illex Squid	179	25	19	33
John Dory	435	90	76	207
Jonah Crab	1,435	96	71	710
King Whiting	232	54	35	123
Knobbed Whelk	27	8	3	16
Little Tuna	5	5	2	2
Longfin Squid	3,348	227	182	1,327
Mako Longfin Shark	4	3	1	1
Mako Shortfin Shark	8	6	3	3

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Menhaden	6	6	1	1
Monkfish	8,657	717	501	2,810
Mullets	14	6	2	6
NK Eel	122	36	NA	NA
NK Flounders	9	9	NA	NA
NK Porgy	34	18	NA	NA
NK Seatrout	25	20	NA	NA
NK Shark	7	5	NA	NA
NK Tilefish	31	20	NA	NA
Ocean Pout	111	19	9	21
Ocean Quahog	795	18	16	281
Offshore Hake	214	32	23	106
Other Fish	17	12	8	9
Other Shellfish	9	6	2	3
Oyster Toadfish	3	3	1	1
Pollock	379	105	17	19
Red Crab	20	3	2	3
Red Hake	2,174	152	124	960
Redfish	197	63	8	8
Rock Crab	479	46	32	292
Sand Tilefish	22	6	5	13
Sand-Dab Flounder	890	105	56	133
Sculpins	18	7	1	1
Scup	1,665	225	169	788
Sea Raven	62	12	5	8
Sea Robins	170	44	27	65
Sea Scallop	6,320	627	437	1,145
Silver Hake	2,731	165	143	1,335
Skates	3,486	312	202	1,057
Southern Flounder	24	13	7	9

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Spot	3	3	2	2
Spotted Weakfish	111	31	22	59
Squeteague Weakfish	821	149	107	444
Striped Bass	71	39	12	21
Striped Sea Robin	7	3	3	4
Summer Flounder	4,457	390	282	1,602
Surf Clam	52	11	2	4
Swordfish	63	15	8	11
Tautog	120	49	19	22
Triggerfish	45	17	5	5
White Hake	469	134	47	109
Winter Flounder	1,829	222	99	222
Witch Flounder	919	171	82	192
Wolffishes	187	60	7	7
Yellowfin Tuna	34	15	8	10
Yellowtail Flounder	1,511	176	91	229

Table 10.57 Total and Expected Number of Trips and Vessels by Port, Zone 1, 2008

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Atlantic City, NJ	249	22	13	56
Barnegat, NJ	133	30	16	38
Barnstable, MA	71	12	8	20
Beaufort, NC	33	13	10	15
Belford, NJ	243	18	9	48
Boston, MA	52	15	2	2
Cape May, NJ	903	149	78	199
Chatham, MA	509	45	33	307
Chilmark, MA	24	3	2	11
Fairhaven, MA	76	12	10	42
Fall River, MA	93	5	5	19

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Freeport, NY	455	13	6	19
Gloucester, MA	99	26	10	15
Greenport, NY	31	4	4	19
Hampton Bay, NY	60	8	8	16
Hampton, VA	115	39	24	34
Harwichport, MA	51	10	7	30
Little Compton, RI	65	10	7	44
Long Beach, NJ	554	59	39	119
Montauk, NY	1,385	69	47	406
Nantucket, MA	88	25	7	48
New Bedford, MA	2,790	335	265	1,042
New London, CT	171	18	11	62
New Shoreham, RI	35	9	6	12
Newport News, VA	198	64	34	49
Newport, RI	309	27	20	124
North Kingstown, RI	89	5	5	23
Ocean City, MD	77	14	5	36
Oriental, NC	36	16	10	16
Point Judith, RI	3,116	133	105	1,150
Point Lookout, NY	717	17	11	42
Point Pleasant, NJ	2,238	92	61	405
Portland, ME	16	6	2	2
Provincetown, MA	18	5	3	13
Shinnecock, NY	486	29	22	235
Stonington, CT	252	24	19	100
Tiverton, RI	132	6	6	32
Wanchese, NC	67	23	18	35
Westport, MA	136	11	7	110
Woods Hole, MA	28	6	4	4

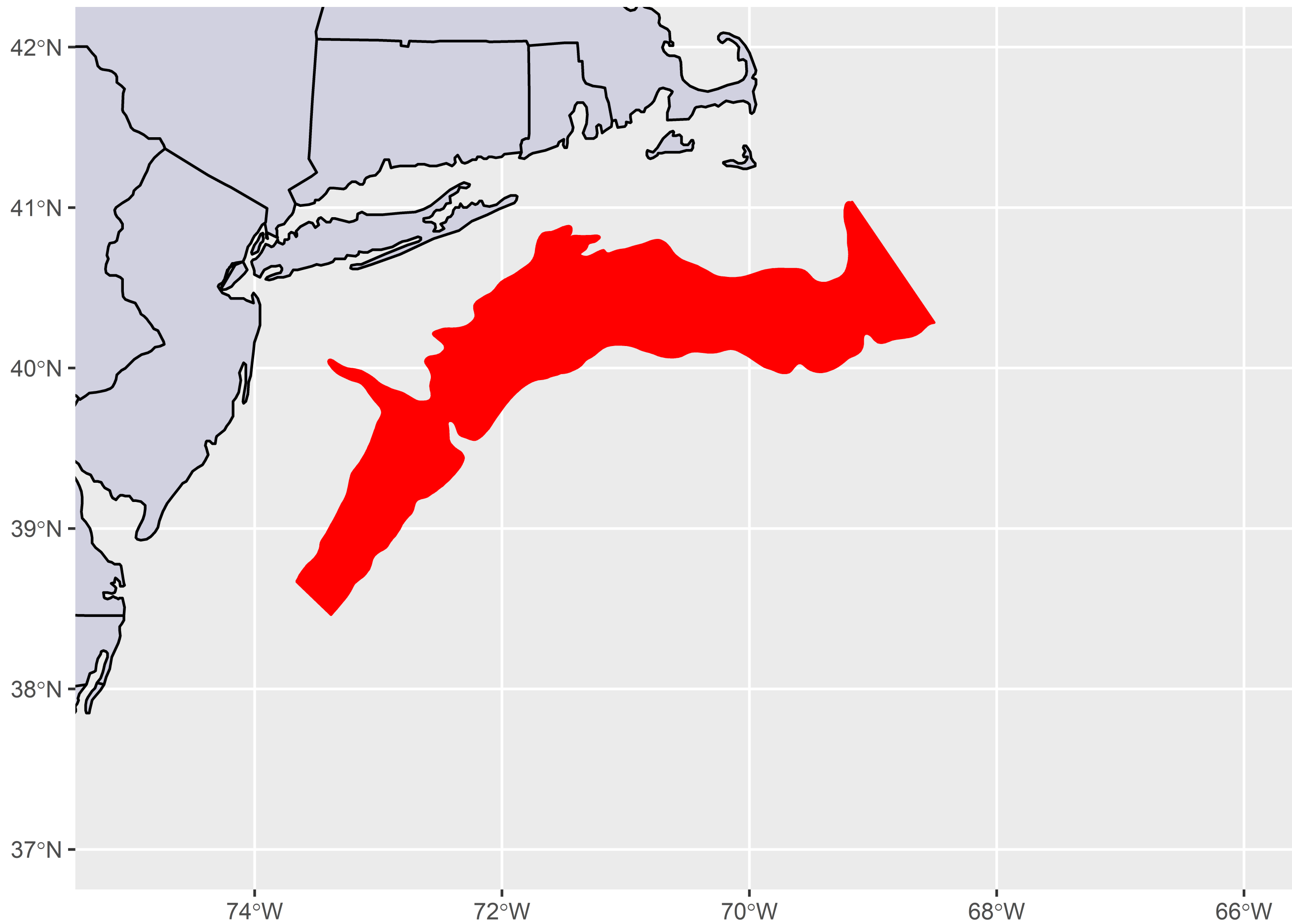
Back (https://www.fisheries.noaa.gov/resource/data/socioeconomic-impacts-atlantic-offshore-wind-development)

Descriptions of Selected Fishery Landings and Estimates of Recreational Party and Charter Vessel Revenue from Areas: A Planning-level Assessment

Prepared by:
National Marine Fisheries Service

June 06, 2023

Zone 1



Data sources:
Recreational fisheries landings data from vessel trip reports (VTR) for vessels issued a party/charter permit and marine angler expenditure surveys

In order to meet requirements of maintaining data confidentiality, these strata are presented individually. In addition, records that did not meet the rule of three (>= 3 unique permits), values were summarized as 'All Others'.

Some caveats/notes:

- Values are reported in nominal dollars. Values in 2021 dollars are reported as well (see Methods below for details).
- Landings are reported in number of fish kept on party/charter trips.
- The term "angler trips" refers to the number of reported passengers on party/charter VTRs.
- The party/charter VTRs contain some trips where no fish were landed. Although these trips do not contribute to the species summaries, they are included in the activity summaries of trips, angler trips, and revenues.
- The term "vessel trips" refers to the number of party/charter VTRs submitted to NMFS where landings of any species were recorded.
- Data summarized here are based on federal VTRs submitted to NMFS.

- Numbers of individual fish species landed on party/charter trips are summarized by management categories as follows:
  - **Northeast Multispecies; Bluefish; Mackerel, Squid, Butterfish; Golden and Blueline Tilefish; Summer Flounder, Scup, Black Sea Bass:** Individual New England and Mid-Atlantic Fishery Management Council FMPs that require a party/charter permit
  - **Other Federal FMPs:** Individual New England and Mid-Atlantic Fishery Management Council FMPs that do not require a party/charter permit and have no recreational measures (Atlantic herring, Atlantic Sea Scallops, Monkfish, Spiny Dogfish, Skates, Red Crab, and Surfclams and Ocean Quahogs)
  - **Atlantic HMS FMP:** Atlantic billfish, Atlantic tunas, swordfish and sharks
  - **ASMFC Interstate FMPs:** Species managed exclusively under an ASMFC ISFMP (American Lobster, Atlantic Croaker, Cobia, Red Drum, Black Drum Spanish Mackerel, Spot, striped Bass, Spotted Sea Trout, Tautog, Weakfish and Coastal Sharks)
  - **No Federal Plan:** Species that are not managed under any Federal or ASMFC ISFMP
- VTR data with missing coordinates have been removed.
- The information reported for 2020 should be interpreted with caution due to the generalized impacts the COVID-19 pandemic had on passenger demand for party/charter trips across many fisheries in the Greater Atlantic Region resulting in an unusually low number of angler trips; hence reduced revenues from passenger fees for affected party/charter entities.
- The number of small businesses changes over time both because of changes in affiliated ownership and fluctuations in revenue. For this reason, we use and report only the most recent three years' revenue in the Small Business Analysis section of this report, consistent with historical guidance provided by the Small Business Administration.
- Confidential data is listed as "Suppressed" or "All Others."

References

DePiper GS (2014) Statistically assessing the precision of self-reported VTR fishing locations. (https://repository.library.noaa.gov/view/noaa/4806)

Benjamin S, Lee MY, DePiper G. 2018. Visualizing fishing data as rasters. NEFSC Ref Doc 18-12; 24 p. (https://repository.library.noaa.gov/view/noaa/23030)

Most Impacted Species By Management Category

The table below indicates the total number of fish kept from the area by Management Categories. The category “All Others” refers to categories with less than three permits impacted to protect data confidentiality.

Figure 1.1 Fish Count of Top Management Categories by Year, Zone 1

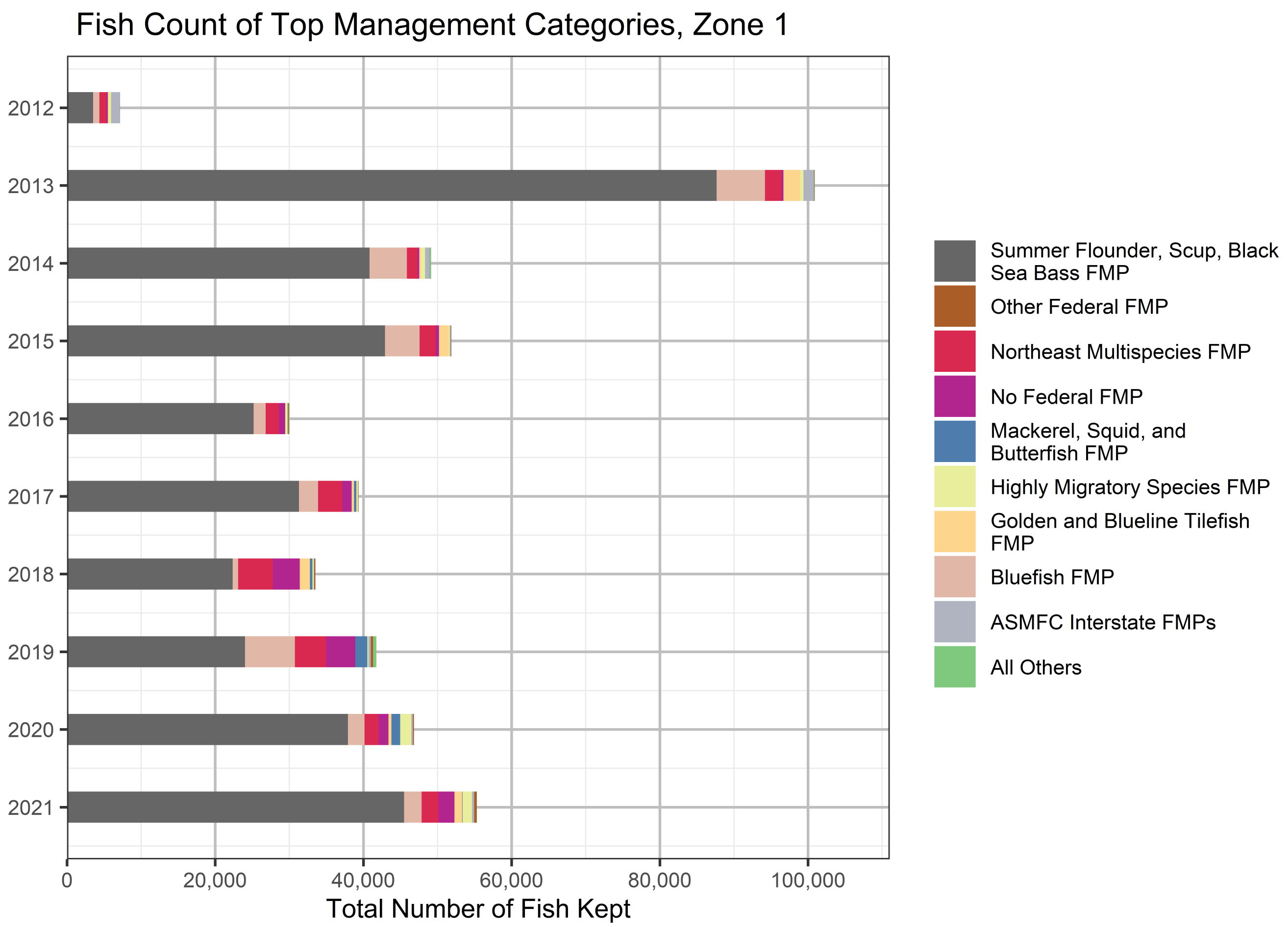


Table 1.1 Total Fish Count for Management Categories, Zone 1

Management Categories	Ten Year Fish Count
Summer Flounder, Scup, Black Sea Bass FMP	361,180
Bluefish FMP	33,344
Northeast Multispecies FMP	24,917
No Federal FMP	14,329
Golden and Blueline Tilefish FMP	7,043
Highly Migratory Species FMP	5,028
ASMFC Interstate FMPs	4,332

Management Categories	Ten Year Fish Count
Mackerel, Squid, and Butterfish FMP	3,545
Other Federal FMP	1,386
All Others	788
Total	**455,892**

Most Impacted Species

We analyzed the top ten species most frequently kept on recreational party/charter trips in the area and to isolate them from combined FMPs. The top ten species by the total number of fish kept are: All Others, Black Sea Bass, Bluefish, Cod, Dolphinfish, Golden Tilefish, Red Hake, Scup, Summer Flounder and Yellowfin Tuna . The category “All Others” refers to species with less than three permits impacted to protect data confidentiality. Additional species outside of the top ten include: Albacore Tuna, Big Eye Tuna, Blue Shark, Bluefin Tuna, Blueline Tilefish, Bonito, Chub Mackerel, Conger Eel, Cunner, Cusk, Dogfish Smooth, Frigate Mackerel, Haddock, Hammerhead Shark, Little Tuna, Mako Shark, Mako Shortfin Shark, Marlin White, Ocean Pout, Pollock, Sea Robins, Skates, Skipjack Tuna, Spiny Dogfish, Spotted Weakfish, Striped Bass, Swordfish, Tautog, Triggerfish, Unknown, White Hake and Winter Flounder.

Figure 2.1 Fish Count of Top Species, Zone 1

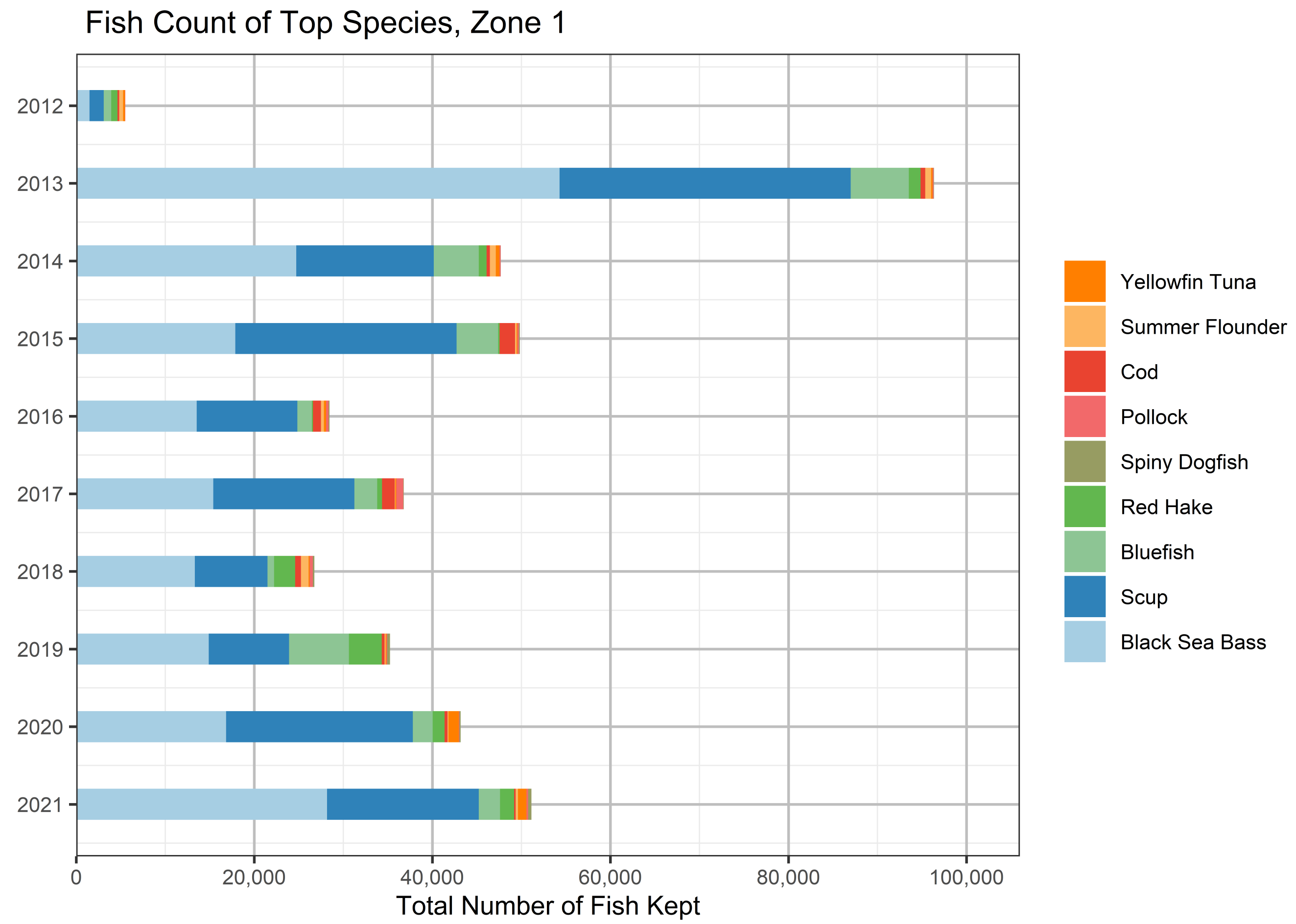


Table 2.1 Fish Count, Most Impacted Species, Zone 1

Species	**Ten Year Fish Count**
Black Sea Bass	200,492
Scup	156,976
Bluefish	33,344
Red Hake	12,743
Cod	6,609
Summer Flounder	3,712
Yellowfin Tuna	3,527
Pollock	2,189
Spiny Dogfish	1,319
Total	**420,911**

Total Party/Charter Activity by Year

We analyzed the total revenue of party/charter trips by year by multiplying the annual mean combined charter and party for-hire fee of each state by the total number of anglers for each year (See Methods section). Revenue values have been deflated to 2019 dollars. All numbers have been rounded to the nearest thousand.

Table 3.1 Total Party/Charter Revenue by Year, Zone 1

Year	Annual Revenue
2012	$134,000
2013	$554,000
2014	$363,000
2015	$290,000
2016	$201,000
2017	$213,000
2018	$329,000
2019	$367,000
2020	$448,000
2021	$414,000
Total	**$3,312,000**

Number of Vessel Trips by Port

The table below indicate the total number of trips within the area by year and port. The category "Other Ports, XX" refers to ports with less than three permits to protect data confidentiality.

Table 4.1 Total Number of Vessel Trips by Port and Year, Zone 1

Port	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Belmar, NJ	3	0	0	0	0	0	0	0	0	0
Montauk, NY	44	115	107	38	32	19	25	17	13	39
Other Ports, CT	3	3	4	5	3	0	0	0	3	5
Other Ports, MA	2	3	2	7	0	8	6	2	3	2
Other Ports, NJ	11	35	28	68	29	32	40	17	56	48

Port	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Other Ports, NY	6	37	13	34	10	3	42	10	20	17
Other Ports, RI	6	4	2	4	2	8	5	1	14	13
Point Judith, RI	47	34	20	8	14	0	0	7	0	0
Point Pleasant, NJ	16	50	33	24	24	30	49	85	73	69
Barnegat, NJ	0	37	12	0	0	0	0	0	0	0
Other Ports, DE	0	2	2	0	1	0	0	0	1	0
Brielle, NJ	0	0	13	0	0	0	0	0	0	0
Other Ports, MD	0	0	1	0	2	0	6	1	1	0
No Port Data	0	0	0	0	0	0	4	0	3	0
Babylon(Captree), NY	0	0	0	0	0	0	0	6	0	0
Freeport, NY	0	0	0	0	0	0	0	4	11	0
Babylon, NY	0	0	0	0	0	0	0	0	13	18
Barnegat Light, NJ	0	0	0	0	0	0	0	0	8	0
Total	**138**	**320**	**237**	**188**	**117**	**100**	**177**	**150**	**219**	**211**

Number of Angler Trips by Port

The table below indicate the total number of angler trips from the area by year and port. The category “Other Ports, XX” refers to ports with less than three permits to protect data confidentiality.

Table 4.2 Total Number of Angler Trips by Port and Year, Zone 1

Port	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Belmar, NJ	41	0	0	0	0	0	0	0	0	0
Montauk, NY	346	986	938	395	329	176	178	127	79	299
Other Ports, CT	8	16	12	57	7	0	0	0	16	32
Other Ports, MA	12	43	8	143	0	44	30	10	14	8
Other Ports, NJ	189	1,036	161	960	733	939	767	487	1,570	1,432
Other Ports, NY	109	958	330	635	137	42	1,071	329	509	402
Other Ports, RI	20	15	8	19	10	205	16	6	51	57
Point Judith, RI	244	306	408	73	199	0	0	103	0	0

Port	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Point Pleasant, NJ	283	1,288	945	709	715	859	1,476	2,649	1,803	1,805
Barnegat, NJ	0	934	341	0	0	0	0	0	0	0
Other Ports, DE	0	16	13	0	7	0	0	0	6	0
Brielle, NJ	0	0	519	0	0	0	0	0	0	0
Other Ports, MD	0	0	6	0	12	0	40	4	6	0
No Port Data	0	0	0	0	0	0	70	0	35	0
Babylon(Captree), NY	0	0	0	0	0	0	0	148	0	0
Freeport, NY	0	0	0	0	0	0	0	93	258	0
Babylon, NY	0	0	0	0	0	0	0	0	407	461
Barnegat Light, NJ	0	0	0	0	0	0	0	0	144	0
Total	**1,252**	**5,598**	**3,689**	**2,991**	**2,149**	**2,265**	**3,648**	**3,956**	**4,898**	**4,496**

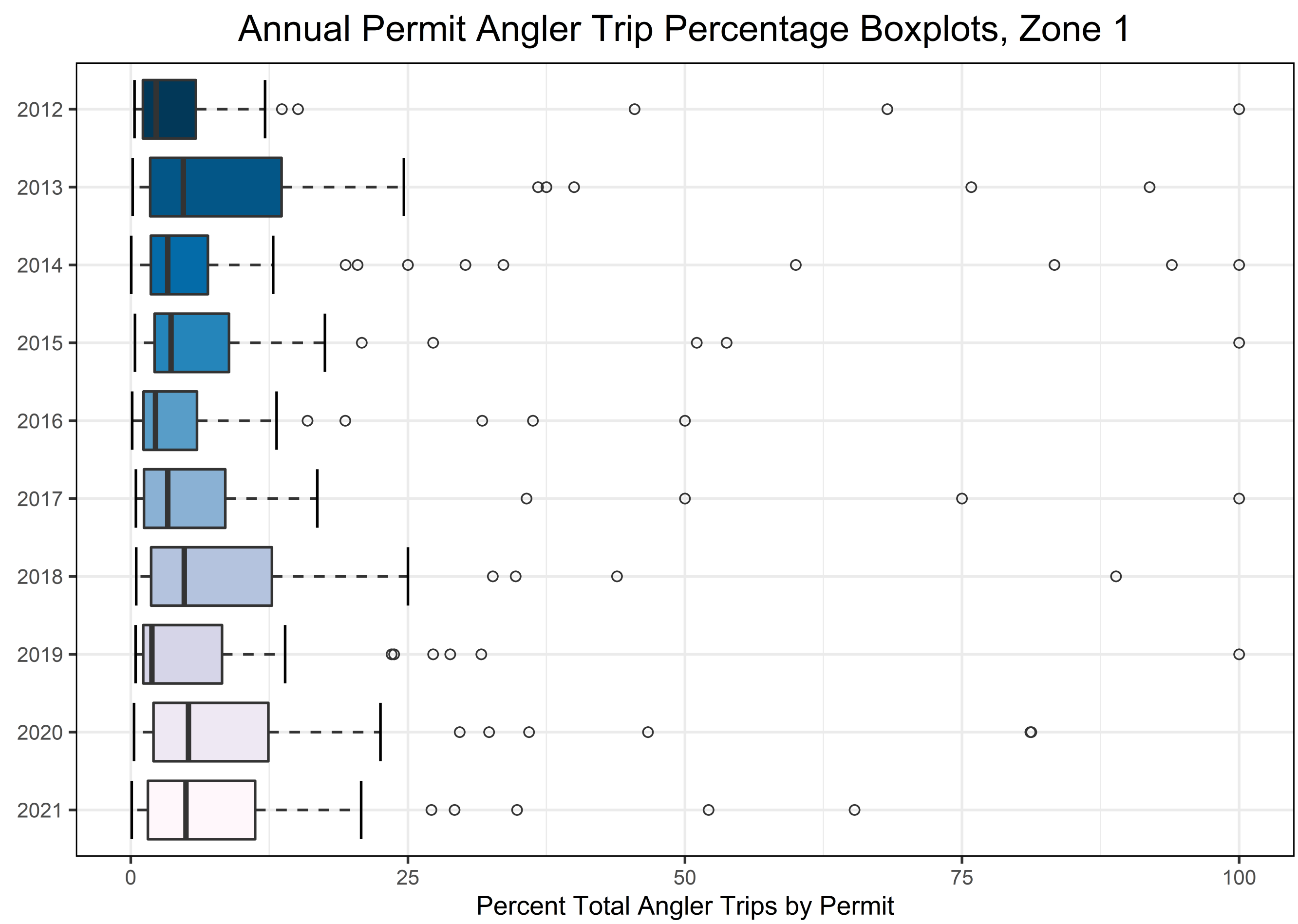
Percentage of Angler Trips by Permit

We analyzed the percentage of each permit's total angler trips coming from within Zone 1 area (see boxplot figure and table below). Boxplots are important statistical summaries because they provide information about the distribution of the percentages. The boxplots below begin at the 1st quartile, or the value beneath which 25 percent of all observations fall. A thick line within the box identifies the median, the observation at which 50 percent of observations are above or beneath. The box ends at the 3rd quartile, or the observation beneath which 75 percent of observations fall. Nonparametric estimates of the minimum and maximum values are also indicated by the "whiskers" (dashed line terminating in a vertical line) that jut out from each side of the box. Any points outside of these whiskers are observations that are considered outliers. In our table , however, the maximum values are inclusive of outliers. The table below presents the minimum, 1st quartile, median, 3rd quartile, and maximum values for the area. These are the ten year angler trip percentages. The boxplot in the figure below further separate the area out by year.

Table 5.1 Ten Year Summary of Permit Angler Trip Revenue Percent, Zone 1

Area	Min	1st Quartile	Median	3rd Quartile	Max
Zone 1	0.04%	1%	3%	10%	100%

Figure 5.1 Annual Permit Angler Trip Percentage Boxplots, Zone 1



Small Business Analysis

A business primarily engaged in for-hire recreational fishing activities is classified as a small business if it is independently owned and operated, is not dominant in its field of operation (including its affiliates) and has combined annual receipts not in excess of $8 million for all its affiliated operations worldwide. Small Business Administration principles of affiliation are used to define a business entity, meaning the following analysis is conducted upon unique business interests, which can represent multiple vessel permits. As such, this section presents the total number of entities, by business category, and the total revenue generated by that business category in Table 6.1. For those businesses with historical fishing within the Zone 1 area, Table 6.2 presents the revenue generated inside the Zone 1 area against the total revenue from those same entities. Revenue values have been deflated to 2019 dollars. All numbers have been rounded to the nearest thousand.

Table 6.1 Total number of entities engaged in federally managed fishing within the Northeast region, and their total revenue, by business category

Year	Business Type	Number of Entities	Revenue
2019	Small Business	319	$71,987,000
2020	Small Business	332	$82,995,000

Year	Business Type	Number of Entities	Revenue
2021	Small Business	409	$107,933,000

Table 6.2 Revenue inside the Zone 1 area against total revenue from entities active inside the Zone 1 area, by business category

Year	Business Type	Number of Entities	Area Revenue	Total Revenue
2019	Small Business	34	$1,513,000	$21,744,000
2020	Small Business	34	$1,673,000	$15,258,000
2021	Small Business	38	$1,717,000	$13,144,000

Species Dependence

The tables below indicate party/charter vessel and angler trips, occurring within the area of interest, as a percentage of totals generated by party/charter vessel and angler trips across the entire region by year and the top ten species deriving the most fish kept from the area by year. The category “All Others” refers to species with less than three permits impacted to protect data confidentiality.

Table 7.1 Annual Party Vessel Trips, Angler Trips, and Number of Vessels in the Zone 1, as a Percent of Total Northeast Region Party/Charter

Year	Vessel Trips as % of Total	Angler Trips as % of Total	Number of Vessels as % of Total
2012	0.43	1.57	9.23
2013	1.09	6.57	11.17
2014	0.84	3.60	10.06
2015	0.70	3.73	9.54
2016	0.45	2.57	8.71
2017	0.41	3.66	7.09
2018	0.71	7.57	7.63
2019	0.61	3.64	9.23
2020	1.01	5.94	8.92
2021	0.92	4.30	9.29

Table 7.2 Ten Year Total Fish Count for Top Ten Species as a Percent of Total, Zone 1

Species	Fish Count as % of Total
Yellowfin Tuna	12.61
Albacore Tuna	10.83
Dolphinfish	10.29
Bonito	9.91
Skipjack Tuna	7.90
Swordfish	7.52
Golden Tilefish	6.85
Mako Shortfin Shark	5.40
Black Sea Bass	5.32

Methods

NOAA Fisheries conducted their first marine angler expenditure survey in 1998 (Steinback and Gentner 2001; Gentner, Price, and Steinback 2001). Additional surveys were conducted in 2006 (Gentner, Price, and Steinback 2008), 2011 (Lovell Steinback, and Hilger 2013), and 2017 (Lovell et al 2020). For-hire passenger fee data collected from these surveys provided the baseline for calculating average annual fees by region/state from 1997 to 2019.

Linear extrapolation was used to estimate average for-hire fees for years with no survey data. For example, in Steinback and Gentner (2001), the average for-hire fee in Maine in 1998 was $46.20. The next angler expenditure survey, conducted in 2006, found the average for-hire fee in Maine was $63.65 (see Gentner, Price, and Steinback 2008). To calculate average fees for the years between 1998 and 2006 we simply extrapolated linearly between the two known data points. This same procedure was used to extrapolate values for all years between the four survey years.

Average for-hire fees in 1997, the year preceding the first survey, and in the two years following the last survey (2018 and 2019), were calculated using industry specific Bureau of Economic Analysis (BEA) output deflators. Specifically, we used BEA output deflators shown for Amusement, Gambling, and Recreation Industries (North American Industry Classification System code 713000), which include recreational fishing guide services. Nominal values were converted to 2019 dollars using the same BEA output deflators.

For further information email Scott Steinback, Economist, NOAA Fisheries, Northeast Fisheries Science Center (Scott.Steinback@noaa.gov (mailto:Scott.Steinback@noaa.gov)).

Steinback, S. and B. Gentner. 2001. “Marine Angler Expenditures in the Northeast Region, 1998”. U.S. Dept. of Commerce. NOAA Tech. Memo. NMFS-F/SPO-47. Gentner, B., M. Price, and S. Steinback. 2001. “Marine Angler Expenditures in the Southeast Region, 2001”. U.S. Dept. of Commerce. NOAA Tech. Memo. NMFS-F/SPO-48 Gentner, Brad, and Scott Steinback. 2008. The Economic Contribution of Marine Angler Expenditures in the United States, 2006.U.S. Dep. Commerce, NOAA Tech. Memo. NMFS-F/SPO-94, 301 p. Lovell, Sabrina, Scott Steinback, and James Hilger. 2013. The Economic Contribution of Marine Angler Expenditures in the United States, 2011. U.S. Dep. Commerce, NOAA Tech. Memo. NMFS-F/SPO-134, 188

p. Lovell, Sabrina, James Hilger, Emily Rollins, Noelle A. Olsen, and Scott Steinback. 2020. The Economic Contribution of Marine Angler Expenditures on Fishing Trips in the United States, 2017. U.S. Dep. Commerce, NOAA Tech. Memo. NMFS-F/SPO-201, 80 p.

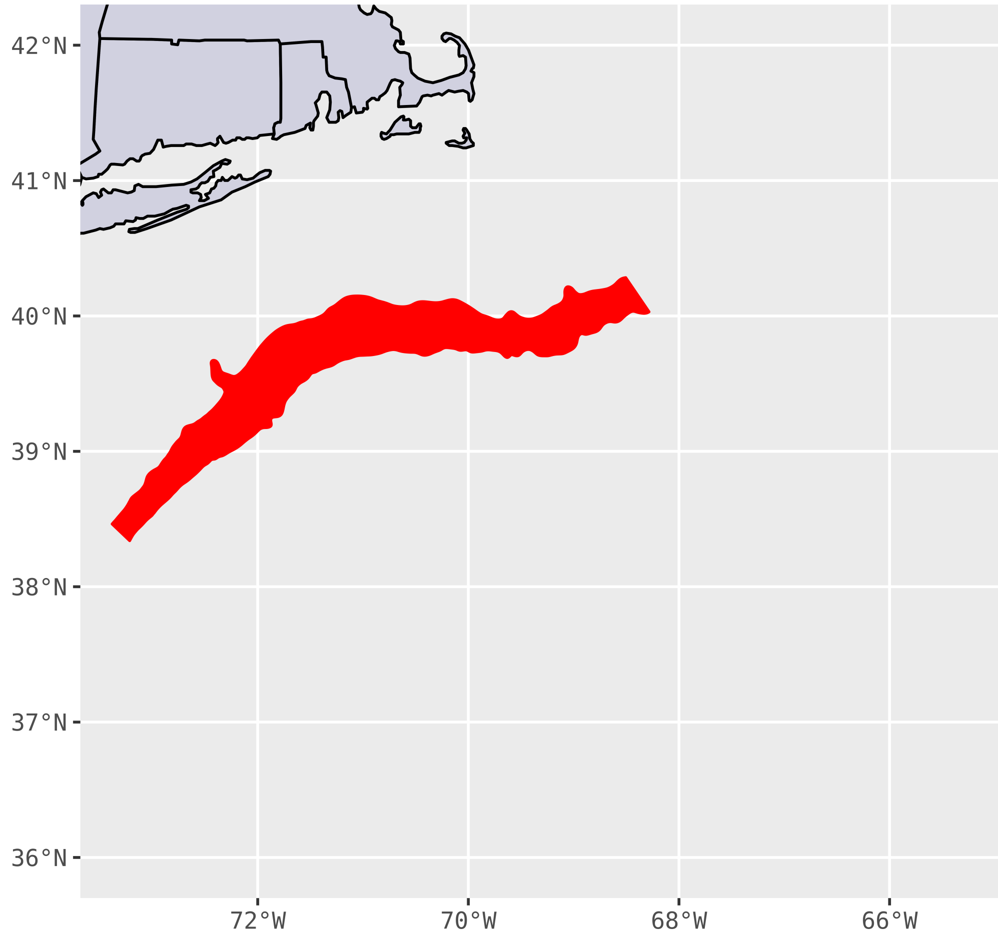
Back (https://www.fisheries.noaa.gov/resource/data/socioeconomic-impacts-atlantic-offshore-wind-development)

Descriptions of Selected Fishery Landings and Estimates of Vessel Revenue from Areas: A Planning-level Assessment

Prepared by:
National Marine Fisheries Service

September 19, 2023

Zone 2



Data sources:
Commercial Fisheries landings data, Vessel Trip Reports, and Surfclam/OceanQuahog Logbooks

In order to meet requirements of maintaining data confidentiality, these strata are presented individually. In addition, records that did not meet the rule of three (>=3 unique dealers and >= 3 unique permits), values were summarized as 'ALL OTHERS'.

Some caveats/notes:

- Values are reported in real 2021 dollars as calculated using the GDP Implicit Price Deflator (https://fred.stlouisfed.org/data/GDPDEF.txt).
- Pounds are reported in landed (dressed) pounds.
- Data summarized here is based on vessels that are required to provide federal VTRs for GARFO managed species (check here (https://media.fisheries.noaa.gov/2022-02/Socioeconomic-InfoNeeds-OSW-GARFO.pdf) for more information).
- Federal lobster vessels, with only lobster permits, do not have a VTR requirement. Many Atlantic Highly Migratory Species permitted vessels also do not have a VTR requirement. Trips with no VTR are not reflected in this summary.
- The ASMFC FMP includes the following species: American Lobster, Cobia, Atlantic Croaker, Black Drum, Red Drum, Menhaden, NK Sea Bass, NK Seatrout, Spot, Striped Bass, Tautog, Jonah Crab, and Pandalid Shrimp.

- The SERO FMP includes the following species: Amber Jack, Brown Shrimp, Dolphinfish, Greater Amberjack, Grouper, Grunts, Hogfish, King Mackerel, Long Tail Grouper, NK Porgy, Penaeid Shrimp, Red Grouper, Red Hind, Red Porgy, Red Snapper, Rock Hind, Sand Tilefish, Scamp Grouper, Snapper, Snowy Grouper, Spadefish, Spanish Mackerel, Speckled Hind, Spiny American Lobster, Triggerfish, Vermillion Snapper, Wahoo, Wreckfish, Yellowedge Grouper.
- There exist other fisheries in State waters that may not be reflected in data from federal sources (e.g. whelk, bluefish, and menhaden). It is recommended to query state agencies for additional data within state waters.
- All summaries presented here are built from percentages of a trip that overlapped spatially with the WEAs. These percentages were applied to landings and values for that trip and summed. This differs from simply using the self-reported VTR/clam logbook locations as those place all value from that trip at a single point. Use of the VTR raster model is more representative as smoothing reported locations reduces the effect of location inaccuracy.
- The information reported for 2020 should be interpreted with caution due to the generalized impacts the COVID-19 pandemic had across many fisheries in the Greater Atlantic Region resulting in reduced landings and lower prices; hence lower revenues as well as unusually low numbers of vessels that fished during the year.
- The number of small businesses changes over time both because of changes in affiliated ownership and fluctuations in revenue. For this reason, we use and report only the most recent three years' revenue in the Small Business Analysis section of this report, consistent with historical guidance provided by the Small Business Administration.
- Confidential data is listed as “Suppressed” or “All Others.”

References

DePiper GS (2014) Statistically assessing the precision of self-reported VTR fishing locations. (https://repository.library.noaa.gov/view/noaa/4806)

Benjamin S, Lee MY, DePiper G. 2018. Visualizing fishing data as rasters. NEFSC Ref Doc 18-12; 24 p. (https://repository.library.noaa.gov/view/noaa/23030)

Most Impacted FMPs

We define "most impacted" as the FMPs deriving the most revenue from the area over the fourteen year analysis period of 2008 to 2021, indicating the highest potential for impact to industry from a reduction in fishing area. The top 5 FMPs by revenue in Zone 2 were Mackerel, Squid, and Butterfish, ASMFC FMP, Summer Flounder, Scup, Black Sea Bass, Sea Scallop and Tilefish. Revenue values have been deflated to 2021 dollars. All numbers have been rounded to the nearest thousand. Specific figures on these FMPs within the area follow. See Table 5.1 for area totals for all FMPs and species.

Figure 1.1 Landings from Most Impacted FMPs, Zone 2

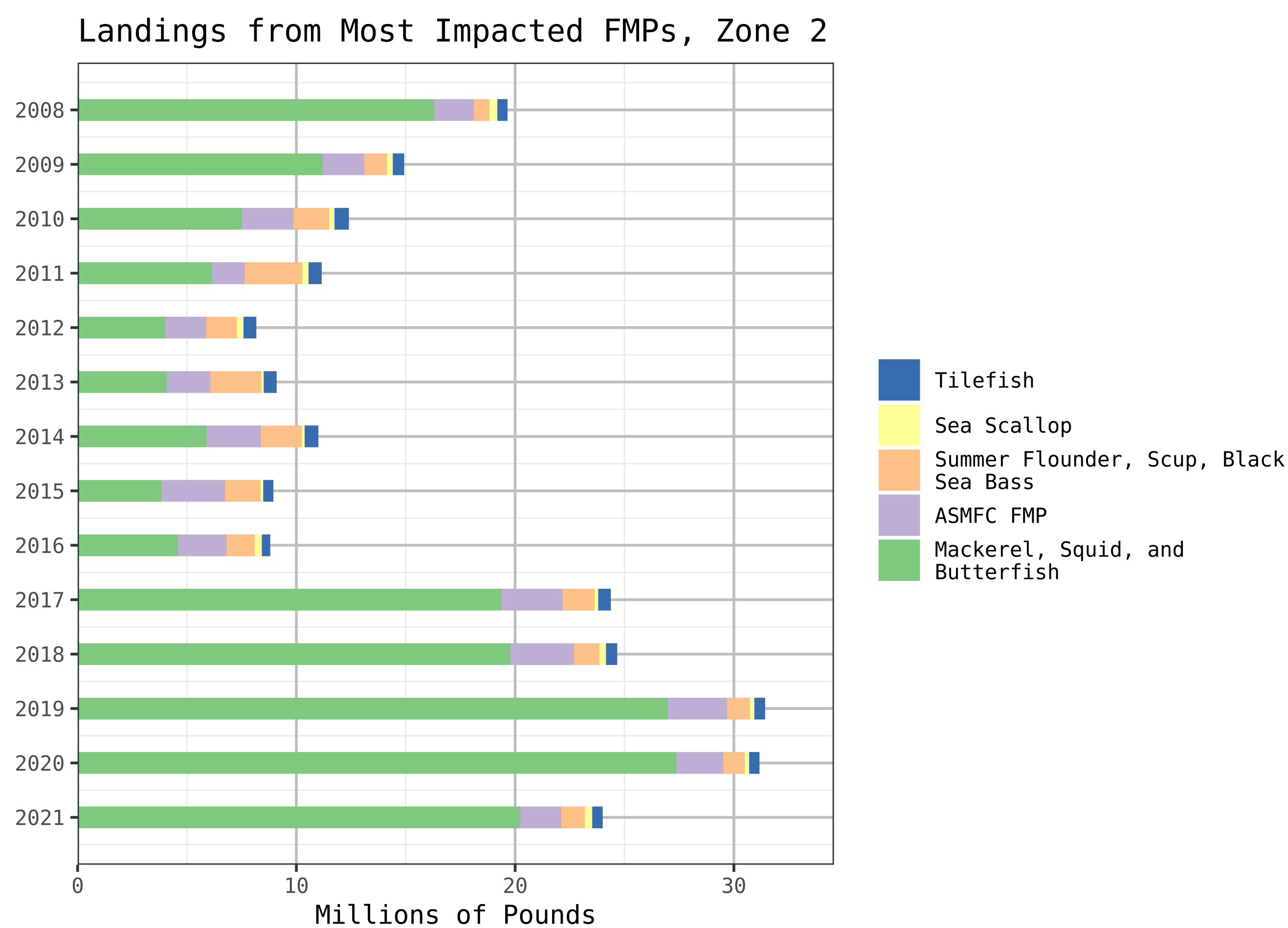


Table 1.1 Fourteen Year Total Landings (Pounds), Most Impacted FMPs, Zone 2

FMP	Fourteen Year Landings
Mackerel, Squid, and Butterfish	177,356,000
ASMFC FMP	31,432,000
Summer Flounder, Scup, Black Sea Bass	20,232,000
Tilefish	7,434,000
Sea Scallop	3,363,000
Total	**239,817,000**

Figure 1.2 Revenue from Most Impacted FMPs, Zone 2

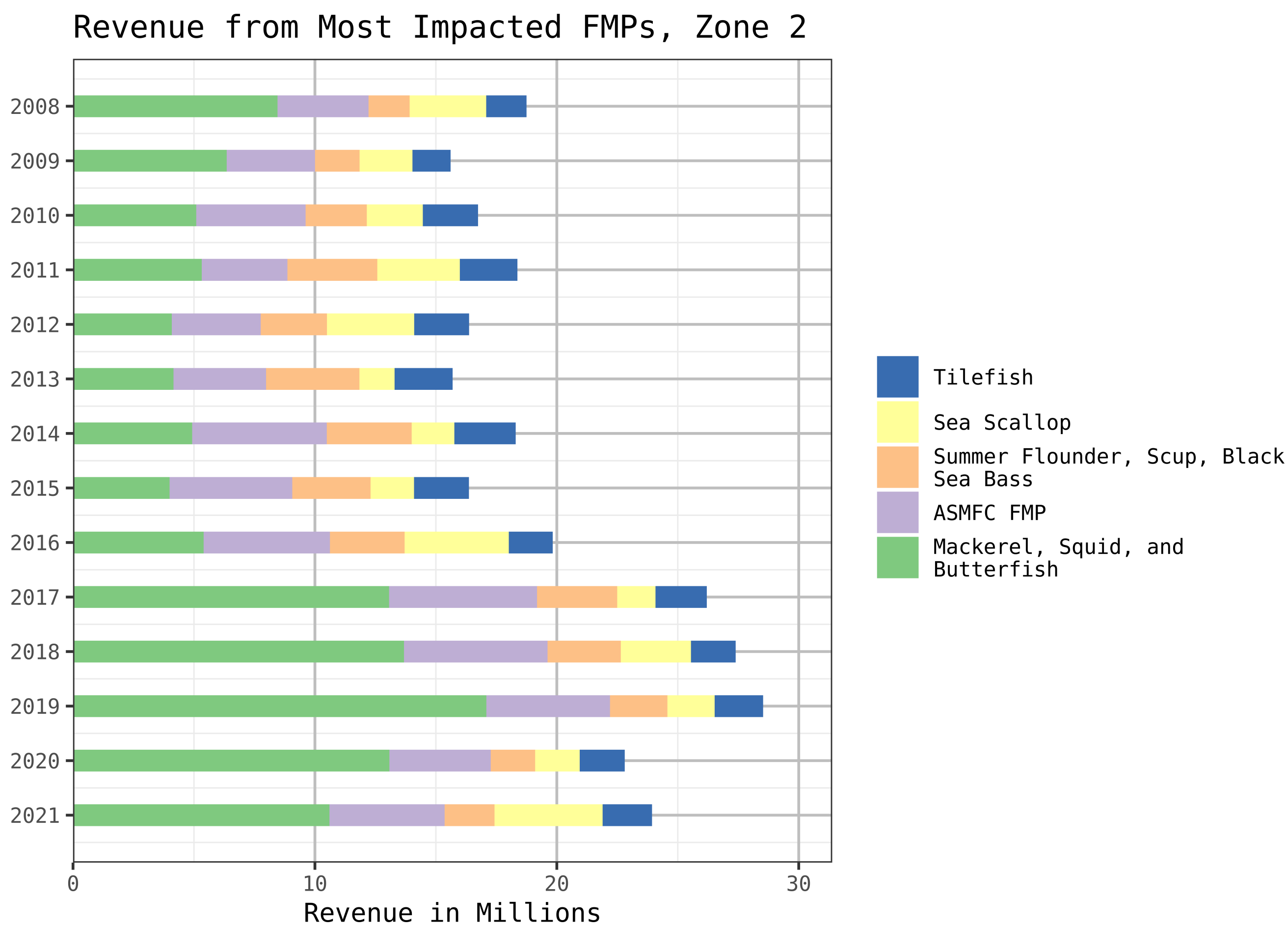


Table 1.2 Fourteen Year Total Revenue for Most Impacted FMPs, Zone 2

FMP	Fourteen Year Revenue
Mackerel, Squid, and Butterfish	$115,294,000
ASMFC FMP	$64,947,000
Summer Flounder, Scup, Black Sea Bass	$38,831,000
Sea Scallop	$36,751,000
Tilefish	$29,074,000
Total	**$284,897,000**

Other Impacted FMPs

We analyzed other impacted FMPs separately in order to better visualize the estimated landings and revenues. The other impacted FMPs are: All Others, Atlantic Herring, Bluefish, Highly Migratory Species, Monkfish, No Federal FMP, Northeast Multispecies, SERO FMP, Skates, Small-Mesh Multispecies, Spiny Dogfish and Surfclam, Ocean Quahog. and “No Federal FMP.” The category “No Federal FMP” contains a variety of species that are not federally regulated, such as: lobster, Jonah crab, smooth and chain dogfish, whelk, and menhaden, (there are close to 115 species without federal FMPs caught in the Zone 2 area).The category "All Others" refers to FMPs with less than three permits or dealers impacted to protect data confidentiality. Revenue values have been deflated to 2021 dollars. All numbers have been rounded to the nearest thousand. See Table 5.1 for area totals for all FMPs and species.

Figure 2.1 Landings from Other Impacted FMPs, Zone 2

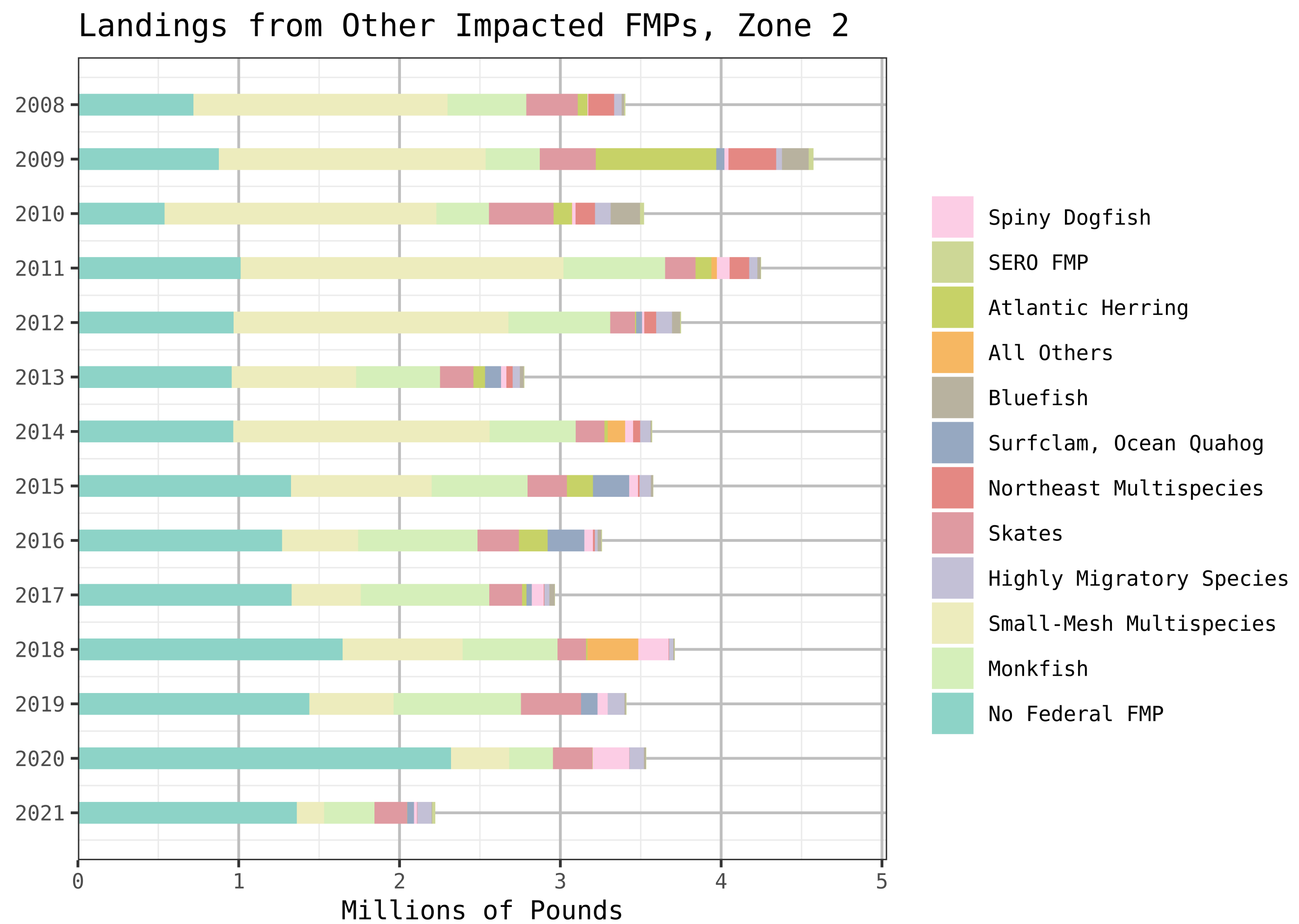


Table 2.1 Fourteen Year Total Landings (Pounds), Other Impacted FMP, Zone 2

FMP	Fourteen Year Landings
No Federal FMP	16,727,000
Small-Mesh Multispecies	14,594,000
Monkfish	7,579,000
Skates	3,504,000
Atlantic Herring	1,503,000
Spiny Dogfish	908,000
Northeast Multispecies	891,000
Highly Migratory Species	864,000
Surfclam, Ocean Quahog	815,000

FMP	Fourteen Year Landings
Bluefish	569,000
All Others	460,000
SERO FMP	119,000
Total	**48,533,000**

Figure 2.2 Revenue from Other Impacted FMPs, Zone 2

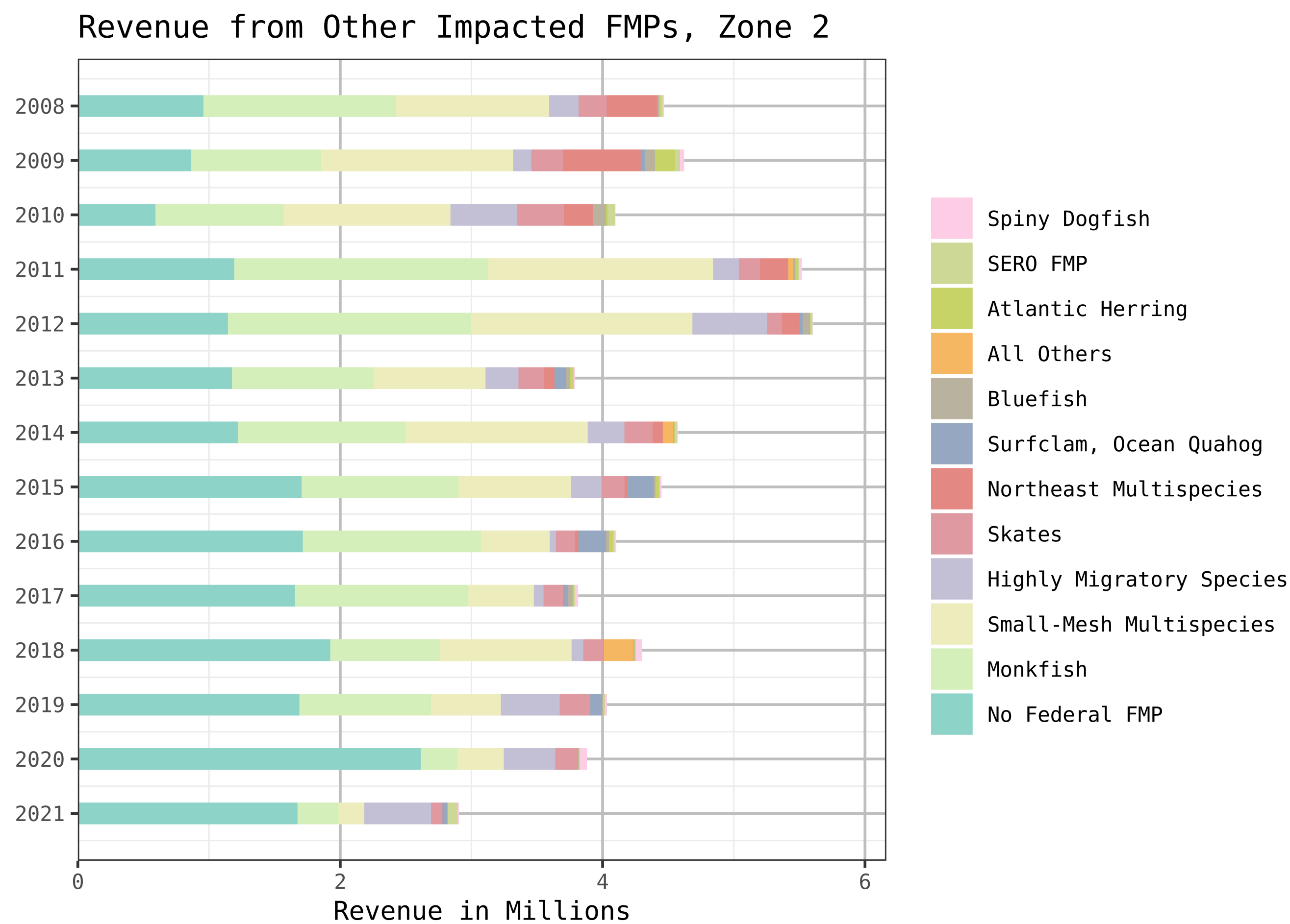


Table 2.2 Fourteen Year Total Revenue for Other Impacted FMPs, Zone 2

FMP	Fourteen Year Revenue
No Federal FMP	$20,121,000
Monkfish	$15,882,000
Small-Mesh Multispecies	$13,517,000
Highly Migratory Species	$3,958,000
Skates	$2,608,000
Northeast Multispecies	$1,768,000
Surfclam, Ocean Quahog	$714,000

FMP	Fourteen Year Revenue
Bluefish	$394,000
All Others	$341,000
Atlantic Herring	$304,000
SERO FMP	$291,000
Spiny Dogfish	$260,000
Total	**$60,158,000**

Most Impacted Species

We analyzed the top ten species due to their economic importance in the area and to isolate them from combined FMPs. The top ten species by revenue are: Illex Squid, Longfin Squid, American Lobster, Sea Scallop, Golden Tilefish, Summer Flounder, Jonah Crab, Monkfish, Silver Hake and All Others. The category “All Others” refers to species with less than three permits or dealers impacted to protect data confidentiality.Revenue values have been deflated to 2021 dollars. All numbers have been rounded to the nearest thousand.See Table 5.1 for area totals for all FMPs and species.

Figure 3.1 Landings of Most Impacted Species, Zone 2

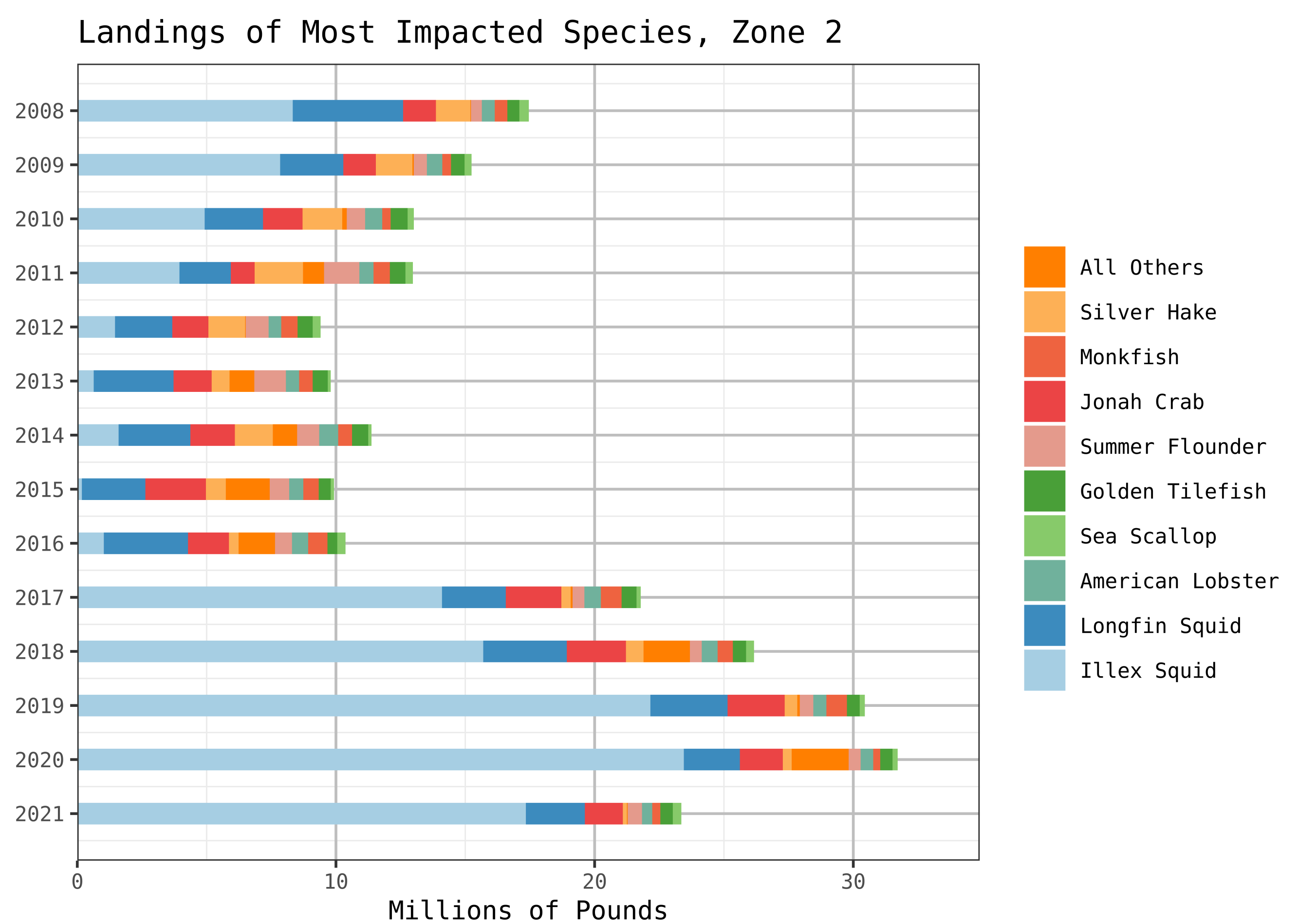


Table 3.1 Fourteen Year Total Landings (Pounds), Most Impacted Species, Zone 2

Species	Fourteen Year Landings
Illex Squid	122,699,000
Longfin Squid	37,834,000
Jonah Crab	23,257,000
Silver Hake	12,908,000
All Others	10,279,000
Summer Flounder	9,828,000
American Lobster	7,858,000
Monkfish	7,578,000
Golden Tilefish	7,406,000
Sea Scallop	3,363,000
Total	**243,008,000**

Figure 3.2 Revenue of Most Impacted Species, Zone 2

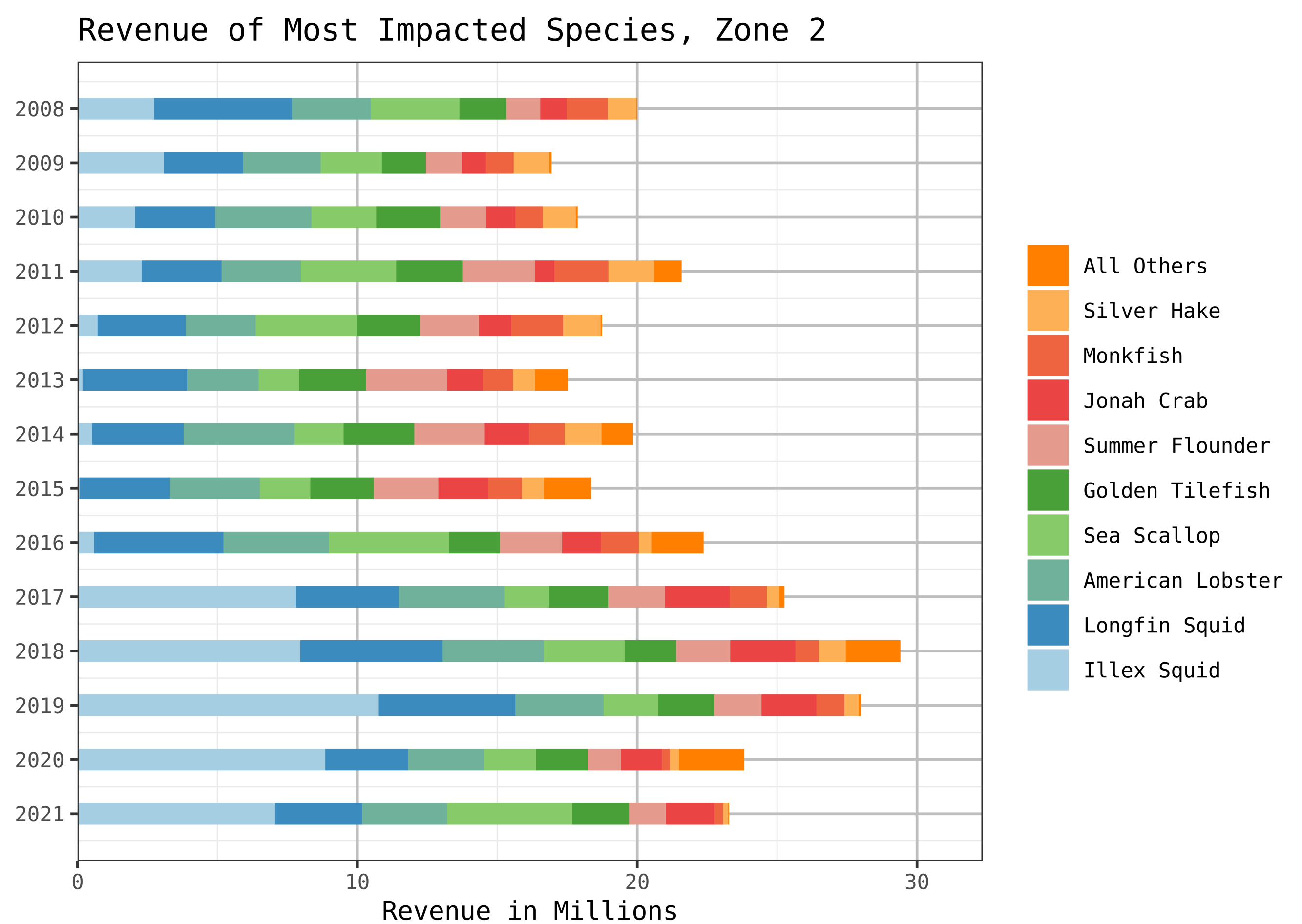


Table 3.2 Fourteen Year Total Revenue, Most Impacted Species, Zone 2

Species	Fourteen Year Revenue
Illex Squid	$54,690,000
Longfin Squid	$51,184,000
American Lobster	$44,182,000
Sea Scallop	$36,751,000
Golden Tilefish	$29,001,000
Summer Flounder	$26,949,000
Jonah Crab	$20,493,000
Monkfish	$15,878,000
Silver Hake	$12,252,000
All Others	$11,665,000
Total	**$303,045,000**

Select Gear Types

We analyzed select gear types to better understand the type of fishing occurring in Zone 2 . The select gear types are: Dredge-Other, Dredge-Clam, Dredge-Scallop, Gillnet-Sink, Gillnet-Other, Weir-Trap, Seine-Purse, Seine-Other, Handline, Hand-Other, Trawl-Bottom, Trawl-Midwater, Longline-Bottom, Longline-Pelagic, Pot-Other, and Pot-Lobster. The category "All Others" refers to species with less than three permits or dealers impacted to protect data confidentiality. Revenue values have been deflated to 2021 dollars. All numbers have been rounded to the nearest thousand.

Figure 4.1 Landings of Select Gear Types, Zone 2

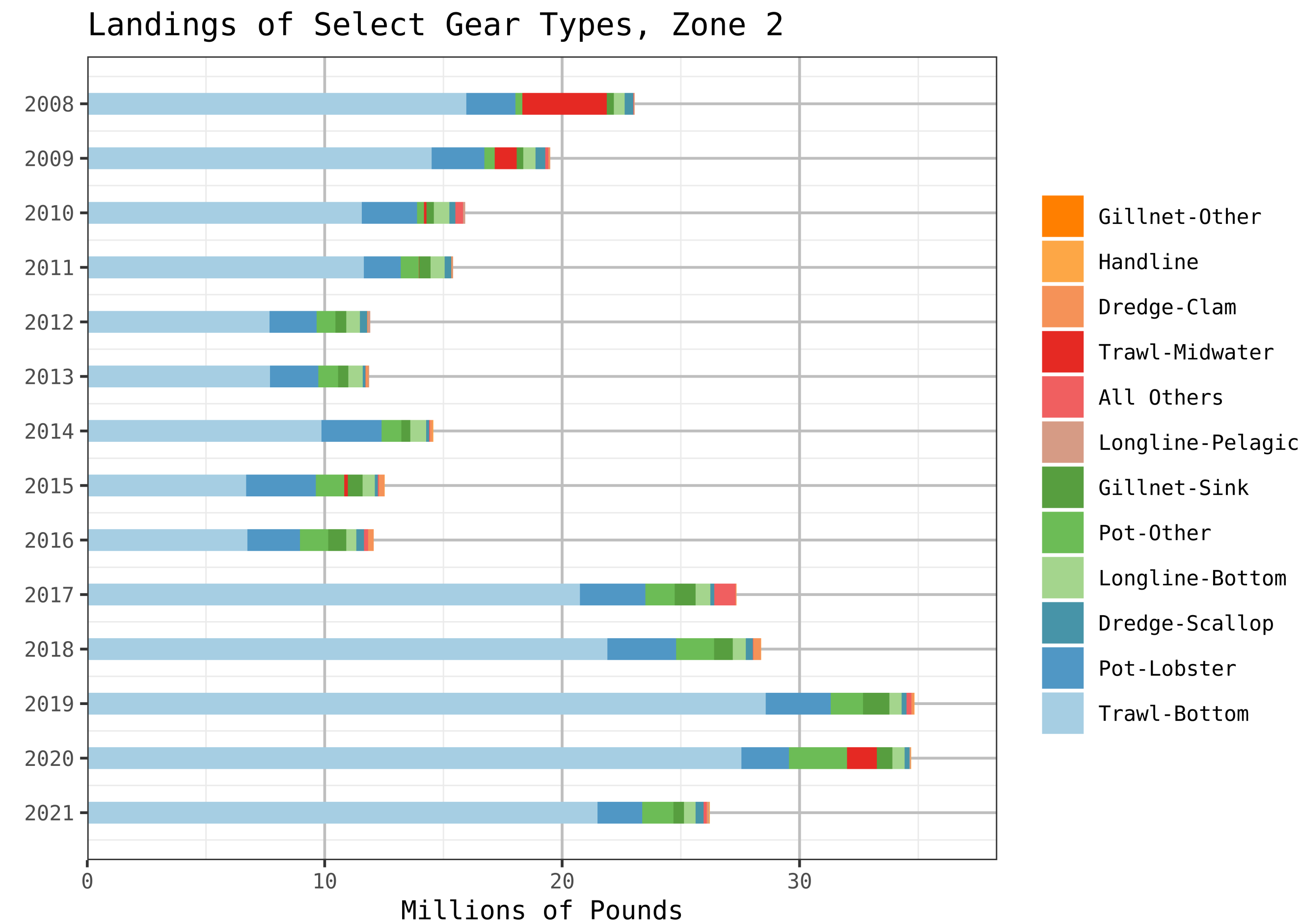


Table 4.1 Fourteen Year Total Landings (Pounds), Select Gear Types, Zone 2

Gear Type	Fourteen Year Landings
Trawl-Bottom	212,634,000
Pot-Lobster	32,139,000
Pot-Other	14,578,000
Gillnet-Sink	7,879,000
Longline-Bottom	7,707,000
Trawl-Midwater	6,010,000
Dredge-Scallop	3,493,000
All Others	2,008,000
Dredge-Clam	1,278,000
Longline-Pelagic	423,000
Handline	200,000
Gillnet-Other	1,000
Total	**288,349,000**

Figure 4.2 Revenue from Select Gear Types, Zone 2

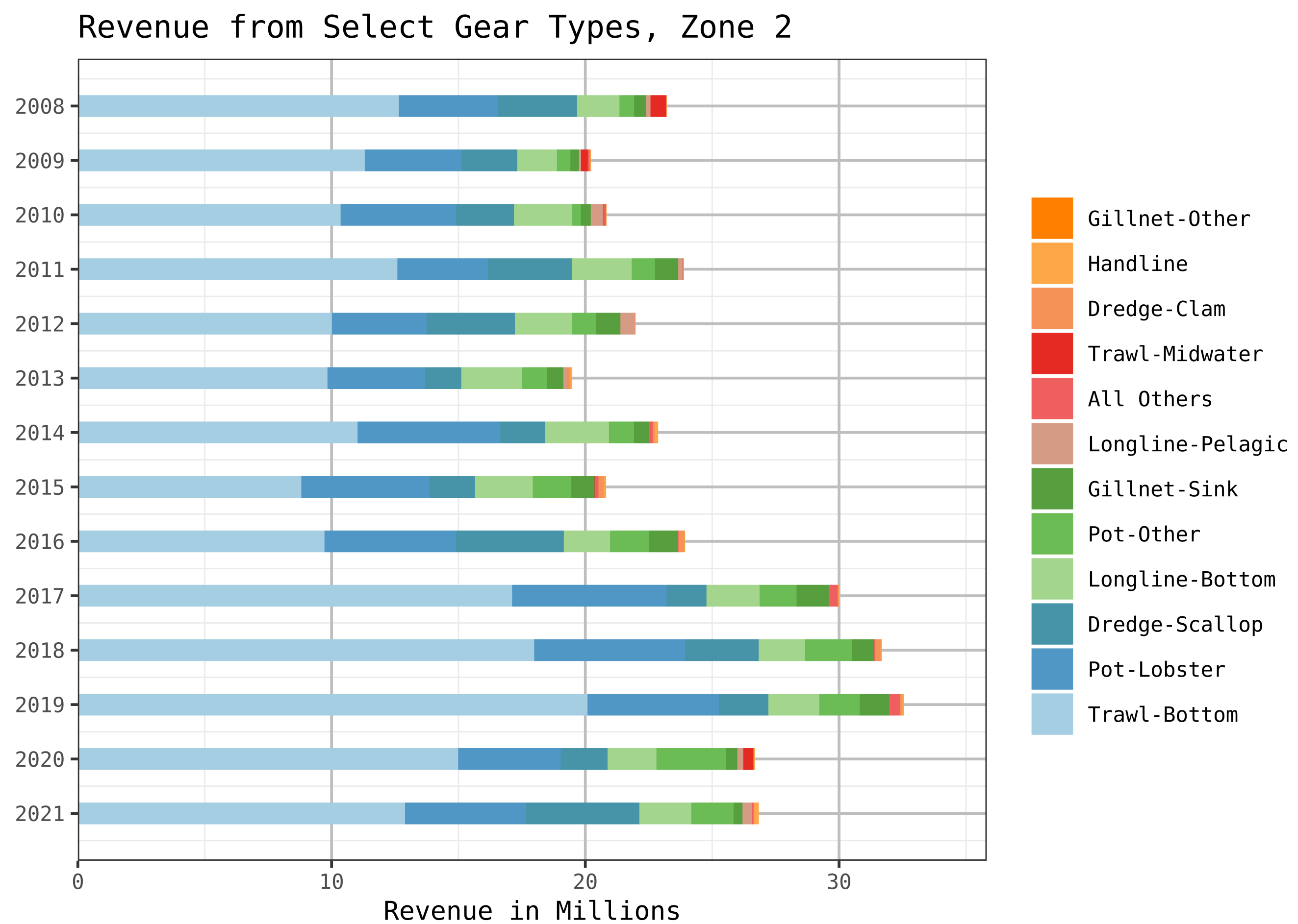


Table 4.2 Fourteen Year Total Revenue, Select Gear Types, Zone 2

Gear Type	Fourteen Year Revenue
Trawl-Bottom	$179,373,000
Pot-Lobster	$65,311,000
Dredge-Scallop	$36,345,000
Longline-Bottom	$29,057,000
Pot-Other	$17,658,000
Gillnet-Sink	$10,447,000
Longline-Pelagic	$2,250,000
All Others	$1,386,000
Trawl-Midwater	$1,313,000
Dredge-Clam	$1,087,000
Handline	$824,000
Gillnet-Other	$4,000

Gear Type	Fourteen Year Revenue
Total	**$345,055,000**

Totals

The following table displays the given year total revenue and total landed pounds of all species by all gear types within the area. From 2008-2021, a total of 288.349 million pounds worth $345.055 million were landed from within Zone 2. All numbers have been rounded to the nearest thousand.

Table 5.1 Fourteen Year Total Revenue and Landings (Pounds), Zone 2

Year	Revenue	Landings
2008	$23,220,000	23,055,000
2009	$20,227,000	19,504,000
2010	$20,840,000	15,921,000
2011	$23,888,000	15,407,000
2012	$21,979,000	11,920,000
2013	$19,483,000	11,874,000
2014	$22,871,000	14,575,000
2015	$20,819,000	12,529,000
2016	$23,933,000	12,064,000
2017	$30,012,000	27,345,000
2018	$31,692,000	28,382,000
2019	$32,565,000	34,842,000
2020	$26,687,000	34,705,000
2021	$26,837,000	26,225,000
Total	**$345,055,000**	**288,349,000**

Landings and Revenue by Port

The ten most impacted (by revenue) ports are listed below. These ports are estimated to receive the most revenue from fishing done within the Zone 2 area. The table below displays each port’s revenue and landing breakdown. The table present the cumulative revenues and landings from 2008-2021. New Bedford receives the highest value of revenue of any port, with $75.056 million from 2008-2021. All numbers have been rounded to the nearest thousand.

Table 6.1 Most Impacted Ports, by Revenue and Landings

City	State	Fourteen Year Revenue	Fourteen Year Landings
New Bedford	MA	$75,056,000	61,890,000
Point Judith	RI	$71,148,000	58,548,000
Montauk	NY	$36,089,000	18,644,000
Cape May	NJ	$26,959,000	46,012,000
North Kingstown	RI	$25,671,000	37,649,000
Newport	RI	$12,048,000	6,989,000
Barnegat	NJ	$8,550,000	2,062,000
Davisville	RI	$7,892,000	10,106,000
Hampton	VA	$6,916,000	2,836,000
Hampton Bay	NY	$6,840,000	2,187,000

Landings and Revenue by State

The following table displays total revenue and total landed pounds by state within the area. All numbers have been rounded to the nearest thousand.

Table 7.1 Most Impacted States, by Revenue and Landings

State	Fourteen Year Revenue	Fourteen Year Landings
RI	$126,517,000	118,763,000
MA	$88,983,000	74,152,000
NY	$45,819,000	23,214,000
NJ	$45,634,000	54,663,000
VA	$17,450,000	6,016,000
CT	$10,597,000	7,111,000
NC	$7,204,000	2,832,000
MD	$1,954,000	764,000
DE	$138,000	48,000
All Others	$88,000	33,000

Percentage of Revenue by Permit

We also analyzed the percentage of each permit's total commercial fishing revenue coming from within the Zone 2 area (see boxplots figures and tables below). Boxplots are important statistical summaries because they provide information about the distribution of the percentages. The boxplots below begin at the 1st quartile, or the value beneath which 25 percent of all observations fall. A thick line within the box identifies the median, the observation at which 50 percent of observations are above or beneath. The box ends at the 3rd quartile, or the observation beneath which 75 percent of observations fall. Nonparametric estimates of the minimum and maximum values are also indicated by the "whiskers" (dashed line terminating in a vertical line) that jut out from each side of the box. Any points outside of these whiskers are observations that are considered outliers. In our tables, however, the maximum values are inclusive of outliers. The first table below presents the minimum, 1st quartile, median, 3rd quartile, and maximum values for the area. These are the fourteen year revenue percentages. The following table represents the total number of outliers by year. The boxplots in the figures below further separate the area out by year.

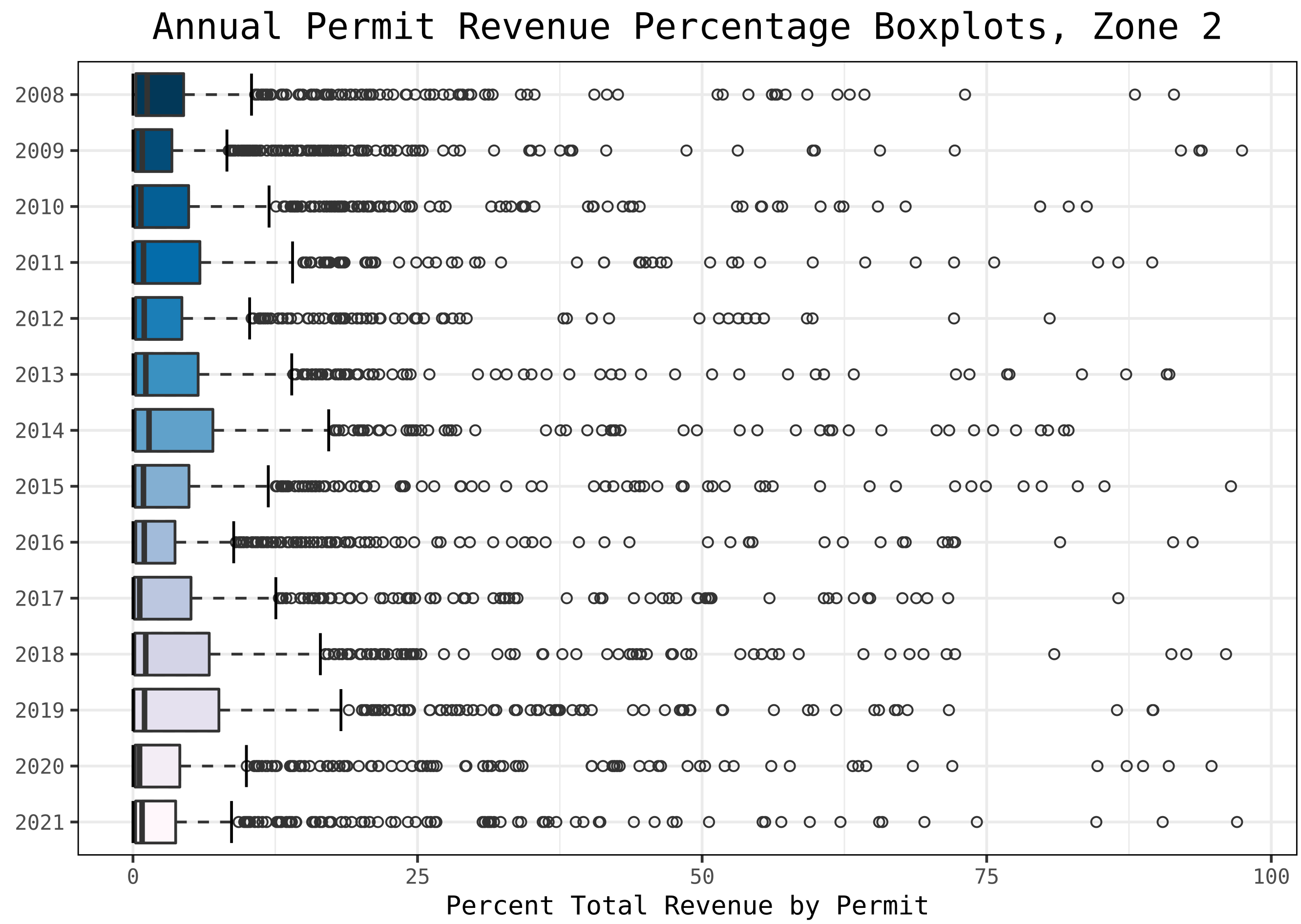
Table 8.1 Analysis of Fourteen Year Permit Revenue Percentage Boxplots, Zone 2

Min	1st Quartile	Median	3rd Quartile	Max
0%	0.19%	0.92%	5%	97%

Table 8.2 Fourteen Year Outlier Count, Zone 2

2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
85	96	88	57	73	64	58	74	87	76	74	68	87	87

Figure 8.1 Annual Permit Revenue Percentage Boxplots, Zone 2



Small Business Analysis

A business primarily engaged in commercial fishing is classified as a small business if it is independently owned and operated, is not dominant in its field of operation (including its affiliates) and has combined annual receipts not in excess of $11 million for all its affiliated operations worldwide. Small Business Administration principles of affiliation are used to define a business entity, meaning the following analysis is conducted upon unique business interests, which can represent multiple vessel permits. As such, this section presents the total number of entities, by business category, and the total revenue generated by that business category in Table 9.1. For those businesses with historical fishing within the Zone 2 area, Table 9.2 presents the revenue generated inside the Zone 2 area against the total revenue from those same entities. Revenue values have been deflated to 2021 dollars. All numbers have been rounded to the nearest thousand.

Table 9.1 Total number of entities engaged in federally managed fishing within the Northeast region, and their total revenue, by business category

Year	Business Type	Number of Entities	Revenue
2019	Large Business	11	$247,928,000
2019	Small Business	1,130	$799,249,000

Year	Business Type	Number of Entities	Revenue
2020	Large Business	11	$200,342,000
2020	Small Business	1,144	$684,526,000
2021	Large Business	11	$248,437,000
2021	Small Business	1,190	$849,039,000

Table 9.2 Revenue inside the Zone 2 area against total revenue from entities active inside the Zone 2 area, by business category

Year	Business Type	Number of Entities	Area Revenue	Total Revenue
2019	Large Business	11	$5,683,000	$247,928,000
2019	Small Business	284	$25,882,000	$533,352,000
2020	Large Business	10	$3,504,000	$184,807,000
2020	Small Business	324	$22,973,000	$512,668,000
2021	Large Business	11	$4,952,000	$248,437,000
2021	Small Business	332	$21,885,000	$630,597,000

Species Dependence

The tables below indicate the top ten species deriving the most revenue from the area by year. Additional information includes landings and effort (Days-at-Sea, or DAS) occurring within the area of interest as a percentage of totals generated by that species across the entire region for each year and the total number of trips and vessels from the area FMP, species, and port for each year. Trips with less than three permits or dealers have been removed to protect data confidentiality. The total number of trips, and number vessels taking those trips, represent an upper bound on the counts as it does not take into account the probability of these trips actually overlapping the area of interest, and identifies all the individuals who could be displaced by wind energy development. Therefore, also included is a count of trips and vessels weighted by the probability of overlap with the area of interest, to generate a more precise expected count of trips and vessels fishing within the area. The category “All Others” refers to gear type categories with less than three permits or dealers impacted to protect data confidentiality.

Table 10.1 Total and Expected Number of Trips and Vessels by Year, Zone 2

Year	Number of Trips	Number of Vessels	Expected Trips	Expected Vessels
2008	4,924	613	984	284
2009	5,167	665	1,038	287
2010	5,047	642	1,068	281
2011	4,917	575	1,085	283

Year	Number of Trips	Number of Vessels	Expected Trips	Expected Vessels
2012	4,253	567	871	260
2013	4,182	520	869	262
2014	4,445	504	1,020	255
2015	4,604	557	988	258
2016	5,064	605	1,023	262
2017	5,139	554	1,156	231
2018	5,227	548	1,197	249
2019	5,419	488	1,284	236
2020	4,880	547	1,097	212
2021	4,819	563	977	224

Table 10.2 Percentages of Total Revenue, Landings, and Days-at-Sea for Species of Interest, Zone 2, 2021

Species	Revenue as % of Total	Landings as % of Total	DAS as % of Total
Skipjack Tuna	56.34	45.19	26.53
Golden Tilefish	32.23	32.58	26.21
Swordfish	27.85	27.51	22.63
Illex Squid	23.66	25.49	28.33
Bigeye Tuna	23.39	23.01	27.35
Albacore Tuna	21.51	20.13	26.21
Butterfish	17.75	19.57	8.77
Jonah Crab	15.20	14.53	9.78
Yellowfin Tuna	14.44	14.00	30.95
Longfin Squid	9.40	9.83	7.88

Table 10.3 Total and Expected Number of Trips and Vessels by FMP, Zone 2, 2021

FMP	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
ASMFC FMP	828	99	45	183
Atlantic Herring	9	5	3	3
Bluefish	298	83	32	42
Highly Migratory Species	346	68	43	106

FMP	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Mackerel, Squid, and Butterfish	2,245	168	102	412
Monkfish	1,837	220	106	296
No Federal FMP	1,517	174	94	348
Northeast Multispecies	59	42	11	12
Sea Scallop	785	312	38	42
SERO FMP	131	53	24	47
Skates	1,077	126	73	169
Small-Mesh Multispecies	1,429	125	75	187
Spiny Dogfish	83	29	10	17
Summer Flounder, Scup, Black Sea Bass	2,217	210	112	281
Surfclam, Ocean Quahog	75	19	3	3
Tilefish	661	115	68	178

Table 10.4 Total and Expected Number of Trips and Vessels by Species, Zone 2, 2021

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Albacore Tuna	31	15	10	19
Am. Plaice Flounder	3	3	1	1
Amber Jack	9	4	3	3
American Eel	79	18	8	17
American Lobster	713	75	37	162
Atlantic Herring	9	5	3	3
Atlantic Mackerel	356	75	35	56
Big Eye Tuna	47	16	14	34
Black Sea Bass	1,348	168	78	147
Blk Bellied Rosefish	4	3	2	2
Bluefin Tuna	4	4	2	2
Bluefish	298	83	32	42
Blueline Tilefish	97	37	18	23
Bonito	49	21	6	6

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Butterfish	1,017	110	67	156
Channeled Whelk	96	4	2	89
Chub Mackerel	4	3	1	1
Clearnose Skate	13	7	3	3
Cod	11	11	2	2
Conger Eel	325	67	36	74
Cunner	5	4	1	1
Dogfish Smooth	209	34	17	36
Dogfish Spiny	83	29	10	17
Dolphinfish	49	18	13	33
Golden Tilefish	618	107	66	174
Haddock	7	6	2	2
Illex Squid	469	34	30	187
John Dory	370	67	45	117
Jonah Crab	641	47	30	152
King Whiting	192	56	24	35
Knobbed Whelk	9	3	2	7
Little Tuna	18	10	4	4
Longfin Squid	1,735	160	91	232
Monkfish	1,836	220	106	296
NK Crab	6	4	NA	NA
NK Eel	19	11	NA	NA
NK Seatrout	57	23	NA	NA
NK Tilefish	18	12	NA	NA
Northern Kingfish	37	15	4	4
Octopus	7	4	2	2
Offshore Hake	33	9	3	6
Other Fish	22	14	7	8
Pollock	6	4	1	1
Red Crab	51	6	5	22

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Red Hake	645	86	47	87
Redfish	14	9	4	4
Rock Crab	14	4	3	6
Scup	1,283	153	71	130
Sea Robins	62	26	7	7
Sea Scallop	785	312	38	42
Silver Hake	1,330	121	73	177
Silver&Offshhake Mix	19	6	3	4
Skates	1,074	126	73	169
Skipjack Tuna	3	3	2	2
Spanish Mackerel	6	3	1	1
Spotted Hake	16	3	3	3
Spotted Weakfish	105	23	7	8
Squeteague Weakfish	732	100	49	79
Summer Flounder	1,800	198	102	218
Surf Clam	17	10	2	3
Swordfish	87	29	20	37
Triggerfish	60	28	8	10
White Hake	18	14	3	3
Winter Flounder	15	14	3	4
Witch Flounder	9	9	2	2
Yellowfin Tuna	63	22	17	46
Yellowtail Flounder	5	5	1	1

Table 10.5 Total and Expected Number of Trips and Vessels by Port, Zone 2, 2021

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Atlantic City, NJ	18	10	3	3
Beaufort, NC	97	45	8	8
Belford, NJ	17	6	1	1
Cape May (County), NJ	4	3	1	1

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Cape May, NJ	410	83	20	47
Hampton Bay, NY	96	7	6	26
Hampton, VA	111	41	7	7
Harwich Port, MA	6	4	3	4
Harwichport, MA	142	3	3	125
Little Compton, RI	58	5	5	37
Montauk, NY	316	31	20	68
New Bedford, MA	1,156	289	67	202
New London, CT	18	4	2	9
Newport News, VA	67	43	5	5
Newport, RI	101	9	5	23
Ocean City, MD	45	11	4	8
Point Judith, RI	1,087	90	54	241
Point Pleasant, NJ	377	44	18	37
Shinnecock, NY	59	11	4	17
Stonington, CT	92	15	9	9
Wanchese, NC	10	5	1	1

Table 10.6 Percentages of Total Revenue, Landings, and Days-at-Sea for Species of Interest, Zone 2, 2020

Species	Revenue as % of Total	Landings as % of Total	DAS as % of Total
Golden Tilefish	36.38	36.71	28.13
Illex Squid	34.25	37.50	33.72
Butterfish	30.36	30.78	11.20
Yellowfin Tuna	25.74	24.60	28.25
Bigeye Tuna	18.50	17.33	27.39
Swordfish	16.69	16.55	22.16
Albacore Tuna	14.93	14.08	18.14
Jonah Crab	12.89	12.88	10.99
Atlantic Chub Mackerel	11.12	3.34	4.76
Longfin Squid	11.12	10.75	9.69

Table 10.7 Total and Expected Number of Trips and Vessels by FMP, Zone 2, 2020

FMP	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
ASMFC FMP	898	95	41	211
Atlantic Herring	6	4	2	2
Bluefish	416	108	38	46
Highly Migratory Species	280	59	39	90
Mackerel, Squid, and Butterfish	2,142	175	109	514
Monkfish	1,886	239	117	355
No Federal FMP	1,369	155	93	364
Northeast Multispecies	90	46	15	17
Sea Scallop	837	308	20	26
SERO FMP	68	30	15	21
Skates	1,059	132	82	213
Small-Mesh Multispecies	1,438	142	90	246
Spiny Dogfish	107	18	8	54
Summer Flounder, Scup, Black Sea Bass	2,130	215	117	298
Tilefish	680	106	78	204

Table 10.8 Total and Expected Number of Trips and Vessels by Species, Zone 2, 2020

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Albacore Tuna	29	14	10	17
American Eel	61	19	11	14
American Lobster	767	75	36	182
Atlantic Herring	6	4	2	2
Atlantic Mackerel	421	87	52	104
Big Eye Tuna	32	14	10	23
Black Sea Bass	1,205	175	87	151
Bluefin Tuna	4	4	3	3
Bluefish	416	108	38	46
Blueline Tilefish	102	39	19	26

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Bonito	46	21	6	6
Butterfish	979	119	75	199
Channeled Whelk	75	4	2	68
Chub Mackerel	14	10	3	3
Cod	10	10	1	1
Conger Eel	425	73	46	114
Cunner	7	4	1	1
Dogfish Smooth	135	27	13	29
Dogfish Spiny	107	18	8	54
Dolphinfish	24	10	10	15
Fourspot Flounder	9	4	2	3
Golden Tilefish	642	102	76	199
Haddock	5	5	1	1
Illex Squid	482	35	32	237
John Dory	312	67	47	109
Jonah Crab	713	52	30	165
King Mackerel	4	3	1	1
King Whiting	248	64	38	57
Knobbed Whelk	18	3	2	16
Little Tuna	17	8	4	4
Longfin Squid	1,591	163	97	269
Mako Shark	5	3	2	3
Mako Shortfin Shark	11	6	4	5
Monkfish	1,883	239	117	355
Mullets	14	6	4	4
NK Crab	35	7	NA	NA
NK Eel	19	11	NA	NA
NK Seatrout	21	11	NA	NA
Northern Kingfish	28	10	4	5
Offshore Hake	19	6	2	2

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Other Fish	11	6	3	4
Pollock	12	8	2	2
Red Hake	657	97	57	129
Redfish	31	13	9	10
Rock Crab	29	8	5	12
Scup	1,041	156	71	119
Sea Robins	49	18	4	4
Sea Scallop	837	308	20	26
Silver Hake	1,335	133	87	231
Silver&Offshhake Mix	15	8	3	5
Skates	1,048	131	82	212
Skipjack Tuna	3	3	1	1
Spotted Hake	13	3	3	4
Spotted Weakfish	70	17	5	5
Squeteague Weakfish	531	87	48	83
Summer Flounder	1,726	195	106	238
Swordfish	104	27	21	41
Tautog	4	3	1	1
Triggerfish	15	9	2	2
Wahoo	6	4	3	4
White Hake	16	15	2	2
Winter Flounder	21	15	2	2
Witch Flounder	16	10	2	2
Yellowfin Tuna	45	17	14	29
Yellowtail Flounder	7	6	1	1

Table 10.9 Total and Expected Number of Trips and Vessels by Port, Zone 2, 2020

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Barnegat, NJ	60	15	7	17
Beaufort, NC	74	40	8	8

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Cape May, NJ	368	75	19	42
Chatham, MA	107	7	7	75
Fairhaven, MA	4	4	1	1
Hampton Bay, NY	81	9	7	22
Hampton, VA	101	44	9	9
Harwichport, MA	117	3	3	95
Little Compton, RI	86	6	6	42
Montauk, NY	268	30	18	58
New Bedford, MA	1,251	303	53	250
New London, CT	28	6	4	9
Newport News, VA	58	35	4	4
Newport, RI	128	10	5	27
Ocean City, MD	35	6	2	3
Point Judith, RI	1,077	98	58	291
Point Pleasant, NJ	426	38	20	46
Shinnecock, NY	53	7	4	13
Stonington, CT	75	17	8	12
Westport, MA	5	4	2	2
Wildwood, NJ	5	4	1	1

Table 10.10 Percentages of Total Revenue, Landings, and Days-at-Sea for Species of Interest, Zone 2, 2019

Species	Revenue as % of Total	Landings as % of Total	DAS as % of Total
Illex Squid	35.71	36.84	35.24
Golden Tilefish	34.48	34.96	27.96
Yellowfin Tuna	32.24	30.46	27.11
Butterfish	23.23	23.80	11.57
Bigeye Tuna	21.11	20.59	27.36
Albacore Tuna	19.66	20.09	15.40
Swordfish	17.42	18.70	22.42
Jonah Crab	14.38	14.63	12.25

Species	Revenue as % of Total	Landings as % of Total	DAS as % of Total
Longfin Squid	10.73	11.01	11.10
Atlantic Chub Mackerel	8.03	7.40	9.40

Table 10.11 Total and Expected Number of Trips and Vessels by FMP, Zone 2, 2019

FMP	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
ASMFC FMP	966	82	44	236
Atlantic Herring	9	5	2	2
Bluefish	468	102	42	55
Highly Migratory Species	306	69	42	85
Mackerel, Squid, and Butterfish	2,661	180	125	619
Monkfish	2,376	252	143	503
No Federal FMP	1,648	161	105	421
Northeast Multispecies	149	59	25	39
Sea Scallop	469	226	17	27
SERO FMP	116	52	23	35
Skates	1,401	143	108	316
Small-Mesh Multispecies	1,740	132	99	306
Spiny Dogfish	112	35	15	30
Summer Flounder, Scup, Black Sea Bass	2,563	226	142	392
Surfclam, Ocean Quahog	108	12	4	4
Tilefish	788	111	83	248

Table 10.12 Total and Expected Number of Trips and Vessels by Species, Zone 2, 2019

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Albacore Tuna	17	8	7	10
Amber Jack	7	4	1	1
American Eel	92	19	11	26
American Lobster	791	64	38	199
Atlantic Herring	9	5	2	2

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Atlantic Mackerel	675	108	73	153
Big Eye Tuna	30	13	11	20
Black Sea Bass	1,395	182	100	177
Blk Bellied Rosefish	7	6	4	4
Bluefish	468	102	42	55
Blueline Tilefish	161	51	26	37
Bonito	56	21	5	6
Butterfish	1,349	126	91	268
Channeled Whelk	93	3	2	83
Chub Mackerel	19	9	4	4
Cod	13	10	2	4
Conger Eel	579	75	49	135
Dogfish Smooth	178	34	18	38
Dogfish Spiny	112	35	15	30
Dolphinfish	56	19	15	27
Fourspot Flounder	12	5	2	3
Golden Tilefish	714	100	78	237
Haddock	6	5	1	1
Harvest Fish	23	13	3	3
Illex Squid	540	41	32	257
John Dory	351	71	53	120
Jonah Crab	778	43	30	180
King Whiting	238	66	34	49
Knobbed Whelk	34	3	2	29
Little Tuna	9	6	2	2
Longfin Squid	2,048	171	114	358
Mako Shark	3	3	2	2
Mako Shortfin Shark	15	7	5	7
Monkfish	2,375	252	143	503
Mullets	15	4	3	4

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
NK Crab	50	6	NA	NA
NK Eel	26	16	NA	NA
NK Seatrout	14	9	NA	NA
Northern Kingfish	40	10	6	8
Offshore Hake	36	8	3	3
Other Fish	7	3	2	2
Pollock	8	5	2	2
Red Crab	43	6	5	19
Red Hake	829	96	66	166
Redfish	89	26	15	25
Rock Crab	49	10	5	14
Scup	1,287	167	88	153
Sea Robins	117	32	12	16
Sea Scallop	469	226	17	27
Silver Hake	1,614	129	95	288
Silver&Offshhake Mix	12	6	4	4
Skates	1,383	143	107	315
Skipjack Tuna	6	6	1	1
Spanish Mackerel	3	3	1	1
Spot	8	4	2	3
Spotted Weakfish	55	16	4	4
Squeteague Weakfish	548	86	49	76
Summer Flounder	2,108	213	131	320
Surf Clam	39	7	2	2
Swordfish	89	25	19	29
Tautog	3	3	1	1
Triggerfish	40	24	5	5
White Hake	10	7	3	3
Winter Flounder	20	16	3	3
Witch Flounder	16	10	3	3

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Yellowfin Tuna	40	13	12	25
Yellowtail Flounder	9	8	2	2

Table 10.13 Total and Expected Number of Trips and Vessels by Port, Zone 2, 2019

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Atlantic City, NJ	55	9	3	4
Barnegat, NJ	66	16	9	23
Beaufort, NC	106	51	11	11
Boston, MA	8	3	3	3
Cape May, NJ	403	73	27	45
Chatham, MA	160	11	10	91
Chincoteague, VA	28	14	2	2
Fairhaven, MA	42	6	3	3
Hampton Bay, NY	108	7	6	27
Hampton, VA	164	56	13	15
Harwichport, MA	135	3	3	108
Hobucken, NC	13	8	1	1
Little Compton, RI	92	5	5	61
Montauk, NY	320	28	20	79
Morehead City, NC	5	3	1	1
New Bedford, MA	942	199	45	238
New London, CT	65	7	5	20
Newport News, VA	89	52	9	9
Newport, RI	136	9	6	30
North Kingstown, RI	31	3	3	9
Ocean City, MD	33	5	3	3
Point Judith, RI	1,309	87	65	349
Point Pleasant, NJ	518	45	27	64
Shinnecock, NY	54	6	4	12
Stonington, CT	113	15	6	14

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Wanchese, NC	14	9	1	1

Table 10.14 Percentages of Total Revenue, Landings, and Days-at-Sea for Species of Interest, Zone 2, 2018

Species	Revenue as % of Total	Landings as % of Total	DAS as % of Total
Golden Tilefish	34.50	34.77	30.17
Illex Squid	31.04	29.65	25.29
Butterfish	21.65	21.72	13.29
Jonah Crab	12.67	12.75	12.80
Longfin Squid	12.35	12.96	12.13
Yellowfin Tuna	12.25	12.01	15.21
Clearnose Skate	11.22	6.96	12.16
Bigeye Tuna	11.04	11.28	15.80
Silver Hake	9.27	6.07	9.70
Weakfish	9.18	8.59	15.11

Table 10.15 Total and Expected Number of Trips and Vessels by FMP, Zone 2, 2018

FMP	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
ASMFC FMP	1,099	106	54	247
Atlantic Herring	47	14	6	7
Bluefish	364	95	40	51
Highly Migratory Species	243	60	35	80
Mackerel, Squid, and Butterfish	2,298	175	117	530
Monkfish	2,282	298	149	517
No Federal FMP	1,899	174	109	515
Northeast Multispecies	98	48	20	24
Sea Scallop	594	269	23	27
SERO FMP	78	38	13	21
Skates	1,301	168	116	331
Small-Mesh Multispecies	1,636	136	99	344

FMP	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Spiny Dogfish	157	34	17	61
Summer Flounder, Scup, Black Sea Bass	2,418	244	146	405
Tilefish	945	133	95	321

Table 10.16 Total and Expected Number of Trips and Vessels by Species, Zone 2, 2018

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Albacore Tuna	4	4	3	3
American Eel	131	24	16	39
American Lobster	899	82	39	205
Atlantic Croaker	4	4	1	1
Atlantic Halibut	4	3	3	3
Atlantic Herring	47	14	6	7
Atlantic Mackerel	655	103	62	146
Big Eye Tuna	17	10	7	12
Black Sea Bass	1,440	193	109	233
Blk Bellied Rosefish	8	3	3	3
Bluefish	364	95	40	51
Blueline Tilefish	197	49	31	55
Bonito	8	8	2	2
Butterfish	1,247	127	87	298
Chub Mackerel	14	8	2	2
Clearnose Skate	49	21	8	9
Cod	12	8	2	2
Conger Eel	617	88	56	176
Cunner	3	3	1	1
Dogfish Smooth	187	31	19	53
Dogfish Spiny	157	34	17	61
Dolphinfish	27	11	7	12
Fourspot Flounder	13	7	4	4

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Golden Tilefish	871	128	93	305
Haddock	16	11	1	1
Illex Squid	409	35	27	165
John Dory	549	86	63	211
Jonah Crab	900	51	34	192
King Whiting	349	70	44	96
Knobbed Whelk	42	4	2	23
Little Tuna	6	4	1	1
Longfin Squid	1,860	168	110	376
Monkfish	2,279	298	149	515
Mullets	20	6	6	8
NK Crab	42	6	NA	NA
NK Eel	44	24	NA	NA
NK Seatrout	22	14	NA	NA
Northern Kingfish	84	21	11	25
Offshore Hake	29	15	4	4
Other Fish	23	9	4	5
Pollock	6	6	3	3
Red Hake	886	108	66	213
Red Porgy	7	5	1	1
Redfish	42	14	10	14
Rock Crab	7	3	2	2
Scup	1,277	180	97	180
Sea Robins	146	35	15	21
Sea Scallop	594	269	23	27
Silver Hake	1,465	123	94	321
Skates	1,278	166	115	328
Spotted Weakfish	156	28	15	17
Squeteague Weakfish	807	110	73	162
Steelhead Trout	15	8	3	3

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Summer Flounder	1,902	225	132	316
Swordfish	25	14	8	10
Tautog	5	3	2	3
Triggerfish	11	9	1	1
White Hake	14	9	3	3
Winter Flounder	20	15	2	2
Witch Flounder	13	10	2	2
Yellowfin Tuna	29	20	10	16
Yellowtail Flounder	9	6	2	2

Table 10.17 Total and Expected Number of Trips and Vessels by Port, Zone 2, 2018

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Atlantic City, NJ	63	6	3	9
Barnegat, NJ	85	22	8	25
Beaufort, NC	136	60	15	16
Boston, MA	7	4	2	2
Cape May, NJ	457	87	30	60
Chatham, MA	130	13	12	90
Chincoteague, VA	36	15	5	5
Fairhaven, MA	18	4	3	9
Gloucester, MA	10	5	2	2
Hampton Bay, NY	63	4	4	20
Hampton, VA	127	50	13	14
Hobucken, NC	15	8	1	1
Little Compton, RI	72	5	5	35
Montauk, NY	300	29	22	79
Morehead City, NC	8	5	2	2
New Bedford, MA	974	220	49	168
New London, CT	70	5	5	21
Newport News, VA	96	47	10	10

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Newport, RI	116	10	6	27
Ocean City, MD	26	6	2	3
Point Judith, RI	1,210	99	65	350
Point Pleasant, NJ	449	45	25	53
Shinnecock, NY	43	7	5	15
Stonington, CT	90	17	10	21
Wanchese, NC	9	4	1	1
Westport, MA	22	4	2	4
Wildwood, NJ	17	5	2	4

Table 10.18 Percentages of Total Revenue, Landings, and Days-at-Sea for Species of Interest, Zone 2, 2017

Species	Revenue as % of Total	Landings as % of Total	DAS as % of Total
Golden Tilefish	40.77	40.74	33.46
Butterfish	33.00	35.62	13.53
Illex Squid	31.52	28.40	26.52
Offshore Hake	23.39	24.19	28.06
Jonah Crab	15.47	15.61	11.75
Spot	14.55	13.45	18.18
Longfin Squid	13.47	14.27	12.95
Swordfish	12.69	12.86	20.07
Clearnose Skate	12.10	7.22	11.77
Red Hake	9.88	7.87	15.13

Table 10.19 Total and Expected Number of Trips and Vessels by FMP, Zone 2, 2017

FMP	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
ASMFC FMP	1,037	116	60	269
Atlantic Herring	27	8	3	6
Bluefish	876	145	85	175
Highly Migratory Species	355	69	40	84

FMP	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Mackerel, Squid, and Butterfish	2,008	166	111	481
Monkfish	2,321	281	147	581
No Federal FMP	1,884	180	122	533
Northeast Multispecies	131	59	24	30
Sea Scallop	800	303	19	22
SERO FMP	112	53	22	37
Skates	1,269	151	103	287
Small-Mesh Multispecies	1,489	126	96	367
Spiny Dogfish	174	42	20	45
Summer Flounder, Scup, Black Sea Bass	2,301	244	143	419
Surfclam, Ocean Quahog	23	10	1	1
Tilefish	1,074	135	95	364

Table 10.20 Total and Expected Number of Trips and Vessels by Species, Zone 2, 2017

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Albacore Tuna	6	5	3	3
American Eel	104	17	11	35
American Lobster	852	86	47	224
Atlantic Croaker	4	3	2	2
Atlantic Herring	27	8	3	6
Atlantic Mackerel	418	83	53	111
Barrelfish	3	3	2	2
Big Eye Tuna	7	4	4	5
Black Sea Bass	1,399	174	106	252
Blk Bellied Rosefish	7	3	3	4
Blue Crab	14	6	2	3
Bluefish	876	145	85	175
Blueline Tilefish	237	54	34	82
Bonito	27	11	4	5

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Butterfish	1,100	110	81	295
Channeled Whelk	85	4	2	53
Chub Mackerel	4	4	2	2
Clearnose Skate	50	20	7	7
Cod	30	22	7	8
Conger Eel	513	72	48	158
Crevalle	7	4	1	1
Cunner	4	4	1	1
Dogfish Smooth	270	42	25	59
Dogfish Spiny	174	42	20	45
Dolphinfish	37	15	11	23
Fourspot Flounder	14	7	4	4
Golden Tilefish	1,023	127	92	353
Haddock	6	6	1	1
Illex Squid	309	27	20	104
John Dory	725	99	78	257
Jonah Crab	800	47	33	198
King Whiting	373	72	50	110
Knobbed Whelk	49	9	2	22
Little Tuna	12	6	2	2
Longfin Squid	1,676	160	106	394
Mako Shortfin Shark	6	5	3	3
Menhaden	7	4	1	1
Monkfish	2,316	281	147	580
Mullets	18	6	3	7
NK Crab	23	5	NA	NA
NK Eel	48	23	NA	NA
NK Seatrout	41	19	NA	NA
NK Tilefish	27	4	NA	NA
Northern Kingfish	64	18	12	20

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Offshore Hake	30	15	7	9
Other Fish	32	9	6	8
Pollock	3	3	1	1
Red Crab	35	6	4	16
Red Hake	975	96	66	269
Redfish	38	13	8	11
Scup	1,330	164	95	219
Sea Robins	198	48	24	36
Sea Scallop	800	303	19	22
Silver Hake	1,303	118	91	322
Skates	1,254	151	102	285
Spotted Weakfish	92	28	10	14
Squeteague Weakfish	806	105	67	165
Striped Bass	8	6	1	1
Summer Flounder	1,679	228	131	300
Surf Clam	6	3	1	1
Swordfish	56	16	10	14
Thresher Shark	6	3	1	1
Triggerfish	50	31	7	7
White Hake	23	18	7	7
White Perch	13	4	3	5
Winter Flounder	39	13	4	4
Witch Flounder	17	13	5	5
Yellowfin Tuna	25	13	10	14
Yellowtail Flounder	24	14	4	4

Table 10.21 Total and Expected Number of Trips and Vessels by Port, Zone 2, 2017

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Barnegat, NJ	67	20	8	27
Beaufort, NC	112	52	16	16

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Cape May, NJ	483	110	30	61
Chatham, MA	180	15	13	85
Chincoteague, VA	42	15	4	4
Fairhaven, MA	35	9	2	3
Gloucester, MA	6	5	2	2
Hampton Bay, NY	49	8	4	19
Hampton, VA	149	55	12	12
Harwichport, MA	140	3	3	92
Little Compton, RI	87	5	4	37
Montauk, NY	272	23	16	71
Morehead City, NC	6	4	1	1
New Bedford, MA	934	227	46	134
New London, CT	88	7	3	12
Newport News, VA	85	51	7	7
Newport, RI	100	9	5	29
Ocean City, MD	36	7	2	3
Point Judith, RI	1,155	89	63	360
Point Pleasant, NJ	425	40	20	45
Sandwich, MA	96	3	3	7
Shinnecock, NY	35	6	4	10
Stonington, CT	75	15	7	31
Wanchese, NC	30	14	5	5
Westport, MA	30	4	2	2

Table 10.22 Percentages of Total Revenue, Landings, and Days-at-Sea for Species of Interest, Zone 2, 2016

Species	Revenue as % of Total	Landings as % of Total	DAS as % of Total
Golden Tilefish	37.41	37.81	32.42
Bigeye Tuna	20.12	19.71	14.68
Offshore Hake	15.47	11.87	20.27
Jonah Crab	12.42	12.43	9.37

Species	Revenue as % of Total	Landings as % of Total	DAS as % of Total
Red Hake	10.20	8.08	12.61
Butterfish	10.10	9.92	10.69
Atlantic Chub Mackerel	9.33	10.48	6.32
Blueline Tilefish	8.86	9.61	24.85
Longfin Squid	8.40	8.42	10.30
Summer Flounder	8.04	9.21	7.16

Table 10.23 Total and Expected Number of Trips and Vessels by FMP, Zone 2, 2016

FMP	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
ASMFC FMP	990	123	53	233
Atlantic Herring	27	12	5	7
Bluefish	869	143	76	163
Highly Migratory Species	219	64	34	64
Mackerel, Squid, and Butterfish	1,961	196	123	371
Monkfish	2,227	326	158	496
No Federal FMP	1,623	178	111	445
Northeast Multispecies	144	62	19	25
Sea Scallop	1,029	348	35	39
SERO FMP	123	57	20	31
Skates	1,111	169	101	230
Small-Mesh Multispecies	1,342	137	89	292
Spiny Dogfish	106	26	10	32
Summer Flounder, Scup, Black Sea Bass	2,246	252	146	372
Surfclam, Ocean Quahog	27	10	5	7
Tilefish	778	115	80	258

Table 10.24 Total and Expected Number of Trips and Vessels by Species, Zone 2, 2016

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Albacore Tuna	8	5	2	2

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Am. Plaice Flounder	6	5	1	1
American Eel	81	16	12	26
American Lobster	828	85	43	201
Atlantic Croaker	25	20	4	4
Atlantic Halibut	9	9	1	1
Atlantic Herring	27	12	5	7
Atlantic Mackerel	423	81	46	104
Big Eye Tuna	12	10	7	8
Black Sea Bass	1,119	181	102	174
Blue Crab	28	7	3	7
Bluefish	869	143	76	163
Blueline Tilefish	201	57	33	63
Bonito	30	13	4	4
Butterfish	996	105	76	232
Chub Mackerel	19	7	3	3
Clearnose Skate	56	16	7	10
Cod	63	34	6	6
Conger Eel	565	78	50	153
Cunner	6	4	2	2
Cusk	6	4	2	3
Dogfish Smooth	164	38	20	43
Dogfish Spiny	106	26	10	32
Dolphinfish	28	12	6	14
Golden Tilefish	705	104	78	243
Haddock	50	18	1	1
Hickory Shad	5	3	2	2
Illex Squid	108	27	14	23
John Dory	578	102	70	180
Jonah Crab	753	51	33	162
King Whiting	249	69	36	59

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Longfin Squid	1,864	195	123	355
Mako Shortfin Shark	4	3	2	2
Monkfish	2,222	326	158	496
Mullets	12	7	3	3
NK Eel	38	18	NA	NA
NK Seatrout	24	12	NA	NA
Northern Kingfish	16	9	3	4
Octopus	9	4	3	3
Offshore Hake	25	14	6	7
Other Fish	47	10	6	11
Pollock	11	8	1	1
Red Hake	899	102	65	219
Red Porgy	7	5	2	2
Redfish	19	11	4	6
Rock Crab	17	9	3	7
Scup	1,098	154	80	153
Sea Robins	110	36	13	17
Sea Scallop	1,029	348	35	39
Sheepshead	4	4	1	1
Silver Hake	1,212	129	84	269
Skates	1,092	169	100	226
Skipjack Tuna	4	4	1	1
Snowy Grouper	8	7	3	3
Spanish Mackerel	4	3	1	1
Spotted Weakfish	61	19	5	6
Squeteague Weakfish	533	85	51	97
Summer Flounder	1,873	241	138	323
Swordfish	25	11	6	6
Triggerfish	52	25	7	7
White Hake	24	16	7	8

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Winter Flounder	68	31	7	8
Witch Flounder	35	19	7	8
Yellowfin Tuna	11	8	5	7
Yellowtail Flounder	53	27	7	7

Table 10.25 Total and Expected Number of Trips and Vessels by Port, Zone 2, 2016

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Atlantic City, NJ	96	6	2	2
Beaufort, NC	87	44	15	16
Belford, NJ	59	12	6	8
Boston, MA	30	6	2	2
Cape May, NJ	432	104	28	42
Chatham, MA	163	12	12	74
Chincoteague, VA	37	16	6	6
Davisville, RI	24	3	3	5
Fairhaven, MA	22	9	1	1
Gloucester, MA	12	6	2	2
Hampton Bay, NY	43	3	3	16
Hampton, VA	192	63	22	25
Harwichport, MA	167	5	4	105
Hyannis, MA	7	3	2	2
Little Compton, RI	53	5	4	31
Montauk, NY	238	24	15	57
Morehead City, NC	8	4	1	1
New Bedford, MA	917	241	61	142
New London, CT	61	7	5	13
Newport News, VA	120	62	9	9
Newport, RI	103	9	6	29
Ocean City, MD	18	5	2	2
Oriental, NC	17	8	3	3

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Point Judith, RI	1,146	90	56	278
Point Pleasant, NJ	321	39	16	30
Sandwich, MA	107	3	3	7
Shinnecock, NY	37	6	6	11
Stonington, CT	90	17	7	25
Wanchese, NC	23	10	4	4
Westport, MA	54	7	4	5

Table 10.26 Percentages of Total Revenue, Landings, and Days-at-Sea for Species of Interest, Zone 2, 2015

Species	Revenue as % of Total	Landings as % of Total	DAS as % of Total
Golden Tilefish	38.39	38.66	31.43
Bigeye Tuna	37.09	44.01	36.54
Yellowfin Tuna	28.69	27.87	33.56
Albacore Tuna	22.56	20.04	31.31
Swordfish	17.18	22.37	19.42
Butterfish	16.63	16.79	11.03
Jonah Crab	16.38	18.15	11.47
Red Hake	11.18	9.28	14.07
Offshore Hake	10.92	12.67	19.32
Longfin Squid	9.21	9.53	11.64

Table 10.27 Total and Expected Number of Trips and Vessels by FMP, Zone 2, 2015

FMP	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
ASMFC FMP	1,025	141	60	242
Atlantic Herring	61	22	8	10
Bluefish	564	136	60	92
Highly Migratory Species	208	59	35	78
Mackerel, Squid, and Butterfish	1,935	190	119	362
Monkfish	2,280	299	155	484

FMP	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
No Federal FMP	1,607	178	107	405
Northeast Multispecies	221	84	34	46
Sea Scallop	565	264	18	19
SERO FMP	91	48	16	21
Skates	1,313	162	99	251
Small-Mesh Multispecies	1,428	138	93	304
Spiny Dogfish	92	32	11	24
Summer Flounder, Scup, Black Sea Bass	2,294	239	148	361
Surfclam, Ocean Quahog	24	14	9	12
Tilefish	623	107	78	219

Table 10.28 Total and Expected Number of Trips and Vessels by Species, Zone 2, 2015

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Albacore Tuna	24	8	7	18
Amber Jack	3	3	1	1
American Eel	104	12	9	30
American Lobster	809	92	46	210
Atlantic Croaker	62	40	8	8
Atlantic Cutlassfish	5	4	1	1
Atlantic Halibut	7	7	2	2
Atlantic Herring	61	22	8	10
Atlantic Mackerel	494	79	49	103
Big Eye Tuna	56	18	11	33
Black Sea Bass	1,131	173	102	169
Blue Crab	9	6	1	1
Bluefin Tuna	5	4	3	4
Bluefish	564	136	60	92
Blueline Tilefish	144	47	30	46
Bonito	15	9	4	5

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Butterfish	978	107	72	233
Channeled Whelk	84	4	2	54
Cod	71	35	9	12
Conger Eel	520	77	48	128
Cusk	7	4	2	3
Dogfish Smooth	105	30	17	26
Dogfish Spiny	92	32	11	24
Dolphinfish	12	7	3	6
Fourspot Flounder	33	10	4	4
Golden Tilefish	569	100	76	207
Haddock	26	17	1	1
Harvest Fish	14	9	2	2
Illex Squid	61	21	7	11
John Dory	533	85	60	189
Jonah Crab	747	52	32	172
King Whiting	221	66	30	48
Knobbed Whelk	48	3	2	30
Longfin Squid	1,799	181	117	344
Mako Shortfin Shark	9	3	2	5
Menhaden	6	6	1	1
Monkfish	2,273	299	155	483
Mullets	9	7	3	3
NK Eel	46	17	NA	NA
NK Seatrout	24	11	NA	NA
NK Tilefish	17	3	NA	NA
Octopus	3	3	1	1
Offshore Hake	28	14	7	7
Other Fish	37	16	7	8
Pollock	11	11	3	3
Red Hake	956	99	65	221

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Redfish	14	11	6	6
Rock Crab	18	8	4	5
Sand Tilefish	4	3	1	1
Scup	1,206	168	88	159
Sea Robins	74	29	12	15
Sea Scallop	565	264	18	19
Silver Hake	1,306	125	85	281
Skates	1,307	162	99	250
Spadefish	3	3	1	1
Spot	18	6	2	4
Spotted Weakfish	81	21	8	10
Squeteague Weakfish	632	99	55	103
Striped Bass	4	4	1	1
Summer Flounder	1,902	225	136	301
Surf Clam	12	7	5	8
Swordfish	37	12	8	18
Triggerfish	38	22	5	5
Wahoo	8	6	4	6
White Hake	55	29	14	16
Winter Flounder	77	33	7	10
Witch Flounder	88	38	18	24
Yellowfin Tuna	53	18	13	33
Yellowtail Flounder	98	42	12	16

Table 10.29 Total and Expected Number of Trips and Vessels by Port, Zone 2, 2015

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Atlantic City, NJ	19	9	6	8
Barnegat, NJ	97	24	13	36
Beaufort, NC	114	52	18	19
Boston, MA	49	6	4	5

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Cape May, NJ	306	92	29	36
Chatham, MA	95	10	9	38
Chincoteague, VA	47	18	6	6
Fairhaven, MA	46	11	3	9
Gloucester, MA	10	6	4	4
Hampton Bay, NY	38	6	5	13
Hampton, VA	149	54	16	17
Harwichport, MA	123	5	5	80
Little Compton, RI	59	4	3	22
Montauk, NY	313	34	17	70
Morehead City, NC	9	3	2	2
New Bedford, MA	753	197	49	159
New London, CT	85	10	5	20
Newport News, VA	80	38	6	6
Newport, RI	103	9	5	25
Ocean City, MD	31	7	4	4
Point Judith, RI	1,111	77	58	265
Point Lookout, NY	9	3	3	3
Point Pleasant, NJ	272	35	16	27
Sandwich, MA	92	3	3	8
Shinnecock, NY	44	6	4	14
Stonington, CT	120	16	10	32
Wanchese, NC	21	8	3	3
Westport, MA	85	6	5	5

Table 10.30 Percentages of Total Revenue, Landings, and Days-at-Sea for Species of Interest, Zone 2, 2014

Species	Revenue as % of Total	Landings as % of Total	DAS as % of Total
Golden Tilefish	38.61	38.27	32.47
Yellowfin Tuna	34.67	33.84	32.64
Bigeye Tuna	34.03	34.83	35.28

Species	Revenue as % of Total	Landings as % of Total	DAS as % of Total
Offshore Hake	25.01	29.21	10.58
Butterfish	21.21	20.58	13.55
Albacore Tuna	20.13	17.01	16.12
Jonah Crab	12.12	12.03	8.96
Longfin Squid	11.14	10.74	12.83
Silver Hake	10.02	9.29	11.80
Red Hake	10.00	8.30	15.99

Table 10.31 Total and Expected Number of Trips and Vessels by FMP, Zone 2, 2014

FMP	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
ASMFC FMP	1,158	133	69	270
Atlantic Herring	26	12	4	4
Bluefish	455	125	51	71
Highly Migratory Species	195	72	43	74
Mackerel, Squid, and Butterfish	1,886	190	122	419
Monkfish	2,212	327	156	523
No Federal FMP	1,631	182	116	438
Northeast Multispecies	272	93	42	73
Sea Scallop	340	211	16	17
SERO FMP	139	62	28	51
Skates	1,116	153	99	249
Small-Mesh Multispecies	1,452	124	92	363
Spiny Dogfish	92	33	13	24
Summer Flounder, Scup, Black Sea Bass	2,238	230	148	430
Tilefish	832	111	83	313

Table 10.32 Total and Expected Number of Trips and Vessels by Species, Zone 2, 2014

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Albacore Tuna	30	18	11	16

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Am. Plaice Flounder	3	3	1	1
American Eel	92	24	12	29
American Lobster	946	101	51	233
Atlantic Croaker	19	17	3	3
Atlantic Herring	26	12	4	4
Atlantic Mackerel	448	81	52	135
Big Eye Tuna	40	21	15	25
Black Sea Bass	1,149	170	100	201
Blue Crab	16	6	3	4
Bluefish	455	125	51	71
Blueline Tilefish	172	52	32	59
Bonito	15	9	3	3
Butterfish	1,038	106	79	280
Channeled Whelk	11	4	1	1
Chub Mackerel	35	12	6	8
Cod	71	43	12	13
Conger Eel	533	72	53	152
Cusk	3	3	2	2
Dogfish Smooth	79	29	14	19
Dogfish Spiny	92	33	13	24
Dolphinfish	72	24	17	36
Fourspot Flounder	43	7	4	11
Golden Tilefish	795	104	81	305
Haddock	23	13	1	1
Harvest Fish	5	4	2	2
Illex Squid	122	19	12	25
John Dory	451	74	57	164
Jonah Crab	859	50	36	185
King Whiting	275	69	45	72
Knobbed Whelk	10	5	1	1

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Longfin Squid	1,735	181	120	384
Mako Shortfin Shark	9	4	3	5
Menhaden	11	4	3	3
Monkfish	2,210	326	156	523
NK Crab	3	3	NA	NA
NK Eel	65	21	NA	NA
NK Seatrout	64	24	NA	NA
Octopus	7	3	2	3
Offshore Hake	29	16	6	6
Other Fish	19	11	5	5
Pollock	13	12	1	1
Red Hake	948	90	67	276
Redfish	9	8	3	3
Ribbonfish	5	4	2	2
Rock Crab	117	15	10	53
Scup	1,228	166	100	229
Sea Robins	89	32	13	16
Sea Scallop	340	211	16	17
Silver Hake	1,304	113	86	328
Skates	1,102	153	99	246
Spanish Mackerel	12	6	3	4
Spot	6	4	2	2
Spotted Weakfish	74	18	9	13
Squeteague Weakfish	754	103	67	166
Striped Bass	6	4	2	2
Summer Flounder	1,863	221	141	366
Swordfish	32	14	9	12
Triggerfish	33	23	5	5
White Hake	83	42	23	32
Winter Flounder	109	43	18	25

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Witch Flounder	111	45	25	42
Yellowfin Tuna	75	32	22	43
Yellowtail Flounder	132	55	20	28

Table 10.33 Total and Expected Number of Trips and Vessels by Port, Zone 2, 2014

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Atlantic City, NJ	25	9	4	6
Barnegat, NJ	127	24	11	48
Beaufort, NC	78	37	13	13
Belford, NJ	33	6	3	6
Cape May, NJ	377	77	28	41
Chatham, MA	103	12	10	40
Chincoteague, VA	74	23	10	12
Davisville, RI	54	4	3	10
Fairhaven, MA	50	9	4	7
Gloucester, MA	6	3	2	2
Hampton Bay, NY	56	7	4	24
Hampton, VA	98	36	15	18
Little Compton, RI	57	4	3	22
Montauk, NY	275	35	23	94
New Bedford, MA	617	147	46	139
New London, CT	103	9	6	37
Newport News, VA	102	42	13	13
Newport, RI	113	7	5	30
Ocean City, MD	31	5	4	5
Oriental, NC	20	6	3	3
Point Judith, RI	1,078	75	57	289
Point Lookout, NY	28	5	4	10
Point Pleasant, NJ	211	47	11	22
Sandwich, MA	103	3	3	8

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Shinnecock, NY	41	5	4	12
Stonington, CT	109	14	10	32
Tiverton, RI	37	3	3	23
Wanchese, NC	52	20	7	7
Westport, MA	111	7	4	18

Table 10.34 Percentages of Total Revenue, Landings, and Days-at-Sea for Species of Interest, Zone 2, 2013

Species	Revenue as % of Total	Landings as % of Total	DAS as % of Total
Golden Tilefish	34.41	34.24	28.65
Bigeye Tuna	31.06	28.83	19.12
Albacore Tuna	23.14	24.01	17.57
Offshore Hake	22.27	22.33	14.57
Jonah Crab	12.70	12.70	8.07
Butterfish	12.17	13.03	9.39
Longfin Squid	12.10	12.67	10.42
Yellowfin Tuna	9.98	8.54	17.51
Summer Flounder	9.65	10.93	6.59
Red Hake	8.60	5.87	11.83

Table 10.35 Total and Expected Number of Trips and Vessels by FMP, Zone 2, 2013

FMP	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
ASMFC FMP	1,164	118	63	251
Atlantic Herring	35	13	5	6
Bluefish	712	140	72	113
Highly Migratory Species	186	67	39	57
Mackerel, Squid, and Butterfish	1,514	150	101	287
Monkfish	2,109	318	168	480
No Federal FMP	1,481	194	117	354
Northeast Multispecies	324	100	49	77

FMP	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Sea Scallop	410	232	22	23
SERO FMP	140	66	29	39
Skates	1,004	157	98	249
Small-Mesh Multispecies	1,144	111	76	244
Spiny Dogfish	88	43	15	23
Summer Flounder, Scup, Black Sea Bass	1,961	247	151	323
Surfclam, Ocean Quahog	12	9	3	3
Tilefish	759	134	90	228

Table 10.36 Total and Expected Number of Trips and Vessels by Species, Zone 2, 2013

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Albacore Tuna	22	14	10	14
American Eel	61	16	8	16
American Lobster	970	90	54	229
Atlantic Croaker	9	9	2	2
Atlantic Halibut	5	5	2	2
Atlantic Herring	35	13	5	6
Atlantic Mackerel	160	49	22	36
Big Eye Tuna	20	15	10	12
Black Sea Bass	1,047	176	98	153
Blue Crab	7	4	2	2
Bluefish	712	140	72	113
Blueline Tilefish	147	51	25	39
Bonito	5	5	2	2
Butterfish	828	99	64	174
Channeled Whelk	12	6	1	1
Chub Mackerel	26	9	2	2
Cod	97	48	17	18
Conchs	12	7	2	2

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Conger Eel	468	70	42	102
Cunner	14	4	3	5
Cusk	6	6	1	1
Dogfish Smooth	95	24	12	21
Dogfish Spiny	88	43	15	23
Dolphinfish	35	18	11	16
Escolar	3	3	2	2
Fourspot Flounder	57	8	6	14
Golden Tilefish	696	131	86	214
Grouper	5	4	2	2
Haddock	21	17	2	2
Illex Squid	88	23	13	16
John Dory	521	100	66	157
Jonah Crab	782	49	34	166
King Whiting	122	44	20	26
Knobbed Whelk	8	3	1	1
Little Tuna	6	4	2	2
Longfin Squid	1,394	146	99	268
Mako Shark	5	4	3	3
Mako Shortfin Shark	13	9	5	7
Monkfish	2,108	317	168	480
Mullets	25	8	5	7
NK Crab	4	3	NA	NA
NK Eel	78	23	NA	NA
NK Seatrout	59	18	NA	NA
Octopus	24	6	4	6
Offshore Hake	42	14	8	11
Other Fish	23	8	4	5
Pollock	14	11	3	3
Red Hake	743	85	57	171

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Redfish	22	13	5	9
Ribbonfish	8	5	3	3
Rock Crab	106	16	7	49
Sand Tilefish	18	8	5	8
Scup	1,100	162	101	166
Sea Robins	78	30	10	12
Sea Scallop	410	232	22	23
Silver Hake	1,013	103	70	220
Skates	998	157	98	248
Spanish Mackerel	6	5	3	3
Spot	4	4	1	1
Spotted Weakfish	81	19	7	8
Squeteague Weakfish	585	93	53	97
Striped Bass	5	4	2	2
Summer Flounder	1,664	226	140	282
Swordfish	38	16	9	12
Tautog	14	5	1	1
Triggerfish	62	33	10	10
Wahoo	4	4	2	2
White Hake	74	41	16	22
Winter Flounder	57	35	9	9
Witch Flounder	144	50	28	42
Yellowfin Tuna	29	17	12	15
Yellowtail Flounder	183	58	29	39

Table 10.37 Total and Expected Number of Trips and Vessels by Port, Zone 2, 2013

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Atlantic City, NJ	12	5	2	2
Beaufort, NC	14	9	3	3
Cape May, NJ	375	82	33	46

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Chatham, MA	111	13	10	53
Chincoteague, VA	94	26	11	15
Davisville, RI	54	4	4	12
Fall River, MA	33	3	2	3
Gloucester, MA	7	5	1	1
Hampton Bay, NY	29	5	3	11
Hampton, VA	129	39	20	23
Little Compton, RI	33	3	2	2
Montauk, NY	348	33	22	86
New Bedford, MA	603	170	51	139
New London, CT	75	7	5	23
Newport News, VA	169	57	25	30
Newport, RI	87	5	3	27
Ocean City, MD	20	6	3	4
Point Judith, RI	921	81	62	220
Point Pleasant, NJ	242	33	11	19
Sandwich, MA	94	4	4	12
Shinnecock, NY	62	8	7	21
Stonington, CT	122	13	10	30
Wanchese, NC	7	5	1	1
Westport, MA	99	5	5	21

Table 10.38 Percentages of Total Revenue, Landings, and Days-at-Sea for Species of Interest, Zone 2, 2012

Species	Revenue as % of Total	Landings as % of Total	DAS as % of Total
Offshore Hake	42.38	30.87	17.55
Golden Tilefish	34.51	34.35	28.45
Bigeye Tuna	31.90	30.02	26.53
Red Hake	27.66	14.44	16.28
Albacore Tuna	22.32	19.74	22.63
Yellowfin Tuna	20.08	16.50	24.58

Species	Revenue as % of Total	Landings as % of Total	DAS as % of Total
Jonah Crab	15.35	15.38	10.60
Swordfish	11.12	14.86	17.85
Silver Hake	10.74	8.99	13.81
Longfin Squid	8.71	8.18	11.79

Table 10.39 Total and Expected Number of Trips and Vessels by FMP, Zone 2, 2012

FMP	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
ASMFC FMP	1,072	140	59	241
Atlantic Herring	24	8	4	7
Bluefish	1,080	166	87	178
Highly Migratory Species	227	64	27	61
Mackerel, Squid, and Butterfish	1,669	182	110	327
Monkfish	2,207	344	177	507
No Federal FMP	1,436	190	99	355
Northeast Multispecies	291	96	43	88
Sea Scallop	671	284	37	43
SERO FMP	199	71	26	50
Skates	1,002	163	103	232
Small-Mesh Multispecies	1,244	116	78	281
Spiny Dogfish	46	22	10	14
Summer Flounder, Scup, Black Sea Bass	2,008	259	141	317
Surfclam, Ocean Quahog	11	7	2	3
Tilefish	735	134	81	224

Table 10.40 Total and Expected Number of Trips and Vessels by Species, Zone 2, 2012

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Albacore Tuna	46	18	10	22
Am. Plaice Flounder	15	11	2	3
Amber Jack	7	4	2	2

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
American Eel	87	18	12	24
American Lobster	956	111	51	228
American Shad	11	6	2	2
Atlantic Croaker	9	8	1	1
Atlantic Halibut	6	5	2	2
Atlantic Herring	24	8	4	7
Atlantic Mackerel	263	56	35	61
Big Eye Tuna	40	11	8	22
Black Sea Bass	1,017	161	85	137
Blk Bellied Rosefish	6	4	3	4
Blue Crab	9	3	2	2
Bluefish	1,080	166	87	178
Blueline Tilefish	126	44	21	36
Bonito	19	11	5	6
Butterfish	777	100	62	171
Channeled Whelk	5	5	1	1
Chub Mackerel	13	10	3	3
Cod	81	43	14	18
Conger Eel	477	59	42	113
Cunner	14	5	2	3
Cusk	20	9	4	5
Dogfish Smooth	115	28	9	21
Dogfish Spiny	46	22	10	14
Dolphinfish	52	13	8	20
Fourspot Flounder	89	11	9	20
Golden Tilefish	692	127	79	215
Haddock	33	20	3	3
Illex Squid	104	19	11	17
John Dory	532	94	57	180
Jonah Crab	756	51	33	182

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
King Mackerel	5	3	2	2
King Whiting	141	48	18	20
Little Tuna	11	7	4	4
Longfin Squid	1,555	179	109	311
Mako Shark	14	4	4	9
Mako Shortfin Shark	19	6	5	11
Menhaden	3	3	1	1
Monkfish	2,207	344	177	507
Mullets	13	10	3	3
NK Eel	57	17	NA	NA
NK Seatrout	25	15	NA	NA
Octopus	16	5	3	4
Offshore Hake	42	13	7	11
Other Fish	23	11	5	5
Pollock	18	15	3	3
Red Crab	37	6	3	12
Red Hake	856	92	60	213
Redfish	26	16	6	8
Rock Crab	119	19	7	37
Sand Tilefish	12	4	2	8
Sand-Dab Flounder	3	3	1	1
Scup	948	156	72	136
Sea Robins	88	29	10	13
Sea Scallop	671	284	37	43
Silver Hake	1,102	105	72	255
Skates	998	162	103	231
Spot	3	3	1	1
Spotted Weakfish	39	17	5	5
Squeteague Weakfish	436	79	41	74
Striped Bass	10	9	1	1

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Summer Flounder	1,705	242	131	271
Surf Clam	8	4	2	2
Swordfish	86	20	14	33
Tautog	4	4	1	1
Triggerfish	101	45	11	13
Wahoo	10	6	5	7
White Hake	57	29	14	21
Winter Flounder	41	31	5	5
Witch Flounder	151	44	24	54
Yellowfin Tuna	62	22	13	31
Yellowtail Flounder	143	59	24	37

Table 10.41 Total and Expected Number of Trips and Vessels by Port, Zone 2, 2012

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Atlantic City, NJ	15	6	2	3
Barnegat, NJ	64	22	13	27
Beaufort, NC	14	10	3	3
Cape May, NJ	352	102	23	29
Chatham, MA	116	13	12	36
Chincoteague, VA	96	19	10	11
Davisville, RI	23	3	3	6
Fairhaven, MA	34	9	4	15
Freeport, NY	10	3	1	1
Gloucester, MA	10	4	1	1
Hampton Bay, NY	24	4	3	7
Hampton, VA	165	34	17	21
Little Compton, RI	41	6	5	9
Montauk, NY	385	32	20	100
Morehead City, NC	5	3	1	1
New Bedford, MA	584	174	55	148

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
New London, CT	84	7	4	30
Newport News, VA	211	57	18	19
Newport, RI	98	6	4	25
Ocean City, MD	27	7	3	4
Point Judith, RI	910	69	51	226
Point Lookout, NY	36	6	4	6
Point Pleasant, NJ	251	44	13	22
Sandwich, MA	88	3	3	6
Shinnecock, NY	79	13	6	23
Stonington, CT	109	17	9	23
Wanchese, NC	17	10	2	2
Westport, MA	99	6	5	23

Table 10.42 Percentages of Total Revenue, Landings, and Days-at-Sea for Species of Interest, Zone 2, 2011

Species	Revenue as % of Total	Landings as % of Total	DAS as % of Total
Golden Tilefish	35.83	35.68	30.74
Bigeye Tuna	26.59	26.58	18.84
Albacore Tuna	18.68	21.58	14.51
Offshore Hake	18.64	18.31	20.96
Spot	15.51	14.12	25.22
Jonah Crab	12.47	12.24	9.73
Silver Hake	12.06	10.95	14.50
Butterfish	11.24	11.14	12.84
Illex Squid	9.48	9.28	12.27
Scup	9.40	9.70	11.02

Table 10.43 Total and Expected Number of Trips and Vessels by FMP, Zone 2, 2011

FMP	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
ASMFC FMP	1,163	152	71	271
Atlantic Herring	76	22	8	19

FMP	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Bluefish	658	148	70	138
Highly Migratory Species	176	64	31	50
Mackerel, Squid, and Butterfish	1,823	187	129	449
Monkfish	2,636	356	189	638
No Federal FMP	1,559	207	125	440
Northeast Multispecies	491	125	60	121
Sea Scallop	543	269	32	44
SERO FMP	109	46	21	34
Skates	1,438	194	121	345
Small-Mesh Multispecies	1,468	135	97	404
Spiny Dogfish	184	52	26	41
Summer Flounder, Scup, Black Sea Bass	2,391	266	175	503
Tilefish	893	129	91	287

Table 10.44 Total and Expected Number of Trips and Vessels by Species, Zone 2, 2011

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Albacore Tuna	11	6	5	7
Am. Plaice Flounder	60	35	2	2
American Eel	111	26	14	39
American Lobster	996	110	61	251
American Shad	11	7	3	4
Atlantic Croaker	19	16	3	3
Atlantic Halibut	8	6	1	1
Atlantic Herring	76	22	8	19
Atlantic Mackerel	424	82	53	127
Big Eye Tuna	22	11	7	10
Black Drum	3	3	2	2
Black Sea Bass	1,119	167	110	232
Bluefin Tuna	4	3	1	1

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Bluefish	658	148	70	138
Blueline Tilefish	117	36	18	29
Bonito	8	6	3	4
Butterfish	917	109	75	256
Channeled Whelk	4	4	1	1
Chub Mackerel	4	3	1	1
Cod	210	79	23	31
Conger Eel	398	68	47	115
Cunner	9	5	2	2
Cusk	33	22	6	7
Dogfish Smooth	89	31	13	20
Dogfish Spiny	184	52	26	41
Dolphinfish	40	15	9	14
Fourspot Flounder	41	8	4	14
Golden Tilefish	847	119	88	280
Grouper	5	5	2	2
Haddock	126	56	4	4
Harvest Fish	11	8	2	2
Illex Squid	217	28	21	44
John Dory	554	88	65	195
Jonah Crab	780	52	34	175
King Whiting	145	41	21	35
Knobbed Whelk	6	4	2	2
Little Tuna	6	4	2	3
Longfin Squid	1,598	176	123	403
Mako Shortfin Shark	7	4	2	3
Menhaden	5	4	1	1
Monkfish	2,636	356	189	638
Mullets	15	7	4	5
NK Eel	63	19	NA	NA

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
NK Seatrout	25	11	NA	NA
Offshore Hake	85	25	11	26
Other Fish	10	8	2	2
Pollock	51	36	4	4
Red Hake	826	91	61	251
Redfish	19	16	4	5
Rock Crab	141	17	9	48
Sand Tilefish	15	4	3	7
Sand-Dab Flounder	10	8	3	4
Scup	1,259	177	120	269
Sea Robins	129	43	19	24
Sea Scallop	543	269	32	44
Silver Hake	1,342	125	93	376
Skates	1,436	194	121	344
Southern Flounder	11	4	2	2
Spadefish	3	3	1	1
Spotted Weakfish	84	20	10	19
Squeteague Weakfish	526	88	58	124
Steelhead Trout	18	6	4	7
Striped Bass	10	10	2	2
Summer Flounder	2,144	255	168	453
Swordfish	52	17	8	14
Tautog	5	5	1	1
Triggerfish	36	18	8	9
White Hake	149	53	29	55
Winter Flounder	126	61	8	8
Witch Flounder	229	60	32	67
Yellowfin Tuna	38	20	12	19
Yellowtail Flounder	328	83	36	65

Table 10.45 Total and Expected Number of Trips and Vessels by Port, Zone 2, 2011

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Beaufort, NC	21	9	2	2
Cape May, NJ	426	86	26	51
Chatham, MA	105	10	9	34
Chincoteague, VA	50	12	9	11
Freeport, NY	28	3	3	8
Gloucester, MA	20	12	2	2
Hampton Bay, NY	19	3	3	11
Hampton, VA	116	35	20	23
Little Compton, RI	87	6	5	20
Montauk, NY	367	33	20	103
New Bedford, MA	822	211	60	149
New London, CT	103	9	5	34
Newport News, VA	166	55	22	29
Newport, RI	125	12	8	36
North Kingstown, RI	77	5	5	17
Ocean City, MD	22	9	6	6
Oriental, NC	21	12	2	2
Point Judith, RI	1,048	72	62	300
Point Lookout, NY	42	5	4	8
Point Pleasant, NJ	278	37	18	63
Sandwich, MA	91	4	4	11
Shinnecock, NY	80	10	6	15
Stonington, CT	135	16	13	35
Tiverton, RI	51	3	3	17
Wanchese, NC	79	32	8	8
Westport, MA	169	9	6	16

Table 10.46 Percentages of Total Revenue, Landings, and Days-at-Sea for Species of Interest, Zone 2, 2010

Species	Revenue as % of Total	Landings as % of Total	DAS as % of Total

Species	Revenue as % of Total	Landings as % of Total	DAS as % of Total
Bigeye Tuna	44.96	42.36	28.91
Yellowfin Tuna	42.98	40.83	28.04
Golden Tilefish	35.47	35.45	30.05
Albacore Tuna	25.34	25.04	21.56
Jonah Crab	15.71	15.44	12.77
Spot	15.60	15.09	23.85
Swordfish	15.16	15.20	20.00
Illex Squid	13.86	13.70	12.17
Longfin Squid	13.07	13.56	12.45
Offshore Hake	9.64	8.36	18.51

Table 10.47 Total and Expected Number of Trips and Vessels by FMP, Zone 2, 2010

FMP	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
ASMFC FMP	1,423	160	76	391
Atlantic Herring	127	37	15	25
Bluefish	714	139	74	157
Highly Migratory Species	132	49	28	52
Mackerel, Squid, and Butterfish	1,715	177	110	410
Monkfish	2,524	396	172	524
No Federal FMP	1,512	193	116	414
Northeast Multispecies	455	140	57	128
Sea Scallop	674	300	33	36
SERO FMP	120	51	29	45
Skates	793	159	84	159
Small-Mesh Multispecies	1,563	139	101	412
Spiny Dogfish	34	27	5	5
Summer Flounder, Scup, Black Sea Bass	2,343	287	167	457
Tilefish	1,036	134	92	330

Table 10.48 Total and Expected Number of Trips and Vessels by Species, Zone 2, 2010

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Albacore Tuna	22	8	7	14
Am. Plaice Flounder	41	35	6	6
American Eel	67	21	12	23
American Lobster	1,234	127	64	350
American Shad	11	6	3	7
Atlantic Croaker	7	6	2	2
Atlantic Herring	127	37	15	25
Atlantic Mackerel	523	97	63	149
Big Eye Tuna	32	10	8	19
Black Sea Bass	920	168	92	152
Blackfin Tuna	3	3	1	1
Blue Crab	9	6	2	2
Bluefin Tuna	8	4	3	4
Bluefish	714	139	74	157
Blueline Tilefish	139	48	26	43
Bonito	9	7	3	3
Butterfish	1,005	111	79	272
Cod	118	68	15	19
Conger Eel	514	81	52	141
Cunner	7	4	3	3
Cusk	14	14	3	3
Dogfish Smooth	32	19	7	10
Dogfish Spiny	34	27	5	5
Dolphinfish	55	17	15	24
Fourspot Flounder	43	10	6	17
Golden Tilefish	1,003	130	91	321
Haddock	60	43	4	4
Harvest Fish	6	4	1	1
Illex Squid	192	39	19	41

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
John Dory	412	80	56	139
Jonah Crab	981	68	41	260
King Whiting	118	35	16	29
Longfin Squid	1,430	159	100	352
Mako Shark	13	4	4	7
Mako Shortfin Shark	14	7	5	6
Monkfish	2,524	396	172	524
NK Eel	49	20	NA	NA
NK Seatrout	19	12	NA	NA
NK Tilefish	38	23	NA	NA
Offshore Hake	84	22	11	29
Other Fish	11	8	3	3
Pollock	34	28	5	5
Red Crab	36	8	6	9
Red Hake	1,002	102	71	290
Red Porgy	6	4	2	2
Redfish	33	20	6	7
Rock Crab	188	22	13	51
Sand Tilefish	10	6	5	5
Sand-Dab Flounder	17	8	6	7
Scup	1,251	176	110	246
Sea Raven	8	4	2	2
Sea Robins	120	34	17	30
Sea Scallop	674	300	33	36
Silver Hake	1,454	130	95	387
Skates	793	159	84	159
Southern Flounder	24	9	3	3
Spotted Weakfish	63	19	10	14
Squeteague Weakfish	560	85	60	132
Striped Bass	12	10	2	2

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Summer Flounder	2,088	270	156	409
Swordfish	64	13	11	24
Tautog	5	5	2	2
Triggerfish	13	12	3	3
Wahoo	9	6	5	6
White Hake	184	59	32	63
Winter Flounder	85	48	6	8
Witch Flounder	199	73	33	69
Yellowfin Tuna	50	19	13	29
Yellowtail Flounder	203	90	29	40

Table 10.49 Total and Expected Number of Trips and Vessels by Port, Zone 2, 2010

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Atlantic City, NJ	3	3	1	1
Barnegat, NJ	85	23	13	30
Beaufort, NC	30	13	3	3
Cape May, NJ	391	107	25	43
Chatham, MA	130	13	11	26
Chincoteague, VA	38	14	6	6
Fairhaven, MA	35	12	3	4
Fall River, MA	16	3	1	1
Freeport, NY	14	3	2	2
Gloucester, MA	15	10	1	1
Hampton, VA	114	38	14	15
Little Compton, RI	57	3	3	4
Montauk, NY	360	34	24	123
Nantucket, MA	6	6	2	2
New Bedford, MA	808	218	53	126
New London, CT	45	9	2	8
Newport News, VA	109	50	10	10

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Newport, RI	129	14	8	30
North Kingstown, RI	69	5	5	11
Ocean City, MD	25	9	3	7
Oriental, NC	21	15	2	2
Point Judith, RI	1,249	80	63	333
Point Lookout, NY	49	4	4	11
Point Pleasant, NJ	313	33	23	70
Sandwich, MA	107	4	4	26
Sea Isle City, NJ	53	3	2	14
Shinnecock, NY	129	18	10	24
Stonington, CT	167	18	13	45
Wanchese, NC	54	25	5	5
Westport, MA	125	8	6	18

Table 10.50 Percentages of Total Revenue, Landings, and Days-at-Sea for Species of Interest, Zone 2, 2009

Species	Revenue as % of Total	Landings as % of Total	DAS as % of Total
Yellowfin Tuna	36.25	36.72	31.09
Bigeye Tuna	31.20	29.95	32.06
Golden Tilefish	30.44	31.05	30.98
Offshore Hake	27.68	26.82	27.98
Illex Squid	24.93	19.29	16.99
Butterfish	16.37	17.00	13.02
Jonah Crab	13.36	13.02	8.94
Spot	13.29	13.71	22.39
Silver Hake	12.59	9.07	13.84
Swordfish	12.34	12.50	24.72

Table 10.51 Total and Expected Number of Trips and Vessels by FMP, Zone 2, 2009

FMP	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips

FMP	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
ASMFC FMP	1,456	185	86	348
Atlantic Herring	107	32	13	21
Bluefish	822	152	76	170
Highly Migratory Species	134	45	25	50
Mackerel, Squid, and Butterfish	1,920	202	120	426
Monkfish	2,448	390	176	534
No Federal FMP	1,526	205	112	398
Northeast Multispecies	499	131	77	165
Sea Scallop	858	344	40	48
SERO FMP	146	55	23	37
Skates	653	153	86	162
Small-Mesh Multispecies	1,603	141	96	408
Spiny Dogfish	42	26	8	8
Summer Flounder, Scup, Black Sea Bass	2,203	290	161	433
Surfclam, Ocean Quahog	14	6	2	4
Tilefish	797	106	73	267

Table 10.52 Total and Expected Number of Trips and Vessels by Species, Zone 2, 2009

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Am. Plaice Flounder	41	33	12	12
American Eel	64	16	11	22
American Lobster	1,293	141	74	324
American Shad	31	10	6	9
Atlantic Croaker	21	17	3	3
Atlantic Halibut	15	10	6	6
Atlantic Herring	107	32	13	21
Atlantic Mackerel	600	99	59	160
Big Eye Tuna	18	9	7	12
Black Sea Bass	623	139	68	94

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Blue Crab	9	9	2	2
Bluefish	822	152	76	170
Blueline Tilefish	61	33	15	18
Bonito	6	6	1	1
Brown Shrimp	19	7	2	2
Butterfish	1,055	118	81	272
Channeled Whelk	5	5	2	2
Cod	132	65	26	33
Conger Eel	423	66	45	114
Cusk	19	18	9	9
Dogfish Smooth	45	23	9	11
Dogfish Spiny	42	26	8	8
Dolphinfish	36	13	10	19
Fourspot Flounder	43	7	4	16
Golden Tilefish	765	101	72	259
Haddock	34	30	10	10
Harvest Fish	6	6	1	1
Illex Squid	147	23	14	36
John Dory	306	70	49	105
Jonah Crab	1,058	63	43	235
King Whiting	116	39	14	24
Little Tuna	6	5	2	2
Longfin Squid	1,674	190	115	379
Mako Shortfin Shark	9	6	5	6
Monkfish	2,448	390	176	534
NK Crab	9	5	NA	NA
NK Eel	61	20	NA	NA
NK Porgy	46	18	NA	NA
NK Seatrout	4	4	NA	NA
NK Tilefish	38	20	NA	NA

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Ocean Quahog	9	4	2	4
Offshore Hake	131	26	13	42
Other Shellfish	9	7	1	1
Pollock	45	33	17	19
Red Crab	40	8	7	12
Red Hake	1,046	99	71	294
Redfish	24	16	8	9
Rock Crab	327	32	15	83
Sand Tilefish	15	6	3	7
Sand-Dab Flounder	169	56	38	54
Scup	1,088	167	91	184
Sea Robins	107	38	16	29
Sea Scallop	858	344	40	48
Silver Hake	1,531	126	93	391
Skates	653	153	86	162
Southern Flounder	31	15	2	2
Spanish Mackerel	5	5	1	1
Spot	8	4	2	2
Spotted Weakfish	67	22	9	19
Squeteague Weakfish	484	92	51	109
Striped Bass	17	14	2	2
Summer Flounder	1,929	273	151	391
Swordfish	67	13	11	25
Tautog	9	7	2	2
Triggerfish	20	13	4	4
White Hake	168	58	38	66
Winter Flounder	165	73	32	42
Witch Flounder	269	85	53	104
Wolffishes	8	8	3	3
Yellowfin Tuna	30	15	12	20

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Yellowtail Flounder	239	86	51	75

Table 10.53 Total and Expected Number of Trips and Vessels by Port, Zone 2, 2009

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Atlantic City, NJ	8	5	1	1
Barnegat, NJ	61	19	9	24
Beaufort, NC	15	10	1	1
Boston, MA	7	6	4	4
Cape May, NJ	494	112	28	46
Chatham, MA	153	13	13	32
Chilmark, MA	13	4	2	2
Chincoteague, VA	27	13	3	4
Fairhaven, MA	30	10	2	2
Gloucester, MA	6	6	1	1
Hampton, VA	116	41	9	9
Little Compton, RI	22	5	3	3
Montauk, NY	425	29	20	136
New Bedford, MA	878	231	75	160
New London, CT	25	5	2	9
Newport News, VA	113	56	5	5
Newport, RI	169	18	11	52
North Kingstown, RI	83	5	5	28
Ocean City, MD	23	11	2	2
Oriental, NC	21	14	2	2
Point Judith, RI	1,391	84	66	340
Point Lookout, NY	47	6	4	6
Point Pleasant, NJ	241	34	18	43
Shinnecock, NY	147	17	9	29
Stonington, CT	100	16	8	27
Wanchese, NC	59	24	5	5

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Westport, MA	65	6	3	6
Woods Hole, MA	7	4	2	2

Table 10.54 Percentages of Total Revenue, Landings, and Days-at-Sea for Species of Interest, Zone 2, 2008

Species	Revenue as % of Total	Landings as % of Total	DAS as % of Total
Bigeye Tuna	46.52	45.19	34.06
Golden Tilefish	33.61	33.35	32.25
Yellowfin Tuna	32.07	29.82	25.81
Illex Squid	25.05	23.18	16.71
Offshore Hake	21.49	21.97	24.29
Butterfish	16.80	16.96	15.23
Longfin Squid	15.05	15.41	13.37
Swordfish	14.36	15.61	28.57
Jonah Crab	13.27	13.06	7.90
Silver Hake	10.89	10.81	14.96

Table 10.55 Total and Expected Number of Trips and Vessels by FMP, Zone 2, 2008

FMP	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
ASMFC FMP	1,436	192	97	315
Atlantic Herring	99	35	8	10
Bluefish	421	129	59	91
Highly Migratory Species	119	43	20	43
Mackerel, Squid, and Butterfish	2,080	202	127	459
Monkfish	2,662	412	186	555
No Federal FMP	1,696	204	117	403
Northeast Multispecies	462	145	65	128
Sea Scallop	734	314	54	58
SERO FMP	128	44	18	35
Skates	655	151	69	113

FMP	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Small-Mesh Multispecies	1,711	151	107	411
Spiny Dogfish	11	8	3	3
Summer Flounder, Scup, Black Sea Bass	2,134	287	151	374
Tilefish	831	120	84	269

Table 10.56 Total and Expected Number of Trips and Vessels by Species, Zone 2, 2008

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Albacore Tuna	11	6	4	7
Am. Plaice Flounder	42	29	7	10
American Eel	60	18	12	19
American Lobster	1,301	157	88	299
American Shad	19	8	2	2
Atlantic Croaker	17	15	2	2
Atlantic Halibut	7	7	3	3
Atlantic Herring	99	35	8	10
Atlantic Mackerel	726	117	69	161
Big Eye Tuna	25	10	7	18
Black Sea Bass	1,225	186	98	197
Blk Bellied Rosefish	4	3	2	2
Blue Back Herring	4	3	2	2
Blue Crab	17	5	2	2
Bluefin Tuna	4	4	2	2
Bluefish	421	129	59	91
Blueline Tilefish	42	28	7	7
Bonito	5	5	2	2
Brown Shrimp	7	4	1	1
Butterfish	1,310	142	99	326
Channeled Whelk	11	5	1	1
Cod	108	62	18	23

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Conger Eel	457	78	50	122
Cusk	9	7	5	5
Dogfish Smooth	24	17	4	5
Dogfish Spiny	11	8	3	3
Dolphinfish	51	14	9	20
Fourspot Flounder	46	4	3	14
Golden Tilefish	802	108	83	266
Haddock	38	31	6	6
Harvest Fish	21	10	2	2
Horseshoe Crab	4	4	1	1
Illex Squid	167	22	16	42
John Dory	418	90	68	144
Jonah Crab	938	65	41	194
King Whiting	164	40	18	34
Little Tuna	4	4	2	2
Longfin Squid	1,744	182	114	399
Mako Longfin Shark	4	3	2	3
Mako Shortfin Shark	8	6	3	3
Monkfish	2,662	412	186	555
Mullets	10	5	1	1
NK Eel	67	23	NA	NA
NK Porgy	33	17	NA	NA
NK Seatrout	15	11	NA	NA
NK Shark	7	4	NA	NA
NK Tilefish	30	19	NA	NA
Ocean Pout	9	3	2	2
Offshore Hake	154	25	13	46
Other Fish	11	8	2	2
Other Shellfish	8	5	1	1
Pollock	36	23	9	11

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Red Crab	20	3	3	7
Red Hake	1,159	114	78	307
Redfish	18	13	6	8
Rock Crab	361	29	17	84
Sand Tilefish	21	6	4	7
Sand-Dab Flounder	95	42	20	29
Scup	918	162	82	135
Sea Raven	4	3	1	1
Sea Robins	69	27	9	11
Sea Scallop	734	314	54	58
Silver Hake	1,646	140	103	397
Skates	655	151	69	113
Southern Flounder	18	10	2	2
Spotted Weakfish	74	23	10	13
Squeteague Weakfish	589	117	65	119
Striped Bass	14	11	2	2
Summer Flounder	1,779	267	138	317
Swordfish	63	14	10	25
Tautog	15	8	3	3
Triggerfish	6	4	2	2
White Hake	188	59	34	69
Winter Flounder	166	78	25	42
Witch Flounder	197	83	35	53
Wolffishes	16	11	5	5
Yellowfin Tuna	34	14	10	20
Yellowtail Flounder	159	72	23	35

Table 10.57 Total and Expected Number of Trips and Vessels by Port, Zone 2, 2008

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Atlantic City, NJ	10	7	4	4

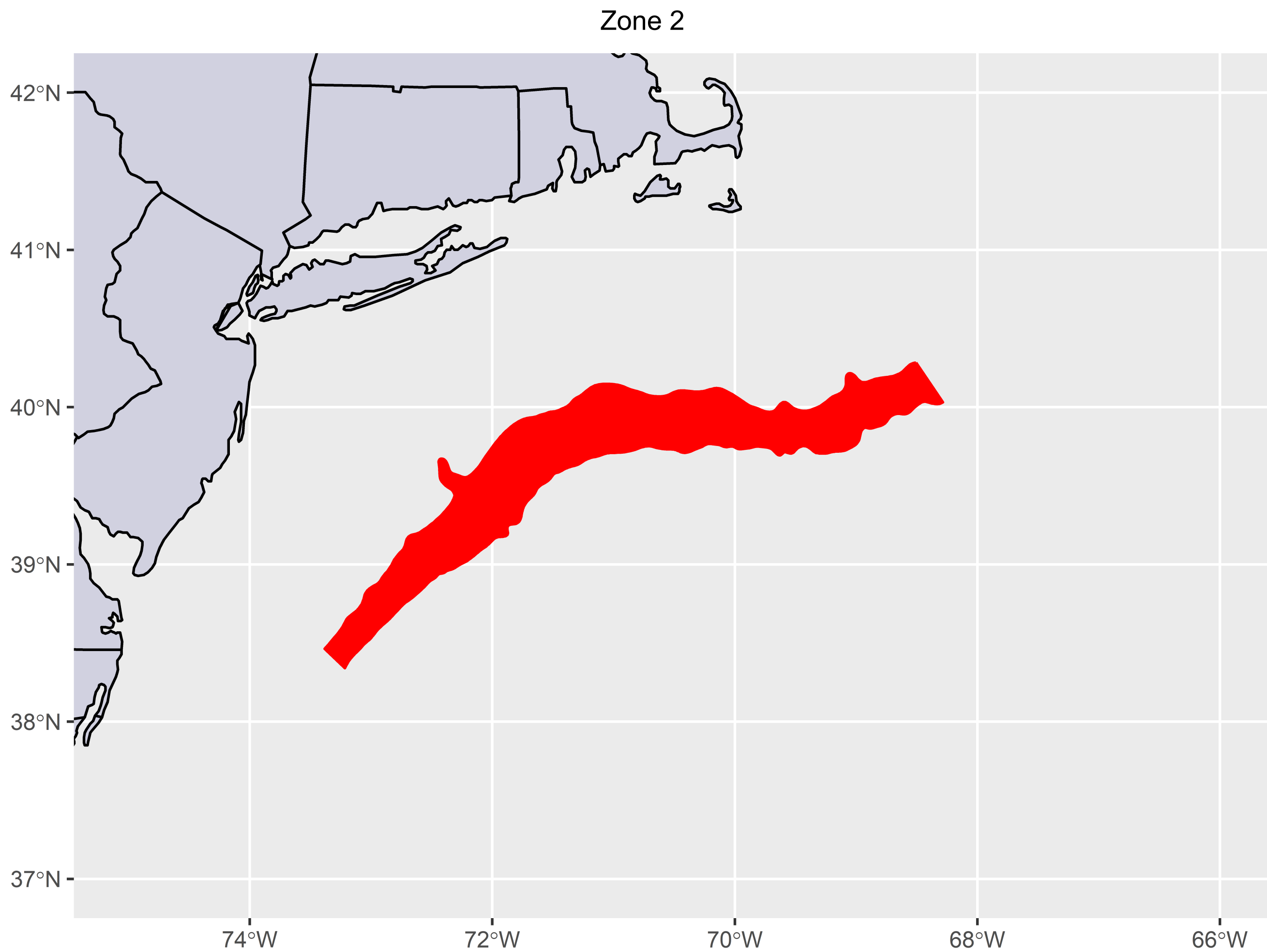
Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Barnegat, NJ	9	7	3	3
Beaufort, NC	33	13	2	2
Belford, NJ	50	6	4	6
Cape May, NJ	477	101	26	58
Chatham, MA	151	13	11	25
Fairhaven, MA	15	5	1	1
Fall River, MA	32	5	2	7
Gloucester, MA	15	5	2	2
Greenport, NY	19	3	2	3
Hampton Bay, NY	14	5	4	6
Hampton, VA	74	34	6	6
Long Beach, NJ	49	17	10	17
Montauk, NY	354	27	20	116
New Bedford, MA	821	202	72	140
New London, CT	52	7	3	15
New Shoreham, RI	12	5	2	2
Newport News, VA	97	49	7	7
Newport, RI	194	15	10	61
North Kingstown, RI	76	5	5	18
Ocean City, MD	22	7	2	4
Oriental, NC	35	15	3	3
Point Judith, RI	1,306	91	64	315
Point Lookout, NY	40	5	5	9
Point Pleasant, NJ	239	29	15	37
Shinnecock, NY	152	15	10	27
Stonington, CT	88	13	6	16
Tiverton, RI	57	4	4	37
Wanchese, NC	63	23	7	7
Westport, MA	76	5	4	10

Back (https://www.fisheries.noaa.gov/resource/data/socioeconomic-impacts-atlantic-offshore-wind-development)

Descriptions of Selected Fishery Landings and Estimates of Recreational Party and Charter Vessel Revenue from Areas: A Planning-level Assessment

Prepared by:
National Marine Fisheries Service

June 06, 2023



Data sources:
Recreational fisheries landings data from vessel trip reports (VTR) for vessels issued a party/charter permit and marine angler expenditure surveys

In order to meet requirements of maintaining data confidentiality, these strata are presented individually. In addition, records that did not meet the rule of three (>= 3 unique permits), values were summarized as 'All Others'.

Some caveats/notes:

- Values are reported in nominal dollars. Values in 2021 dollars are reported as well (see Methods below for details).
- Landings are reported in number of fish kept on party/charter trips.
- The term "angler trips" refers to the number of reported passengers on party/charter VTRs.
- The party/charter VTRs contain some trips where no fish were landed. Although these trips do not contribute to the species summaries, they are included in the activity summaries of trips, angler trips, and revenues.
- The term "vessel trips" refers to the number of party/charter VTRs submitted to NMFS where landings of any species were recorded.
- Data summarized here are based on federal VTRs submitted to NMFS.

- Numbers of individual fish species landed on party/charter trips are summarized by management categories as follows:
  - **Northeast Multispecies; Bluefish; Mackerel, Squid, Butterfish; Golden and Blueline Tilefish; Summer Flounder, Scup, Black Sea Bass:** Individual New England and Mid-Atlantic Fishery Management Council FMPs that require a party/charter permit
  - **Other Federal FMPs:** Individual New England and Mid-Atlantic Fishery Management Council FMPs that do not require a party/charter permit and have no recreational measures (Atlantic herring, Atlantic Sea Scallops, Monkfish, Spiny Dogfish, Skates, Red Crab, and Surfclams and Ocean Quahogs)
  - **Atlantic HMS FMP:** Atlantic billfish, Atlantic tunas, swordfish and sharks
  - **ASMFC Interstate FMPs:** Species managed exclusively under an ASMFC ISFMP (American Lobster, Atlantic Croaker, Cobia, Red Drum, Black Drum Spanish Mackerel, Spot, striped Bass, Spotted Sea Trout, Tautog, Weakfish and Coastal Sharks)
  - **No Federal Plan:** Species that are not managed under any Federal or ASMFC ISFMP
- VTR data with missing coordinates have been removed.
- The information reported for 2020 should be interpreted with caution due to the generalized impacts the COVID-19 pandemic had on passenger demand for party/charter trips across many fisheries in the Greater Atlantic Region resulting in an unusually low number of angler trips; hence reduced revenues from passenger fees for affected party/charter entities.
- The number of small businesses changes over time both because of changes in affiliated ownership and fluctuations in revenue. For this reason, we use and report only the most recent three years' revenue in the Small Business Analysis section of this report, consistent with historical guidance provided by the Small Business Administration.
- Confidential data is listed as "Suppressed" or "All Others."

References

DePiper GS (2014) Statistically assessing the precision of self-reported VTR fishing locations. (https://repository.library.noaa.gov/view/noaa/4806)

Benjamin S, Lee MY, DePiper G. 2018. Visualizing fishing data as rasters. NEFSC Ref Doc 18-12; 24 p. (https://repository.library.noaa.gov/view/noaa/23030)

Most Impacted Species By Management Category

The table below indicates the total number of fish kept from the area by Management Categories. The category "All Others" refers to categories with less than three permits impacted to protect data confidentiality.

Figure 1.1 Fish Count of Top Management Categories by Year, Zone 2

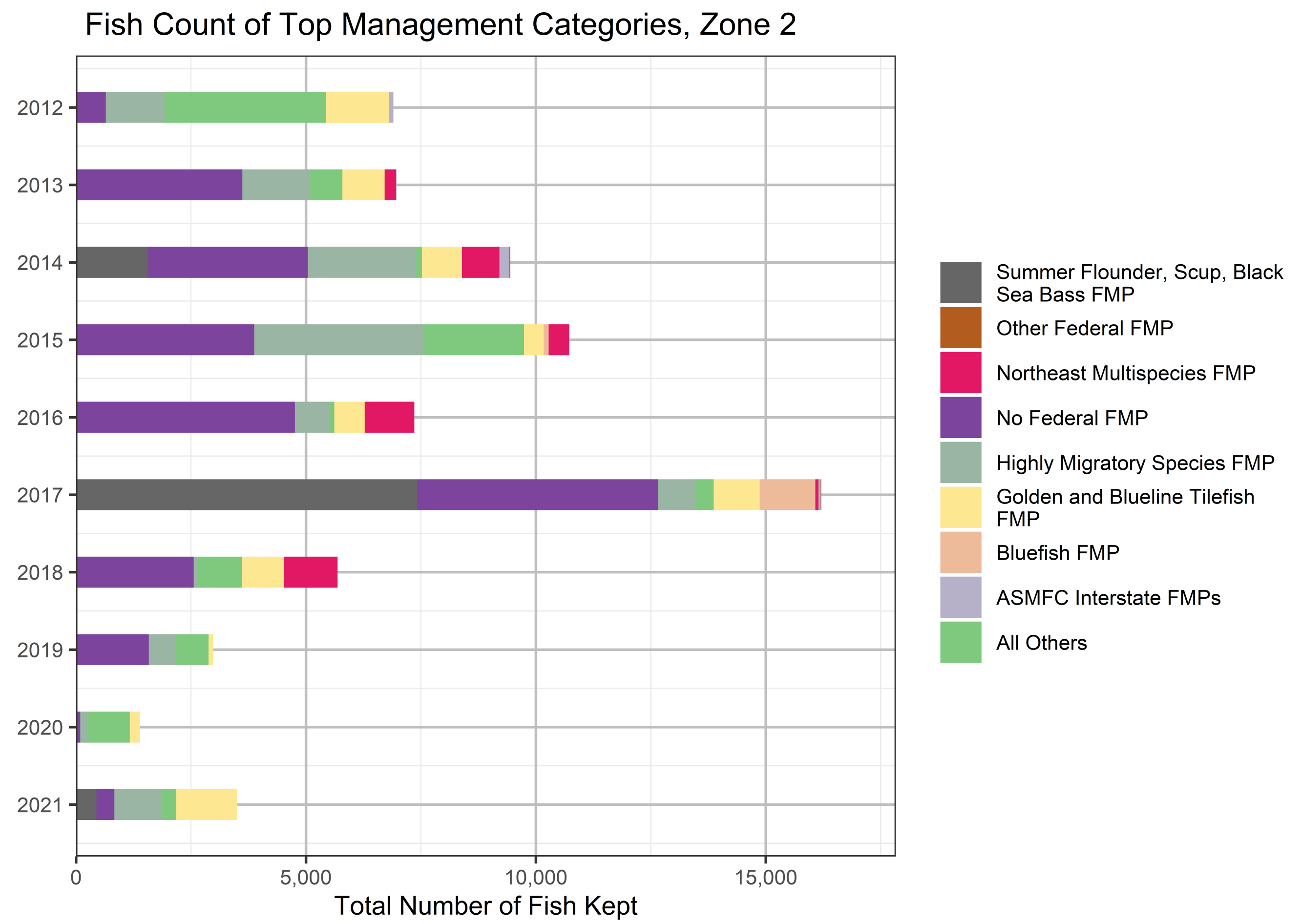


Table 1.1 Total Fish Count for Management Categories, Zone 2

Management Categories	Ten Year Fish Count
No Federal FMP	26,259
Highly Migratory Species FMP	12,217
All Others	9,942
Summer Flounder, Scup, Black Sea Bass FMP	9,410
Golden and Blueline Tilefish FMP	7,807
Northeast Multispecies FMP	3,819
Bluefish FMP	1,319

Management Categories	Ten Year Fish Count
ASMFC Interstate FMPs	375
Other Federal FMP	33
Total	**71,181**

Most Impacted Species

We analyzed the top ten species most frequently kept on recreational party/charter trips in the area and to isolate them from combined FMPs. The top ten species by the total number of fish kept are: Albacore Tuna, All Others, Big Eye Tuna, Black Sea Bass, Bluefish, Blueline Tilefish, Dolphinfish, Golden Tilefish, White Hake and Yellowfin Tuna . The category “All Others” refers to species with less than three permits impacted to protect data confidentiality. Additional species outside of the top ten include: Blue Shark, Bluefin Tuna, Cod, Little Tuna, Mako Shortfin Shark, Marlin Blue, Marlin White, Other Fish, Pollock, Red Hake, Skipjack Tuna, Spiny Dogfish, Swordfish and Wahoo.

Figure 2.1 Fish Count of Top Species, Zone 2

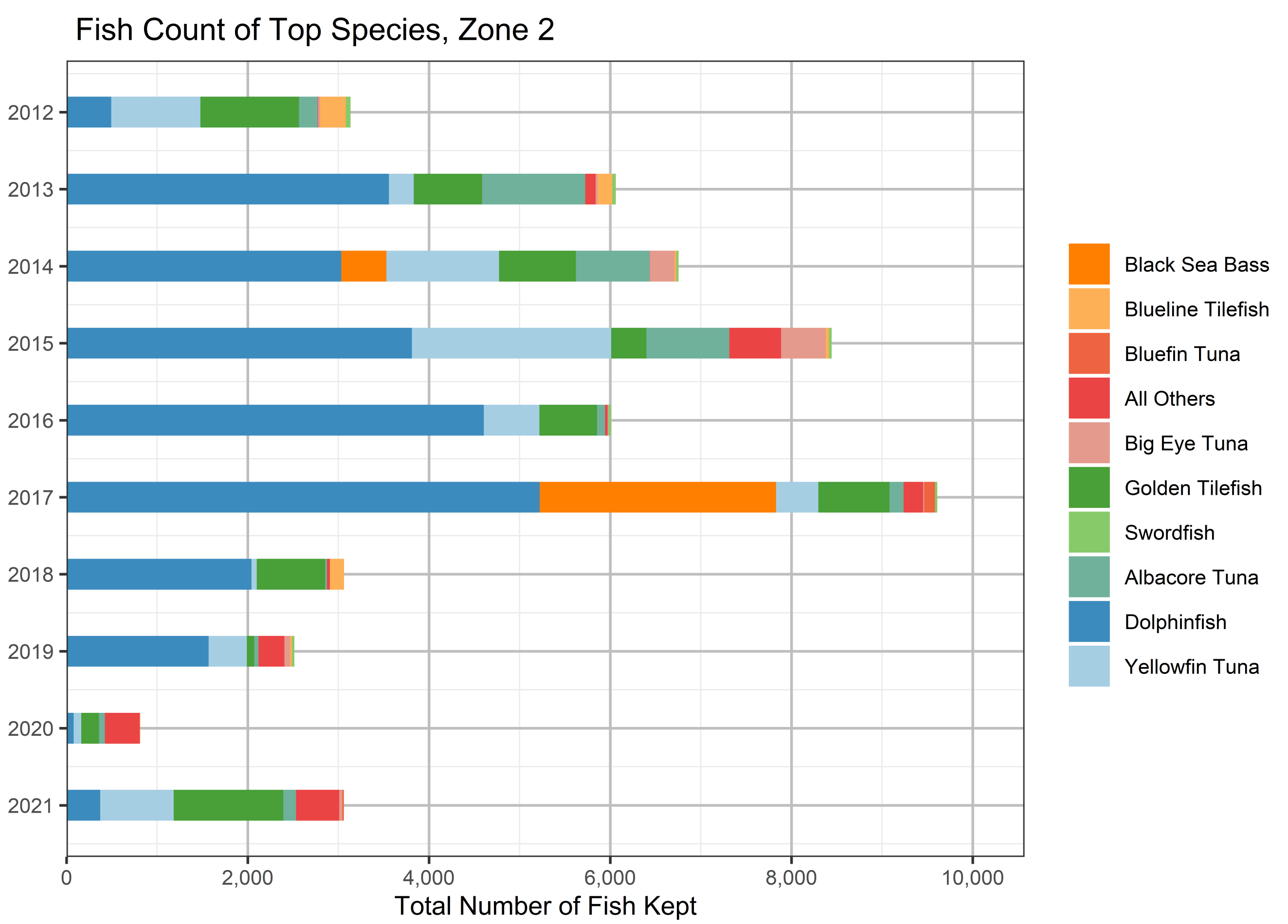


Table 2.1 Fish Count, Most Impacted Species, Zone 2

Species	Ten Year Fish Count
Dolphinfish	24,782
Yellowfin Tuna	7,153
Golden Tilefish	6,743
Albacore Tuna	3,593
Black Sea Bass	3,108
All Others	2,108
Big Eye Tuna	924
Blueline Tilefish	680
Swordfish	225
Bluefin Tuna	147
Total	**49,463**

Total Party/Charter Activity by Year

We analyzed the total revenue of party/charter trips by year by multiplying the annual mean combined charter and party for-hire fee of each state by the total number of anglers for each year (See Methods section). Revenue values have been deflated to 2019 dollars. All numbers have been rounded to the nearest thousand.

Table 3.1 Total Party/Charter Revenue by Year, Zone 2

Year	Annual Revenue
2012	$228,000
2013	$170,000
2014	$193,000
2015	$246,000
2016	$173,000
2017	$212,000
2018	$48,000
2019	$62,000
2020	$25,000
2021	$74,000

Year	Annual Revenue
Total	**$1,430,000**

Number of Vessel Trips by Port

The table below indicate the total number of trips within the area by year and port. The category “Other Ports, XX” refers to ports with less than three permits to protect data confidentiality.

Table 4.1 Total Number of Vessel Trips by Port and Year, Zone 2

Port	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Barnegat, NJ	23	29	28	15	0	0	0	0	0	0
Montauk, NY	18	0	29	22	14	0	0	0	3	23
Other Ports, CT	3	0	1	0	0	0	0	1	0	0
Other Ports, MA	1	4	2	8	4	2	0	2	2	2
Other Ports, MD	2	0	0	1	0	0	0	0	0	2
Other Ports, NJ	23	22	32	64	69	36	15	10	8	18
Other Ports, NY	5	12	5	5	2	7	8	3	3	4
Other Ports, RI	4	0	4	2	2	3	0	5	6	2
Point Pleasant, NJ	73	38	28	0	0	86	6	38	0	36
Point Judith, RI	0	6	0	7	0	0	0	0	0	0
Other Ports, DE	0	0	1	0	0	0	0	0	0	0
Long Beach, NJ	0	0	0	13	0	0	0	0	0	0
No Port Data	0	0	0	0	0	0	1	2	2	5
Cape May, NJ	0	0	0	0	0	0	0	0	0	3
Total	**152**	**111**	**130**	**137**	**91**	**134**	**30**	**61**	**24**	**95**

Number of Angler Trips by Port

The table below indicate the total number of angler trips from the area by year and port. The category “Other Ports, XX” refers to ports with less than three permits to protect data confidentiality.

Table 4.2 Total Number of Angler Trips by Port and Year, Zone 2

Port	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Barnegat, NJ	461	445	325	230	0	0	0	0	0	0
Montauk, NY	312	0	433	207	174	0	0	0	32	225
Other Ports, CT	15	0	6	0	0	0	0	6	0	0
Other Ports, MA	6	20	8	191	12	9	0	6	8	6
Other Ports, MD	12	0	0	6	0	0	0	0	0	8
Other Ports, NJ	396	403	596	1,621	1,681	826	286	183	183	245
Other Ports, NY	19	130	62	70	4	90	153	52	18	25
Other Ports, RI	118	0	14	6	7	37	0	14	25	11
Point Pleasant, NJ	1,118	768	533	0	0	1,311	82	402	0	265
Point Judith, RI	0	82	0	144	0	0	0	0	0	0
Other Ports, DE	0	0	65	0	0	0	0	0	0	0
Long Beach, NJ	0	0	0	75	0	0	0	0	0	0
No Port Data	0	0	0	0	0	0	6	10	10	27
Cape May, NJ	0	0	0	0	0	0	0	0	0	16
Total	**2,457**	**1,848**	**2,042**	**2,550**	**1,878**	**2,273**	**527**	**673**	**276**	**828**

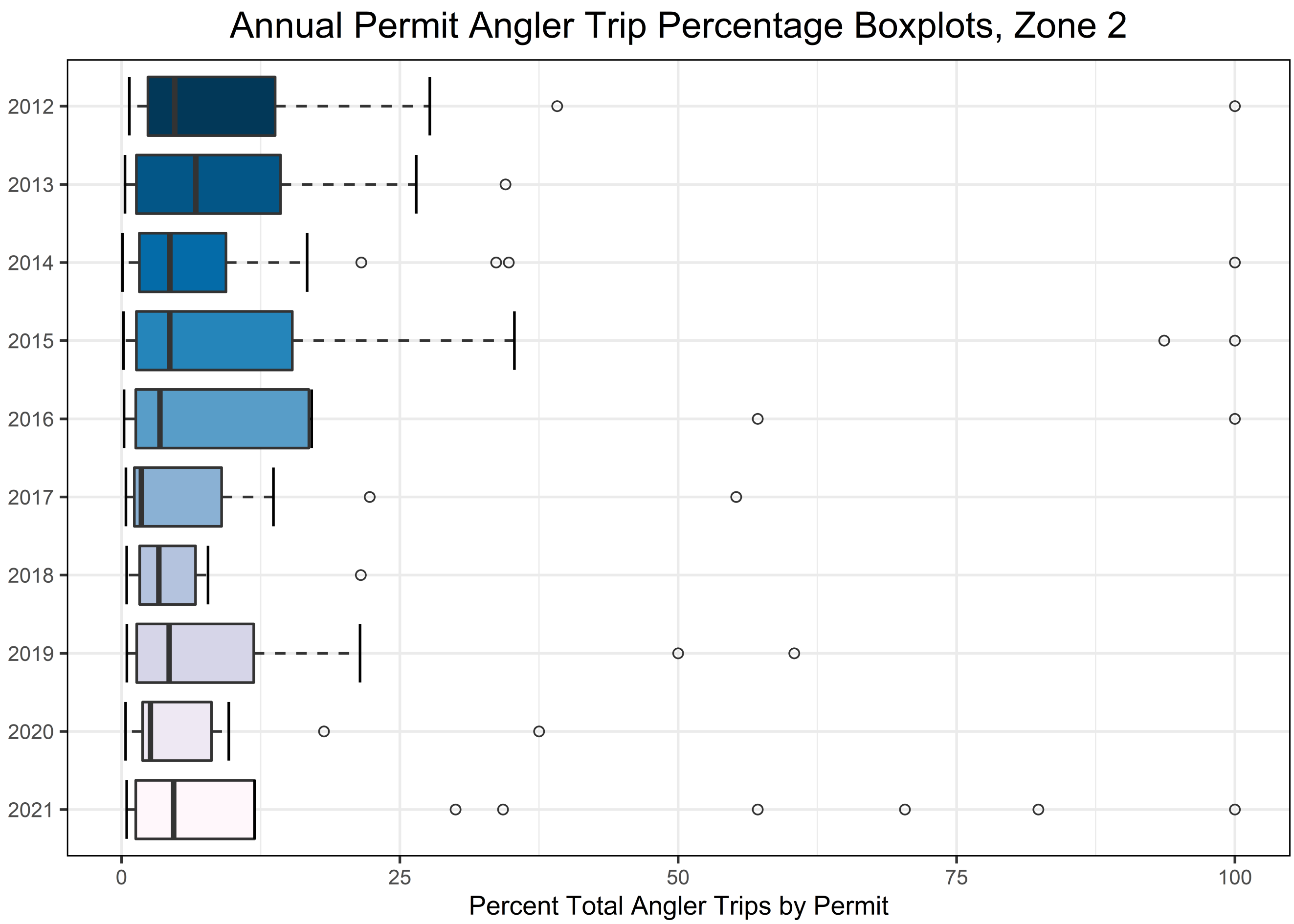
Percentage of Angler Trips by Permit

We analyzed the percentage of each permit’s total angler trips coming from within Zone 2 area (see boxplot figure and table below). Boxplots are important statistical summaries because they provide information about the distribution of the percentages. The boxplots below begin at the 1st quartile, or the value beneath which 25 percent of all observations fall. A thick line within the box identifies the median, the observation at which 50 percent of observations are above or beneath. The box ends at the 3rd quartile, or the observation beneath which 75 percent of observations fall. Nonparametric estimates of the minimum and maximum values are also indicated by the “whiskers” (dashed line terminating in a vertical line) that jut out from each side of the box. Any points outside of these whiskers are observations that are considered outliers. In our table , however, the maximum values are inclusive of outliers. The table below presents the minimum, 1st quartile, median, 3rd quartile, and maximum values for the area. These are the ten year angler trip percentages. The boxplot in the figure below further separate the area out by year.

Table 5.1 Ten Year Summary of Permit Angler Trip Revenue Percent, Zone 2

Area	Min	1st Quartile	Median	3rd Quartile	Max
Zone 2	0.09%	1%	4%	12%	100%

Figure 5.1 Annual Permit Angler Trip Percentage Boxplots, Zone 2



Small Business Analysis

A business primarily engaged in for-hire recreational fishing activities is classified as a small business if it is independently owned and operated, is not dominant in its field of operation (including its affiliates) and has combined annual receipts not in excess of $8 million for all its affiliated operations worldwide. Small Business Administration principles of affiliation are used to define a business entity, meaning the following analysis is conducted upon unique business interests, which can represent multiple vessel permits. As such, this section presents the total number of entities, by business category, and the total revenue generated by that business category in Table 6.1. For those businesses with historical fishing within the Zone 2 area, Table 6.2 presents the revenue generated inside the Zone 2 area against the total revenue from those same entities. Revenue values have been deflated to 2019 dollars. All numbers have been rounded to the nearest thousand.

Table 6.1 Total number of entities engaged in federally managed fishing within the Northeast region, and their total revenue, by business category

Year	Business Type	Number of Entities	Revenue
2019	Small Business	319	$71,987,000
2020	Small Business	332	$82,995,000
2021	Small Business	409	$107,933,000

Table 6.2 Revenue inside the Zone 2 area against total revenue from entities active inside the Zone 2 area, by business category

Year	Business Type	Number of Entities	Area Revenue	Total Revenue
2019	Small Business	12	$199,000	$12,261,000
2020	Small Business	13	$81,000	$7,389,000
2021	Small Business	23	$198,000	$9,862,000

Species Dependence

The tables below indicate party/charter vessel and angler trips, occurring within the area of interest, as a percentage of totals generated by party/charter vessel and angler trips across the entire region by year and the top ten species deriving the most fish kept from the area by year. The category “All Others” refers to species with less than three permits impacted to protect data confidentiality.

Table 7.1 Annual Party Vessel Trips, Angler Trips, and Number of Vessels in the Zone 2, as a Percent of Total Northeast Region Party/Charter

Year	Vessel Trips as % of Total	Angler Trips as % of Total	Number of Vessels as % of Total
2012	0.48	6.35	4.27
2013	0.38	4.32	3.78
2014	0.46	3.70	5.50
2015	0.51	4.44	7.16
2016	0.35	4.21	3.57
2017	0.55	5.34	3.31
2018	0.12	2.24	1.91
2019	0.25	2.84	3.96

Year	Vessel Trips as % of Total	Angler Trips as % of Total	Number of Vessels as % of Total
2020	0.11	1.41	3.05
2021	0.41	2.96	5.40

Table 7.2 Ten Year Total Fish Count for Top Ten Species as a Percent of Total, Zone 2

Species	Fish Count as % of Total
Albacore Tuna	46.38
Big Eye Tuna	45.52
Dolphinfish	35.92
Swordfish	33.83
Yellowfin Tuna	25.57
Marlin White	12.73
Golden Tilefish	10.53
Skipjack Tuna	6.04
White Hake	5.36

Methods

NOAA Fisheries conducted their first marine angler expenditure survey in 1998 (Steinback and Gentner 2001; Gentner, Price, and Steinback 2001). Additional surveys were conducted in 2006 (Gentner, Price, and Steinback 2008), 2011 (Lovell Steinback, and Hilger 2013), and 2017 (Lovell et al 2020). For-hire passenger fee data collected from these surveys provided the baseline for calculating average annual fees by region/state from 1997 to 2019.

Linear extrapolation was used to estimate average for-hire fees for years with no survey data. For example, in Steinback and Gentner (2001), the average for-hire fee in Maine in 1998 was $46.20. The next angler expenditure survey, conducted in 2006, found the average for-hire fee in Maine was $63.65 (see Gentner, Price, and Steinback 2008). To calculate average fees for the years between 1998 and 2006 we simply extrapolated linearly between the two known data points. This same procedure was used to extrapolate values for all years between the four survey years.

Average for-hire fees in 1997, the year preceding the first survey, and in the two years following the last survey (2018 and 2019), were calculated using industry specific Bureau of Economic Analysis (BEA) output deflators. Specifically, we used BEA output deflators shown for Amusement, Gambling, and Recreation Industries (North American Industry Classification System code 713000), which include recreational fishing guide services. Nominal values were converted to 2019 dollars using the same BEA output deflators.

For further information email Scott Steinback, Economist, NOAA Fisheries, Northeast Fisheries Science Center (Scott.Steinback@noaa.gov (mailto:Scott.Steinback@noaa.gov)).

Steinback, S. and B. Gentner. 2001. “Marine Angler Expenditures in the Northeast Region, 1998”. U.S. Dept. of Commerce. NOAA Tech. Memo. NMFS-F/SPO-47. Gentner, B., M. Price, and S. Steinback. 2001. “Marine Angler Expenditures in the Southeast Region, 2001”. U.S. Dept. of Commerce. NOAA Tech. Memo. NMFS-F/SPO-48 Gentner, Brad, and Scott Steinback. 2008. The Economic Contribution of Marine Angler Expenditures in the United States, 2006.U.S. Dep. Commerce, NOAA Tech. Memo. NMFS-F/SPO-94, 301 p. Lovell, Sabrina, Scott Steinback, and James Hilger. 2013. The Economic Contribution of Marine Angler Expenditures in the United States, 2011. U.S. Dep. Commerce, NOAA Tech. Memo. NMFS-F/SPO-134, 188 p. Lovell, Sabrina, James Hilger, Emily Rollins, Noelle A. Olsen, and Scott Steinback. 2020. The Economic Contribution of Marine Angler Expenditures on Fishing Trips in the United States, 2017. U.S. Dep. Commerce, NOAA Tech. Memo. NMFS-F/SPO-201, 80 p.

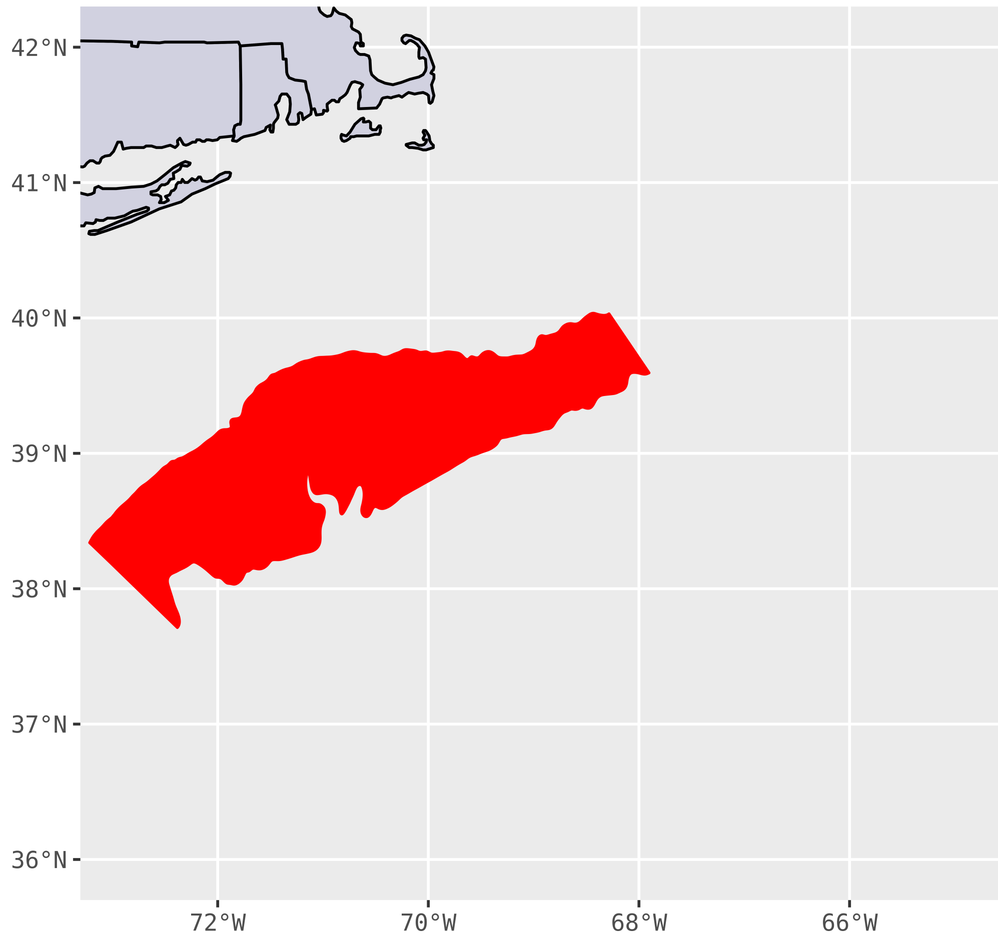
Back (https://www.fisheries.noaa.gov/resource/data/socioeconomic-impacts-atlantic-offshore-wind-development)

Descriptions of Selected Fishery Landings and Estimates of Vessel Revenue from Areas: A Planning-level Assessment

Prepared by:
National Marine Fisheries Service

September 19, 2023

Zone 3



Data sources:
Commercial Fisheries landings data, Vessel Trip Reports, and Surfclam/OceanQuahog Logbooks

In order to meet requirements of maintaining data confidentiality, these strata are presented individually. In addition, records that did not meet the rule of three (>=3 unique dealers and >= 3 unique permits), values were summarized as 'ALL OTHERS'.

Some caveats/notes:

- Values are reported in real 2021 dollars as calculated using the GDP Implicit Price Deflator (https://fred.stlouisfed.org/data/GDPDEF.txt).
- Pounds are reported in landed (dressed) pounds.
- Data summarized here is based on vessels that are required to provide federal VTRs for GARFO managed species (check here (https://media.fisheries.noaa.gov/2022-02/Socioeconomic-InfoNeeds-OSW-GARFO.pdf) for more information).
- Federal lobster vessels, with only lobster permits, do not have a VTR requirement. Many Atlantic Highly Migratory Species permitted vessels also do not have a VTR requirement. Trips with no VTR are not reflected in this summary.
- The ASMFC FMP includes the following species: American Lobster, Cobia, Atlantic Croaker, Black Drum, Red Drum, Menhaden, NK Sea Bass, NK Seatrout, Spot, Striped Bass, Tautog, Jonah Crab, and Pandalid Shrimp.

- The SERO FMP includes the following species: Amber Jack, Brown Shrimp, Dolphinfish, Greater Amberjack, Grouper, Grunts, Hogfish, King Mackerel, Long Tail Grouper, NK Porgy, Penaeid Shrimp, Red Grouper, Red Hind, Red Porgy, Red Snapper, Rock Hind, Sand Tilefish, Scamp Grouper, Snapper, Snowy Grouper, Spadefish, Spanish Mackerel, Speckled Hind, Spiny American Lobster, Triggerfish, Vermillion Snapper, Wahoo, Wreckfish, Yellowedge Grouper.
- There exist other fisheries in State waters that may not be reflected in data from federal sources (e.g. whelk, bluefish, and menhaden). It is recommended to query state agencies for additional data within state waters.
- All summaries presented here are built from percentages of a trip that overlapped spatially with the WEAs. These percentages were applied to landings and values for that trip and summed. This differs from simply using the self-reported VTR/clam logbook locations as those place all value from that trip at a single point. Use of the VTR raster model is more representative as smoothing reported locations reduces the effect of location inaccuracy.
- The information reported for 2020 should be interpreted with caution due to the generalized impacts the COVID-19 pandemic had across many fisheries in the Greater Atlantic Region resulting in reduced landings and lower prices; hence lower revenues as well as unusually low numbers of vessels that fished during the year.
- The number of small businesses changes over time both because of changes in affiliated ownership and fluctuations in revenue. For this reason, we use and report only the most recent three years' revenue in the Small Business Analysis section of this report, consistent with historical guidance provided by the Small Business Administration.
- Confidential data is listed as “Suppressed” or “All Others.”

References

DePiper GS (2014) Statistically assessing the precision of self-reported VTR fishing locations. (https://repository.library.noaa.gov/view/noaa/4806)

Benjamin S, Lee MY, DePiper G. 2018. Visualizing fishing data as rasters. NEFSC Ref Doc 18-12; 24 p. (https://repository.library.noaa.gov/view/noaa/23030)

Most Impacted FMPs

We define "most impacted" as the FMPs deriving the most revenue from the area over the fourteen year analysis period of 2008 to 2021, indicating the highest potential for impact to industry from a reduction in fishing area. The top 5 FMPs by revenue in Zone 3 were Mackerel, Squid, and Butterfish, ASMFC FMP, Sea Scallop, Summer Flounder, Scup, Black Sea Bass and No Federal FMP. The category "No Federal FMP" contains a variety of species that are not federally regulated, such as: smooth and chain dogfish, whelk, and menhaden, (there are close to 103 species without federal FMPs caught in the Zone 3 area). Revenue values have been deflated to 2021 dollars. All numbers have been rounded to the nearest thousand. Specific figures on these FMPs within the area follow. See Table 5.1 for area totals for all FMPs and species.

Figure 1.1 Landings from Most Impacted FMPs, Zone 3

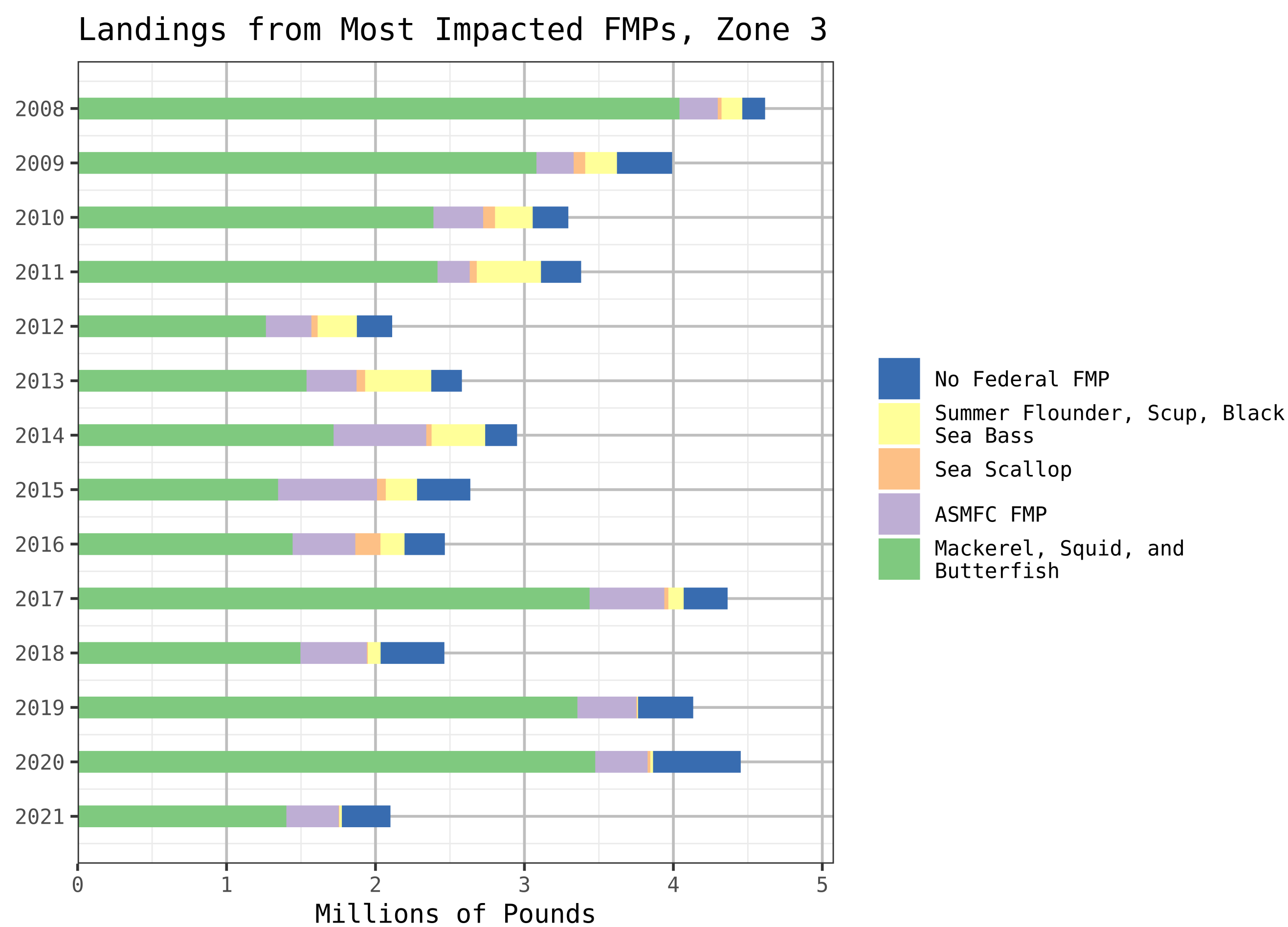


Table 1.1 Fourteen Year Total Landings (Pounds), Most Impacted FMPs, Zone 3

FMP	Fourteen Year Landings
Mackerel, Squid, and Butterfish	32,403,000
ASMFC FMP	5,451,000
No Federal FMP	4,327,000
Summer Flounder, Scup, Black Sea Bass	2,703,000
Sea Scallop	657,000

FMP	Fourteen Year Landings
Total	**45,541,000**

Figure 1.2 Revenue from Most Impacted FMPs, Zone 3

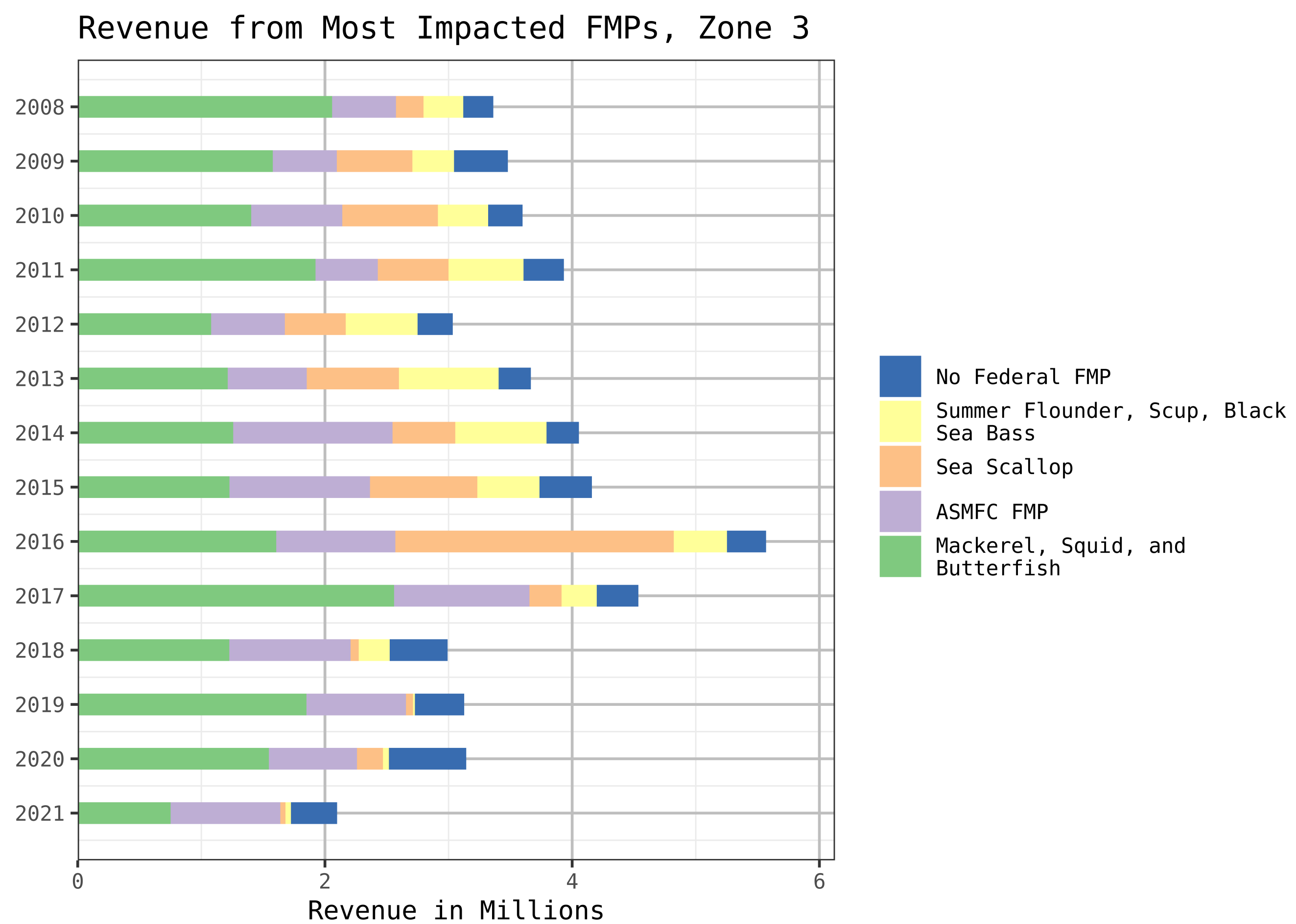


Table 1.2 Fourteen Year Total Revenue for Most Impacted FMPs, Zone 3

FMP	Fourteen Year Revenue
Mackerel, Squid, and Butterfish	$21,281,000
ASMFC FMP	$11,384,000
Sea Scallop	$7,680,000
Summer Flounder, Scup, Black Sea Bass	$5,373,000
No Federal FMP	$5,034,000
Total	**$50,752,000**

Other Impacted FMPs

We analyzed other impacted FMPs separately in order to better visualize the estimated landings and revenues. The other impacted FMPs are: All Others, Atlantic Herring, Bluefish, Highly Migratory Species, Monkfish, Northeast Multispecies, SERO FMP, Skates, Small-Mesh Multispecies, Spiny Dogfish, Surfclam, Ocean Quahog and Tilefish. The category “All Others” refers to FMPs with less than three permits or dealers impacted to protect data confidentiality. Revenue values have been deflated to 2021 dollars. All numbers have been rounded to the nearest thousand. See Table 5.1 for area totals for all FMPs and species.

Figure 2.1 Landings from Other Impacted FMPs, Zone 3

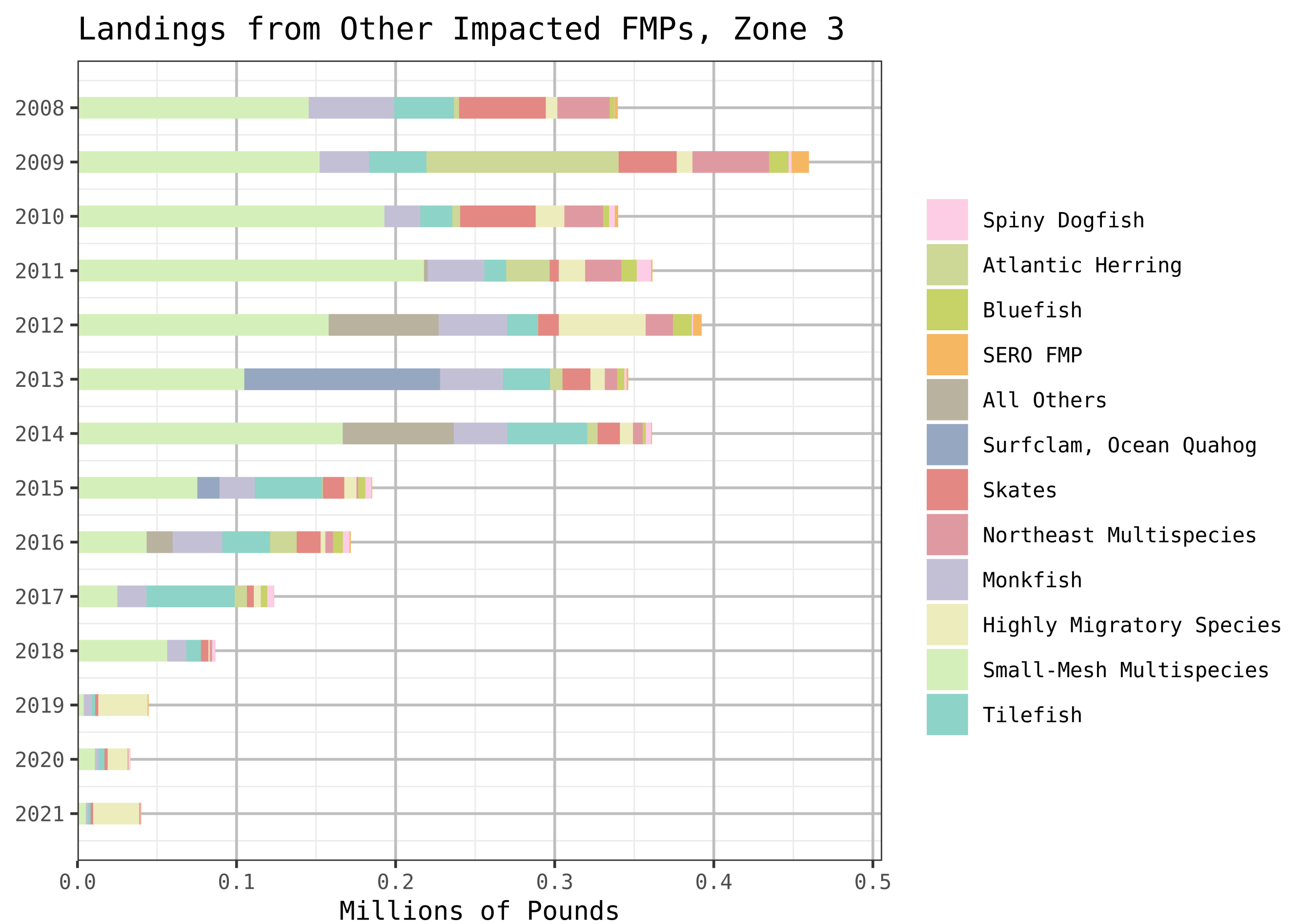


Table 2.1 Fourteen Year Total Landings (Pounds), Other Impacted FMP, Zone 3

FMP	Fourteen Year Landings
Small-Mesh Multispecies	1,358,000
Monkfish	351,000
Tilefish	351,000
Skates	232,000
Highly Migratory Species	212,000
Atlantic Herring	196,000
Northeast Multispecies	168,000

FMP	Fourteen Year Landings
All Others	158,000
Surfclam, Ocean Quahog	137,000
Bluefish	62,000
Spiny Dogfish	36,000
SERO FMP	25,000
Total	**3,286,000**

Figure 2.2 Revenue from Other Impacted FMPs, Zone 3

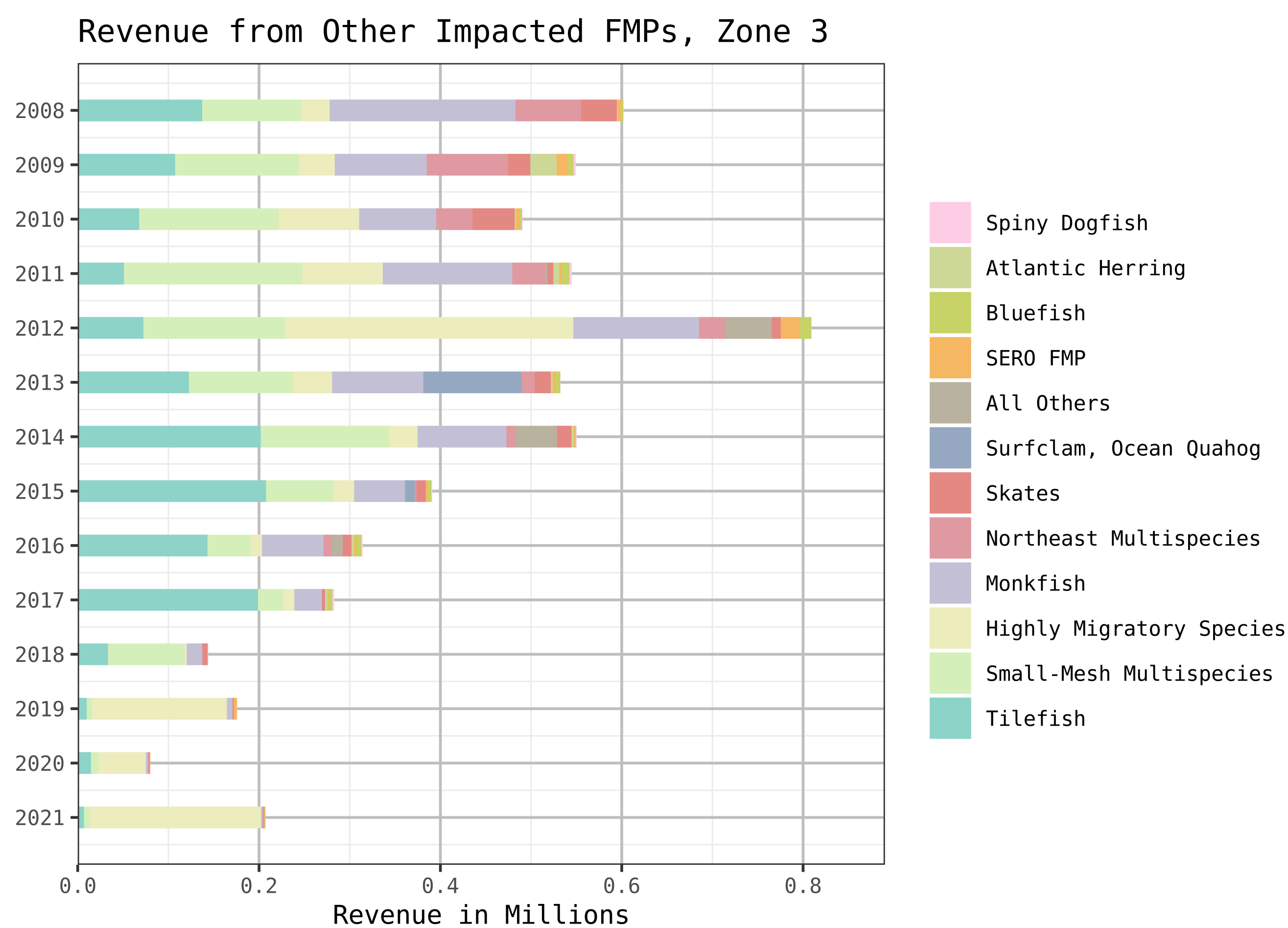


Table 2.2 Fourteen Year Total Revenue for Other Impacted FMPs, Zone 3

FMP	Fourteen Year Revenue
Tilefish	$1,375,000
Small-Mesh Multispecies	$1,265,000
Highly Migratory Species	$1,080,000
Monkfish	$1,053,000
Northeast Multispecies	$305,000

FMP	Fourteen Year Revenue
Skates	$193,000
Surfclam, Ocean Quahog	$119,000
All Others	$112,000
SERO FMP	$60,000
Bluefish	$53,000
Atlantic Herring	$48,000
Spiny Dogfish	$12,000
Total	**$5,674,000**

Most Impacted Species

We analyzed the top ten species due to their economic importance in the area and to isolate them from combined FMPs. The top ten species by revenue are: Illex Squid, Longfin Squid, American Lobster, Sea Scallop, Summer Flounder, Jonah Crab, All Others, Butterfish, Red Crab and Golden Tilefish. The category “All Others” refers to species with less than three permits or dealers impacted to protect data confidentiality.Revenue values have been deflated to 2021 dollars. All numbers have been rounded to the nearest thousand.See Table 5.1 for area totals for all FMPs and species.

Figure 3.1 Landings of Most Impacted Species, Zone 3

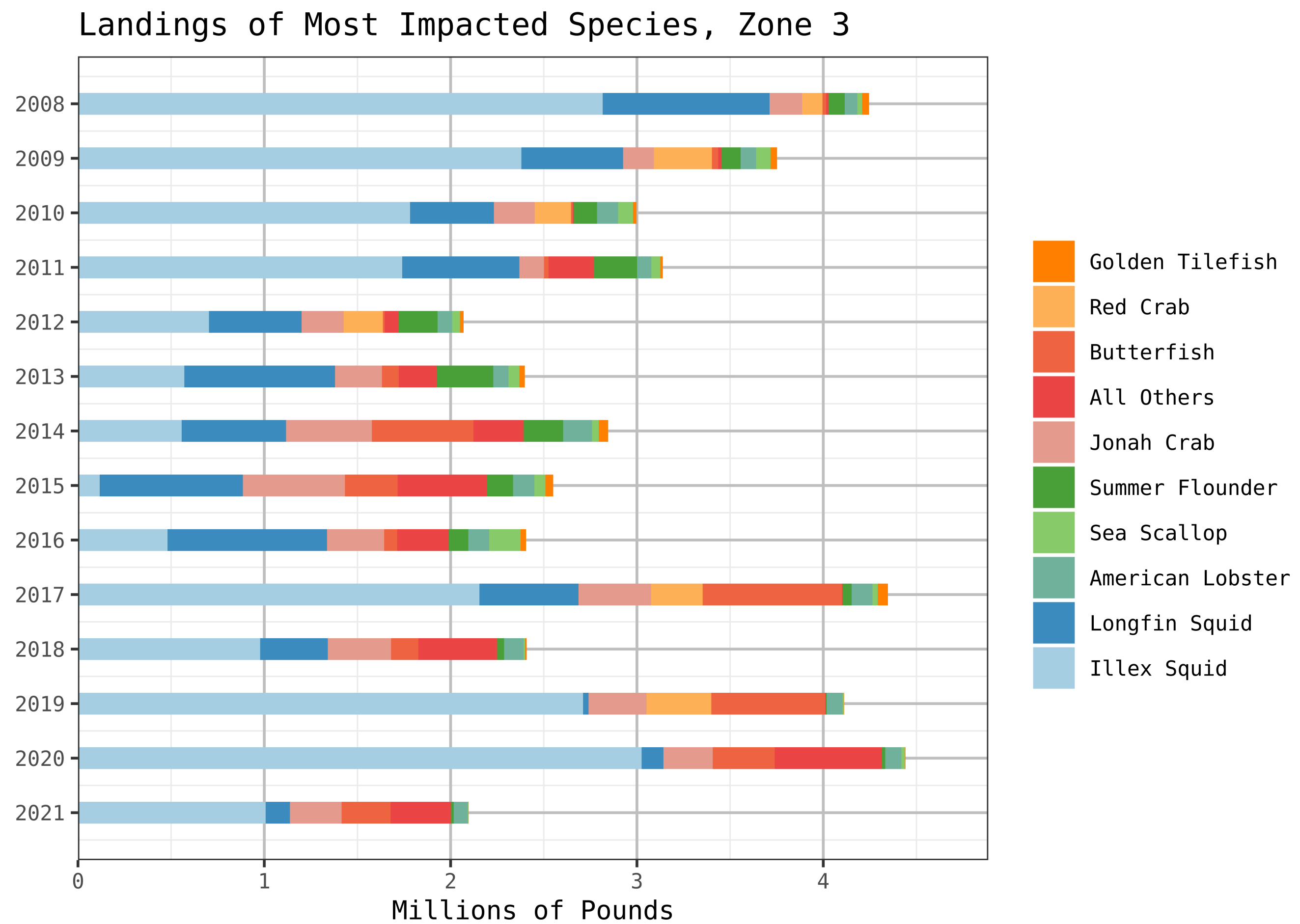


Table 3.1 Fourteen Year Total Landings (Pounds), Most Impacted Species, Zone 3

Species	Fourteen Year Landings
Illex Squid	21,021,000
Longfin Squid	7,184,000
Jonah Crab	4,065,000
Butterfish	3,190,000
All Others	2,912,000
Summer Flounder	1,636,000
Red Crab	1,451,000
American Lobster	1,346,000
Sea Scallop	657,000
Golden Tilefish	348,000
Total	**43,809,000**

Figure 3.2 Revenue of Most Impacted Species, Zone 3

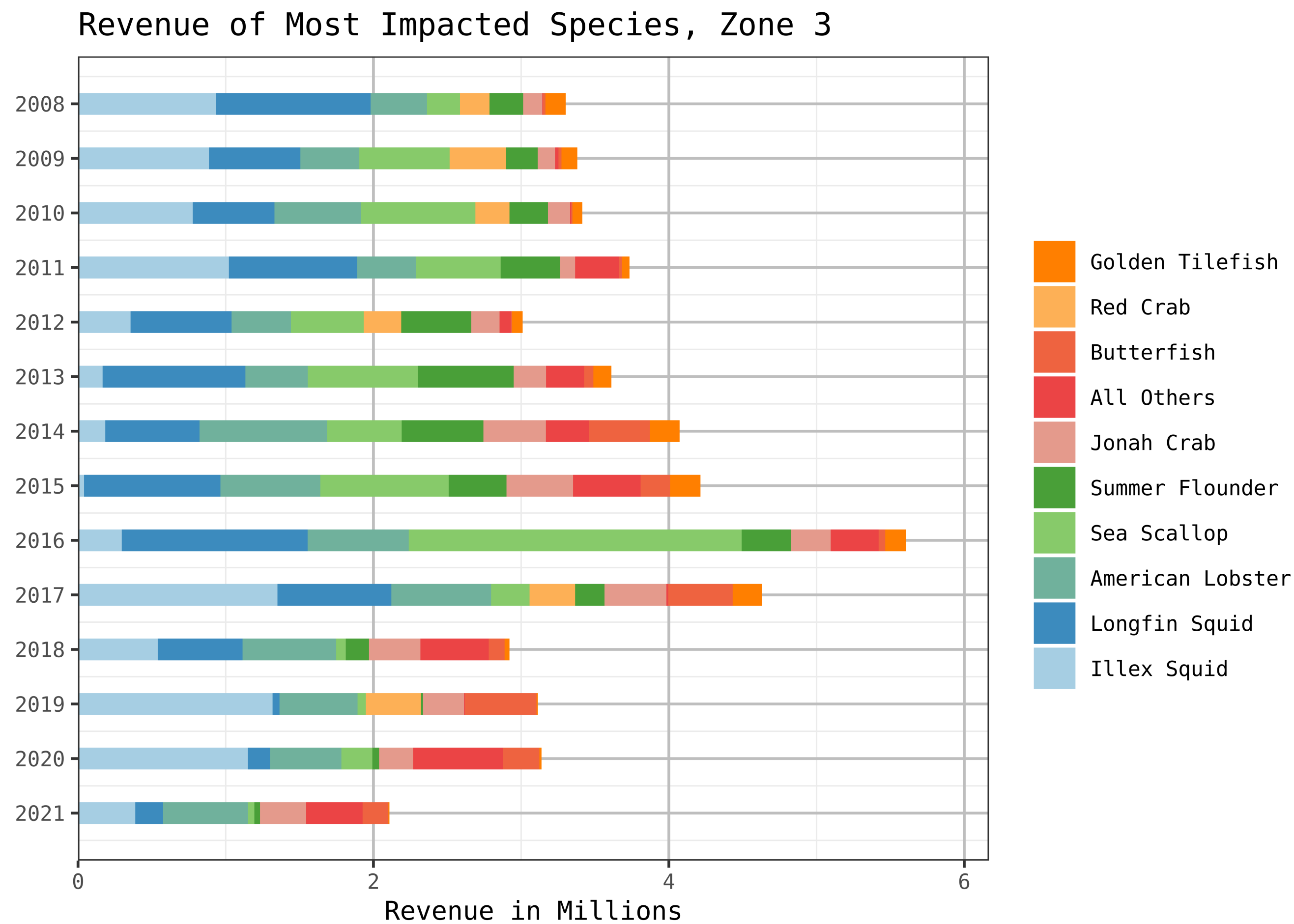


Table 3.2 Fourteen Year Total Revenue, Most Impacted Species, Zone 3

Species	Fourteen Year Revenue
Illex Squid	$9,409,000
Longfin Squid	$9,285,000
American Lobster	$7,711,000
Sea Scallop	$7,680,000
Summer Flounder	$3,961,000
Jonah Crab	$3,638,000
All Others	$3,208,000
Butterfish	$2,247,000
Red Crab	$1,750,000
Golden Tilefish	$1,368,000
Total	**$50,255,000**

Select Gear Types

We analyzed select gear types to better understand the type of fishing occurring in Zone 3 . The select gear types are: Dredge-Other, Dredge-Clam, Dredge-Scallop, Gillnet-Sink, Gillnet-Other, Weir-Trap, Seine-Purse, Seine-Other, Handline, Hand-Other, Trawl-Bottom, Trawl-Midwater, Longline-Bottom, Longline-Pelagic, Pot-Other, and Pot-Lobster. The category “All Others” refers to species with less than three permits or dealers impacted to protect data confidentiality. Revenue values have been deflated to 2021 dollars. All numbers have been rounded to the nearest thousand.

Figure 4.1 Landings of Select Gear Types, Zone 3

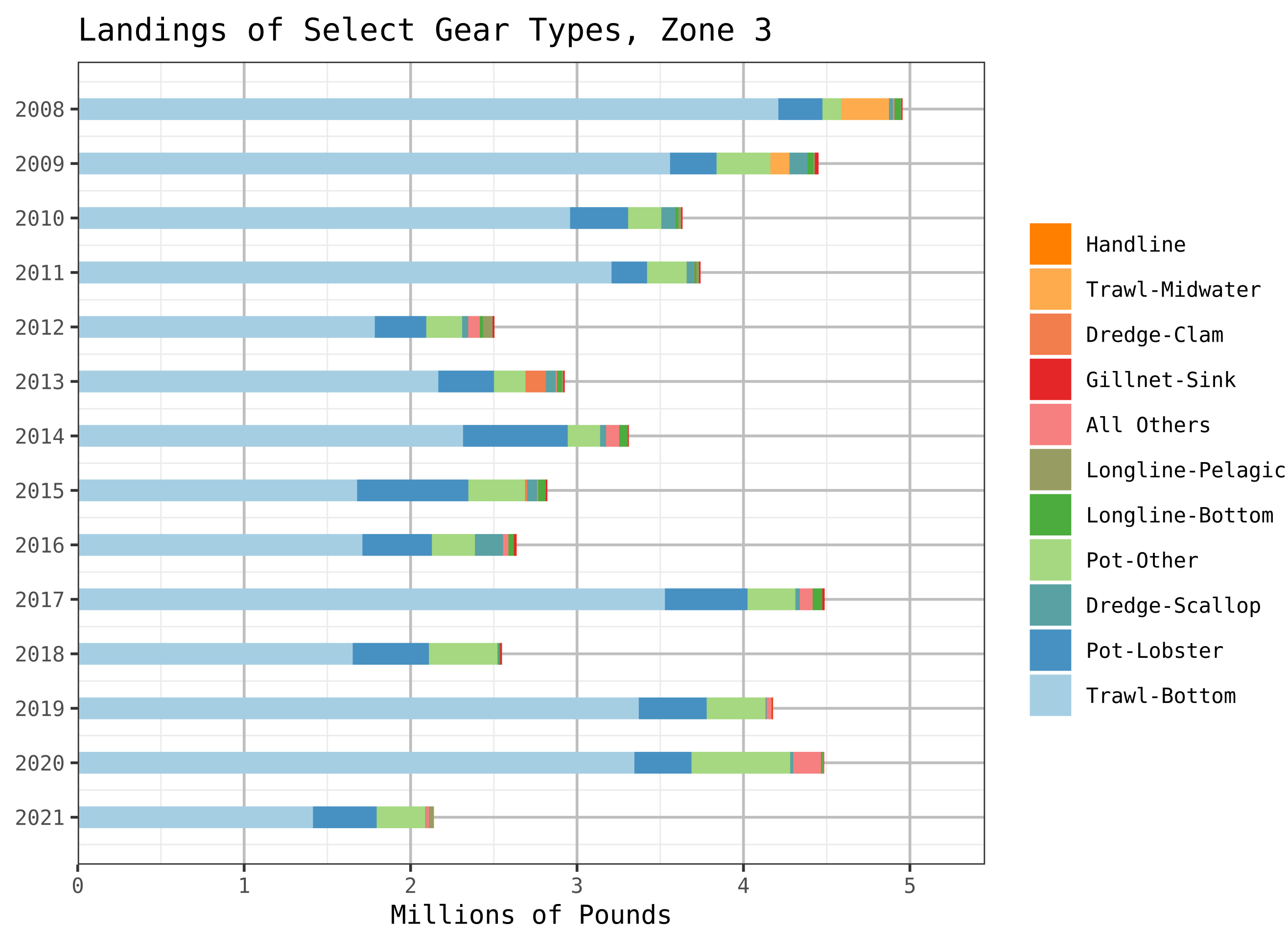


Table 4.1 Fourteen Year Total Landings (Pounds), Select Gear Types, Zone 3

Gear Type	Fourteen Year Landings
Trawl-Bottom	36,899,000
Pot-Lobster	5,555,000
Pot-Other	4,007,000
Dredge-Scallop	679,000
All Others	499,000
Trawl-Midwater	402,000

Gear Type	Fourteen Year Landings
Longline-Bottom	364,000
Longline-Pelagic	145,000
Dredge-Clam	137,000
Gillnet-Sink	133,000
Handline	7,000
Total	**48,827,000**

Figure 4.2 Revenue from Select Gear Types, Zone 3

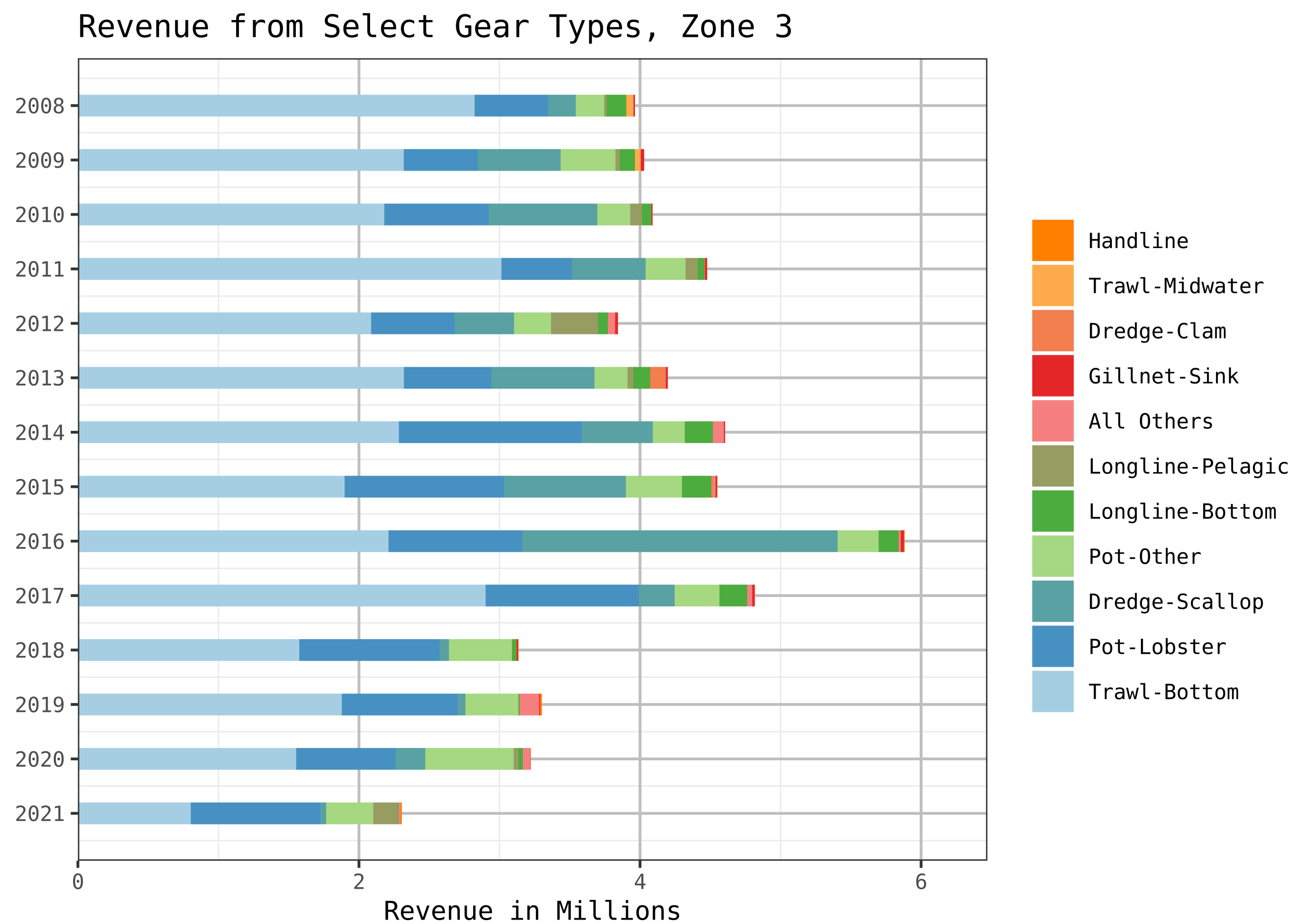


Table 4.2 Fourteen Year Total Revenue, Select Gear Types, Zone 3

Gear Type	Fourteen Year Revenue
Trawl-Bottom	$29,844,000
Pot-Lobster	$11,443,000
Dredge-Scallop	$7,482,000
Pot-Other	$4,641,000
Longline-Bottom	$1,380,000

Gear Type	Fourteen Year Revenue
Longline-Pelagic	$802,000
All Others	$412,000
Gillnet-Sink	$176,000
Dredge-Clam	$119,000
Trawl-Midwater	$90,000
Handline	$38,000
Total	**$56,426,000**

Totals

The following table displays the given year total revenue and total landed pounds of all species by all gear types within the area. From 2008-2021, a total of 48.827 million pounds worth $56.426 million were landed from within Zone 3. All numbers have been rounded to the nearest thousand.

Table 5.1 Fourteen Year Total Revenue and Landings (Pounds), Zone 3

Year	Revenue	Landings
2008	$3,964,000	4,956,000
2009	$4,029,000	4,452,000
2010	$4,090,000	3,634,000
2011	$4,478,000	3,742,000
2012	$3,843,000	2,504,000
2013	$4,198,000	2,927,000
2014	$4,605,000	3,312,000
2015	$4,551,000	2,822,000
2016	$5,883,000	2,638,000
2017	$4,818,000	4,488,000
2018	$3,136,000	2,549,000
2019	$3,302,000	4,178,000
2020	$3,223,000	4,485,000
2021	$2,306,000	2,140,000
Total	**$56,426,000**	**48,827,000**

Landings and Revenue by Port

The ten most impacted (by revenue) ports are listed below. These ports are estimated to receive the most revenue from fishing done within the Zone 3 area. The table below displays each port's revenue and landing breakdown. The table present the cumulative revenues and landings from 2008-2021. New Bedford receives the highest value of revenue of any port, with $14.555 million from 2008-2021. All numbers have been rounded to the nearest thousand.

Table 6.1 Most Impacted Ports, by Revenue and Landings

City	State	Fourteen Year Revenue	Fourteen Year Landings
New Bedford	MA	$14,555,000	11,541,000
Point Judith	RI	$8,218,000	6,520,000
North Kingstown	RI	$7,354,000	10,667,000
Cape May	NJ	$6,367,000	8,504,000
Montauk	NY	$2,927,000	1,761,000
Newport	RI	$2,552,000	1,368,000
Davisville	RI	$2,225,000	2,617,000
Newport News	VA	$1,603,000	523,000
Hampton	VA	$1,360,000	613,000
All Others		$1,217,000	257,000

Landings and Revenue by State

The following table displays total revenue and total landed pounds by state within the area. All numbers have been rounded to the nearest thousand.

Table 7.1 Most Impacted States, by Revenue and Landings

State	Fourteen Year Revenue	Fourteen Year Landings
RI	$21,618,000	21,785,000
MA	$16,253,000	12,856,000
NJ	$8,286,000	9,349,000
VA	$3,916,000	1,408,000
NY	$3,403,000	2,009,000

State	Fourteen Year Revenue	Fourteen Year Landings
NC	$1,507,000	645,000
CT	$984,000	587,000
MD	$369,000	112,000
All Others	$49,000	18,000
ME	$2,000	9,000

Percentage of Revenue by Permit

We also analyzed the percentage of each permit's total commercial fishing revenue coming from within the Zone 3 area (see boxplots figures and tables below). Boxplots are important statistical summaries because they provide information about the distribution of the percentages. The boxplots below begin at the 1st quartile, or the value beneath which 25 percent of all observations fall. A thick line within the box identifies the median, the observation at which 50 percent of observations are above or beneath. The box ends at the 3rd quartile, or the observation beneath which 75 percent of observations fall. Nonparametric estimates of the minimum and maximum values are also indicated by the "whiskers" (dashed line terminating in a vertical line) that jut out from each side of the box. Any points outside of these whiskers are observations that are considered outliers. In our tables, however, the maximum values are inclusive of outliers. The first table below presents the minimum, 1st quartile, median, 3rd quartile, and maximum values for the area. These are the fourteen year revenue percentages. The following table represents the total number of outliers by year. The boxplots in the figures below further separate the area out by year.

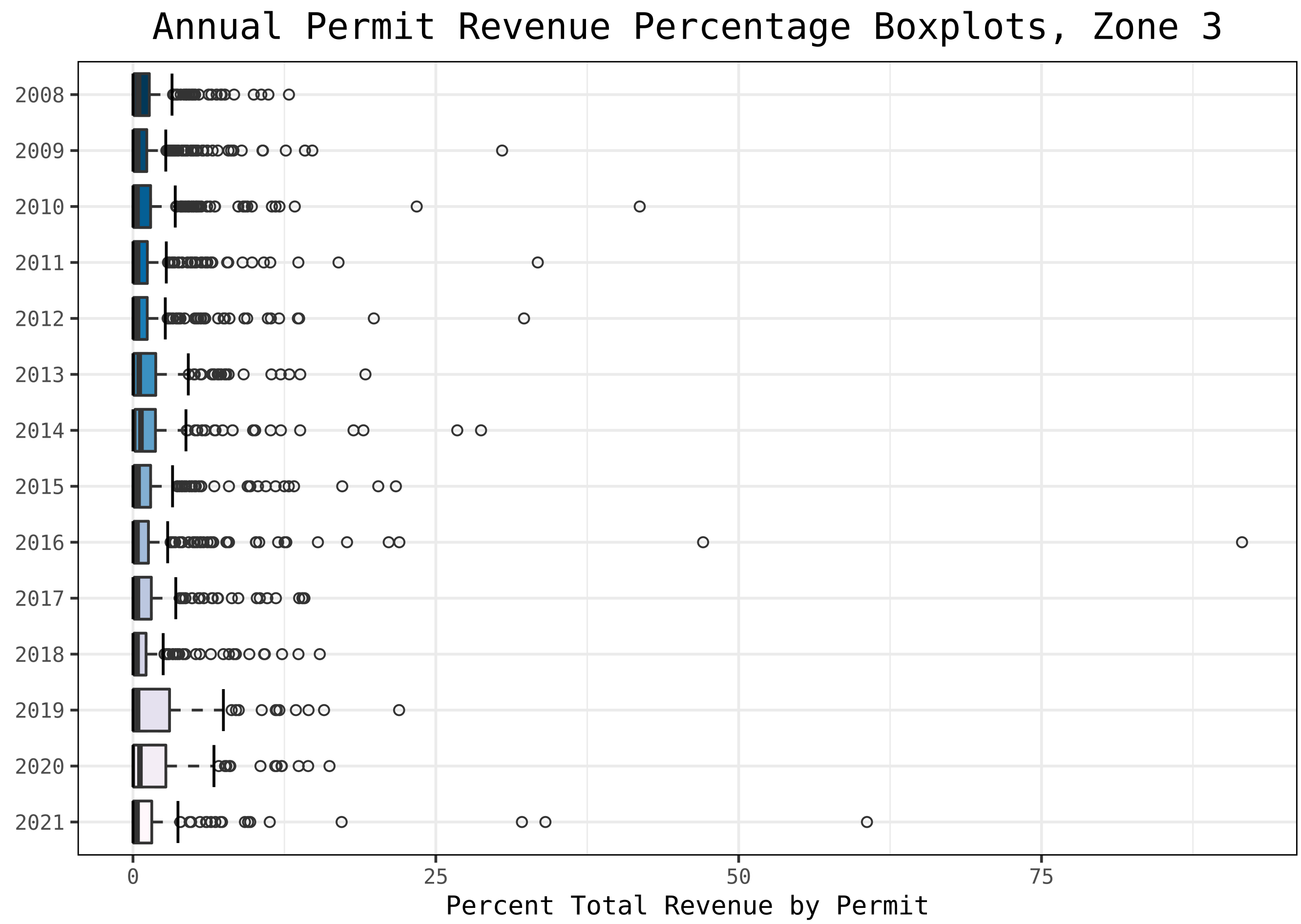
Table 8.1 Analysis of Fourteen Year Permit Revenue Percentage Boxplots, Zone 3

Min	1st Quartile	Median	3rd Quartile	Max
0%	0.08%	0.40%	1%	92%

Table 8.2 Fourteen Year Outlier Count, Zone 3

2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
31	48	44	36	38	24	23	30	42	25	28	11	14	20

Figure 8.1 Annual Permit Revenue Percentage Boxplots, Zone 3



Small Business Analysis

A business primarily engaged in commercial fishing is classified as a small business if it is independently owned and operated, is not dominant in its field of operation (including its affiliates) and has combined annual receipts not in excess of $11 million for all its affiliated operations worldwide. Small Business Administration principles of affiliation are used to define a business entity, meaning the following analysis is conducted upon unique business interests, which can represent multiple vessel permits. As such, this section presents the total number of entities, by business category, and the total revenue generated by that business category in Table 9.1. For those businesses with historical fishing within the Zone 3 area, Table 9.2 presents the revenue generated inside the Zone 3 area against the total revenue from those same entities. Revenue values have been deflated to 2021 dollars. All numbers have been rounded to the nearest thousand.

Table 9.1 Total number of entities engaged in federally managed fishing within the Northeast region, and their total revenue, by business category

Year	Business Type	Number of Entities	Revenue
2019	Large Business	11	$247,928,000
2019	Small Business	1,130	$799,249,000

Year	Business Type	Number of Entities	Revenue
2020	Large Business	11	$200,342,000
2020	Small Business	1,144	$684,526,000
2021	Large Business	11	$248,437,000
2021	Small Business	1,190	$849,039,000

Table 9.2 Revenue inside the Zone 3 area against total revenue from entities active inside the Zone 3 area, by business category

Year	Business Type	Number of Entities	Area Revenue	Total Revenue
2019	Large Business	6	$1,047,000	$132,025,000
2019	Small Business	83	$2,204,000	$128,777,000
2020	Large Business	4	$501,000	$67,676,000
2020	Small Business	98	$2,696,000	$157,613,000
2021	Large Business	9	$586,000	$207,032,000
2021	Small Business	110	$1,720,000	$173,630,000

Species Dependence

The tables below indicate the top ten species deriving the most revenue from the area by year. Additional information includes landings and effort (Days-at-Sea, or DAS) occurring within the area of interest as a percentage of totals generated by that species across the entire region for each year and the total number of trips and vessels from the area FMP, species, and port for each year. Trips with less than three permits or dealers have been removed to protect data confidentiality. The total number of trips, and number vessels taking those trips, represent an upper bound on the counts as it does not take into account the probability of these trips actually overlapping the area of interest, and identifies all the individuals who could be displaced by wind energy development. Therefore, also included is a count of trips and vessels weighted by the probability of overlap with the area of interest, to generate a more precise expected count of trips and vessels fishing within the area. The category “All Others” refers to gear type categories with less than three permits or dealers impacted to protect data confidentiality.

Table 10.1 Total and Expected Number of Trips and Vessels by Year, Zone 3

Year	Number of Trips	Number of Vessels	Expected Trips	Expected Vessels
2008	2,691	353	127	99
2009	2,662	371	161	109
2010	2,729	379	137	104
2011	2,689	312	133	103

Year	Number of Trips	Number of Vessels	Expected Trips	Expected Vessels
2012	2,271	312	116	87
2013	2,277	292	128	96
2014	2,625	264	139	103
2015	2,217	277	116	81
2016	2,437	320	140	101
2017	1,899	229	111	74
2018	1,606	236	86	60
2019	1,173	118	76	46
2020	1,206	133	82	50
2021	923	147	63	43

Table 10.2 Percentages of Total Revenue, Landings, and Days-at-Sea for Species of Interest, Zone 3, 2021

Species	Revenue as % of Total	Landings as % of Total	DAS as % of Total
Albacore Tuna	11.57	12.05	7.03
Bigeye Tuna	9.63	8.68	6.68
Butterfish	7.23	8.37	0.61
Swordfish	6.93	7.63	4.11
Yellowfin Tuna	3.70	3.50	6.62
Jonah Crab	2.75	2.75	1.85
Illex Squid	1.30	1.48	2.31
Longfin Squid	0.57	0.56	0.54
All Others	0.50	0.45	0.18
American Lobster	0.36	0.35	0.40

Table 10.3 Total and Expected Number of Trips and Vessels by FMP, Zone 3, 2021

FMP	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
ASMFC FMP	496	45	16	26
Bluefish	23	21	2	2
Highly Migratory Species	72	25	8	9
Mackerel, Squid, and Butterfish	277	56	19	25

FMP	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Monkfish	145	58	8	10
No Federal FMP	183	66	13	16
Northeast Multispecies	9	9	1	1
Sea Scallop	19	16	1	1
SERO FMP	21	13	4	4
Skates	59	34	3	3
Small-Mesh Multispecies	89	40	5	7
Spiny Dogfish	10	6	1	1
Summer Flounder, Scup, Black Sea Bass	117	56	6	7
Tilefish	91	46	6	7

Table 10.4 Total and Expected Number of Trips and Vessels by Species, Zone 3, 2021

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Albacore Tuna	20	10	4	4
American Eel	6	5	1	1
American Lobster	468	41	16	25
Atlantic Mackerel	29	16	4	4
Big Eye Tuna	31	13	6	7
Black Sea Bass	41	28	3	3
Bluefish	23	21	2	2
Blueline Tilefish	9	6	1	1
Butterfish	80	35	6	7
Cod	5	5	1	1
Conger Eel	36	21	3	3
Dogfish Smooth	25	8	2	2
Dogfish Spiny	10	6	1	1
Dolphinfish	20	12	4	4
Golden Tilefish	87	44	5	7
Illex Squid	170	27	12	16

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
John Dory	76	29	6	7
Jonah Crab	454	34	15	24
King Whiting	3	3	1	1
Longfin Squid	118	45	8	10
Monkfish	145	58	8	10
NK Eel	3	3	NA	NA
NK Tilefish	4	4	NA	NA
Other Fish	5	5	2	2
Red Hake	47	27	3	5
Rock Crab	9	3	1	1
Scup	27	23	1	1
Sea Scallop	19	16	1	1
Silver Hake	82	37	5	6
Skates	59	34	3	3
Squeteague Weakfish	15	14	1	1
Summer Flounder	108	53	6	6
Swordfish	24	11	4	4
White Hake	4	4	1	1
Yellowfin Tuna	41	15	6	7

Table 10.5 Total and Expected Number of Trips and Vessels by Port, Zone 3, 2021

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Little Compton, RI	43	3	2	3
Montauk, NY	21	10	3	5
New Bedford, MA	339	52	17	25
Newport, RI	81	7	2	4
Point Judith, RI	188	36	11	16
Stonington, CT	8	7	1	1

Table 10.6 Percentages of Total Revenue, Landings, and Days-at-Sea for Species of Interest, Zone 3, 2020

Species	Revenue as % of Total	Landings as % of Total	DAS as % of Total

Species	Revenue as % of Total	Landings as % of Total	DAS as % of Total
Butterfish	6.11	6.20	0.50
Yellowfin Tuna	5.79	5.13	3.45
Illex Squid	4.45	4.84	5.29
Jonah Crab	2.04	2.05	1.83
Albacore Tuna	1.84	1.64	2.44
Bigeye Tuna	1.75	1.61	2.85
Swordfish	1.66	1.72	2.35
All Others	0.74	0.63	0.17
Longfin Squid	0.56	0.58	0.32
American Lobster	0.47	0.45	0.44

Table 10.7 Total and Expected Number of Trips and Vessels by FMP, Zone 3, 2020

FMP	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
ASMFC FMP	597	41	16	28
Bluefish	18	12	2	2
Highly Migratory Species	66	26	5	5
Mackerel, Squid, and Butterfish	409	52	27	41
Monkfish	155	50	10	10
No Federal FMP	231	60	15	21
Northeast Multispecies	7	6	1	1
Sea Scallop	20	12	2	2
SERO FMP	16	10	2	2
Skates	84	36	4	4
Small-Mesh Multispecies	87	36	6	6
Spiny Dogfish	51	5	1	1
Summer Flounder, Scup, Black Sea Bass	101	46	5	5
Tilefish	84	33	5	5

Table 10.8 Total and Expected Number of Trips and Vessels by Species, Zone 3, 2020

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Albacore Tuna	18	8	2	2
American Lobster	536	40	16	26
Atlantic Mackerel	27	18	2	2
Big Eye Tuna	21	8	2	2
Black Sea Bass	48	29	3	3
Bluefin Tuna	3	3	1	1
Bluefish	18	12	2	2
Blueline Tilefish	11	5	1	1
Butterfish	75	35	7	7
Conger Eel	48	22	3	3
Dogfish Smooth	14	6	1	1
Dogfish Spiny	51	5	1	1
Dolphinfish	12	7	2	2
Golden Tilefish	77	33	4	4
Illex Squid	327	28	23	35
John Dory	96	38	8	8
Jonah Crab	505	31	14	24
Longfin Squid	91	37	8	8
Mako Shortfin Shark	7	4	2	2
Monkfish	155	50	10	10
NK Crab	24	4	NA	NA
Other Fish	7	4	1	1
Red Hake	32	21	2	2
Rock Crab	15	4	2	2
Scup	12	11	1	1
Sea Scallop	20	12	2	2
Silver Hake	83	34	6	6
Skates	83	35	4	4
Squeteague Weakfish	6	6	1	1
Summer Flounder	77	38	5	5

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Swordfish	35	15	4	4
Yellowfin Tuna	25	12	3	3

Table 10.9 Total and Expected Number of Trips and Vessels by Port, Zone 3, 2020

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Chatham, MA	52	6	1	1
Little Compton, RI	39	3	2	3
Montauk, NY	26	9	1	1
New Bedford, MA	472	49	23	38
New London, CT	6	3	1	1
Newport, RI	80	7	2	5
Point Judith, RI	228	32	13	19
Point Pleasant, NJ	37	3	2	2

Table 10.10 Percentages of Total Revenue, Landings, and Days-at-Sea for Species of Interest, Zone 3, 2019

Species	Revenue as % of Total	Landings as % of Total	DAS as % of Total
Yellowfin Tuna	13.82	11.79	7.27
Butterfish	8.00	8.32	0.28
Bigeye Tuna	7.03	7.65	6.14
Illex Squid	4.37	4.51	4.99
Swordfish	2.07	2.15	4.37
Jonah Crab	2.04	2.06	1.78
All Others	0.95	1.11	0.25
American Lobster	0.41	0.40	0.46
Golden Tilefish	0.17	0.16	0.66
Longfin Squid	0.10	0.11	0.20

Table 10.11 Total and Expected Number of Trips and Vessels by FMP, Zone 3, 2019

FMP	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
ASMFC FMP	623	37	16	29

FMP	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Bluefish	12	11	1	1
Highly Migratory Species	39	19	5	7
Mackerel, Squid, and Butterfish	396	44	24	37
Monkfish	159	54	8	8
No Federal FMP	227	45	13	15
Northeast Multispecies	12	10	1	1
Sea Scallop	10	6	1	1
SERO FMP	27	11	4	4
Skates	81	35	3	3
Small-Mesh Multispecies	60	29	3	3
Spiny Dogfish	16	5	1	1
Summer Flounder, Scup, Black Sea Bass	87	49	3	3
Tilefish	72	28	5	6

Table 10.12 Total and Expected Number of Trips and Vessels by Species, Zone 3, 2019

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
American Lobster	587	37	16	27
Atlantic Mackerel	22	10	3	3
Big Eye Tuna	11	6	3	3
Black Sea Bass	48	24	2	2
Bluefish	12	11	1	1
Blueline Tilefish	6	5	1	1
Butterfish	52	26	5	5
Conger Eel	34	13	2	2
Dogfish Smooth	8	6	1	1
Dogfish Spiny	16	5	1	1
Dolphinfish	24	9	4	4
Golden Tilefish	69	26	5	5
Illex Squid	343	26	21	32

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
John Dory	79	22	6	7
Jonah Crab	525	28	14	23
King Whiting	3	3	1	1
Longfin Squid	66	32	6	7
Monkfish	159	54	8	8
NK Crab	45	4	NA	NA
Red Crab	43	6	4	6
Red Hake	33	14	2	2
Redfish	7	5	1	1
Rock Crab	23	3	1	1
Scup	26	22	2	2
Sea Scallop	10	6	1	1
Silver Hake	40	28	2	2
Skates	81	35	3	3
Squeteague Weakfish	4	3	1	1
Summer Flounder	59	42	3	3
Swordfish	19	10	4	4
White Hake	4	4	1	1
Yellowfin Tuna	19	7	3	5

Table 10.13 Total and Expected Number of Trips and Vessels by Port, Zone 3, 2019

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Chatham, MA	37	6	1	1
Little Compton, RI	40	3	2	3
Montauk, NY	39	9	2	4
New Bedford, MA	428	40	22	33
Newport News, VA	5	4	1	1
Newport, RI	109	6	2	4
Point Judith, RI	243	31	13	19

Table 10.14 Percentages of Total Revenue, Landings, and Days-at-Sea for Species of Interest, Zone 3, 2018

Species	Revenue as % of Total	Landings as % of Total	DAS as % of Total
Butterfish	3.92	4.18	1.13
Illex Squid	2.10	1.85	2.56
Jonah Crab	1.89	1.89	1.98
Longfin Squid	1.40	1.46	0.99
All Others	1.05	1.15	0.39
Clearnose Skate	0.93	0.47	1.17
Silver Hake	0.79	0.47	0.65
Summer Flounder	0.67	0.69	0.58
Black Sea Bass	0.63	0.59	0.61
Golden Tilefish	0.62	0.61	1.51

Table 10.15 Total and Expected Number of Trips and Vessels by FMP, Zone 3, 2018

FMP	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
ASMFC FMP	597	49	18	32
Atlantic Herring	9	3	1	1
Bluefish	43	26	3	3
Highly Migratory Species	72	28	4	4
Mackerel, Squid, and Butterfish	652	111	32	38
Monkfish	581	153	24	26
No Federal FMP	623	107	31	37
Northeast Multispecies	30	19	1	1
Sea Scallop	20	16	1	1
SERO FMP	30	11	1	1
Skates	353	98	13	13
Small-Mesh Multispecies	443	88	21	21
Spiny Dogfish	56	12	2	2
Summer Flounder, Scup, Black Sea Bass	570	159	26	27

FMP	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Tilefish	332	88	16	16

Table 10.16 Total and Expected Number of Trips and Vessels by Species, Zone 3, 2018

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
American Eel	46	13	2	2
American Lobster	534	40	17	30
Atlantic Herring	9	3	1	1
Atlantic Mackerel	164	58	9	9
Big Eye Tuna	8	6	1	1
Black Sea Bass	335	127	16	16
Bluefish	43	26	3	3
Blueline Tilefish	42	24	3	3
Butterfish	376	84	22	22
Clearnose Skate	16	7	1	1
Cod	8	5	1	1
Conger Eel	221	58	11	11
Dogfish Smooth	54	16	3	3
Dogfish Spiny	56	12	2	2
Dolphinfish	19	6	1	1
Golden Tilefish	315	86	15	15
Haddock	5	4	1	1
Illex Squid	173	21	11	14
John Dory	243	58	13	15
Jonah Crab	501	33	15	26
King Whiting	152	44	7	7
Longfin Squid	482	110	25	27
Monkfish	579	153	24	26
NK Eel	13	12	NA	NA
NK Seatrout	10	5	NA	NA
Northern Kingfish	34	13	2	2

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Offshore Hake	6	5	1	1
Other Fish	7	4	2	2
Pollock	3	3	1	1
Red Hake	261	61	11	11
Redfish	12	6	1	1
Scup	251	109	10	10
Sea Robins	32	15	3	3
Sea Scallop	20	16	1	1
Silver Hake	393	85	19	19
Skates	347	98	12	13
Spotted Weakfish	29	14	1	1
Squeteague Weakfish	246	70	10	10
Summer Flounder	441	150	18	19
Swordfish	5	3	1	1
White Hake	5	4	1	1
Winter Flounder	7	5	1	1
Yellowfin Tuna	12	9	1	1

Table 10.17 Total and Expected Number of Trips and Vessels by Port, Zone 3, 2018

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Beaufort, NC	55	40	2	2
Cape May, NJ	65	24	5	5
Chatham, MA	84	10	2	2
Chincoteague, VA	8	6	2	2
Gloucester, MA	5	3	1	1
Hampton Bay, NY	26	3	1	1
Hampton, VA	32	21	1	1
Little Compton, RI	38	3	2	3
Montauk, NY	92	16	4	4
Morehead City, NC	4	4	1	1

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
New Bedford, MA	305	45	12	19
New London, CT	17	3	1	1
Newport News, VA	17	10	1	1
Newport, RI	48	5	2	4
Point Judith, RI	415	56	18	25
Point Pleasant, NJ	99	21	4	4
Stonington, CT	20	9	1	1

Table 10.18 Percentages of Total Revenue, Landings, and Days-at-Sea for Species of Interest, Zone 3, 2017

Species	Revenue as % of Total	Landings as % of Total	DAS as % of Total
Butterfish	9.15	9.52	1.83
Illex Squid	5.45	4.34	5.71
Golden Tilefish	3.83	3.90	3.06
Longfin Squid	2.83	3.08	1.97
Jonah Crab	2.80	2.83	2.00
Yellowfin Tuna	2.00	1.84	3.46
Swordfish	1.43	1.47	3.65
Offshore Hake	1.04	1.39	2.48
Clearnose Skate	1.00	0.65	1.80
Summer Flounder	0.84	0.93	0.79

Table 10.19 Total and Expected Number of Trips and Vessels by FMP, Zone 3, 2017

FMP	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
ASMFC FMP	603	73	19	35
Atlantic Herring	11	5	1	1
Bluefish	364	99	19	19
Highly Migratory Species	136	39	8	9
Mackerel, Squid, and Butterfish	883	122	38	55
Monkfish	842	148	34	37

FMP	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
No Federal FMP	826	122	36	43
Northeast Multispecies	46	29	3	3
Sea Scallop	27	22	4	5
SERO FMP	49	28	3	4
Skates	370	90	12	12
Small-Mesh Multispecies	632	97	26	28
Spiny Dogfish	72	21	4	4
Summer Flounder, Scup, Black Sea Bass	759	154	29	29
Tilefish	547	99	25	26

Table 10.20 Total and Expected Number of Trips and Vessels by Species, Zone 3, 2017

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
American Eel	61	14	4	4
American Lobster	541	64	18	32
Atlantic Herring	11	5	1	1
Atlantic Mackerel	152	56	7	7
Barrelfish	3	3	1	1
Big Eye Tuna	6	3	1	1
Black Sea Bass	431	123	16	16
Blue Crab	7	4	1	1
Bluefish	364	99	19	19
Blueline Tilefish	158	43	9	9
Bonito	12	5	2	2
Butterfish	517	79	24	29
Clearnose Skate	27	12	1	1
Cod	7	6	1	1
Conger Eel	290	53	14	14
Crevalle	3	3	1	1
Dogfish Smooth	106	28	6	6

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Dogfish Spiny	72	21	4	4
Dolphinfish	14	7	2	2
Fourspot Flounder	5	4	1	1
Golden Tilefish	514	94	23	24
Illex Squid	162	17	10	16
John Dory	400	71	23	26
Jonah Crab	473	39	15	28
King Whiting	153	52	7	7
Little Tuna	3	3	1	1
Longfin Squid	741	118	34	44
Monkfish	841	148	34	37
Mullets	8	4	1	1
NK Crab	17	3	NA	NA
NK Eel	21	13	NA	NA
NK Seatrout	9	7	NA	NA
Northern Kingfish	30	12	2	2
Offshore Hake	16	7	1	1
Other Fish	25	8	2	2
Red Crab	33	5	3	4
Red Hake	423	67	17	18
Redfish	20	8	2	2
Scup	415	115	15	15
Sea Robins	73	27	3	3
Sea Scallop	27	22	4	5
Silver Hake	540	91	23	24
Skates	362	90	11	11
Spotted Weakfish	22	13	1	1
Squeteague Weakfish	279	74	10	10
Summer Flounder	543	146	21	21
Swordfish	22	9	2	2

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Triggerfish	21	14	1	1
White Hake	13	12	1	1
Witch Flounder	7	7	1	1
Yellowfin Tuna	15	6	2	2

Table 10.21 Total and Expected Number of Trips and Vessels by Port, Zone 3, 2017

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Beaufort, NC	49	32	2	2
Cape May, NJ	132	35	8	8
Chatham, MA	69	10	1	1
Hampton Bay, NY	31	4	2	2
Hampton, VA	48	29	2	2
Montauk, NY	115	13	6	6
New Bedford, MA	214	39	11	15
Newport News, VA	30	22	1	1
Newport, RI	50	5	3	7
Ocean City, MD	9	4	1	1
Point Judith, RI	606	59	26	38
Point Pleasant, NJ	74	20	4	4
Sandwich, MA	81	3	2	2
Stonington, CT	42	8	2	3
Wanchese, NC	10	7	1	1

Table 10.22 Percentages of Total Revenue, Landings, and Days-at-Sea for Species of Interest, Zone 3, 2016

Species	Revenue as % of Total	Landings as % of Total	DAS as % of Total
Atlantic Chub Mackerel	5.43	6.03	3.11
Swordfish	3.96	3.66	3.24
Illex Squid	3.61	3.27	4.66
Golden Tilefish	2.94	2.95	3.62
Offshore Hake	2.84	2.28	3.58

Species	Revenue as % of Total	Landings as % of Total	DAS as % of Total
Butterfish	2.68	2.89	1.73
Jonah Crab	2.42	2.42	1.73
Longfin Squid	2.28	2.21	1.95
Bigeye Tuna	2.20	1.75	2.55
Yellowfin Tuna	2.13	1.29	1.16

Table 10.23 Total and Expected Number of Trips and Vessels by FMP, Zone 3, 2016

FMP	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
ASMFC FMP	617	84	19	35
Atlantic Herring	13	9	1	1
Bluefish	536	112	22	22
Highly Migratory Species	146	43	9	9
Mackerel, Squid, and Butterfish	1,197	157	48	58
Monkfish	1,138	193	49	55
No Federal FMP	985	137	42	48
Northeast Multispecies	54	28	3	3
Sea Scallop	169	111	16	24
SERO FMP	81	43	6	6
Skates	461	94	17	20
Small-Mesh Multispecies	753	99	31	33
Spiny Dogfish	77	16	3	3
Summer Flounder, Scup, Black Sea Bass	1,139	183	45	50
Tilefish	638	97	27	27

Table 10.24 Total and Expected Number of Trips and Vessels by Species, Zone 3, 2016

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Albacore Tuna	5	4	2	2
American Eel	67	14	4	4
American Lobster	538	58	17	31

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Atlantic Croaker	19	16	1	1
Atlantic Herring	13	9	1	1
Atlantic Mackerel	284	61	13	13
Big Eye Tuna	6	5	1	1
Black Sea Bass	524	140	20	23
Blk Bellied Rosefish	8	6	1	1
Blue Crab	16	7	1	1
Bluefish	536	112	22	22
Blueline Tilefish	187	54	10	10
Bonito	10	7	1	1
Butterfish	650	89	29	30
Chub Mackerel	18	7	1	1
Clearnose Skate	40	14	2	2
Cod	11	10	1	1
Conger Eel	407	63	16	16
Dogfish Smooth	110	26	5	5
Dogfish Spiny	77	16	3	3
Dolphinfish	22	9	3	3
Golden Tilefish	570	87	24	24
Haddock	10	5	1	1
Illex Squid	102	25	7	8
John Dory	505	84	26	28
Jonah Crab	460	40	14	25
King Whiting	172	58	7	8
Longfin Squid	1,141	157	47	56
Mako Shortfin Shark	4	3	1	1
Monkfish	1,137	193	49	55
Mullets	9	6	1	1
NK Eel	36	17	NA	NA
NK Seatrout	7	6	NA	NA

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Northern Kingfish	11	6	1	1
Octopus	7	3	1	1
Offshore Hake	18	10	2	2
Other Fish	46	10	3	3
Red Hake	536	75	20	21
Red Porgy	5	4	1	1
Redfish	15	8	1	1
Scup	458	106	15	17
Sea Robins	40	20	2	2
Sea Scallop	169	111	16	24
Silver Hake	684	93	29	31
Skates	448	94	16	20
Snowy Grouper	6	6	1	1
Spanish Mackerel	5	4	2	2
Spotted Weakfish	11	7	1	1
Squeteague Weakfish	265	64	9	9
Summer Flounder	990	174	41	45
Swordfish	20	9	2	2
Triggerfish	21	13	1	1
White Hake	11	8	1	1
Winter Flounder	12	10	1	1
Witch Flounder	15	9	1	1
Wreckfish	3	3	1	1
Yellowfin Tuna	5	4	2	2
Yellowtail Flounder	11	8	1	1

Table 10.25 Total and Expected Number of Trips and Vessels by Port, Zone 3, 2016

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Beaufort, NC	73	43	3	3
Belford, NJ	10	5	1	1

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Cape May, NJ	224	59	15	19
Chatham, MA	69	9	2	2
Chincoteague, VA	27	14	1	1
Hampton, VA	128	55	5	5
Little Compton, RI	42	3	2	3
Montauk, NY	140	13	5	5
Morehead City, NC	5	3	1	1
New Bedford, MA	291	85	15	20
Newport News, VA	57	35	5	5
Newport, RI	56	8	3	6
Ocean City, MD	17	6	2	3
Point Judith, RI	706	59	27	34
Point Pleasant, NJ	48	17	3	3
Sandwich, MA	88	3	2	2
Shinnecock, NY	18	5	2	5
Stonington, CT	56	11	3	3
Wanchese, NC	18	9	1	1

Table 10.26 Percentages of Total Revenue, Landings, and Days-at-Sea for Species of Interest, Zone 3, 2015

Species	Revenue as % of Total	Landings as % of Total	DAS as % of Total
Butterfish	6.10	6.40	1.76
Jonah Crab	4.14	4.25	2.57
Golden Tilefish	3.50	3.50	3.49
Bigeye Tuna	2.94	4.10	3.32
Swordfish	2.92	3.78	4.22
Longfin Squid	2.63	2.98	2.04
Albacore Tuna	2.35	2.14	3.41
Illex Squid	2.26	2.19	4.40
Yellowfin Tuna	2.23	2.82	2.88
Offshore Hake	1.97	1.79	3.62

Table 10.27 Total and Expected Number of Trips and Vessels by FMP, Zone 3, 2015

FMP	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
ASMFC FMP	644	89	21	42
Atlantic Herring	22	11	1	1
Bluefish	304	101	13	13
Highly Migratory Species	110	39	6	6
Mackerel, Squid, and Butterfish	1,077	148	40	47
Monkfish	1,077	180	40	42
No Federal FMP	906	136	36	42
Northeast Multispecies	99	51	5	5
Sea Scallop	48	34	5	6
SERO FMP	55	32	3	3
Skates	451	101	13	13
Small-Mesh Multispecies	726	105	25	27
Spiny Dogfish	44	10	2	2
Summer Flounder, Scup, Black Sea Bass	1,114	178	38	38
Surfclam, Ocean Quahog	5	5	1	1
Tilefish	469	87	21	23

Table 10.28 Total and Expected Number of Trips and Vessels by Species, Zone 3, 2015

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Albacore Tuna	13	4	2	2
Amber Jack	3	3	1	1
American Eel	74	10	3	3
American Lobster	537	57	18	38
Atlantic Croaker	37	23	2	2
Atlantic Cutlassfish	5	4	1	1
Atlantic Herring	22	11	1	1
Atlantic Mackerel	271	59	8	8
Big Eye Tuna	22	9	2	2

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Black Sea Bass	527	138	17	17
Blue Crab	7	5	1	1
Bluefish	304	101	13	13
Blueline Tilefish	120	44	7	7
Bonito	8	5	1	1
Butterfish	599	81	24	26
Cod	20	13	1	1
Conger Eel	314	55	12	12
Cusk	6	3	1	1
Dogfish Smooth	61	22	3	3
Dogfish Spiny	44	10	2	2
Dolphinfish	7	4	1	1
Fourspot Flounder	6	4	1	1
Golden Tilefish	423	80	19	20
Haddock	6	5	1	1
Harvest Fish	11	7	1	1
Illex Squid	51	15	3	4
John Dory	469	70	23	25
Jonah Crab	468	39	16	33
King Whiting	137	48	4	4
Longfin Squid	1,008	147	39	45
Monkfish	1,071	180	40	42
Mullets	6	4	1	1
NK Eel	26	10	NA	NA
NK Seatrout	15	8	NA	NA
NK Tilefish	15	3	NA	NA
Octopus	3	3	1	1
Offshore Hake	22	12	1	1
Other Fish	31	14	2	2
Pollock	3	3	1	1

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Red Hake	507	70	17	18
Redfish	13	10	1	1
Sand Tilefish	3	3	1	1
Scup	448	123	11	11
Sea Robins	41	19	2	2
Sea Scallop	48	34	5	6
Silver Hake	665	94	23	24
Skates	445	101	13	13
Spot	12	3	1	1
Spotted Weakfish	23	13	1	1
Squeteague Weakfish	283	71	8	8
Summer Flounder	946	171	33	33
Surf Clam	3	3	1	1
Swordfish	32	11	3	3
Triggerfish	22	13	1	1
Wahoo	5	4	1	1
White Hake	39	25	2	2
Winter Flounder	23	14	1	1
Witch Flounder	47	23	3	3
Yellowfin Tuna	27	11	2	2
Yellowtail Flounder	35	19	2	2

Table 10.29 Total and Expected Number of Trips and Vessels by Port, Zone 3, 2015

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Barnegat, NJ	36	12	2	3
Beaufort, NC	100	47	5	5
Cape May, NJ	192	54	11	13
Chatham, MA	24	5	1	1
Chincoteague, VA	33	16	1	1
Gloucester, MA	3	3	1	1

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Hampton Bay, NY	24	4	1	1
Hampton, VA	85	43	3	3
Montauk, NY	168	14	5	6
Morehead City, NC	9	3	1	1
New Bedford, MA	266	58	12	24
Newport News, VA	39	25	2	2
Newport, RI	59	6	3	6
Ocean City, MD	17	6	1	1
Point Judith, RI	584	54	20	26
Point Pleasant, NJ	52	20	2	2
Sandwich, MA	89	3	2	2
Shinnecock, NY	13	3	1	1
Stonington, CT	58	7	2	3
Wanchese, NC	18	8	1	1
Westport, MA	13	3	2	2

Table 10.30 Percentages of Total Revenue, Landings, and Days-at-Sea for Species of Interest, Zone 3, 2014

Species	Revenue as % of Total	Landings as % of Total	DAS as % of Total
Butterfish	8.09	8.07	2.02
Offshore Hake	4.91	5.41	2.55
Bigeye Tuna	4.30	4.31	5.44
Jonah Crab	3.24	3.23	1.84
Golden Tilefish	3.07	3.06	3.58
Atlantic Chub Mackerel	2.77	3.30	2.95
Illex Squid	2.67	2.85	4.01
Longfin Squid	2.17	2.17	2.10
Yellowfin Tuna	2.16	1.88	3.02
Summer Flounder	1.81	2.12	1.43

Table 10.31 Total and Expected Number of Trips and Vessels by FMP, Zone 3, 2014

FMP	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
ASMFC FMP	719	90	25	43
Atlantic Herring	16	7	1	1
Bluefish	294	101	13	13
Highly Migratory Species	97	41	7	7
Mackerel, Squid, and Butterfish	1,313	160	52	62
Monkfish	1,250	185	51	55
No Federal FMP	1,145	145	44	52
Northeast Multispecies	154	62	8	8
Sea Scallop	38	28	5	5
SERO FMP	91	39	5	5
Skates	508	97	18	18
Small-Mesh Multispecies	916	105	33	38
Spiny Dogfish	42	13	2	2
Summer Flounder, Scup, Black Sea Bass	1,406	184	56	61
Tilefish	679	96	28	29

Table 10.32 Total and Expected Number of Trips and Vessels by Species, Zone 3, 2014

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
American Eel	77	20	3	3
American Lobster	598	68	21	39
Atlantic Croaker	12	11	1	1
Atlantic Herring	16	7	1	1
Atlantic Mackerel	343	69	12	12
Big Eye Tuna	16	9	3	3
Black Sea Bass	718	139	28	28
Blue Crab	15	5	1	1
Bluefish	294	101	13	13
Blueline Tilefish	155	49	7	7
Bonito	6	4	1	1

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Butterfish	741	90	29	33
Chub Mackerel	34	11	3	3
Cod	25	24	1	1
Conger Eel	393	61	14	14
Cusk	3	3	1	1
Dogfish Smooth	45	21	3	3
Dogfish Spiny	42	13	2	2
Dolphinfish	47	14	3	3
Fourspot Flounder	28	3	1	1
Golden Tilefish	644	89	28	28
Haddock	5	5	1	1
Harvest Fish	5	4	1	1
Illex Squid	110	17	7	9
John Dory	403	70	21	22
Jonah Crab	516	36	17	33
King Whiting	203	60	8	8
Longfin Squid	1,195	158	48	55
Mako Shortfin Shark	8	4	2	2
Menhaden	9	3	1	1
Monkfish	1,250	185	51	55
NK Eel	57	18	NA	NA
NK Seatrout	48	18	NA	NA
Octopus	5	3	1	1
Offshore Hake	23	12	2	2
Other Fish	15	8	1	1
Pollock	4	3	1	1
Red Hake	653	77	22	24
Redfish	7	7	1	1
Ribbonfish	5	4	1	1
Rock Crab	104	12	5	8

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Scup	735	139	28	29
Sea Robins	47	22	2	2
Sea Scallop	38	28	5	5
Silver Hake	822	95	31	34
Skates	499	97	18	18
Spanish Mackerel	9	4	1	1
Spot	6	4	1	1
Spotted Weakfish	26	11	1	1
Squeteague Weakfish	482	86	15	15
Summer Flounder	1,173	179	49	52
Swordfish	30	12	3	3
Triggerfish	16	12	1	1
White Hake	58	31	3	3
Winter Flounder	52	31	3	3
Witch Flounder	77	33	4	4
Yellowfin Tuna	21	9	2	2
Yellowtail Flounder	62	31	4	4

Table 10.33 Total and Expected Number of Trips and Vessels by Port, Zone 3, 2014

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Beaufort, NC	72	33	4	4
Cape May, NJ	249	50	13	13
Chatham, MA	31	4	1	1
Chincoteague, VA	55	18	4	4
Davisville, RI	51	4	3	5
Hampton Bay, NY	40	4	2	2
Hampton, VA	85	34	5	6
Montauk, NY	199	21	8	10
New Bedford, MA	266	54	15	24
Newport News, VA	73	31	4	5

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Newport, RI	60	3	3	7
Ocean City, MD	28	6	2	2
Oriental, NC	20	6	2	2
Point Judith, RI	719	56	25	31
Point Pleasant, NJ	48	16	2	2
Sandwich, MA	84	3	2	2
Shinnecock, NY	15	3	1	1
Stonington, CT	64	8	2	3
Tiverton, RI	35	3	2	4
Wanchese, NC	50	20	2	2
Westport, MA	39	4	1	1

Table 10.34 Percentages of Total Revenue, Landings, and Days-at-Sea for Species of Interest, Zone 3, 2013

Species	Revenue as % of Total	Landings as % of Total	DAS as % of Total
Illex Squid	6.00	6.82	4.38
Bigeye Tuna	5.12	5.92	5.53
Yellowfin Tuna	4.04	4.13	4.56
Butterfish	3.56	4.03	1.76
Longfin Squid	3.13	3.32	2.16
Albacore Tuna	2.88	3.02	4.22
Offshore Hake	2.86	2.79	1.74
Jonah Crab	2.19	2.17	1.38
Summer Flounder	2.16	2.69	1.31
Golden Tilefish	1.75	1.70	3.43

Table 10.35 Total and Expected Number of Trips and Vessels by FMP, Zone 3, 2013

FMP	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
ASMFC FMP	664	76	22	36
Atlantic Herring	15	10	1	1

FMP	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Bluefish	397	108	16	16
Highly Migratory Species	115	44	7	8
Mackerel, Squid, and Butterfish	899	118	39	48
Monkfish	1,123	187	52	59
No Federal FMP	950	154	42	50
Northeast Multispecies	191	59	11	11
Sea Scallop	69	52	5	8
SERO FMP	89	41	5	5
Skates	473	99	17	17
Small-Mesh Multispecies	623	88	24	27
Spiny Dogfish	36	21	1	1
Summer Flounder, Scup, Black Sea Bass	1,054	179	44	45
Surfclam, Ocean Quahog	9	5	5	9
Tilefish	544	112	26	27

Table 10.36 Total and Expected Number of Trips and Vessels by Species, Zone 3, 2013

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Albacore Tuna	15	7	2	2
American Eel	45	11	3	3
American Lobster	600	63	19	34
Atlantic Croaker	7	7	1	1
Atlantic Herring	15	10	1	1
Atlantic Mackerel	105	37	4	4
Big Eye Tuna	15	7	2	2
Black Sea Bass	543	132	22	22
Bluefish	397	108	16	16
Blueline Tilefish	120	46	8	8
Bonito	4	4	1	1
Butterfish	482	73	22	24

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Chub Mackerel	25	9	3	3
Cod	41	24	2	2
Conchs	5	5	1	1
Conger Eel	280	49	9	9
Cusk	5	5	1	1
Dogfish Smooth	56	20	3	3
Dogfish Spiny	36	21	1	1
Dolphinfish	27	10	2	2
Escolar	4	3	1	1
Fourspot Flounder	35	5	1	1
Golden Tilefish	492	109	23	23
Grouper	5	4	1	1
Haddock	8	8	1	1
Illex Squid	83	19	8	9
John Dory	434	89	23	24
Jonah Crab	460	35	13	25
King Whiting	75	32	3	3
Little Tuna	6	4	1	1
Longfin Squid	821	114	36	44
Mako Shark	5	3	1	1
Mako Shortfin Shark	12	7	2	2
Monkfish	1,123	187	52	59
Mullets	19	6	2	2
NK Crab	3	3	NA	NA
NK Eel	43	11	NA	NA
NK Seatrout	35	12	NA	NA
Octopus	23	5	1	1
Offshore Hake	29	12	2	2
Other Fish	18	6	2	2
Pollock	7	6	1	1

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Red Hake	425	66	16	19
Redfish	17	8	2	2
Ribbonfish	7	5	1	1
Rock Crab	83	10	5	7
Sand Tilefish	11	7	1	1
Scup	544	132	20	20
Sea Robins	40	20	2	2
Sea Scallop	69	52	5	8
Silver Hake	544	81	23	26
Skates	468	99	17	17
Spanish Mackerel	6	5	1	1
Spotted Weakfish	29	15	1	1
Squeteague Weakfish	306	73	9	9
Summer Flounder	888	168	39	39
Surf Clam	6	4	4	6
Swordfish	40	16	4	5
Triggerfish	29	18	1	1
Wahoo	5	3	2	2
White Hake	43	25	3	3
Winter Flounder	22	15	2	2
Witch Flounder	99	35	6	6
Wreckfish	5	3	1	1
Yellowfin Tuna	20	10	3	3
Yellowtail Flounder	110	38	6	6

Table 10.37 Total and Expected Number of Trips and Vessels by Port, Zone 3, 2013

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Atlantic City, NJ	6	3	2	4
Beaufort, NC	13	9	1	1
Cape May, NJ	264	57	15	17

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Chatham, MA	58	8	2	2
Chincoteague, VA	69	24	4	4
Davisville, RI	44	4	3	4
Hampton, VA	102	30	6	6
Montauk, NY	179	20	7	9
New Bedford, MA	306	68	20	27
New London, CT	56	3	3	3
Newport News, VA	124	39	9	9
Newport, RI	43	4	2	5
Ocean City, MD	15	5	1	1
Point Judith, RI	521	55	19	23
Point Pleasant, NJ	48	13	2	2
Sandwich, MA	81	3	2	2
Shinnecock, NY	29	4	1	1
Stonington, CT	63	9	2	4
Westport, MA	29	4	2	2

Table 10.38 Percentages of Total Revenue, Landings, and Days-at-Sea for Species of Interest, Zone 3, 2012

Species	Revenue as % of Total	Landings as % of Total	DAS as % of Total
Yellowfin Tuna	15.35	14.91	12.90
Bigeye Tuna	14.97	14.40	15.25
Albacore Tuna	7.77	6.09	12.90
Offshore Hake	5.34	3.84	2.71
Swordfish	3.74	4.20	7.72
Illex Squid	2.77	2.72	3.59
Jonah Crab	2.54	2.49	1.79
Red Hake	2.14	1.16	1.69
Longfin Squid	1.89	1.84	1.97
Summer Flounder	1.51	1.79	1.24

Table 10.39 Total and Expected Number of Trips and Vessels by FMP, Zone 3, 2012

FMP	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
ASMFC FMP	646	83	20	33
Atlantic Herring	19	5	1	1
Bluefish	641	128	25	26
Highly Migratory Species	152	38	11	14
Mackerel, Squid, and Butterfish	1,059	145	38	46
Monkfish	1,169	200	46	50
No Federal FMP	967	138	41	50
Northeast Multispecies	206	67	10	10
Sea Scallop	147	92	5	6
SERO FMP	124	40	8	9
Skates	421	107	15	15
Small-Mesh Multispecies	710	86	24	26
Spiny Dogfish	25	11	2	2
Summer Flounder, Scup, Black Sea Bass	1,100	185	40	44
Tilefish	505	100	18	21

Table 10.40 Total and Expected Number of Trips and Vessels by Species, Zone 3, 2012

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Albacore Tuna	35	11	6	9
Am. Plaice Flounder	11	9	1	1
Amber Jack	5	4	1	1
American Eel	60	14	3	3
American Lobster	611	68	20	32
Atlantic Croaker	7	6	1	1
Atlantic Herring	19	5	1	1
Atlantic Mackerel	195	46	7	7
Big Eye Tuna	38	9	6	9
Black Sea Bass	503	119	19	19

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Blk Bellied Rosefish	5	4	1	1
Blue Crab	9	3	1	1
Bluefish	641	128	25	26
Blueline Tilefish	112	40	6	6
Bonito	10	7	1	1
Butterfish	489	77	17	19
Chub Mackerel	11	8	1	1
Cod	50	27	2	2
Conger Eel	330	47	12	13
Cusk	18	8	2	2
Dogfish Smooth	65	15	2	2
Dogfish Spiny	25	11	2	2
Dolphinfish	43	8	6	6
Fourspot Flounder	54	8	2	2
Golden Tilefish	467	94	16	19
Haddock	19	15	1	1
Illex Squid	97	17	7	7
John Dory	463	83	22	26
Jonah Crab	472	34	13	25
King Mackerel	5	3	1	1
King Whiting	77	33	4	4
Little Tuna	10	7	2	2
Longfin Squid	986	144	36	43
Mako Shark	14	4	3	4
Mako Shortfin Shark	17	5	4	4
Menhaden	3	3	1	1
Monkfish	1,169	200	46	50
Mullets	10	8	1	1
NK Eel	40	12	NA	NA
NK Seatrout	11	6	NA	NA

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Octopus	13	5	1	1
Offshore Hake	35	11	2	2
Other Fish	14	7	1	1
Pollock	10	9	1	1
Red Crab	36	5	3	4
Red Hake	527	63	17	18
Redfish	19	12	2	2
Rock Crab	65	10	3	5
Scup	459	109	14	14
Sea Robins	37	15	2	2
Sea Scallop	147	92	5	6
Silver Hake	632	80	21	23
Skates	417	106	15	15
Spotted Weakfish	12	6	1	1
Squeteague Weakfish	238	58	6	6
Summer Flounder	932	177	36	38
Swordfish	82	19	9	11
Triggerfish	46	23	2	2
Wahoo	11	6	3	3
White Hake	44	21	2	2
Winter Flounder	23	20	2	2
Witch Flounder	118	34	5	5
Yellowfin Tuna	43	11	6	10
Yellowtail Flounder	101	43	5	5

Table 10.41 Total and Expected Number of Trips and Vessels by Port, Zone 3, 2012

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Beaufort, NC	11	8	1	1
Cape May, NJ	190	62	11	12
Chatham, MA	28	6	2	2

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Chincoteague, VA	69	17	3	3
Davisville, RI	22	3	2	2
Hampton Bay, NY	7	3	1	1
Hampton, VA	141	29	7	9
Montauk, NY	207	17	6	9
New Bedford, MA	307	84	16	21
New London, CT	65	3	3	3
Newport News, VA	130	35	5	5
Newport, RI	38	4	2	5
Ocean City, MD	20	4	2	3
Point Judith, RI	566	48	18	22
Point Lookout, NY	11	4	1	1
Point Pleasant, NJ	28	14	2	2
Sandwich, MA	77	3	2	2
Shinnecock, NY	40	4	2	2
Stonington, CT	58	11	2	2
Wanchese, NC	11	8	1	1
Westport, MA	32	4	1	1

Table 10.42 Percentages of Total Revenue, Landings, and Days-at-Sea for Species of Interest, Zone 3, 2011

Species	Revenue as % of Total	Landings as % of Total	DAS as % of Total
Bigeye Tuna	11.41	12.15	8.51
Yellowfin Tuna	7.36	6.83	6.35
Spot	6.09	5.11	6.16
Illex Squid	4.22	4.09	4.39
Albacore Tuna	3.32	3.62	2.75
Longfin Squid	2.74	2.87	2.39
Offshore Hake	2.48	2.36	3.34
Atlantic Mackerel	2.18	1.77	3.59
Swordfish	2.14	2.17	5.09

Species	Revenue as % of Total	Landings as % of Total	DAS as % of Total
Black Sea Bass	1.84	1.77	1.73

Table 10.43 Total and Expected Number of Trips and Vessels by FMP, Zone 3, 2011

FMP	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
ASMFC FMP	757	107	28	40
Atlantic Herring	48	12	2	2
Bluefish	444	111	21	22
Highly Migratory Species	98	38	8	10
Mackerel, Squid, and Butterfish	1,282	156	54	64
Monkfish	1,339	220	53	58
No Federal FMP	1,108	168	49	58
Northeast Multispecies	282	93	14	14
Sea Scallop	84	57	4	4
SERO FMP	81	35	6	7
Skates	533	129	16	17
Small-Mesh Multispecies	913	106	36	40
Spiny Dogfish	75	25	5	5
Summer Flounder, Scup, Black Sea Bass	1,421	198	57	61
Tilefish	559	96	23	24

Table 10.44 Total and Expected Number of Trips and Vessels by Species, Zone 3, 2011

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Albacore Tuna	10	5	2	2
Am. Plaice Flounder	30	21	1	1
American Eel	91	20	5	6
American Lobster	680	78	24	36
American Shad	11	7	1	1
Atlantic Croaker	17	15	2	2
Atlantic Halibut	4	4	1	1

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Atlantic Herring	48	12	2	2
Atlantic Mackerel	313	66	14	16
Big Eye Tuna	20	9	4	5
Black Sea Bass	749	139	30	30
Bluefin Tuna	4	3	2	3
Bluefish	444	111	21	22
Blueline Tilefish	97	34	6	6
Bonito	6	4	1	1
Butterfish	618	90	27	29
Chub Mackerel	3	3	1	1
Cod	87	47	2	2
Conger Eel	276	59	11	11
Cunner	4	4	1	1
Cusk	23	13	3	3
Dogfish Smooth	40	18	3	4
Dogfish Spiny	75	25	5	5
Dolphinfish	31	12	3	3
Fourspot Flounder	25	5	2	2
Golden Tilefish	523	87	20	22
Haddock	64	33	2	2
Harvest Fish	10	7	2	2
Illex Squid	199	27	13	15
John Dory	471	83	24	28
Jonah Crab	486	36	14	23
King Whiting	102	35	5	5
Knobbed Whelk	4	3	1	1
Little Tuna	6	4	1	1
Longfin Squid	1,110	152	48	54
Mako Shortfin Shark	5	3	2	3
Menhaden	5	4	1	1

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Monkfish	1,339	220	53	58
Mullets	15	7	1	1
NK Eel	51	18	NA	NA
NK Seatrout	15	8	NA	NA
Offshore Hake	66	20	4	4
Other Fish	9	7	1	1
Pollock	22	17	1	1
Red Hake	539	70	21	23
Redfish	14	11	1	1
Rock Crab	73	8	3	4
Sand Tilefish	13	3	1	1
Sand-Dab Flounder	7	5	1	1
Scup	766	148	32	33
Sea Robins	94	36	4	5
Sea Scallop	84	57	4	4
Silver Hake	836	99	33	37
Skates	531	128	16	17
Southern Flounder	9	3	1	1
Spadefish	3	3	1	1
Spotted Weakfish	47	13	2	2
Squeteague Weakfish	329	76	12	12
Striped Bass	9	9	1	1
Summer Flounder	1,252	192	50	53
Swordfish	43	15	5	6
Triggerfish	21	11	1	1
White Hake	104	41	6	6
Winter Flounder	67	43	2	2
Witch Flounder	149	51	8	8
Yellowfin Tuna	21	10	3	4
Yellowtail Flounder	164	60	6	6

Table 10.45 Total and Expected Number of Trips and Vessels by Port, Zone 3, 2011

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Cape May, NJ	314	50	15	17
Chatham, MA	12	6	2	3
Chincoteague, VA	48	12	3	3
Gloucester, MA	12	9	1	1
Hampton Bay, NY	10	3	1	1
Hampton, VA	106	31	6	6
Montauk, NY	193	16	8	10
New Bedford, MA	335	84	15	18
Newport News, VA	119	32	6	6
Newport, RI	57	8	2	6
North Kingstown, RI	73	5	4	8
Ocean City, MD	23	8	3	3
Oriental, NC	20	12	1	1
Point Judith, RI	673	58	23	28
Point Lookout, NY	22	5	2	3
Point Pleasant, NJ	142	18	6	6
Sandwich, MA	76	3	2	2
Shinnecock, NY	35	5	1	1
Stonington, CT	64	12	2	2
Wanchese, NC	64	30	4	4
Westport, MA	26	3	1	1

Table 10.46 Percentages of Total Revenue, Landings, and Days-at-Sea for Species of Interest, Zone 3, 2010

Species	Revenue as % of Total	Landings as % of Total	DAS as % of Total
Offshore Hake	10.08	6.96	9.39
Bigeye Tuna	7.43	6.96	6.23
Yellowfin Tuna	7.42	8.76	4.77
Illex Squid	5.24	4.96	4.30
Albacore Tuna	2.80	2.67	4.93

Species	Revenue as % of Total	Landings as % of Total	DAS as % of Total
Longfin Squid	2.52	2.71	2.15
Swordfish	2.38	2.34	4.05
Jonah Crab	2.25	2.20	2.07
Black Sea Bass	1.64	1.64	1.30
Atlantic Mackerel	1.26	0.66	1.71

Table 10.47 Total and Expected Number of Trips and Vessels by FMP, Zone 3, 2010

FMP	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
ASMFC FMP	868	102	31	51
Atlantic Herring	63	21	4	4
Bluefish	477	106	19	19
Highly Migratory Species	95	28	7	7
Mackerel, Squid, and Butterfish	1,154	136	45	51
Monkfish	1,283	242	51	56
No Federal FMP	1,031	151	42	52
Northeast Multispecies	289	82	16	18
Sea Scallop	181	127	8	8
SERO FMP	85	41	6	6
Skates	294	92	13	14
Small-Mesh Multispecies	942	104	35	40
Spiny Dogfish	15	14	1	1
Summer Flounder, Scup, Black Sea Bass	1,297	212	48	51
Tilefish	711	107	26	29

Table 10.48 Total and Expected Number of Trips and Vessels by Species, Zone 3, 2010

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Albacore Tuna	19	5	2	3
Am. Plaice Flounder	25	22	2	2
American Eel	60	18	3	4

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
American Lobster	800	85	29	49
American Shad	6	5	1	1
Atlantic Croaker	7	6	1	1
Atlantic Herring	63	21	4	4
Atlantic Mackerel	371	80	12	13
Big Eye Tuna	29	8	3	3
Black Sea Bass	557	132	21	22
Blackfin Tuna	3	3	1	1
Bluefin Tuna	9	4	2	2
Bluefish	477	106	19	19
Blueline Tilefish	115	42	4	4
Butterfish	677	95	25	27
Cod	52	35	2	2
Conger Eel	346	64	13	14
Cusk	9	9	1	1
Dogfish Smooth	17	9	1	1
Dogfish Spiny	15	14	1	1
Dolphinfish	31	12	3	3
Fourspot Flounder	33	5	2	2
Golden Tilefish	684	104	25	28
Haddock	29	22	1	1
Harvest Fish	5	4	1	1
Illex Squid	179	35	12	13
John Dory	373	70	18	21
Jonah Crab	580	45	20	38
King Whiting	86	29	3	3
Longfin Squid	942	126	37	40
Mako Shortfin Shark	11	4	2	2
Monkfish	1,283	242	51	56
NK Eel	34	13	NA	NA

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
NK Seatrout	13	9	NA	NA
NK Tilefish	25	16	NA	NA
Offshore Hake	71	16	4	4
Other Fish	10	8	1	1
Pollock	17	16	2	2
Red Crab	37	7	4	5
Red Hake	638	78	24	27
Red Porgy	5	3	1	1
Redfish	22	15	2	2
Rock Crab	107	16	6	10
Sand Tilefish	7	4	1	1
Sand-Dab Flounder	12	6	1	1
Scup	709	138	26	26
Sea Raven	6	4	1	1
Sea Robins	66	29	4	4
Sea Scallop	181	127	8	8
Silver Hake	883	100	33	37
Skates	294	92	13	14
Southern Flounder	17	8	1	1
Spotted Weakfish	38	14	2	2
Squeteague Weakfish	347	75	11	11
Striped Bass	4	4	1	1
Summer Flounder	1,135	203	43	44
Swordfish	64	12	5	5
Triggerfish	9	8	1	1
Wahoo	7	4	1	1
White Hake	130	42	7	8
Winter Flounder	39	23	2	2
Witch Flounder	152	54	8	8
Yellowfin Tuna	35	11	3	4

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Yellowtail Flounder	113	51	5	5

Table 10.49 Total and Expected Number of Trips and Vessels by Port, Zone 3, 2010

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Beaufort, NC	27	12	1	1
Cape May, NJ	246	57	12	13
Chatham, MA	20	6	2	2
Gloucester, MA	5	3	1	1
Hampton, VA	91	35	5	5
Montauk, NY	241	20	9	12
Nantucket, MA	6	6	1	1
New Bedford, MA	416	121	20	25
Newport News, VA	70	39	4	4
Newport, RI	60	11	2	5
North Kingstown, RI	64	5	4	5
Ocean City, MD	23	7	2	2
Oriental, NC	16	12	1	1
Point Judith, RI	732	57	27	36
Point Lookout, NY	22	3	1	1
Point Pleasant, NJ	168	22	7	7
Sandwich, MA	71	3	3	4
Sea Isle City, NJ	47	3	2	3
Shinnecock, NY	49	8	1	1
Stonington, CT	76	10	3	4
Wanchese, NC	45	24	2	2
Westport, MA	32	3	1	1

Table 10.50 Percentages of Total Revenue, Landings, and Days-at-Sea for Species of Interest, Zone 3, 2009

Species	Revenue as % of Total	Landings as % of Total	DAS as % of Total
Bigeye Tuna	11.60	12.39	8.50

Species	Revenue as % of Total	Landings as % of Total	DAS as % of Total
Yellowfin Tuna	9.16	9.66	6.11
Illex Squid	7.15	5.85	5.51
Swordfish	3.47	3.74	5.67
Offshore Hake	3.10	2.92	3.68
Butterfish	2.82	3.66	1.86
Longfin Squid	2.58	2.63	2.24
Golden Tilefish	2.08	2.13	2.83
Jonah Crab	1.81	1.70	1.28
Black Sea Bass	1.46	1.34	1.53

Table 10.51 Total and Expected Number of Trips and Vessels by FMP, Zone 3, 2009

FMP	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
ASMFC FMP	866	127	29	43
Atlantic Herring	51	18	2	2
Bluefish	510	124	24	25
Highly Migratory Species	94	29	9	9
Mackerel, Squid, and Butterfish	1,194	161	50	61
Monkfish	1,186	222	53	58
No Federal FMP	997	170	44	64
Northeast Multispecies	320	92	19	20
Sea Scallop	178	117	12	13
SERO FMP	124	49	8	8
Skates	241	88	14	14
Small-Mesh Multispecies	912	108	36	42
Spiny Dogfish	15	14	2	2
Summer Flounder, Scup, Black Sea Bass	1,210	220	52	72
Tilefish	584	82	23	23

Table 10.52 Total and Expected Number of Trips and Vessels by Species, Zone 3, 2009

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Am. Plaice Flounder	30	26	3	3
American Eel	48	13	2	2
American Lobster	786	98	27	41
American Shad	12	5	1	1
Atlantic Croaker	18	15	1	1
Atlantic Halibut	15	10	2	2
Atlantic Herring	51	18	2	2
Atlantic Mackerel	371	76	15	15
Big Eye Tuna	17	9	3	3
Black Sea Bass	359	116	17	17
Blue Crab	8	8	1	1
Bluefish	510	124	24	25
Blueline Tilefish	54	30	4	4
Bonito	3	3	1	1
Brown Shrimp	16	7	1	1
Butterfish	652	98	28	29
Cod	60	41	4	4
Conger Eel	296	53	12	13
Cusk	17	17	3	3
Dogfish Smooth	23	14	3	3
Dogfish Spiny	15	14	2	2
Dolphinfish	29	9	3	3
Fourspot Flounder	34	4	2	2
Golden Tilefish	556	77	21	21
Haddock	24	22	3	3
Harvest Fish	6	6	1	1
Horseshoe Crab	13	5	2	9
Illex Squid	138	21	9	11
John Dory	267	66	15	15
Jonah Crab	604	45	18	30

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
King Whiting	74	31	3	3
Longfin Squid	1,018	156	45	51
Mako Shortfin Shark	9	6	2	2
Monkfish	1,186	222	53	58
NK Crab	4	3	NA	NA
NK Eel	35	13	NA	NA
NK Porgy	41	17	NA	NA
NK Seatrout	3	3	NA	NA
NK Tilefish	32	19	NA	NA
Offshore Hake	96	20	4	5
Other Shellfish	8	7	1	1
Pollock	41	31	4	4
Red Crab	36	8	3	6
Red Hake	657	75	27	30
Redfish	20	15	3	3
Rock Crab	186	19	8	9
Sand Tilefish	15	6	1	1
Sand-Dab Flounder	93	41	6	6
Scup	522	126	22	37
Sea Robins	57	25	4	4
Sea Scallop	178	117	12	13
Silver Hake	872	101	35	41
Skates	241	88	14	14
Southern Flounder	26	14	1	1
Spanish Mackerel	5	5	2	2
Spot	7	4	1	1
Spotted Weakfish	20	14	1	1
Squeteague Weakfish	291	77	11	11
Striped Bass	11	8	1	1
Summer Flounder	1,056	208	45	64

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Swordfish	64	13	6	6
Triggerfish	14	10	2	2
White Hake	136	52	9	9
Winter Flounder	76	41	5	5
Witch Flounder	183	67	11	11
Yellowfin Tuna	19	8	3	3
Yellowtail Flounder	142	60	9	9

Table 10.53 Total and Expected Number of Trips and Vessels by Port, Zone 3, 2009

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Barnegat, NJ	31	8	2	2
Beaufort, NC	14	9	1	1
Boston, MA	7	6	1	1
Cape May, NJ	296	57	16	22
Chatham, MA	11	5	1	1
Chilmark, MA	5	3	1	1
Chincoteague, VA	23	11	2	2
Hampton, VA	74	34	3	3
Montauk, NY	294	18	10	14
New Bedford, MA	369	106	19	24
Newport News, VA	44	29	3	3
Newport, RI	99	14	5	9
North Kingstown, RI	76	5	5	9
Ocean City, MD	10	7	1	1
Oriental, NC	19	14	1	1
Point Judith, RI	772	57	29	34
Point Lookout, NY	10	3	1	1
Point Pleasant, NJ	70	20	4	4
Shinnecock, NY	60	10	2	2
Stonington, CT	52	8	3	3

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Wanchese, NC	52	23	2	2
Westport, MA	16	4	2	2

Table 10.54 Percentages of Total Revenue, Landings, and Days-at-Sea for Species of Interest, Zone 3, 2008

Species	Revenue as % of Total	Landings as % of Total	DAS as % of Total
Illex Squid	8.56	7.83	6.72
Yellowfin Tuna	4.31	3.95	4.64
Bigeye Tuna	4.12	4.08	5.67
Longfin Squid	3.19	3.23	2.08
Swordfish	3.09	2.95	4.91
Golden Tilefish	2.76	2.71	3.58
Offshore Hake	2.26	2.41	2.95
Butterfish	1.99	2.29	2.07
Jonah Crab	1.84	1.80	1.08
Silver Hake	1.01	0.98	1.86

Table 10.55 Total and Expected Number of Trips and Vessels by FMP, Zone 3, 2008

FMP	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
ASMFC FMP	840	141	30	40
Atlantic Herring	25	14	1	1
Bluefish	333	112	15	15
Highly Migratory Species	92	28	7	7
Mackerel, Squid, and Butterfish	1,377	171	52	63
Monkfish	1,403	239	56	62
No Federal FMP	1,120	165	42	48
Northeast Multispecies	307	98	18	19
Sea Scallop	190	116	7	9
SERO FMP	106	39	6	6
Skates	225	83	11	11

FMP	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Small-Mesh Multispecies	1,036	116	38	41
Spiny Dogfish	5	5	1	1
Summer Flounder, Scup, Black Sea Bass	1,206	207	43	44
Tilefish	675	111	26	27

Table 10.56 Total and Expected Number of Trips and Vessels by Species, Zone 3, 2008

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Albacore Tuna	9	5	1	1
Am. Plaice Flounder	30	22	3	3
American Eel	46	17	2	2
American Lobster	773	116	29	38
American Shad	5	4	1	1
Atlantic Croaker	14	12	1	1
Atlantic Halibut	6	6	1	1
Atlantic Herring	25	14	1	1
Atlantic Mackerel	437	95	15	15
Big Eye Tuna	21	7	3	3
Black Sea Bass	687	151	23	23
Blue Crab	6	4	1	1
Bluefin Tuna	3	3	1	1
Bluefish	333	112	15	15
Blueline Tilefish	39	27	2	2
Bonito	4	4	1	1
Brown Shrimp	6	4	1	1
Butterfish	878	126	34	35
Cod	53	38	4	4
Conger Eel	343	64	13	14
Cusk	8	6	2	2
Dogfish Smooth	12	8	1	1

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Dogfish Spiny	5	5	1	1
Dolphinfish	40	12	3	3
Golden Tilefish	648	98	25	26
Haddock	25	22	2	2
Harvest Fish	17	9	1	1
Horseshoe Crab	4	4	1	1
Illex Squid	160	22	11	14
John Dory	372	84	19	20
Jonah Crab	517	53	16	25
King Whiting	103	34	4	4
Longfin Squid	1,150	156	46	50
Mako Longfin Shark	4	3	1	1
Mako Shortfin Shark	8	6	2	2
Monkfish	1,403	239	56	62
NK Eel	45	18	NA	NA
NK Porgy	30	16	NA	NA
NK Seatrout	12	8	NA	NA
NK Shark	7	4	NA	NA
NK Tilefish	26	17	NA	NA
Offshore Hake	116	17	4	4
Other Shellfish	8	5	1	1
Pollock	27	17	4	4
Red Crab	20	3	2	3
Red Hake	726	87	27	28
Redfish	15	11	2	2
Rock Crab	197	22	7	9
Sand Tilefish	19	5	1	1
Sand-Dab Flounder	53	30	5	5
Scup	478	130	14	14
Sea Raven	3	3	1	1

Species	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Sea Robins	44	18	1	1
Sea Scallop	190	116	7	9
Silver Hake	996	111	37	40
Skates	225	83	11	11
Southern Flounder	15	10	1	1
Spotted Weakfish	40	17	1	1
Squeteague Weakfish	363	95	11	12
Striped Bass	9	7	1	1
Summer Flounder	998	194	35	37
Swordfish	61	14	5	5
Tautog	10	5	1	1
Triggerfish	6	4	1	1
White Hake	147	45	9	9
Winter Flounder	89	44	6	6
Witch Flounder	139	61	8	8
Wolffishes	10	8	2	2
Yellowfin Tuna	25	10	3	3
Yellowtail Flounder	83	40	6	6

Table 10.57 Total and Expected Number of Trips and Vessels by Port, Zone 3, 2008

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
Beaufort, NC	26	12	1	1
Cape May, NJ	334	59	15	19
Fall River, MA	26	4	2	2
Hampton Bay, NY	9	3	1	1
Hampton, VA	39	25	2	2
Montauk, NY	267	19	9	11
New Bedford, MA	356	99	18	19
Newport News, VA	44	27	2	2
Newport, RI	122	11	5	10

Port	Number of Trips	Number of Vessels	Expected Vessels	Expected Trips
North Kingstown, RI	72	5	5	8
Ocean City, MD	18	5	2	3
Oriental, NC	33	15	1	1
Point Judith, RI	786	62	28	34
Point Lookout, NY	31	4	1	1
Point Pleasant, NJ	77	16	3	3
Shinnecock, NY	51	9	2	2
Tiverton, RI	49	4	2	4
Wanchese, NC	54	22	2	2
Westport, MA	17	5	2	2

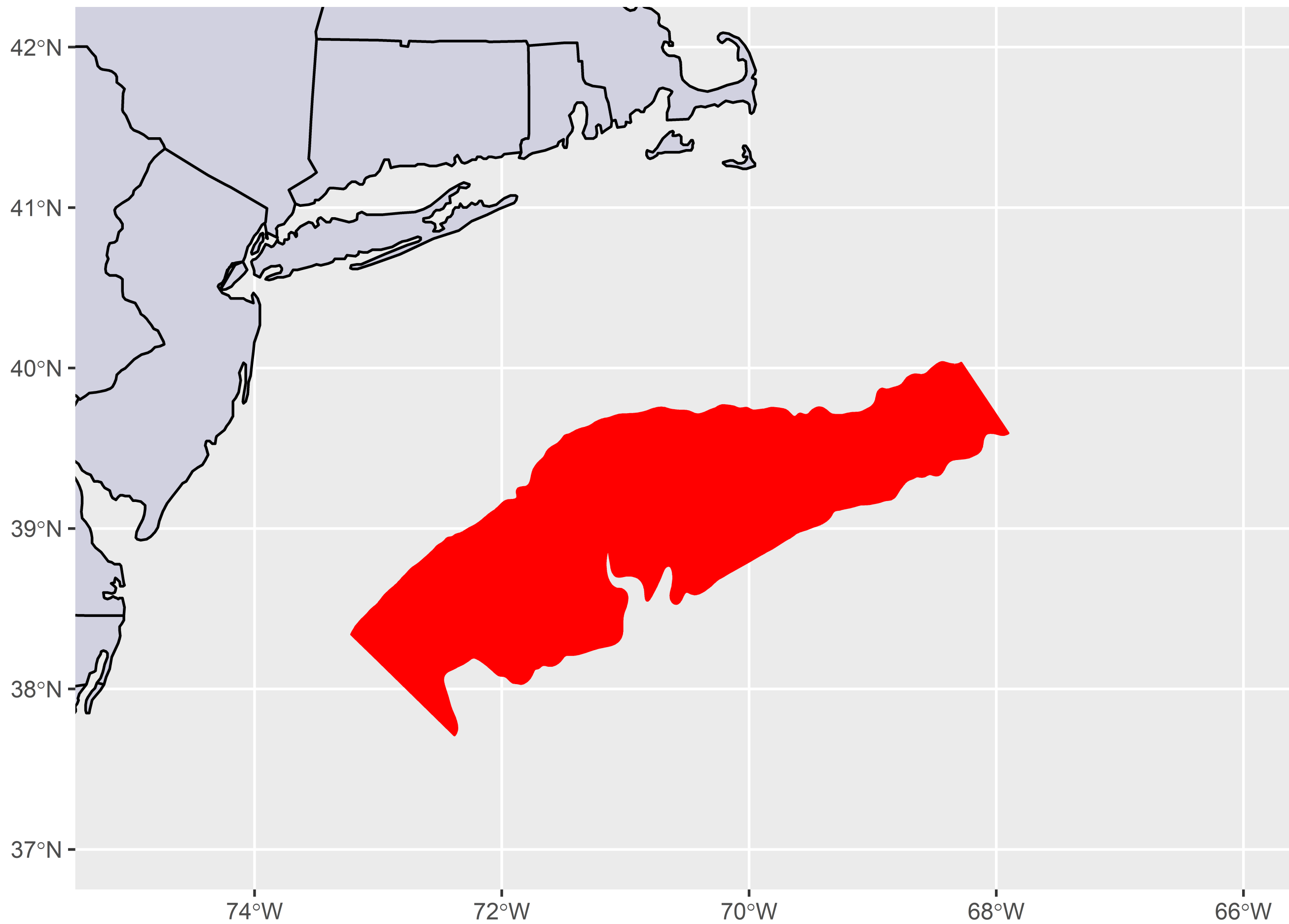
Back (https://www.fisheries.noaa.gov/resource/data/socioeconomic-impacts-atlantic-offshore-wind-development)

Descriptions of Selected Fishery Landings and Estimates of Recreational Party and Charter Vessel Revenue from Areas: A Planning-level Assessment

Prepared by:
National Marine Fisheries Service

June 06, 2023

Zone 3



Data sources:
Recreational fisheries landings data from vessel trip reports (VTR) for vessels issued a party/charter permit and marine angler expenditure surveys

In order to meet requirements of maintaining data confidentiality, these strata are presented individually. In addition, records that did not meet the rule of three (>= 3 unique permits), values were summarized as 'All Others'.

Some caveats/notes:

- Values are reported in nominal dollars. Values in 2021 dollars are reported as well (see Methods below for details).
- Landings are reported in number of fish kept on party/charter trips.
- The term "angler trips" refers to the number of reported passengers on party/charter VTRs.
- The party/charter VTRs contain some trips where no fish were landed. Although these trips do not contribute to the species summaries, they are included in the activity summaries of trips, angler trips, and revenues.
- The term "vessel trips" refers to the number of party/charter VTRs submitted to NMFS where landings of any species were recorded.
- Data summarized here are based on federal VTRs submitted to NMFS.

- Numbers of individual fish species landed on party/charter trips are summarized by management categories as follows:
    - **Northeast Multispecies; Bluefish; Mackerel, Squid, Butterfish; Golden and Blueline Tilefish; Summer Flounder, Scup, Black Sea Bass:** Individual New England and Mid-Atlantic Fishery Management Council FMPs that require a party/charter permit
    - **Other Federal FMPs:** Individual New England and Mid-Atlantic Fishery Management Council FMPs that do not require a party/charter permit and have no recreational measures (Atlantic herring, Atlantic Sea Scallops, Monkfish, Spiny Dogfish, Skates, Red Crab, and Surfclams and Ocean Quahogs)
    - **Atlantic HMS FMP:** Atlantic billfish, Atlantic tunas, swordfish and sharks
    - **ASMFC Interstate FMPs:** Species managed exclusively under an ASMFC ISFMP (American Lobster, Atlantic Croaker, Cobia, Red Drum, Black Drum Spanish Mackerel, Spot, striped Bass, Spotted Sea Trout, Tautog, Weakfish and Coastal Sharks)
    - **No Federal Plan:** Species that are not managed under any Federal or ASMFC ISFMP
- VTR data with missing coordinates have been removed.
- The information reported for 2020 should be interpreted with caution due to the generalized impacts the COVID-19 pandemic had on passenger demand for party/charter trips across many fisheries in the Greater Atlantic Region resulting in an unusually low number of angler trips; hence reduced revenues from passenger fees for affected party/charter entities.
- The number of small businesses changes over time both because of changes in affiliated ownership and fluctuations in revenue. For this reason, we use and report only the most recent three years' revenue in the Small Business Analysis section of this report, consistent with historical guidance provided by the Small Business Administration.
- Confidential data is listed as "Suppressed" or "All Others."

References

DePiper GS (2014) Statistically assessing the precision of self-reported VTR fishing locations. (https://repository.library.noaa.gov/view/noaa/4806)

Benjamin S, Lee MY, DePiper G. 2018. Visualizing fishing data as rasters. NEFSC Ref Doc 18-12; 24 p. (https://repository.library.noaa.gov/view/noaa/23030)

Most Impacted Species By Management Category

The table below indicates the total number of fish kept from the area by Management Categories. The category "All Others" refers to categories with less than three permits impacted to protect data confidentiality.

Figure 1.1 Fish Count of Top Management Categories by Year, Zone 3

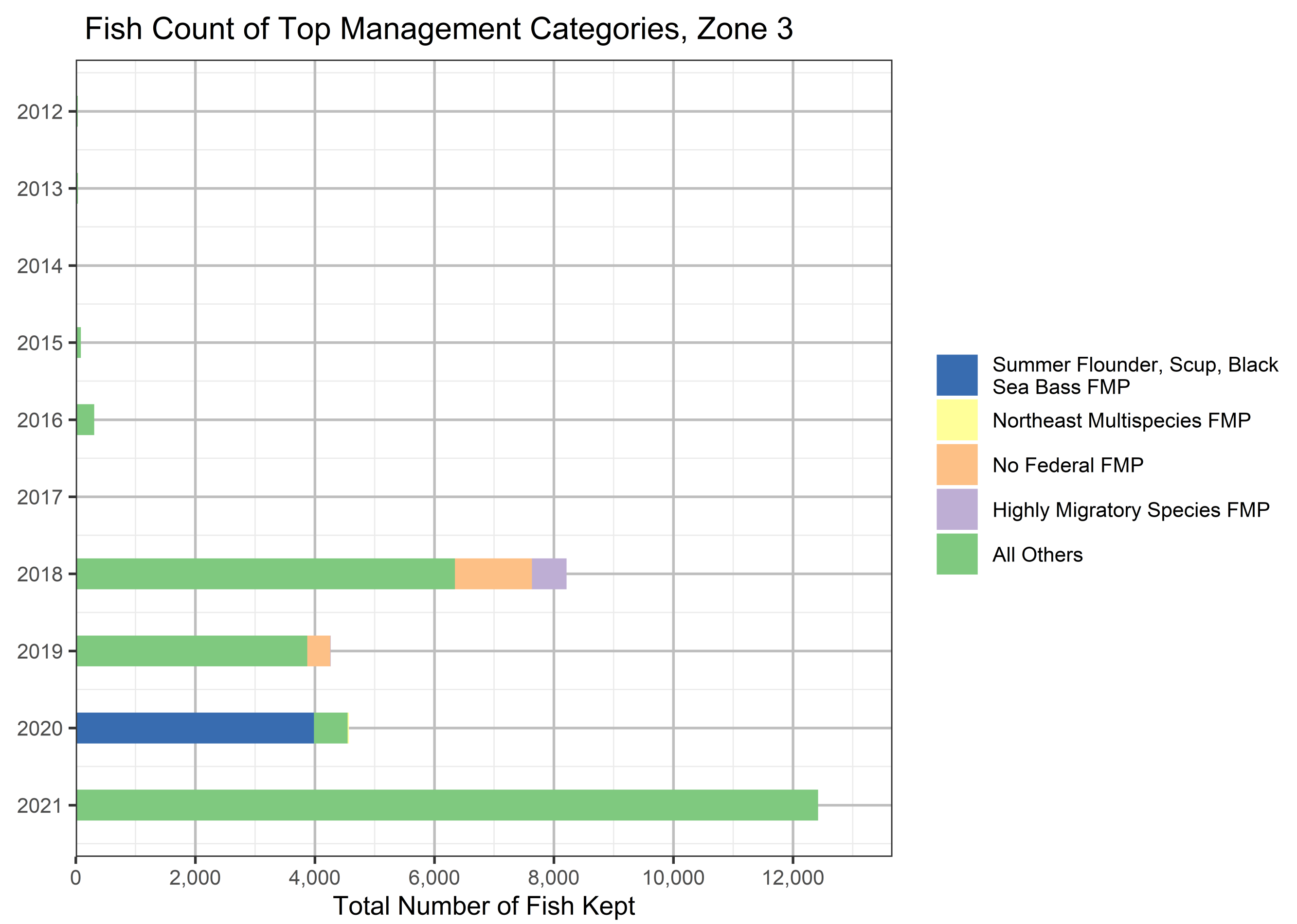


Table 1.1 Total Fish Count for Management Categories, Zone 3

Management Categories	Ten Year Fish Count
All Others	23,677
Summer Flounder, Scup, Black Sea Bass FMP	3,985
No Federal FMP	1,673
Highly Migratory Species FMP	598
Northeast Multispecies FMP	22
Total	**29,955**

Most Impacted Species

We analyzed the top six species most frequently kept on recreational party/charter trips in the area and to isolate them from combined FMPs. The top six species by the total number of fish kept are: All Others, Black Sea Bass, Dolphinfish, Marlin White, Scup and Yellowfin Tuna . The category “All Others” refers to species with less than three permits impacted to protect data confidentiality.

Figure 2.1 Fish Count of Top Species, Zone 3

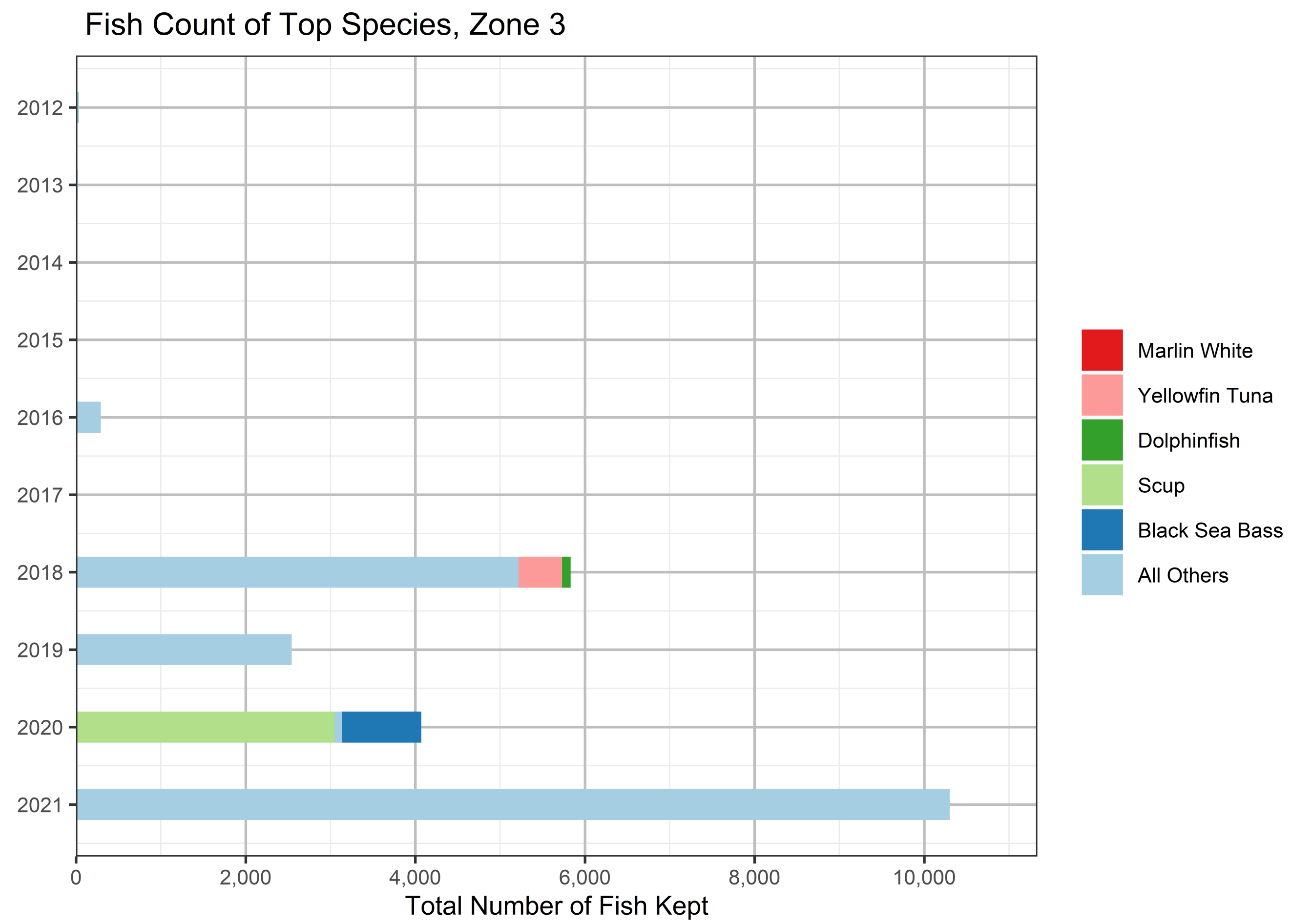


Table 2.1 Fish Count, Most Impacted Species, Zone 3

Species	**Ten Year Fish Count**
All Others	18,518
Scup	3,050
Black Sea Bass	935
Yellowfin Tuna	513
Dolphinfish	101
Marlin White	0
Total	**23,117**

Total Party/Charter Activity by Year

We analyzed the total revenue of party/charter trips by year by multiplying the annual mean combined charter and party for-hire fee of each state by the total number of anglers for each year (See Methods section). Revenue values have been deflated to 2019 dollars. All numbers have been rounded to the nearest thousand.Suppressed years have been set to 0 when calculating the total.

Table 3.1 Total Party/Charter Revenue by Year, Zone 3

Year	Annual Revenue
2012	Suppressed
2013	Suppressed
2014	$2,000
2015	Suppressed
2016	$5,000
2017	Suppressed
2018	$47,000
2019	$37,000
2020	$37,000
2021	Suppressed
Total	**$128,000**

Number of Vessel Trips by Port

The table below indicate the total number of trips within the area by year and port. The category “Other Ports, XX” refers to ports with less than three permits to protect data confidentiality.

Table 4.1 Total Number of Vessel Trips by Port and Year, Zone 3

Port	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Other Ports, NJ	1	0	2	0	2	2	7	0	11	0
Other Ports, NY	0	2	0	0	0	0	20	9	6	24
Other Ports, MD	0	0	3	0	0	0	0	0	0	0

Port	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Other Ports, DE	0	0	0	1	0	0	0	0	1	0
Other Ports, RI	0	0	0	2	2	0	0	0	0	0
No Port Data	0	0	0	0	0	0	1	0	0	0
Other Ports, MA	0	0	0	0	0	0	0	1	0	0
Point Pleasant, NJ	0	0	0	0	0	0	0	8	0	0
Other Ports, CT	0	0	0	0	0	0	0	0	2	0
Total	**1**	**2**	**5**	**3**	**4**	**2**	**28**	**18**	**20**	**24**

Number of Angler Trips by Port

The table below indicate the total number of angler trips from the area by year and port. The category “Other Ports, XX” refers to ports with less than three permits to protect data confidentiality.

Table 4.2 Total Number of Angler Trips by Port and Year, Zone 3

Port	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Other Ports, NJ	26	0	9	0	43	11	82	0	229	0
Other Ports, NY	0	21	0	0	0	0	443	200	139	534
Other Ports, MD	0	0	14	0	0	0	0	0	0	0
Other Ports, DE	0	0	0	2	0	0	0	0	7	0
Other Ports, RI	0	0	0	12	12	0	0	0	0	0
No Port Data	0	0	0	0	0	0	5	0	0	0
Other Ports, MA	0	0	0	0	0	0	0	3	0	0
Point Pleasant, NJ	0	0	0	0	0	0	0	200	0	0
Other Ports, CT	0	0	0	0	0	0	0	0	26	0
Total	**26**	**21**	**23**	**14**	**55**	**11**	**530**	**403**	**401**	**534**

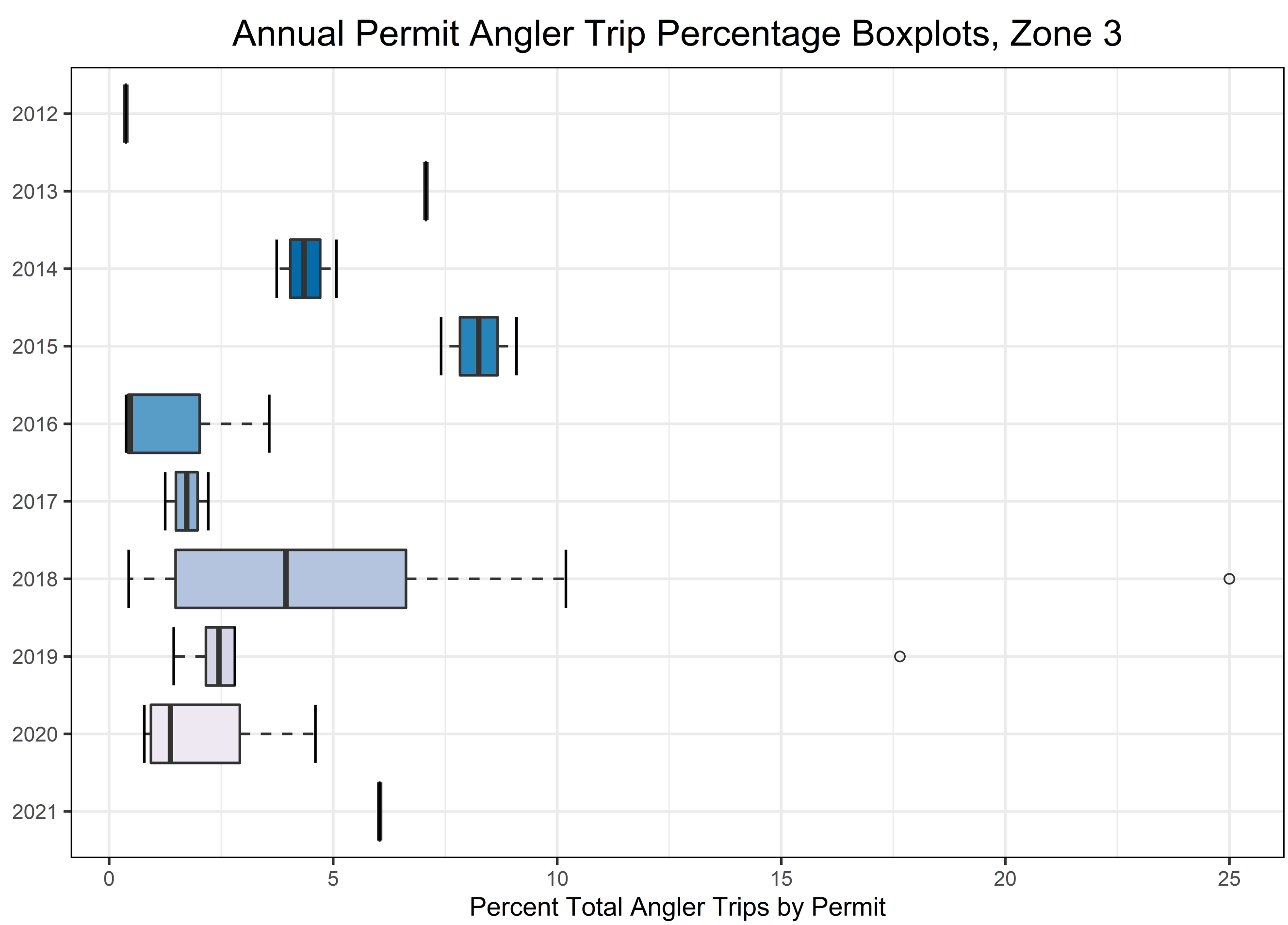
Percentage of Angler Trips by Permit

We analyzed the percentage of each permit’s total angler trips coming from within Zone 3 area (see boxplot figure and table below). Boxplots are important statistical summaries because they provide information about the distribution of the percentages. The boxplots below begin at the 1st quartile, or the value beneath which 25 percent of all observations fall. A thick line within the box identifies the median, the observation at which 50 percent of observations are above or beneath. The box ends at the 3rd quartile, or the observation beneath which 75 percent of observations fall. Nonparametric estimates of the minimum and maximum values are also indicated by the “whiskers” (dashed line terminating in a vertical line) that jut out from each side of the box. Any points outside of these whiskers are observations that are considered outliers. In our table , however, the maximum values are inclusive of outliers. The table below presents the minimum, 1st quartile, median, 3rd quartile, and maximum values for the area. These are the ten year angler trip percentages. The boxplot in the figure below further separate the area out by year.

Table 5.1 Ten Year Summary of Permit Angler Trip Revenue Percent, Zone 3

Area	Min	1st Quartile	Median	3rd Quartile	Max
Zone 3	0.37%	1%	3%	5%	25%

Figure 5.1 Annual Permit Angler Trip Percentage Boxplots, Zone 3



Small Business Analysis

A business primarily engaged in for-hire recreational fishing activities is classified as a small business if it is independently owned and operated, is not dominant in its field of operation (including its affiliates) and has combined annual receipts not in excess of $8 million for all its affiliated operations worldwide. Small Business Administration principles of affiliation are used to define a business entity, meaning the following analysis is conducted upon unique business interests, which can represent multiple vessel permits. As such, this section presents the total number of entities, by business category, and the total revenue generated by that business category in Table 6.1. For those businesses with historical fishing within the Zone 3 area, Table 6.2 presents the revenue generated inside the Zone 3 area against the total revenue from those same entities. Revenue values have been deflated to 2019 dollars. All numbers have been rounded to the nearest thousand.

Table 6.1 Total number of entities engaged in federally managed fishing within the Northeast region, and their total revenue, by business category

Year	Business Type	Number of Entities	Revenue
2019	Small Business	319	$71,987,000
2020	Small Business	332	$82,995,000
2021	Small Business	409	$107,933,000

Table 6.2 Revenue inside the Zone 3 area against total revenue from entities active inside the Zone 3 area, by business category

Year	Business Type	Number of Entities	Area Revenue	Total Revenue
2019	Small Business	5	$142,000	$3,715,000
2020	Small Business	4	$109,000	$4,549,000

Species Dependence

The tables below indicate party/charter vessel and angler trips, occurring within the area of interest, as a percentage of totals generated by party/charter vessel and angler trips across the entire region by year and the top six species deriving the most fish kept from the area by year. The category “All Others” refers to species with less than three permits impacted to protect data confidentiality.

Not enough activity to create table: Table 7.1 Annual Party Vessel Trips, Angler Trips, and Number of Vessels in the Zone 3 area, as a Percent of Total Northeast Region Party/Charter

Table 7.2 Ten Year Total Fish Count for Top Six Species as a Percent of Total, Zone 3

Species	Fish Count as % of Total
Yellowfin Tuna	1.83
Dolphinfish	0.15
Scup	0.04
Black Sea Bass	0.02

Methods

NOAA Fisheries conducted their first marine angler expenditure survey in 1998 (Steinback and Gentner 2001; Gentner, Price, and Steinback 2001). Additional surveys were conducted in 2006 (Gentner, Price, and Steinback 2008), 2011 (Lovell Steinback, and Hilger 2013), and 2017 (Lovell et al 2020). For-hire passenger fee data collected from these surveys provided the baseline for calculating average annual fees by region/state from 1997 to 2019.

Linear extrapolation was used to estimate average for-hire fees for years with no survey data. For example, in Steinback and Gentner (2001), the average for-hire fee in Maine in 1998 was $46.20. The next angler expenditure survey, conducted in 2006, found the average for-hire fee in Maine was $63.65 (see Gentner, Price, and Steinback 2008). To calculate average fees for the years between 1998 and 2006 we simply extrapolated linearly between the two known data points. This same procedure was used to extrapolate values for all years between the four survey years.

Average for-hire fees in 1997, the year preceding the first survey, and in the two years following the last survey (2018 and 2019), were calculated using industry specific Bureau of Economic Analysis (BEA) output deflators. Specifically, we used BEA output deflators shown for Amusement, Gambling, and Recreation Industries (North American Industry Classification System code 713000), which include recreational fishing guide services. Nominal values were converted to 2019 dollars using the same BEA output deflators.

For further information email Scott Steinback, Economist, NOAA Fisheries, Northeast Fisheries Science Center (Scott.Steinback@noaa.gov (mailto:Scott.Steinback@noaa.gov)).

Steinback, S. and B. Gentner. 2001. “Marine Angler Expenditures in the Northeast Region, 1998”. U.S. Dept. of Commerce. NOAA Tech. Memo. NMFS-F/SPO-47. Gentner, B., M. Price, and S. Steinback. 2001. “Marine Angler Expenditures in the Southeast Region, 2001”. U.S. Dept. of Commerce. NOAA Tech. Memo. NMFS-F/SPO-48 Gentner, Brad, and Scott Steinback. 2008. The Economic Contribution of Marine Angler Expenditures in the United States, 2006.U.S. Dep. Commerce, NOAA Tech. Memo. NMFS-F/SPO-94, 301 p. Lovell, Sabrina, Scott Steinback, and James Hilger. 2013. The Economic Contribution of Marine Angler Expenditures in the United States, 2011. U.S. Dep. Commerce, NOAA Tech. Memo. NMFS-F/SPO-134, 188 p. Lovell, Sabrina, James Hilger, Emily Rollins, Noelle A. Olsen, and Scott Steinback. 2020. The Economic Contribution of Marine Angler Expenditures on Fishing Trips in the United States, 2017. U.S. Dep. Commerce, NOAA Tech. Memo. NMFS-F/SPO-201, 80 p.

Endnotes

[1] Figure 15 references demersal species biomass for Acadian redfish (*Sebastes fasciatus*), American plaice (*Hippoglossoides platessoides*), Atlantic cod (*Gadus morhua*), Atlantic halibut (*Hippoglossus hippoglossus*), Atlantic wolffish (*Anarhichas lupus*), barndoor skate (*Dipturus laevis*), black sea bass (*Centropristis striata*), clearnose skate (*Raja eglanteria*), cunner (*Tautogolabrus adspersus*), fourspot flounder (*Hippoglossina oblonga*), haddock (*Melanogrammus aeglefinus*), little skate (*Leucoraja erinacea*), longhorn sculpin (*Myoxocephalus octodecemspinosus*), monkfish (*Lophius americanus*), ocean pout (*Zoarces americanus*), offshore hake (*Merluccius albidus),* pollock (*Pollachius pollachius*), red hake (*Urophycis chuss*), rosette skate (*Leucoraja garmani*), scup (*Stenotomus chrysops*), sea raven (*Hemitripterus americanus*), silver hake (*Merluccius bilinearis)*, spotted hake *(Urophycis regia*), smooth skate (*Malacoraja senta*), summer flounder (*Paralichthys dentatus*), tautog (*Tautoga onitis*), thorny skate (*Amblyraja radiata*), white hake (*Urophycis tenuis*), windowpane flounder (*Scophthalmus aquosus*), winter flounder (*Pseudopleuronectes americanus*), witch flounder (*Glyptocephalus cynoglossus),* and yellowtail flounder (*Pleuronectes ferruginea*).

[2] Figure 16 references CPUE for Acadian redfish (*Sebastes fasciatus*), American plaice (*Hippoglossoides platessoides*), Atlantic cod (*Gadus morhua*), Atlantic halibut (*Hippoglossus hippoglossus*), Atlantic wolffish (*Anarhichas lupus*), barndoor skate (*Dipturus laevis*), black sea bass (*Centropristis striata*), clearnose skate (*Raja eglanteria*), cunner (*Tautogolabrus adspersus*), fourspot flounder (*Hippoglossina oblonga*), haddock (*Melanogrammus aeglefinus*), little skate (*Leucoraja erinacea*), longhorn sculpin (*Myoxocephalus octodecemspinosus*), monkfish (*Lophius americanus*), ocean pout (*Zoarces americanus*), offshore hake (*Merluccius albidus),* pollock (*Pollachius pollachius*), red hake (*Urophycis chuss*), rosette skate (*Leucoraja garmani*), scup (*Stenotomus chrysops*), sea raven (*Hemitripterus americanus*), silver hake (*Merluccius bilinearis)*, spotted hake *(Urophycis regia*), smooth skate (*Malacoraja senta*), summer flounder (*Paralichthys dentatus*), tautog (*Tautoga onitis*), thorny skate (*Amblyraja radiata*), white hake (*Urophycis tenuis*), windowpane flounder (*Scophthalmus aquosus*), winter flounder (*Pseudopleuronectes americanus*), witch flounder (*Glyptocephalus cynoglossus),* and yellowtail flounder (*Pleuronectes ferruginea*).

[3] Figure 17 references forage species biomass for alewife (*Alosa pseudoharengus*), American shad (*Alosa sapidissima*), Atlantic herring (*Clupea harengus*), Atlantic mackerel (*Scomber scombrus*), Atlantic menhaden (*Brevoortia tyrannus*), bay anchovy (*Anchoa mitchilli*), blueback herring (*Alosa aestivalis*), butterfish (*Peprilus triacanthus*), hickory shad (Alosa mediocris), round herring (*Spratelloides gracilis*), sand lance (*Ammodytes americanus*), and striped anchovy (*Anchoa hepsetus*).

[4] Figure 18 references CPUE for alewife (*Alosa pseudoharengus*), American shad (*Alosa sapidissima*), Atlantic herring (*Clupea harengus*), Atlantic mackerel (*Scomber scombrus*), Atlantic menhaden (*Brevoortia tyrannus*), bay anchovy (*Anchoa mitchilli*), blueback herring (*Alosa aestivalis*), butterfish (*Peprilus triacanthus*), hickory shad (Alosa mediocris), round herring (*Spratelloides gracilis*), sand lance (*Ammodytes americanus*), and striped anchovy (*Anchoa hepsetus*).

[5] Figure 30 references the Northeast multispecies complex includes Atlantic cod, haddock, yellowtail flounder, pollock, American plaice, witch flounder, white hake, windowpane flounder, winter flounder, Acadian redfish, Atlantic halibut, Atlantic wolffish, and ocean pout.

[6] Citations include: (BOEM 2013; BOEM 2015; MAFMC 2014; Lipsky et al. 2016; VCZMP 2016; NYSERDA 2017).

[7] Defined by the EPA under §316(b) as, "The entrapment of aquatic organisms on the outer part of an intake structure or against screening devices during periods of intake water withdrawal."

[8] Defined by the EPA under §316(b) as, "The incorporation of fish, eggs, larvae and other plankton with intake water flow…."

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