New York State Coastal Management Program

Renewable Energy
Geographic Location Description

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1 Introduction

1.1 Request for Program Change

This document constitutes a request by New York State Department of State (DOS) for the National Oceanic and Atmospheric Administration (NOAA) Office for Coastal Management (OCM) to concur in the incorporation of Program Changes to the New York State Coastal Management Program (CMP) under the Coastal Zone Management Act (CZMA). New York is seeking federal consistency review over certain federal actions related to renewable energy development taking place in a specific area within federal waters of the Outer Continental Shelf (OCS) that are delineated herein as the Renewable Energy Geographic Location Description or GLD.

This document complies with the program change submission requirements identified in 15 CFR Part 923 Subpart H. Section 1 contains an overview of New York State's renewable energy planning efforts within the proposed GLD. The GLD boundary is delineated in Section 2. Section 3 identifies the listed federal license or permit activities and OCS authorizations that will be subject to DOS review when proposed within the federally approved GLD. Section 4 contains an analysis of reasonably foreseeable effects that meets each of NOAA's decision criteria in 15 CFR § 923.84.

1.2 Renewable Energy Planning in New York State

Trends in policy and technology are making it clear that offshore renewable energy production will be a key factor in fulfilling growing energy needs for New York and the broader Northeast. New York State has a significant interest in the outcome of offshore renewable energy projects, both for their potential impacts as well as their ability to further targets identified in New York State's Climate Leadership and Community Protection Act (NYS Climate Act) of 100% zero emissions electricity by 2040 and 9 gigawatts of offshore wind by 2035. Offshore wind is also a multi-billion-dollar industry that brings economic opportunities to New York State and the surrounding region. New York is projected to realize over $4.4B of value added from offshore wind development, creating more than 50,000 new jobs to support project construction and port upgrades.[1] New York's forward-looking clean energy goals are complemented by the State's ongoing commitment to minimizing impacts to ocean uses and resources through the responsible development of offshore wind in the Atlantic Ocean.

New York State has been preparing for this new industry for over a decade. In 2009 and 2010, New York began participating in Task Forces established by the Bureau of Ocean Energy Management (BOEM) to facilitate coordination among state, local, and tribal governments throughout the area identification and leasing process. Also in 2009, the Governor of New York co-signed the Mid-Atlantic Governors Agreement on Ocean Conservation, which created the Mid-Atlantic Regional Council on the Ocean with four other Mid-Atlantic States to, in part, advance offshore wind development in the region. In 2013, DOS released the Offshore Atlantic Ocean Study, a comprehensive study on the physical, biological, wildlife and geographic characteristics of the Atlantic Ocean impacting New Yorkers. The study established New York's direct interest in the offshore space extending from Long Island to the edge of the OCS. The New York State Department of Environmental Conservation (NYSDEC) in partnership with DOS released the New York Ocean Action Plan in 2017 that presents a vision of the priority issues and key actions affecting New York's ocean ecosystem. Also in 2017, the CMP Policy 29 was updated and approved by NOAA on

[1] See Appendix G *in* NYSERDA. 2022. Offshore Wind Ports: Cumulative Impacts Study. Prepared by HDR Inc. Contract Agreement No. 155561. Report Number 22-10. April 2022. Available at: https://www.nyserda.ny.gov/-/media/Files/Programs/offshore-wind/22-10-Ports-Cumulative-Impact-Study-acc.pdf

May 5, 2017, to reflect the emerging significance of offshore renewable energy resources and the relevance of new project development to New York's existing coastal uses and resources. In early 2018, the New York State Energy Research and Development Authority (NYSERDA) released the New York State Offshore Wind Master Plan, which detailed a comprehensive planning process comprised of multiple studies and extensive public engagement to encourage responsible and cost-effective offshore wind development for New York State while taking environmental, maritime, economic, and social issues into account. In March 2021, BOEM released the final NY Bight wind energy area (WEA). The State continues to participate in and lead a variety of workgroups and committees aimed at understanding issues and providing guidance on how to responsibly implement New York State's goals to advance offshore wind energy development.

Anticipated offshore renewable energy development and technologies are advancing rapidly. Currently, there are 29 active commercial renewable energy leases in the U.S. Atlantic Ocean, with more leasing proposed at the time of drafting. Developments in offshore wind, the global success of floating technologies, ever decreasing project costs, and ambitious state targets are all contributing to greater economic viability and have considerably expanded viable offshore areas for energy production. The current offshore wind targets for New York and New Jersey are 9 GW by 2035 and 11 GW by 2040, respectively. In addition, the NYS Climate Action Council in their recommended policies and actions to help meet the NYS Climate Act requirements identified a potential need for 20 GW of OSW by 2050.[2] The accelerated pace of OSW development and potential for new renewable energy directives signal that the current 2035 targets will be surpassed.[3]

Other emerging technologies like hydrokinetic energy, water column pressure, hydrothermal properties of the marine environment, or co-generation capabilities (e.g., hydrogen hubs) make it clear that the trend toward increased offshore carbon-free energy production will continue. In her 2022 State of the State address, Governor Hochul announced the initiation of a second Offshore Wind Master Plan, recognizing the need to expand into new planning areas to meet this increased demand. The proposed GLD is New York State's response in recognition of this new normal and must be forward-thinking to appropriately accommodate this rapid growth and plan for expansion into new areas.

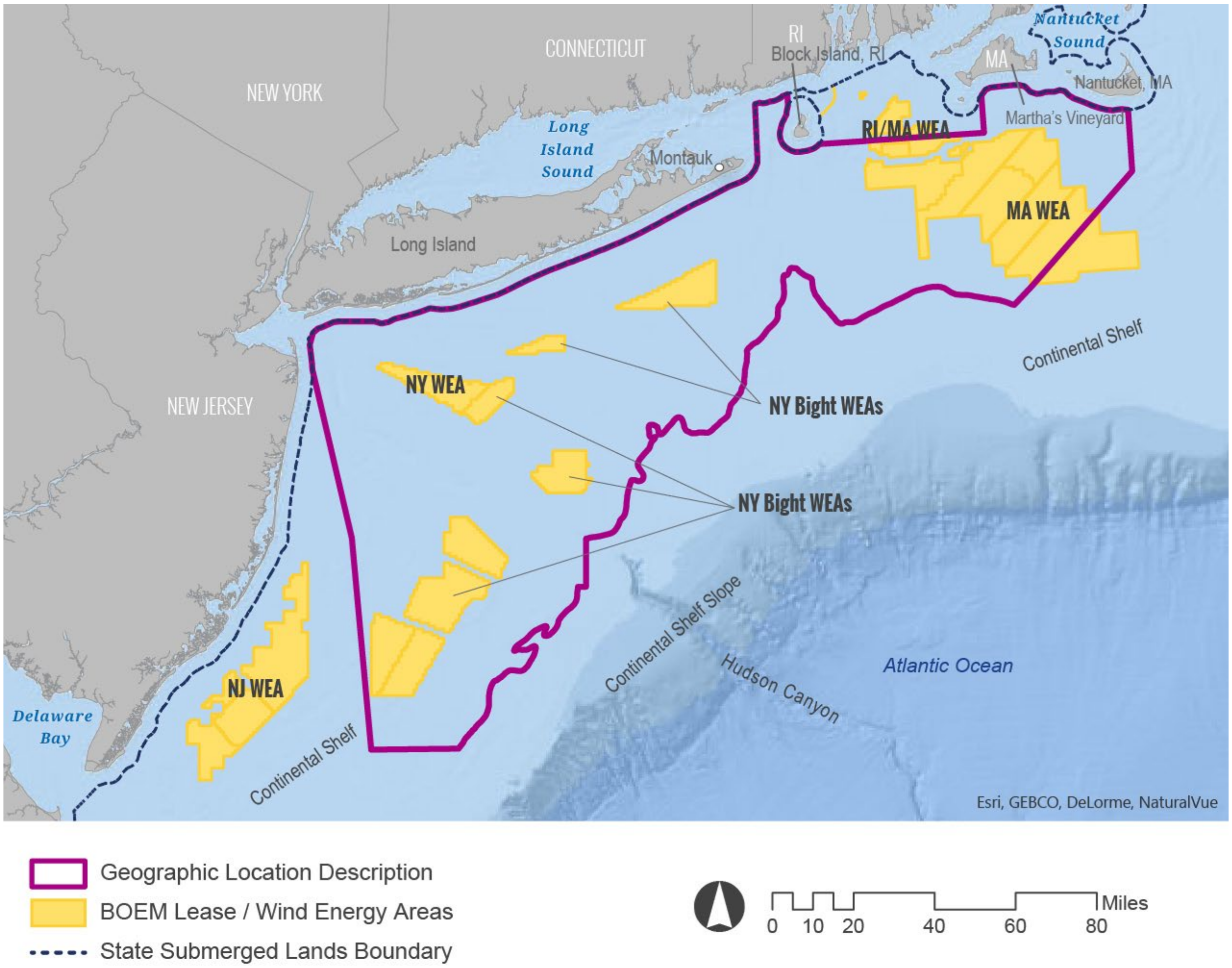
As shown by the extensive studies already undertaken by the State, and the additional work underway in consultation with BOEM and other state and federal partners, the State is cognizant and responsive to the importance of existing coastal resources and uses, including marine shipping and navigation, commercial fishing, recreational fishing, boating, and wildlife viewing, and coastal and ocean habitats, when considering future sites for offshore wind and other renewable energy development. Recent spatial data analyses and refinements have contributed to a greater understanding of the interconnectedness between New York's coastal areas and the OCS. This underscores the necessity and importance of New York's ecosystem-based management approach and adds further support for the State's long-standing interests in accommodating ocean uses and protecting resources vital to the State. The GLD and coastal effects analysis draw from the many studies and coordination resulting from the long-term offshore renewable energy planning efforts occurring on the OCS.

[2] New York State Climate Action Council. December 2021. Draft Scoping Plan. Available at: https://climate.ny.gov/Our-Climate-Act/Draft-Scoping-Plan

[3] NYSERDA. 2022. Draft Offshore Wind Cable Corridor Constraints Assessment. Prepared by WSP USA, NYSERDA Contract 155565. Available at: https://portal.nyserda.ny.gov/CORE_Solicitation_Detail_Page?SolicitationId=a0r8z00000099olAAA

2 Geographic Location Description (GLD) (§ 923.83 (a) (5) (ii) (A))

The proposed GLD is approximately 12,056 square miles in area, encompassing a portion of the Atlantic Ocean referred to as the New York Bight and adjacent areas of the OCS south of Rhode Island and Martha's Vineyard in the Block Island Sound, Rhode Island Sound, and Atlantic Ocean (Figure 1). Specifically, the GLD is a polygon starting at the intersection of the 3 nm State/Federal jurisdictional boundary and the traffic precautionary area south of New York/New Jersey Harbor at approximately North 40 degrees 20 minutes 10 seconds and West 73 degrees 54 minutes 18 seconds. The boundary continues straight, generally southeasterly, to a point that is the southwest corner of the Barnegat to Ambrose Traffic Lane. The boundary continues in a straight line, generally southeasterly, to its intersection of the southern boundary of NOAA National Marine Fisheries Service (NMFS) statistical area 615, at a point North 39 degrees and West 73 degrees 39 minutes 25 seconds. The boundary continues, following NMFS statistical area 615's southern boundary, easterly to its intersection with the -70m bathymetric contour (General Bathymetric Chart of the Ocean [GEBCO]). The boundary follows the -70m contour generally northeast to its intersection of BOEM lease block number NJ18-03 6422. The boundary follows the southern border of lease block NJ18-03 6422 easterly to the beginning of BOEM lease block NJ18-03 6423. The boundary then follows the western boundaries of the following BOEM lease blocks NJ18-03 6423, NJ18-03 6373, NJ18-03 6323, and NJ18-036273 in a northerly direction. The boundary then follows the northern boundary of lease block NJ18-03 6273 in a westerly direction to its intersection with the -70m contour. The boundary continues following the -70m contour first in a northwesterly direction, then a westerly direction to a point approximately North 40 degrees 30 minutes 56 seconds and West 70 degrees 36 minutes 51 seconds The boundary continues straight, generally in a northeasterly direction to the southwest corner of BOEM lease block NK19-08 7103 , the boundary continues in a northerly direction following the western boundaries of the following BOEM lease blocks; NK19-08 7103, NK19-08 7053, NK19-08 7003, NK19-08 6953, NK19-08 6903 and NK19-08 6853 until its intersection with the 3 nm State/Federal jurisdictional boundary. The boundary continues westerly following the 3nm boundary until its intersection with BOEM lease block NK19-07 6773 at a point approximately North 41 degrees 16 minutes 9.6 seconds and West 70 degrees 43 minutes 10 seconds. The boundary continues south following the western boundaries of the following BOEM lease blocks NK19-07 6773, NK19-07 6823, NK19-07 6873 and NK19-07 6923. The boundary then continues west following the southern boundaries of the following BOEM lease blocks NK19-07 6923, NK19-07 6922, NK19-07 6921, NK19-07 6920, NK19-07 6919, NK19-07 6918, NK19-07 6917, NK19-07 6916, NK19-07 6915, NK19-07 6914, NK19-07 6913, NK19-07 6912, NK19-07 6911, NK19-07 6910, until its intersection with the 3nm federal state boundary line at a point approximately North 41 degrees, 7 minutes 17 seconds and West 71 degrees, 29 minutes 42.6 seconds. The boundary continues westerly following the 3 nm boundary, until the beginning point at approximately North 40 degrees 20 minutes 10 seconds and West 73 degrees 54 minutes 18 seconds. Figure B-1 displays the datasets described herein in relation to the GLD boundary.



Prepared by the Department of State, Office of Planning, Development and Community Infrastructure, April 2022.

Figure 1. Renewable Energy Geographic Location Description

3 Listed Federal Actions to be Included Within GLD (§ 923.83 (a) (5) (ii) (B))

DOS requests approval of the following listed federal license or permit activities and OCS Plans pursuant to 15 CFR Part 930, Subparts D and E, respectively, associated with the GLD. Upon NOAA approval, the following shall be amended in the New York State Coastal Management Program as Table 5 in Section **II**-9:

Table 5: Renewable Energy Geographic Location Description

The following authorizations for research, siting, construction, operations and maintenance, and decommissioning of offshore renewable energy generation infrastructure, and transmission infrastructure, in the Renewable Energy Geographic Location Description are listed activities. These approved activities are subject to review for consistency with applicable enforceable policies of the New York State Coastal Management Program in accordance with 15 CFR Part 930, Subpart D and E and other applicable Parts of 15 CFR Part 930. The **bold text** represents new or amended federal license or permit activities, not already listed in the approved New York State Coastal Management Program.

FEDERAL ACTIVITIES AFFECTING LAND AND WATER USES AND NATURAL RESOURCES IN THE RENEWABLE ENERGY GEOGRAPHIC LOCATION DESCRIPTION	
Department of Defense	
Army Corps of Engineers	Construction of dams, dikes or ditches across navigable waters, or obstruction or alteration of navigable waters required under Sections 9 and 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 401, 403).
	Occupation of seawall, bulkhead, jetty, dike, levee, wharf, pier, or other work built by the U.S. pursuant to Section 14 of the Rivers and Harbors Act of 1899 (33 U.S.C. 408).
Department of Energy	
Federal Energy Regulatory Commission	**Permits and licenses required for marine hydrokinetic projects pursuant to the Federal Power Act. (16 U.S.C. §§ 792 to 823; implementing regulations at 18 C.F.R. Chapter 1, Subchapter B, Parts 4 and 5).**
	Permits and licenses for interstate electric transmission facilities under Section 216 of the Federal Power Act (16 U.S.C. § 824p).
Department of Interior	
Bureau of Ocean Energy Management	Permits required for pipelines crossing federal lands, including OCS lands, and associated activities pursuant to the OCS Lands Act (43 U.S.C. 1334) and 43 U.S.C. 931 (c) and 30 U.S.C. 185.
	Issuance or approval of leases, permits, easements, rights-of-way, research activities, and other authorizations pursuant to the OCS Lands Act (43 U.S.C. §§ 1331 et seq.; 43 U.S.C. § 1337(p); implementing regulations at 30 C.F.R. Part 585), including in response to unsolicited requests, for the planning, construction, operation, maintenance and/or support activities related to OCS renewable energy development.

4 Reasonably Foreseeable Effects to the Uses and Resources of the State's Coastal Zone (§ 923.83 (a)(5) (ii) (C))

A federal action is subject to federal consistency review if the action will affect a state's coastal uses or resources, even if the action is located outside the coastal zone.[4] "Coastal effects" is shorthand for reasonably foreseeable effects and includes both direct and indirect (secondary and cumulative) effects. The following is an analysis of the reasonably foreseeable coastal effects of listed federal license or permit activities under 15 CFR Part 930, Subparts D and E that may be proposed in the federal waters of the proposed GLD. This analysis is organized based upon NOAA's eight decision criteria for a program's federal consistency list or a GLD (15 CFR § 923.84(d)).

While there are many coastal uses and resources important to New York State, this analysis focuses on New York's commercial and for-hire fishing uses and recreational uses and resources, which offer ample data to demonstrate reasonably foreseeable coastal effects. The omission of other coastal uses and resources is an indication there may not be adequate data at this time to demonstrate coastal effects, not that these uses and resources are any less significant to the State's coastal program. Nor should their omission be taken as an indication that coastal effects would not exist. Once approved, the GLD enables DOS to evaluate any impacts to New York from a listed activity within the boundary, in accordance with the State's enforceable coastal policies and with project and site-specific data as available. While as a general rule, as distance from New York's coastal area increases, the relative effect of an activity on New York's uses and resources decreases, this relationship between distance and effects is not equally proportional for all uses or resources nor for all areas of the OCS – like commercial fishing where valuable fishing grounds exist many miles offshore.

In summary, the GLD represents an important review mechanism to identify State interests but is not an exhaustive description of what impacts will ultimately be evaluated. To that end, the coastal effects analyzed in detail in the following sections are not necessarily representative of the full breadth of potential impacts associated with these activities nor the geographic scope of those impacts that may be considered during a federal consistency review. Such impacts are anticipated to be identified and addressed through coordination and constructive dialogue with project proponents through the course of a resultant review and based on an analysis of the State's federally approved enforceable coastal policies.

4.1 Affected Uses and Resources (§ 923.84(d) (1))

On the OCS, New York's coastal uses and resources are integrally linked to the people, industries, and ecology of the marine environments of Long Island and New York City and the freshwater tidal estuarine environment of the Hudson River. New York's Ocean Economy is the fourth largest in the United States and is generally inclusive of the Bronx, Kings, Nassau, New York, Queens, Richmond, Suffolk, and Westchester counties. Marine industries in these counties produced more than $14.2 billion in wages and generated more than $31.6 billion in Gross Domestic Product (GDP) in 2019.[5] Specifically, the Port of New York and New Jersey is the largest on the Atlantic seaboard and a major economic driver for the region. Smaller ports located along the north and south shores of Long Island support a robust commercial and for-hire fishing industry. The tourism and recreation sector employs the largest number of workers and makes the most substantial contribution to the State's ocean economy ($23 billion in Gross

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[4] See 15 CFR § 930.11(g), "The term 'effect on any coastal use or resource' means any reasonably foreseeable effect on any coastal use or resource resulting from a Federal agency activity or federal license or permit activity."
[5] NOAA Economics: National Ocean Watch (ENOW) Explorer. Available at: https://coast.noaa.gov/digitalcoast/tools/enow.html. Accessed June 2, 2022.

Domestic Product or 84%). Since 2005, employment within the tourism and recreation sector grew by 60 percent and continues to have a strong growth trajectory.

The affected coastal uses analyzed herein are primarily the New York commercial and for-hire fishing fleet that fishes and navigates within the GLD boundary, and recreational uses enjoyed by residents and visitors alike and contributing substantively to New York's coastal economy, including fishing, boating, diving, and wildlife watching. Another affected coastal use is New York's ports and waterfront facilities that support these industries, predominantly located in New York City and along Long Island.

The affected coastal resources include species targeted by the commercial, for-hire, and recreational fishing industries and diverse habitats that support the rich ecology and overall health of the New York Bight and southern New England waters. These resources are greatly influenced by the geologic and oceanographic features unique to this region.

4.1.1 Commercial and For-Hire Fishing

New York has a robust commercial fishing industry of economic significance to the State. The GLD contains important fishing grounds for commercial vessels landing in New York as well as long-established routes to access productive grounds far-afield. Commercial fishing gear used in the GLD includes rod and reel, longlines, gillnets, seines, beam trawls, otter trawls, paired mid-water and bottom trawls, spears, pots and traps, and dredges.[6] The affected coastal resources include species targeted by the commercial fishing industry using mobile gear (e.g., surf clam, northern quahog, squid, sea scallops, flounder, scup, and hake [or whiting]) and fixed gear (e.g., tilefish, crab, lobster).

For-hire boatmen also fish the GLD, targeting a broad range of species that their clientele can fish using rod and reel. New York often categorizes for-hire fishermen as a subset of its commercial fishing industry because, while they are not selling fish for a profit, they are selling their services, use of vessels, crew, gear and bait, and, most importantly, marketable fishing experiences that sustain their businesses.

New York's commercial and for-hire (charter) fishing industry contributes to the coastal landscape of Long Island and local economies through direct employment and products and services. Coastal towns have established waterfront districts to protect maritime uses in the commercial fishing ports and seafood processing facilities from being overtaken by other development. Montauk is New York's largest commercial fishing port and is home to seafood processing and distribution companies, several that also have retail markets and restaurants. Welding and steel shops in Montauk, NY are regionally important and service local vessels as well as a significant number of commercial vessels from New Jersey and New Bedford, MA. The active presence of the commercial fishing industry and the intrinsic character it lends are highly valued by New Yorkers.

4.1.2 Recreational Uses and Resources

The area covered by the GLD supports a range of offshore recreational and tourist-oriented activities including fishing, diving, boating, and wildlife viewing (e.g., whale watching, bird watching) that are important to New York. There are commercial businesses that directly rely on these resources like boat rentals, marinas, tackle shops, and boating sales and repair shops that support coastal economies. Environmental health and scenic quality within the GLD are essential to a thriving recreational industry that many coastal communities rely upon to support their economic health and provide a cultural identity. These characteristics are an important aspect to maintaining healthy and vibrant historic coastal towns.

Many marine species rely on the habitats in the New York Bight and move between inshore and offshore habitats daily, seasonally, or to complete critical phases of their life cycle. These include high-valued

[6] Scotti, J., J. Stent, and K. Gerbino. n.d. New York Commercial Fisherman Ocean Use Mapping: Final Report. https://docs.dos.ny.gov/communitieswaterfronts/ocean_docs/Cornell_Report_NYS_Commercial_Fishing.pdf

recreationally fished species like flounder/fluke, black sea bass, scup, striped bass, and bluefish. Several recreationally important diadromous fish species migrate between the ocean and New York's freshwater rivers, including river herring (alewife and blueback, collectively), striped bass, American eel, and sea run brook trout. Other marine fauna, such as marine mammals and sea turtles, occur seasonally in waters off New York in close range to wildlife tour boats and move great distances to feeding, breeding, and nursery areas. The New York Bight serves as a migratory corridor for certain large whale species, like blue, fin, humpback, and the right whale, some with year-round occurrences in this region. New York is also located along the Atlantic Flyway where a great diversity of migratory birds and seabirds are temporary residents, relying on pelagic and coastal habitats for breeding, overwintering, and migratory stopovers.[7] This convergence of species creates ideal conditions for recreational fishing and wildlife viewing opportunities in the GLD.

4.2 Where and in What Densities the Uses and Resources are Found (§ 923.84(d) (2))

This section provides a narrative description and graphically depicts the known occurrence or intensity of use for each of the affected coastal uses and resources in the GLD.

4.2.1 Commercial and For-Hire Fishing

Commercial fishing is defined to represent fishing activities where the fish harvested are intended to enter commerce through sale, barter, or trade.[8] In contrast, for-hire or charter fishing is a component of recreational fisheries that includes charter boats, headboats, and guideboats.[9]

Fishing grounds in the GLD are targeted by New York fishermen for a variety of species including sea scallops, squid, monkfish, mackerel, summer and winter flounder, skates, herring, surf clams, crabs, lobster, tilefish, bluefish, black sea bass, spiny dogfish, scup, cod, pollock, striped bass, as well as highly migratory species such as tunas and sharks.[10] **One of the highest valued commercially fished species landed in the State is longfin squid, averaging 13% of total dollars landed (Table 1).** Squid, scup, and surf clam are among the most landed species by pound in the State (Table 2). These species and most of the other top valued commercial species landed in New York are primarily fished offshore using mobile, bottom-tending gears like hydraulic dredges or bottom trawls.[11] The primary exceptions are tilefish, which is a valuable offshore fishery (8% of total dollars landed) that is usually taken in the longline fishery (bottom-tending fixed gear), and lobsters, which are commercially fished using pots.

The Communities at Sea data is often the best available and most widely accessible dataset for identifying a state's commercial fishing grounds.[12] The Communities at Sea data for New York show that the GLD is fished extensively by New York commercial fishermen primarily using bottom trawls, dredges, and gillnets (Figure 2).

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[7] New York State Department of Environmental Conservation (NYSDEC) and Department of State (NYSDOS). 2017. New York Ocean Action Plan 2017-2027. http://www.dec.ny.gov/docs/fish_marine_pdf/nyoceanactionplan.pdf. Updated 23 January 2017.
[8] 16 U.S.C. 1802. Magnuson-Stevens Fishery Conservation and Management Act. Sec. 3 104-297(4).
[9] NOAA. 2019. For-Hire Studies. Accessed June 25, 2019. https://www.st.nmfs.noaa.gov/economics/fisheries/recreational/for-hire/index
[10] Scotti et al. (n.d.)
[11] ASMFC (Atlantic States Marine Fisheries Commission). 2019. Fisheries. Accessed May 28, 2019. Retrieved from: http://www.mafmc.org/
[12] Communities at Sea data links fishing communities to specific resource areas in the ocean using Federal Vessel Trip Report (VTR) and vessel permit data to identify where 90% of effort occurs by port and gear type. Other data such as Vessel Monitoring System (VMS) are also considered to accurately depict fishing effort due to the continuous satellite surveillance system, but the data are difficult to obtain and may not represent all fisheries. AIS data sets have shortcomings because the requirement for commercial fishing vessels to use AIS has been in effect for a relatively short time and commercial fishing vessels may turn off AIS, particularly beyond 12 miles from the coast. Additionally, vessel type is a manually entered field in the AIS data and commercial fishing vessels sometimes do not fill this field, or record type as "Other."

Bottom trawls are fished throughout the GLD, with the densest fishing from New York ports occurring off Long Island along the state/federal boundary, dispersed along the southern GLD boundary, following the Hudson Valley Shelf, and extending off Nantucket and Martha's Vineyard southward into the MA WEA. Clear patterns are visible between the New York bottom trawl activity and areas of dense squid fishing, with New York fishermen targeting productive fishing grounds (Figure 2; see Appendix B for gear-specific figures). Fishing patterns reflect the high interannual and seasonal variability of the longfin squid as stocks move between deeper offshore waters and shallower nearshore waters throughout the Mid-Atlantic Bight.[13] Summer flounder and scup are also fished by New York bottom trawlers offshore as captured in the Communities at Sea bottom trawl data. Trawling for squid and hake (whiting) is also common east of the GLD, in the waters off Massachusetts extending to Georges Bank, and results in lengthy transit between the fishing grounds and New York homeports. Silver hake are targeted with small-mesh trawl gear with fishing activity best approximated by the draft Declared Out of Fishery dataset (Figure 3).[14] Very high and high fishing activity occurs along the Hudson Valley Shelf, southeast of Montauk, New York, and along the southern GLD boundary. Medium-high fishing activity occurs in most renewable energy lease areas in the GLD.

Hydraulic dredges are used to fish surfclam and scallops in discrete areas off eastern and western Long Island and to the southwest (Figure 4). While surfclam is the top species landed in New York by pound, there are inconsistencies between surfclam fishing grounds and the Communities at Sea dredge data for New York ports, and, because of these challenges, it was not feasible to evaluate the relative importance of specific surfclam fishing grounds to the State. Dredge data for New York communities does align with scallop fishing grounds located directly south and east of Long Island, following the Hudson Valley Shelf, and along the 70m bathymetric contour that marks the GLD boundary (Figure 4).

A compilation of all New York State Communities at Sea data is provided in Figure 5. Gillnets are fished along the length of Long Island, concentrated near the state/federal boundary and south of eastern Long Island, primarily targeting monkfish. Longline fishing for tilefish occurs off eastern Long Island and continues east into the waters off Rhode Island and Massachusetts and south to the OCS slope, beyond the GLD boundary. Pots (e.g., fish, lobster, crab) are also fished in the GLD; however, those Communities at Sea data are not shown because they have substantial overlap with gillnets and would be difficult to distinguish. Based upon the Communities at Sea data, New York commercial fishing is less common in the southwestern region of GLD; however, this region is part of the Hudson Valley Shelf is known to provide rich benthic habitat supporting many of New York's commercially and recreationally important species.[15]

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[13] Jacobson, L., Hart, D., Hendrickson, L., Idoine, J., & Chute T. (2009). Northeast Invertebrate Fisheries. In: NMFS Our living oceans. Report on the status of U.S. living marine resources, 6th edition U.S. Department of Commerce. October 2009. 103-111.
[14] Silver hake do not have species specific commercial fishing mapping as this is an exempted fishery. The draft Declared Out of Fishery data is the best approximation as it depicts vessels required by NOAA Fisheries to carry a Vessel Monitoring System (VMS) and have declared out of any fishery, like hake. This dataset includes a small proportion of other vessels such as research and recreational/for-hire, although analyses have demonstrated those to have minimal geographic coverage and do not greatly influence the vessel density results shown.
[15] NYSDEC and NYSDOS (2017)

Table 1. Value of New York State Commercial Landings from 2011 to 2019, highlighting the highest value species fished in the GLD.

Value of Commercial Fish Landings by Year (Dollars)										Avg. Yearly Contribution (%)
Fish Species	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	
Squid, longfin	$7,249,771	$8,647,612	$5,948,991	$5,447,556	$5,413,428	$7,830,440	$4,924,203	$7,946,519	$6,800,847	13%
Tilefish, golden	$4,525,153	$4,259,864	$4,672,500	$4,246,667	$3,651,824	$2,972,111	$3,321,683	$3,646,229	$4,049,855	8%
Scup	$2,551,000	$3,536,300	$2,970,472	$2,313,075	$3,137,625	$2,896,673	$2,492,452	$2,798,006	$3,204,337	6%
Flounder, summer	$3,731,878	$3,652,585	$3,197,386	$2,996,938	$3,043,105	$2,527,473	$2,402,314	$2,218,848	$3,508,800	6%
Scallop, sea	$4,960,136	$4,082,954	$2,601,565	$2,963,409	$978,119	$3,783,357	$2,135,807	$1,360,681	$992,598	5%
Surfclam, Atlantic	$545,088	$3,095,590	$2,410,205	$1,665,776	$2,115,279	$2,506,819	$1,465,396	$1,018,837	$703,129	3%
Goosefish (monkfish)	$2,159,865	$2,716,794	$1,625,649	$1,308,542	$1,437,870	$1,963,231	$1,273,268	$1,115,112	$1,032,211	3%
Silver Hake	$2,230,953	$2,247,623	$1,919,245	$1,926,725	$1,367,294	$1,520,457	$1,024,239	$1,007,953	$1,269,264	3%
Total Landings (All Species)	$50,454,598	$54,904,004	$57,225,131	$56,734,233	$69,034,587	$52,384,313	$48,674,914	$48,565,739	$39,168,658	N/A

Source: ACCSP NYS Commercial Landings Summary data. Queried 9/1/2020.

Table 2. Pounds of New York State Commercial Landings from 2011 to 2019, highlighting the top 10 most landed species fished in the GLD.

Commercial Fish Landings by Year (Pounds)										Avg. Relative Contribution (%)
Species	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	
Clam, Atlantic surf	4,241,633	24,052,490	18,091,079	12,965,950	16,389,743	19,356,847	11,416,833	7,992,620	5,544,046	21%
Squid, longfin	5,629,600	7,838,170	4,984,940	5,138,484	4,258,863	6,302,565	3,315,083	4,901,421	4,031,224	9%
Scup	3,728,936	4,306,995	4,574,421	3,174,867	4,050,297	3,504,265	3,464,504	3,348,867	4,070,216	7%
Scallop, Sea	4,351,142	3,580,878	2,128,640	2,178,791	726,988	3,312,827	2,092,936	1,308,318	853,321	4%
Skates	1,584,224	2,477,581	1,975,742	2,194,376	2,197,208	1,982,058	1,950,731	1,400,946	1,494,179	3%
Hake, silver	3,038,092	2,819,256	2,390,355	2,311,195	1,501,616	1,718,915	1,173,998	953,534	1,407,482	3%
Goosefish (monkfish)	1,425,687	1,854,536	1,429,173	1,133,035	1,192,208	1,581,750	1,180,818	1,620,717	1,527,296	3%
Menhaden	312,697	232,673	1,141,133	768,538	1,407,002	1,637,913	1,634,042	471,087	973,925	2%
Golden Tilefish	1,521,473	1,412,895	1,466,276	1,378,384	934,661	741,280	1,048,536	1,159,111	1,122,384	2%
Flounder, summer	1,517,022	1,237,820	1,033,284	832,556	829,928	603,522	491,433	462,673	875,329	2%
Total landings (All Species)	54,710,627	70,168,800	67,485,918	58,508,117	78,208,079	65,374,145	54,721,301	47,046,400	39,579,460	-

Source: ACCSP NYS Commercial Landings Summary data. Queried 9/1/2020.

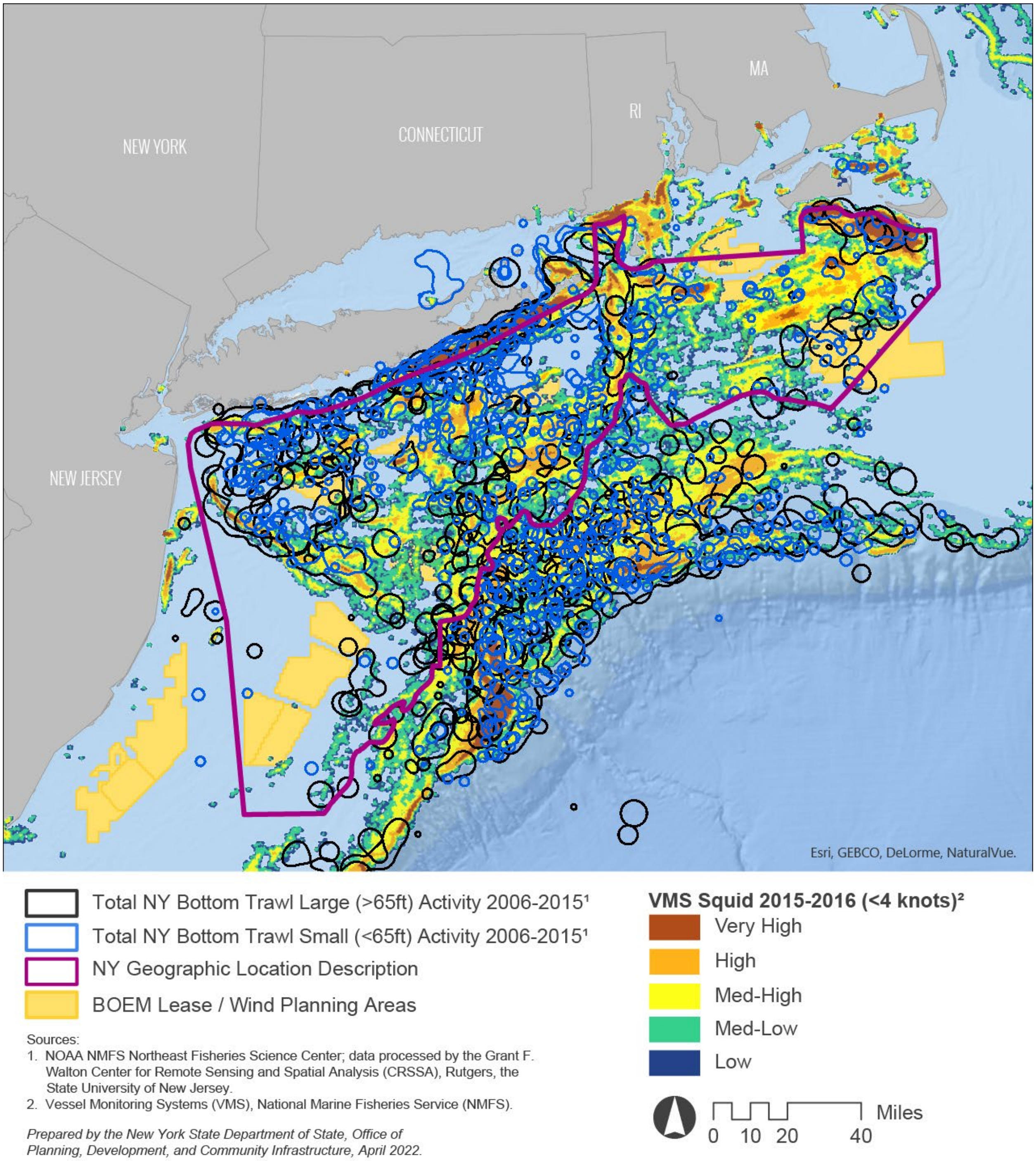

Figure 2. New York bottom trawl fishing (large and small vessels) targeting longfin squid fishing grounds in the GLD.

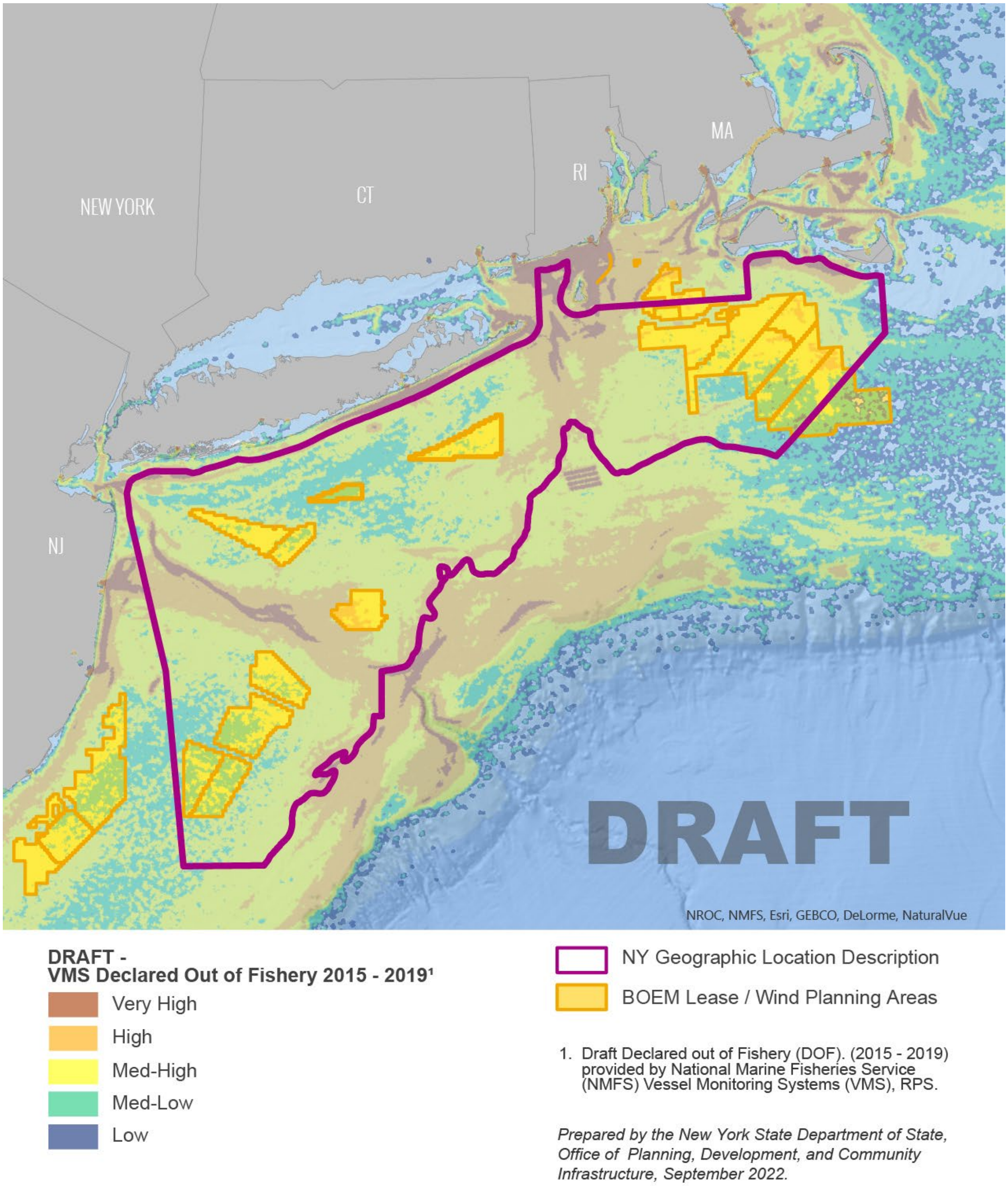

Figure 3. Draft Declared out of fishery activity in the GLD.

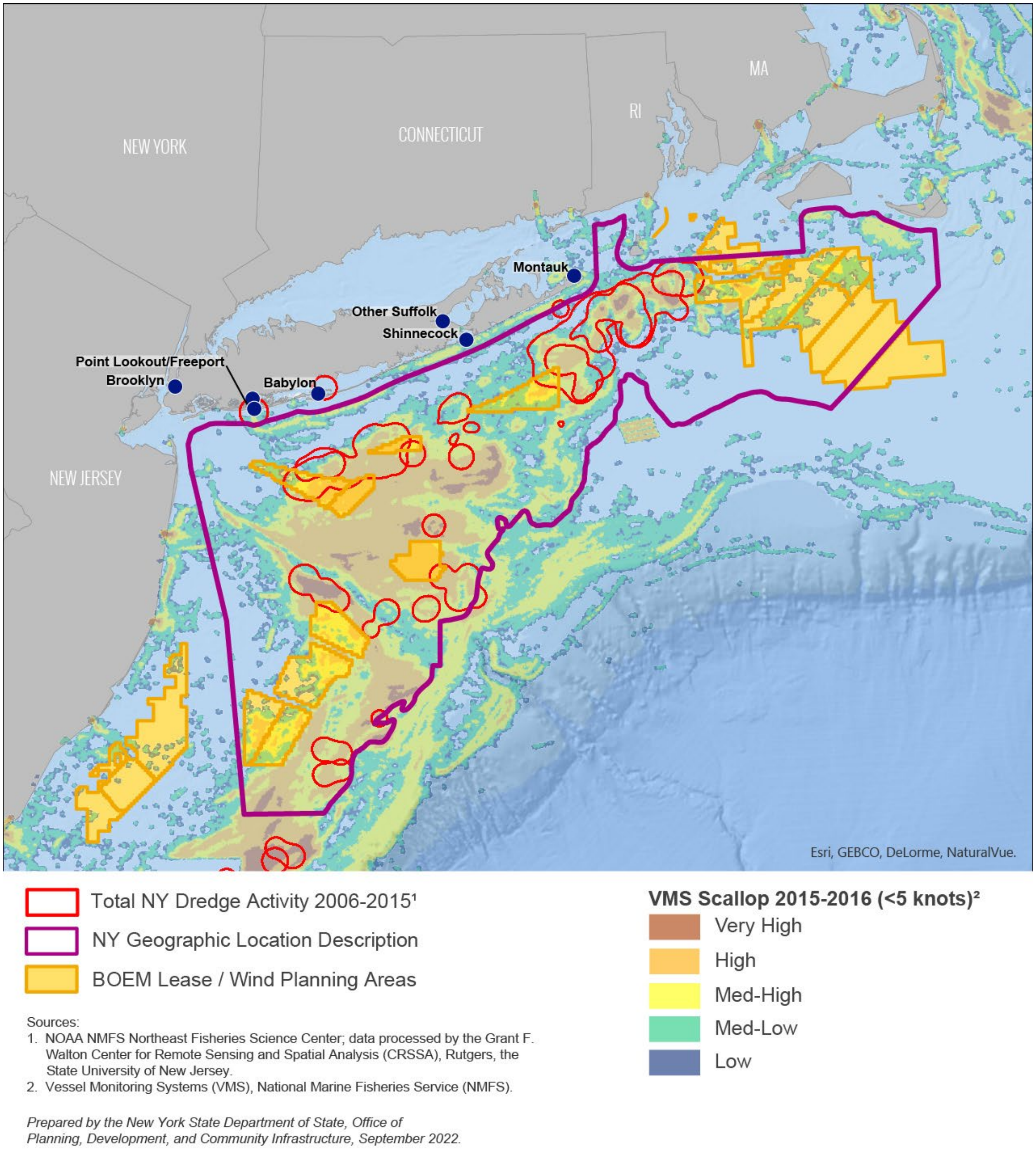

Figure 4. New York hydraulic dredge fishing targeting scallop beds in the GLD.

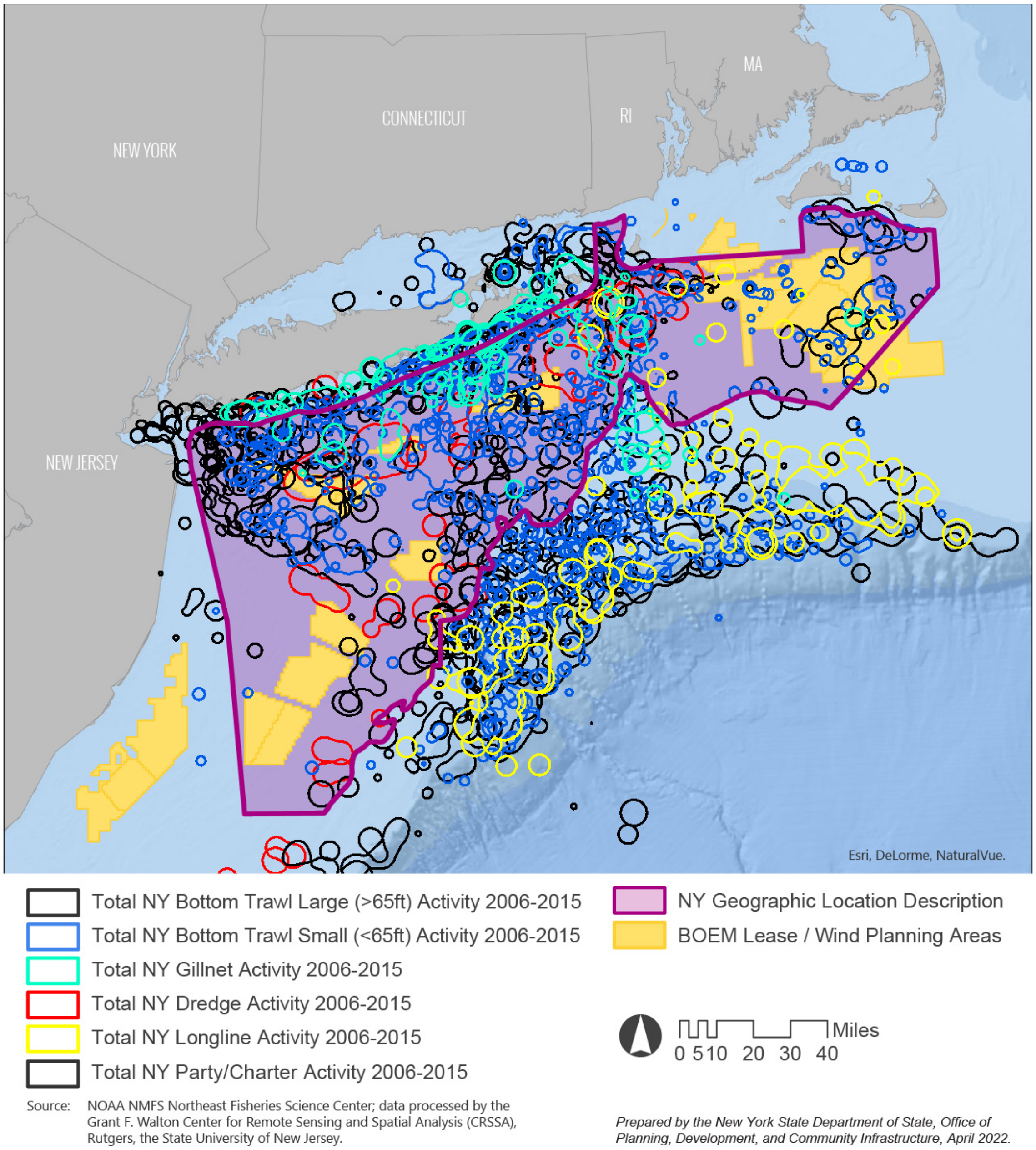

Figure 5. New York Communities At Sea data for all gear types in the GLD, 20016-2015.

A number of datasets are used to characterize the location and intensity of use by the State's for-hire fishermen. The Cornell Cooperative Extension Marine Program collected information from New York for-hire fishermen to identify key fishing areas for DOS, target species, and gear (Table 3).[16] Survey results from this study were used to map important fishing grounds used by recreational and for-hire fishermen

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[16] Scotti et al. (n.d.)

(Figure 10, see also Section 4.2.2). VTR data also provide an important timeseries that documents the diversity of ports and target species reported in for-hire trips to federal waters (Table 4). **Communities at Sea party/charter data showcase Captree and Montauk as generating the highest charter fishing activity of any port from southern Massachusetts to Cape May, New Jersey (Figure 6).** In addition to the peak charter fishing occurring closer to these ports, these data show for-hire vessels targeting highly migratory species (HMS) like bluefin tuna, Atlantic sailfish, blue marlin, sharks, and swordfish by traveling to the center of the GLD and beyond to the shelf slope (Figure 6). New York's for-hire fishery covers a broad geography, with regionally significant activity occurring within the GLD south of New York City and Long Island.

Table 3. Summary of Qualitative For-Hire Boatmen in New York. Adapted from Scotti et al. (n.d.)

Port	Primary Fishery	Gear Type
Shinnecock	fluke, black sea bass, striped bass, scup, bluefish, tautog (blackfish), tuna, cod; spring, summer, fall species	rod and reel
Captree	black sea bass, scup, fluke, bluefish, cod	hook and line
Brooklyn (Sheepshead Bay)	blackfish, seabass, bluefish, cod, red hake (ling), fluke, scup, striped bass	rod and reel

Table 4. Top ports and species for NYS federal party / for-hire charter trips by year.

Year	Top Ports	Top Species
2019	Montauk, Babylon (Captree), Suffolk County, Point Lookout, Shinnecock, Brooklyn, Freeport	scup, red hake, black sea bass, bluefish, fluke, sea robin, striped bass, Atlantic cod, chub mackerel
2018	Montauk, Babylon (Captree), Suffolk County, Point Lookout, Islip, Brooklyn	scup, black sea bass, red hake, fluke, bluefish, sea robin, striped bass, chub mackerel, tautog, Atlantic cod
2017	Montauk, Babylon (Captree), Islip, Point Lookout, Brooklyn, Port Jefferson	scup, black sea bass, bluefish, red hake, fluke, striped bass, sea robin, tautog, Atlantic cod
2016	Montauk, Babylon (Captree), Islip, Brooklyn, Point Lookout, Port Jefferson	scup, black sea bass, bluefish, fluke, red hake, sea robin, Atlantic cod, striped bass, tautog
2015	Montauk, Babylon (Captree), Islip, Brooklyn, Point Lookout, Freeport, Hampton Bays	scup, black sea bass, bluefish, fluke, red hake, Atlantic cod, tautog, striped bass, sea robin
2014	Montauk, Babylon (Captree), Brooklyn, Point Lookout, Islip, Port Jefferson, Freeport	scup, black sea bass, red hake, bluefish, fluke, striped bass, tautog, Atlantic cod, sea robin
2013	Montauk, Babylon (Captree), Brooklyn, Point Lookout, Port Jefferson, Freeport	scup, black sea bass, bluefish, red hake, fluke, striped bass, Atlantic cod, tautog, sea robin
2012	Montauk, Babylon (Captree), Brooklyn, Point Lookout, Port Jefferson	scup, black sea bass, red hake, bluefish, Atlantic mackerel, fluke, striped bass, longfin squid
Source: ACCSP Federal VTR trips with landings in NYS. Date of Query: 8/21/2020		

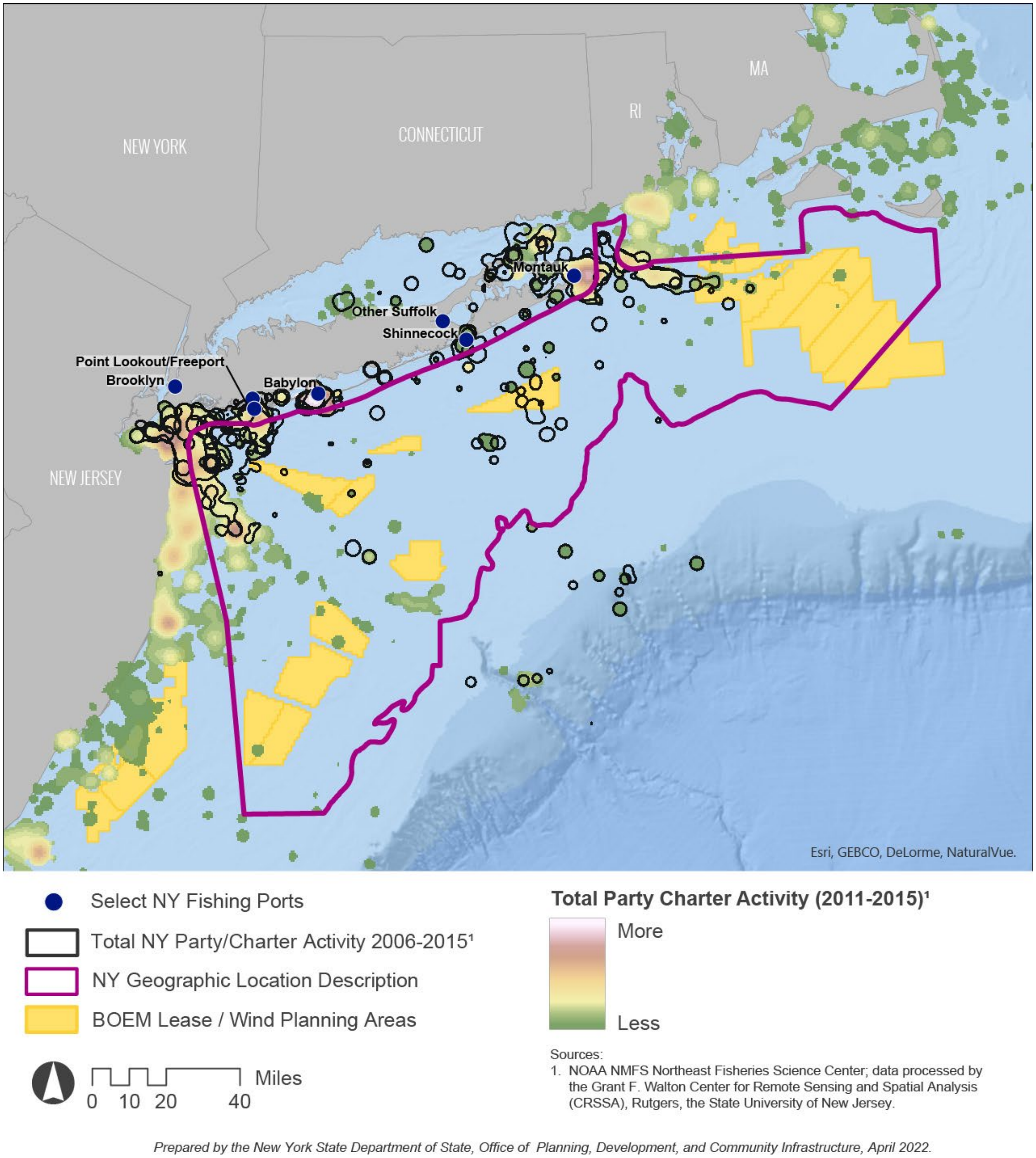

Figure 6. New York State For-Hire Fishing, total trips from 2011-2015.

Safe and efficient access to traditional fishing grounds is a critical topic for New York's fishing fleet. Fishing vessels represent a significant subset of users in the GLD; however, these vessels are typically not well represented in published datasets (i.e., AIS, vessel monitoring system [VMS]) due to different federal reporting requirements for smaller vessel size classes. Various workshops and stakeholder outreach efforts held in 2018 and 2019 generated valuable maps and discussions that provide the most comprehensive available characterization of existing commercial fishing transit and transit needs in the GLD.

There are distinct differences between fishing vessel transit patterns in southern New England waters compared to transit in the New York Bight. Assessments in southern New England waters illustrate that New York commercial fishermen require efficient east-west corridors through the MA WEA (yellow routes shown in Figure 7) to access fishing grounds for squid, scallop, whiting, and butterfish that are collectively located south of Nantucket and Martha's Vineyard, Massachusetts and west of Nantucket Shoals (e.g., Nantucket Lightship Closed Area, Lydonia Canyon).[17,18] Transit routes eastward from Montauk through the MA WEA are further illustrated in draft transit data showing routes to and from productive fishing grounds on Georges Bank (Figure 8). The draft Declared Out of Fishery Transit data depict movements of vessels targeting unmanaged fisheries like whiting and validates anecdotal information provided by New York fishermen (Figure 8). In the New York Bight, the NYS Fisheries Technical Working Group (F-TWG) compiled existing commercial fishing transit routes representing over 150 fishing vessels.[19] Many important fishing routes to and from New York are apparent in the survey data, including prominent routes from Montauk and Shinnecock, NY to fishing grounds in the GLD and a pronounced cluster of routes connecting points along New Jersey to eastern Long Island and from Long Island to Point Judith, RI (Figure 9). Transit patterns south and southwest of New York fishing ports that provide access to three main areas will need to be preserved: to fishing grounds in the central Bight, to the OCS shelf edge, and access between New York and New Jersey fishing ports (Figure 9). The New York Bight transit data reflect multi-vector fishing trips: port to port, port to fishing ground, and fishing ground to another port. Collectively, these data represent snapshots of fishing vessel routes used across all seasons and multiple years to reveal the complex and interconnected nature of New York's commercial fishing activity.

In response to the fishing industry's concerns, BOEM preemptively separated lease areas to create de facto "transit lanes" within the New York Bight WEAs configuration (i.e., the southwestern WEA in the GLD referred to as Hudson South), which marks progress toward reducing the need for carve-outs during the COP phase. Despite this meaningful progress, additional coordination among the developers, regulators, and commercial fishing industry is needed to fully address transit concerns throughout the GLD, including temporary closures during construction, crowding or bottlenecks, and balancing fishing activity in the transit lanes, which are discussed in greater detail in the following sections.

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[17] RODA Fisheries. December 3, 2018 Workshop Documents. https://www.rodafisheries.org/12318-workshop-documents
[18] USCG. 2020. The Areas Offshore of Massachusetts and Rhode Island Port Access Route Study. Dated January 22, 2020. Docket ID: USCG-2019-0131-0050.
[19] NYS F-TWG. 2019. New York Bight Transit Lane Workshop. March 27, 2019. https://nyfisheriestwg.ene.com/Resources/TransitWorkshop

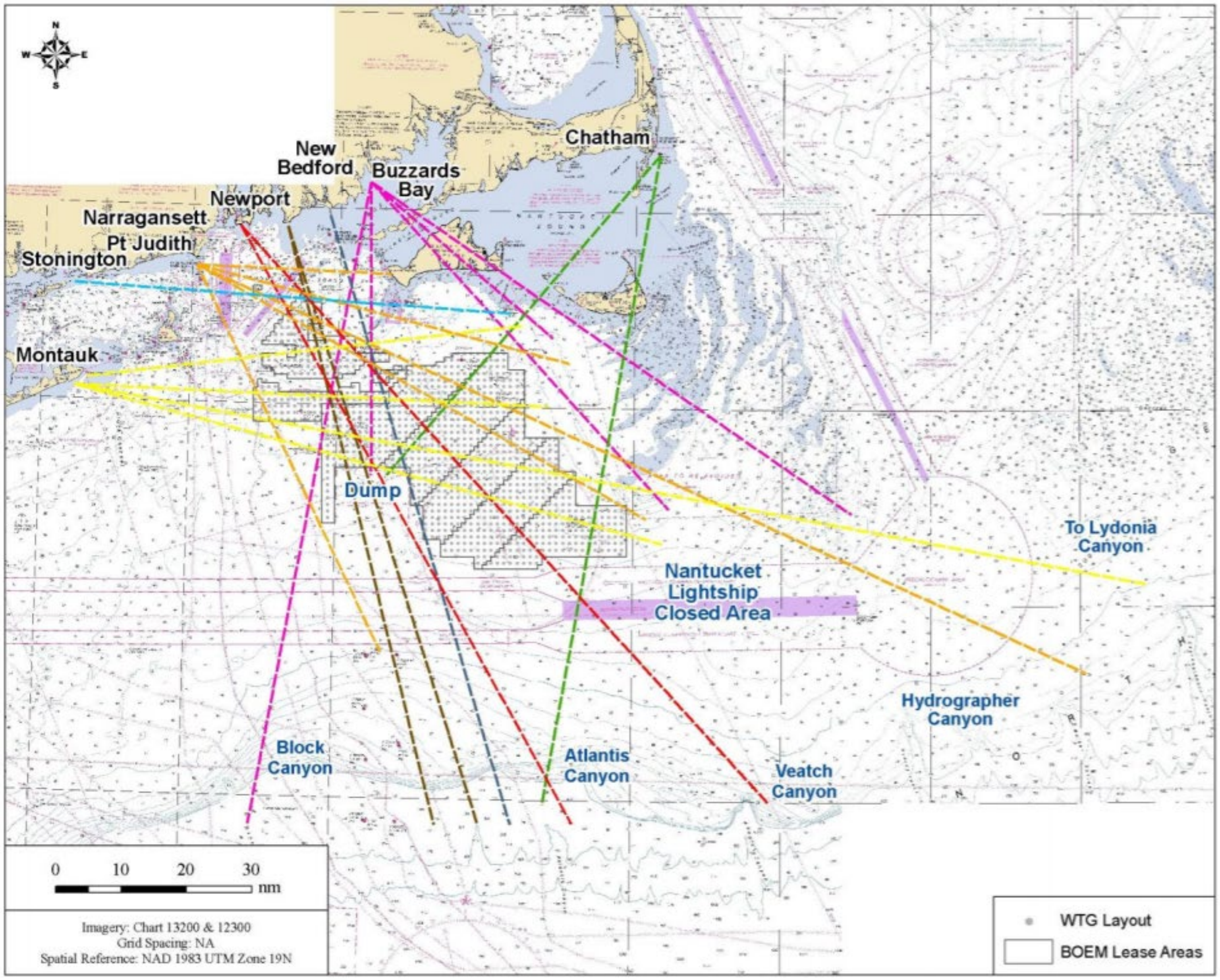

Figure 7. Schematic linking fishing ports to destination fishing grounds through the MA WEA, based upon anecdotal information collected by Vineyard Wind and 2017 and 2018 AIS vessel traffic data. Refer to yellow lines depicting transit routes from Montauk, NY.
Source: Baird (2019)

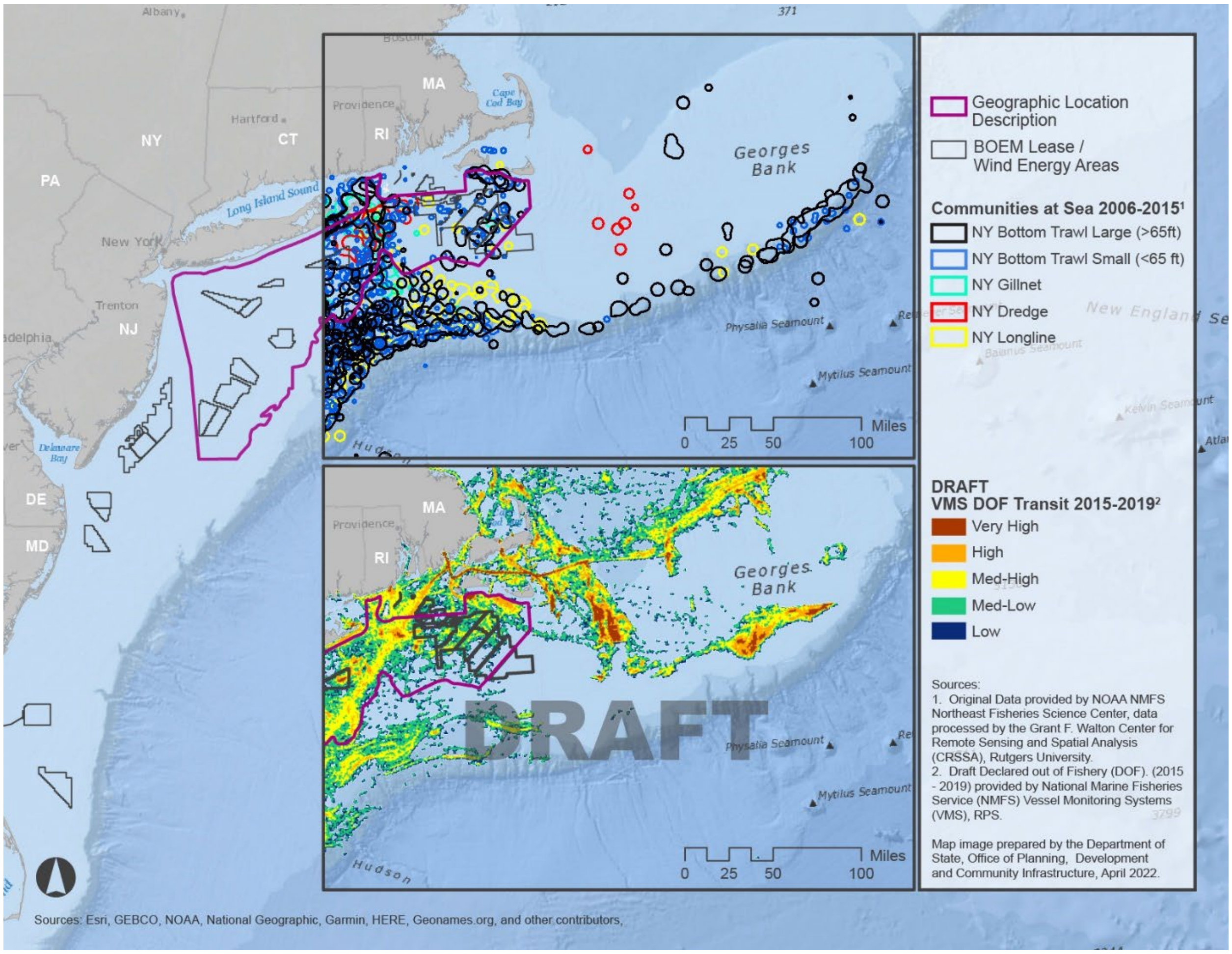

Figure 8. New York State Communities at Sea data juxtaposed with vessel transit from the Vessel Monitoring Systems (VMS) Declared Out of Fishery (DOF) dataset.
Note: DOF dataset is currently in draft form and subject to change.

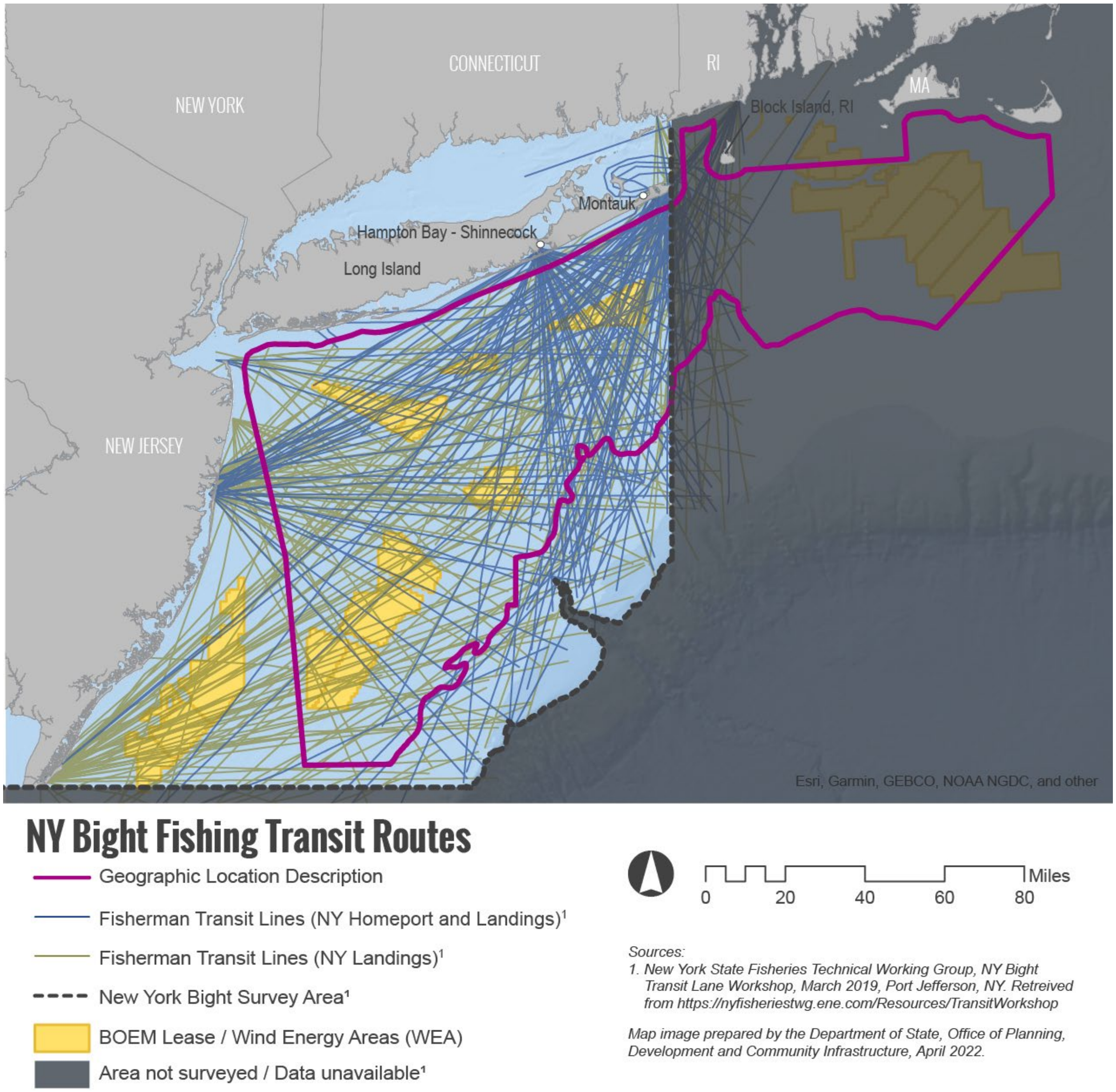

Figure 9. Existing New York Commercial Fishing Vessel Transit Routes in the New York Bight.
Note: These survey results do not include transit through Southern New England waters, which is why the region is grayed out. See prior figures.

4.2.2 Recreational Uses and Resources

Recreational boating focuses on personal and pleasure craft used for sailing, power boating, and fishing and diving activities. Sailors and power boaters use state and federal waters to travel between recreational harbors and other destinations, sightsee, race, fish, dive, or participate in other recreational activities. Figure 10 includes data from the 2012 Northeast Recreational Boater Survey, which targeted marine recreational boaters from New York to Maine whose boats were 10 feet or greater in length and used exclusively in marine waters. Recreational boater routes originate from multiple points along the New York coast, including Freeport, East Moriches, Shinnecock, and Montauk and travel into federal waters (Figure 10). Several boater routes extend from New York to the seaward boundary of the GLD and are likely seeking unique fishing opportunities along the OCS edge.

Recreational fishing is one of the most popular boating activities in New York and federal waters.[20] The Long Island Region, in particular, has the greatest percentage of boating facilities in the State and still has the greatest need for boating facilities State-wide, indicating the high demand for water-dependent recreational activities like fishing.[21] Long Island is ideally situated so that both southern and northern fish species frequent the offshore waters and are readily accessible from a number of bayside harbors. Striped bass, Atlantic cod, winter flounder and mackerel attract many recreational anglers to the GLD in the spring, and bluefish, summer flounder, and Spanish mackerel in the summer.[22] Fall fishing is also popular in the GLD, with recreational fishermen from New York State fishing the fall run of striped bass.

New York recreational anglers on average catch over 4 million fish in federal waters annually. Black sea bass, followed by summer flounder, scup, tautog, and striped bass are typically the top species caught.[23] As shown below in Figure 10, New York recreational anglers target areas along the northern GLD boundary and along the Hudson Valley Shelf leading to the Hudson Canyon.

Long-distance fishing trips to deeper waters of the GLD and to the shelf break are likely targeting highly migratory species (HMS: tunas, billfish, and sharks) in the Atlantic Ocean. A 2011 survey identified a dedicated following of specialized marine anglers in pursuit of these "big game" fish.[24] During the period from June to October 2011, New Yorkers held 1,811 Atlantic HMS Angling permits and took approximately 5,500 private boating trips in pursuit of these species. Of all shark trips, more originated from New York than other states (40%). New York respondents also fished for tuna (11% of all tuna trips from Maine to North Carolina). While these fishermen represent a small fraction of overall recreational angling, they make significantly greater economic contributions compared to average marine anglers.[25] Therefore, this is an important sub-set of New York recreational anglers who use the GLD.

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[20] Starbuck K, Lipsky A. SeaPlan. 2012. Northeast Recreational Boater Survey: A Socioeconomic and Spatial Characterization of Recreational Boating in Coastal and Ocean Waters of the Northeast United States. Technical Report Dec 2013. Boston (MA): Doc #121.13.10, p.105.

[21] New York State Office of Parks, Recreation and Historic Preservation. 2019. Statewide Comprehensive Outdoor Recreation Plan: Improving our Visitors' Experience through Inclusivity, Diversity and Resiliency, 2020-2025. Available at: https://parks.ny.gov/documents/inside-our-agency/20202025StatewideComprehensiveOutdoorRecreationPlan.pdf

[22] https://www.dec.ny.gov/outdoor/7755.html

[23] NOAA Fisheries MRIP CATCH TIME SERIES Total Catch in Ocean (>3mi) by New York Private/Rental Boats. Queried 8/2021.

[24] Hutt et al. 2014. The Economic Contribution of Atlantic Highly Migratory Species Angling Permit Holders in New England and the Mid-Atlantic, 2011. NOAA Technical Memorandum NMFS-F/SPO-147.

[25] *Ibid.*

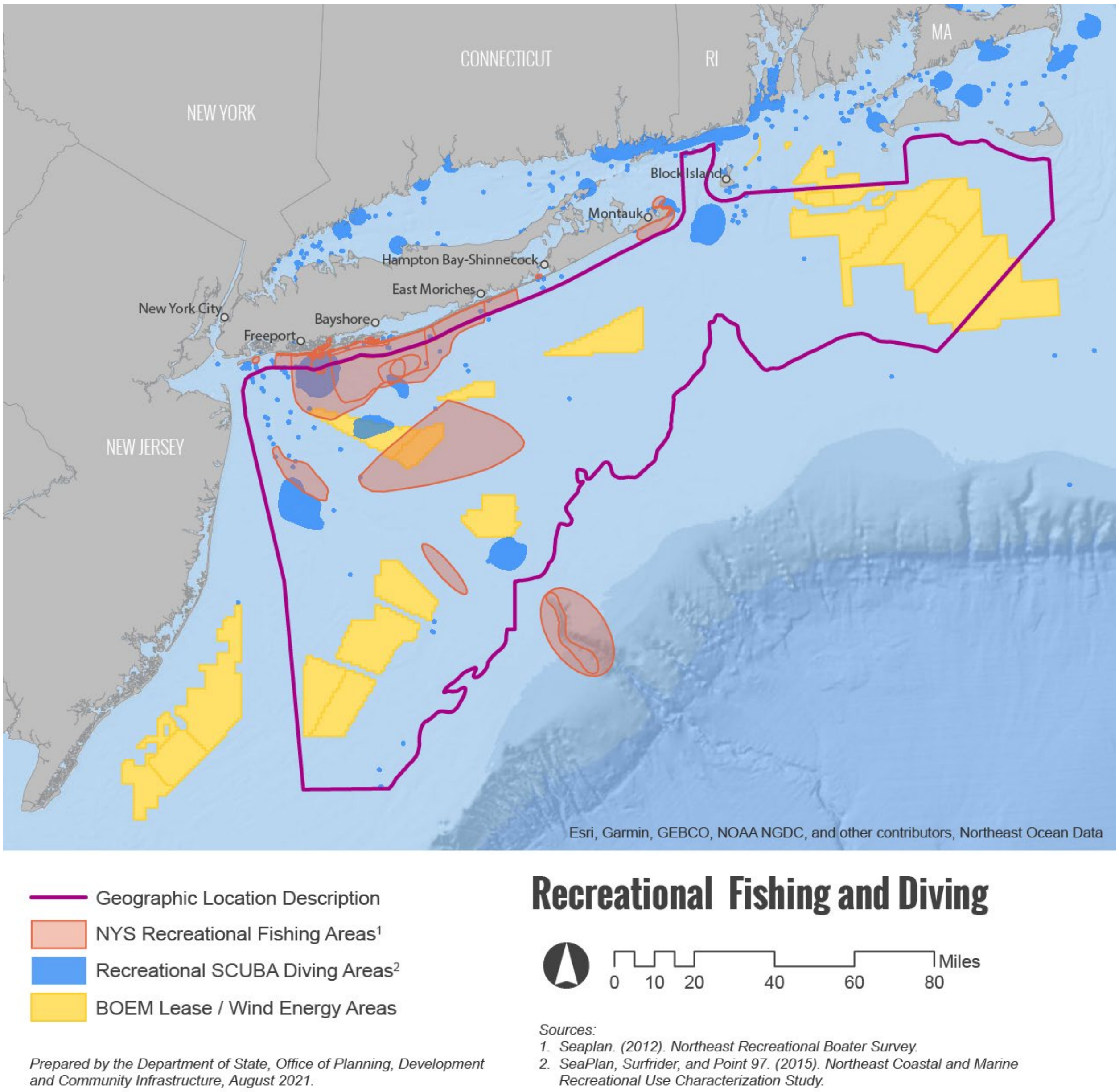

Figure 10. Recreational fishing and diving in the GLD.

Shipwrecks, natural or artificial reefs, and canyons in the GLD serve as offshore fishing and diving sites. These sites feature structural habitat important to fisheries and fish communities. A recent evaluation of New York's offshore wind study area identified a total of 60 charted and uncharted wrecks, almost entirely vessel shipwrecks.[26]

There are multiple mapped dive sites in the GLD and both New York City and Long Island that are home to several diving centers and clubs. There is a higher concentration of dive sites in the western portion of

[26] NYSERDA. 2018. New York State Offshore Wind Master Plan. Cultural Resources Study. Report 17-25h.

the proposed GLD area and off Montauk and south of Block Island, according to a study of scuba diving locations region-wide in the Northeast U.S. (Figure 10). Six dive sites within the GLD are considered sensitive and appear as large blue areas in Figure 10, primarily located south and southeast of Freeport, NY. Diving activity occurs year-round but is concentrated during the months of May through October.[27]

Boat-based wildlife viewing in the GLD consists primarily of bird watching (pelagic and shorebirds) and whale watching aboard charter vessels. Documented bird watching areas occur off the coast of Long Island where it typically pairs with fishing activities and other recreational boating along the northern boundary of the GLD near Jones Inlet, the waters off Fire Island Inlet, and Moriches Inlet (Figure 11). Cruises from Montauk occur approximately weekly from late June through early September. Another documented large wildlife viewing area stretches over 60 nautical miles from Jones Inlet to Hudson Canyon and is used by charter vessels specifically for pelagic bird watching during the winter (Figure 11). Pelagic bird watching occurs across the continental shelf, continental slope, canyons, and beyond through both commercial charter vessels and personal craft.[28] The offshore bird concentrations also lead to exceptional birdwatching along the Long Island shoreline that is a year-round activity enjoyed at hot spots near Jones Beach and Montauk Point.[29]

New York's whale watching operations are concentrated in three general use areas: outside of New York Harbor, south of Long Island, and east of Montauk.[30] Tours are primarily scheduled from spring through fall, typically peaking in June, July, and August, with some NY-based tour companies offering cruises year-round (Figure 12). The Commercial Whale Watching Areas in Figure 11 are based entirely on vessel track data originating from New York Harbor. The Gotham Whale tours operate from the western portion of the GLD off New Jersey, toward the eastern tip of Long Island, and as far south as the continental shelf slope. Local whale watching cruises leaving Montauk travel east about 20 nm primarily south of Block Island as part of weekly tours during the summer months. Longer trips of approximately 40 nm are made to the eastern boundary of the MA WEA (Figure 11). Similarly, the citizen science sitings can serve as a proxy for trip frequency to specific locations. Offshore whale and pelagic bird watching cruises also leave from Montauk heading east to the Great South Channel, out past Nantucket Island and back during July and August (see Transit data in Figure 11). New York's commercial whale watching areas extend to the extremities of the GLD, off Rhode Island, Massachusetts, and New Jersey and represent a significant recreational industry for the State.

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[27] NYSERDA. 2018. New York State Offshore Wind Master Plan, Marine Recreational Uses Study. Report 17-25m.
[28] *Ibid.*
[29] https://www.audubon.org/news/birding-new-york
[30] Three major New York-based touring companies are: Gotham Whale and Hornblower Cruises departing from New York City; Long Island Whale and Seal watching in Freeport, NY, and Viking Fleet out of Montauk, NY.

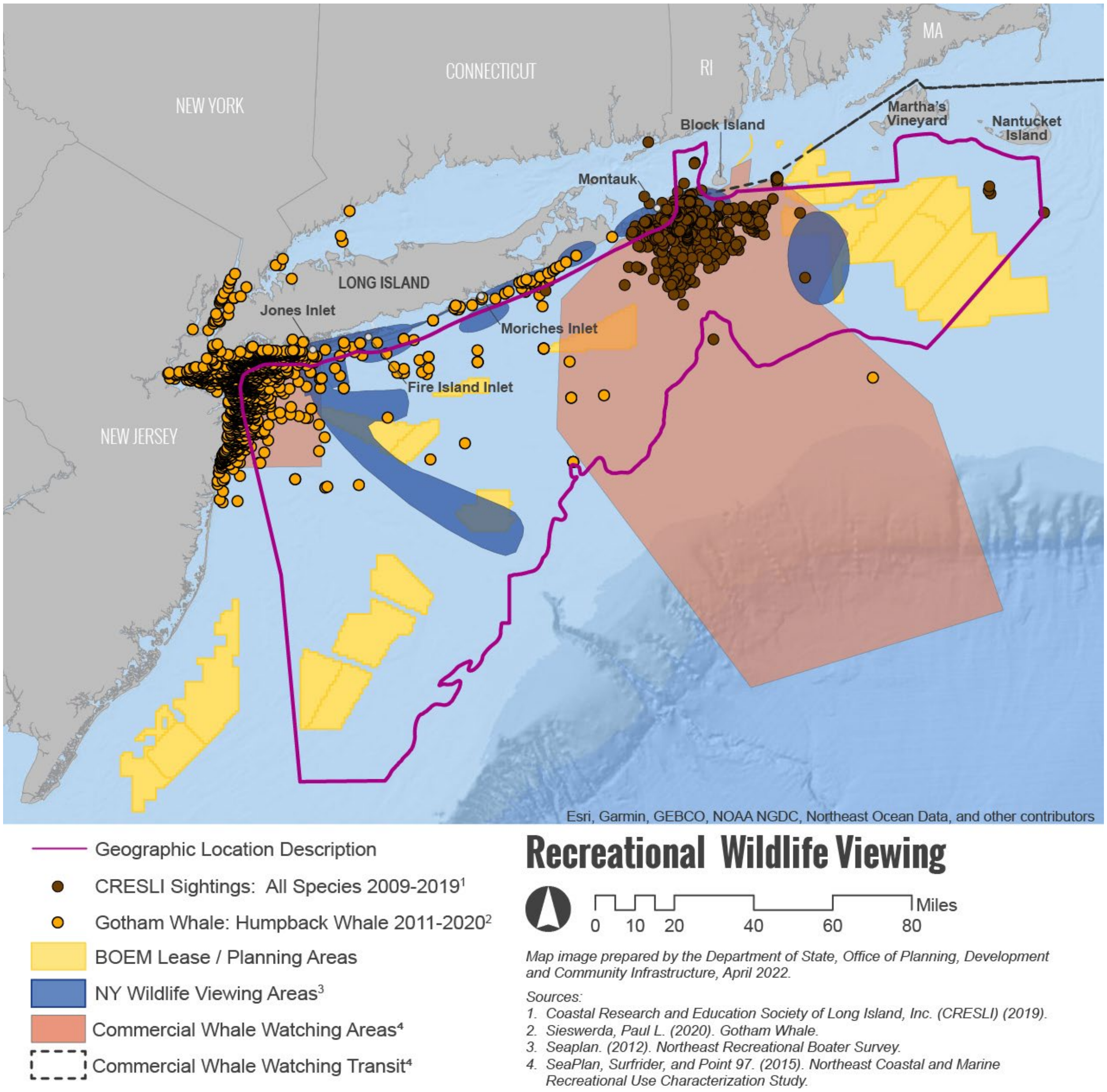

Figure 11. Recreational wildlife viewing in the GLD.

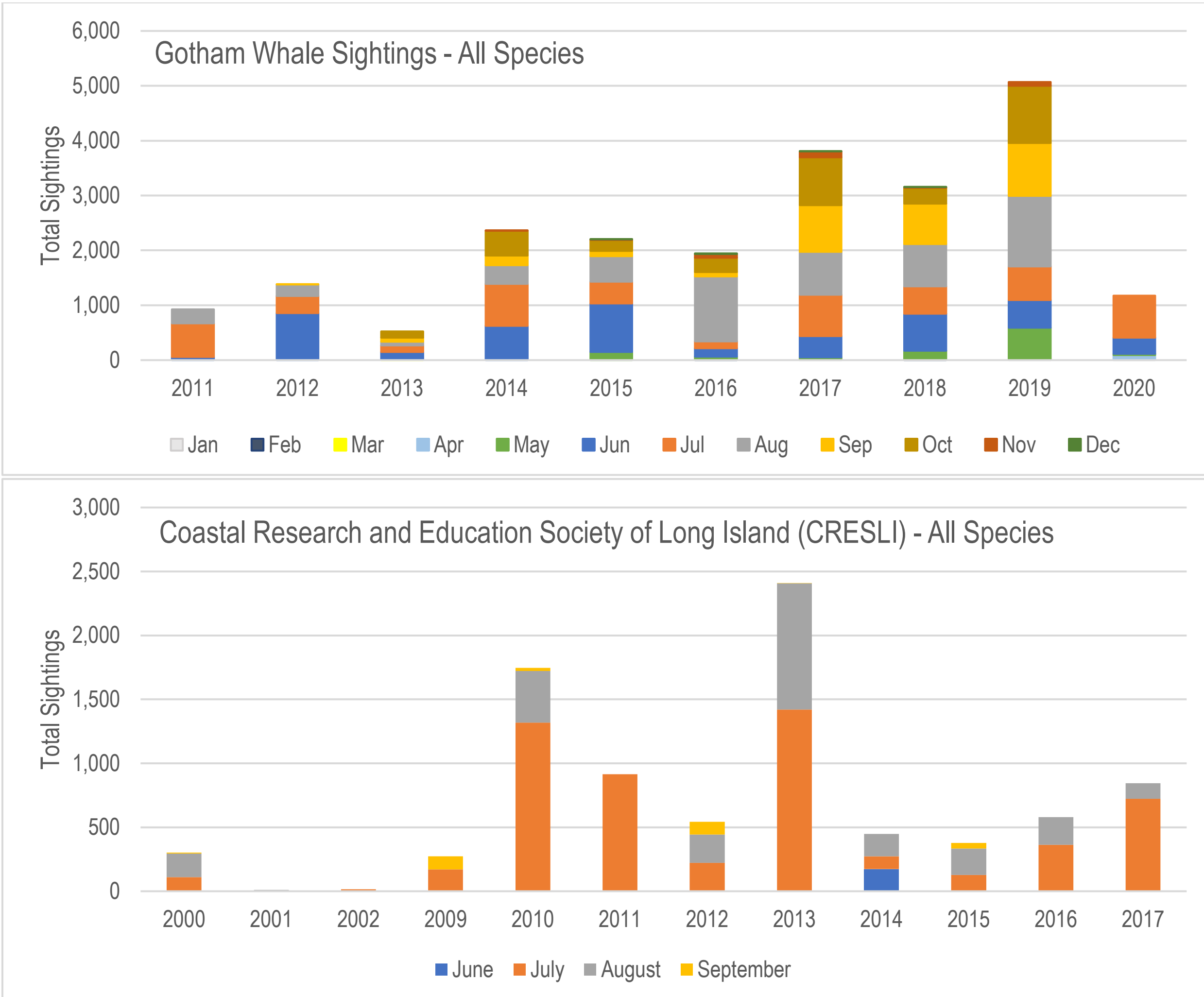

Figure 12. Total marine mammal sightings by month from NY-based citizen science groups.

Excursions, like recreational fishing, whale watching, and wildlife viewing, would not be possible without healthy ocean ecosystems. New York State has prioritized protecting and maintaining marine habitats, not just for a particular species group, but in recognition that ensuring the ecological integrity of the ocean ecosystem will provide long-term direct benefits to ocean users and industries. To highlight this, additional detail is provided on habitat use patterns of iconic large whale species that attract wildlife enthusiasts.

Large Whale Species

The New York Ocean Action Plan focuses on six large whale species, which are commonly found in the New York Bight and also represent some of the most threatened species in the U.S. These include fin whale (*Balaenoptera physalus*), humpback whale (*Megaptera novaeangliae*), North Atlantic right whale (*Eubalaena glacialis)*, blue whale (*Balaenoptera musculus)*, sei whale (*Balaenaoptera borealis*), and sperm whale (*Physeter macrocephalus*).[31] The distribution, density and seasonal use of these cetaceans (right whale analyzed separately; see paragraph below) were modeled in the New York State Offshore Wind Master Plan.[32] The sei, blue, fin, and sperm whales were analyzed as a group and predicted to generally occupy habitats near or on the shelf slope, with the Hudson Canyon predicted to be a high-use area.[33] Humpback whale densities were analyzed with other baleen whales and are predicted to have greatest occurrence year-round in the New York Bight.[34]

New York State has undertaken a multi-year baseline monitoring program that includes NYSERDA-sponsored aerial surveys, aerial surveys sponsored by the New York State Department of Environmental Conservation (NYSDEC), and NYSDEC-sponsored acoustic monitoring. Data from aerial surveys indicate that fin and humpback whales can be found throughout the New York Bight during most times of the year, and, based upon the relatively large number of sightings and observed behaviors, the New York Bight can be considered part of the fin and humpback whales' seasonal feeding grounds, at least in some years (Figure 13).[35] Sperm whales were observed across all seasons near the shelf edge and deeper. Sei and blue whales appear to be relatively rare. These observations combined with passive acoustic monitoring demonstrate critical uses within the GLD that are not always apparent in predictive modeling.[36] In total, large whales were most frequently sighted within the study on the expansive continental shelf in waters less than 200m deep (5.2 whales/1,000 km effort).[37] The abundance of large whale species in nearshore and shelf waters of the GLD has attracted and supported New York's growing whale watching industry.

The North Atlantic right whale is particularly vulnerable due to its low population size, which was estimated around 400 individuals in 2019.[38] Right whales make extensive movements within and between habitats off the mid-Atlantic states. While New York's density modeling and aerial surveys were conducted on a smaller geographic area than the GLD, this research demonstrates relatively higher occurrence of North Atlantic right whale off New York State during fall through spring and in many cases in nearshore waters (< 25 km from shore).[39, 40] Overall, right whales exhibited resting behavior, so it is still unclear why right whales consistently occupy the waters of the New York Bight and how these habitats may be important.[41]

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[31] NYSDEC. https://www.dec.ny.gov/lands/113647.html
[32] NYSERDA. 2018. New York State Offshore Wind Master Plan, Marine Mammals and Sea Turtles Study. Report 17-25L.
[33] *Ibid*, Figure 11
[34] *Ibid*, Figure 6
[35] Tetra Tech and LGL. 2020. Final Comprehensive Report for New York Bight Whale Monitoring Aerial Surveys, March 2017 – February 2020. Technical report prepared by Tetra Tech, Inc. and LGL Ecological Research Associates, Inc. 211 pp. + appendices. Prepared for New York State Department of Environmental Conservation, Division of Marine Resources, East Setauket, NY. May 18, 2020https://www.dec.ny.gov/lands/113818.html
[36] *Ibid*
[37] *Ibid*
[38] NOAA Fisheries. 2020. "North Atlantic Right Whale". https://www.fisheries.noaa.gov/species/north-atlantic-right-whale
[39] NYSERDA (2018). Report 17-25L. Figure 13.
[40] Tetra Tech and LGL (2020)
[41] *Ibid* and Estabrook, B. J., K. B. Hodge, D. P. Salisbury, A. Rahaman, D. Ponirakis, D. V. Harris, J. M. Zeh, S. E. Parks, A. N. Rice. 2021. Final Report for New York Bight Whale Monitoring Passive Acoustic Surveys October 2017- October 2020. Contract C009925. New York State Department of Environmental Conservation. East Setauket, NY.

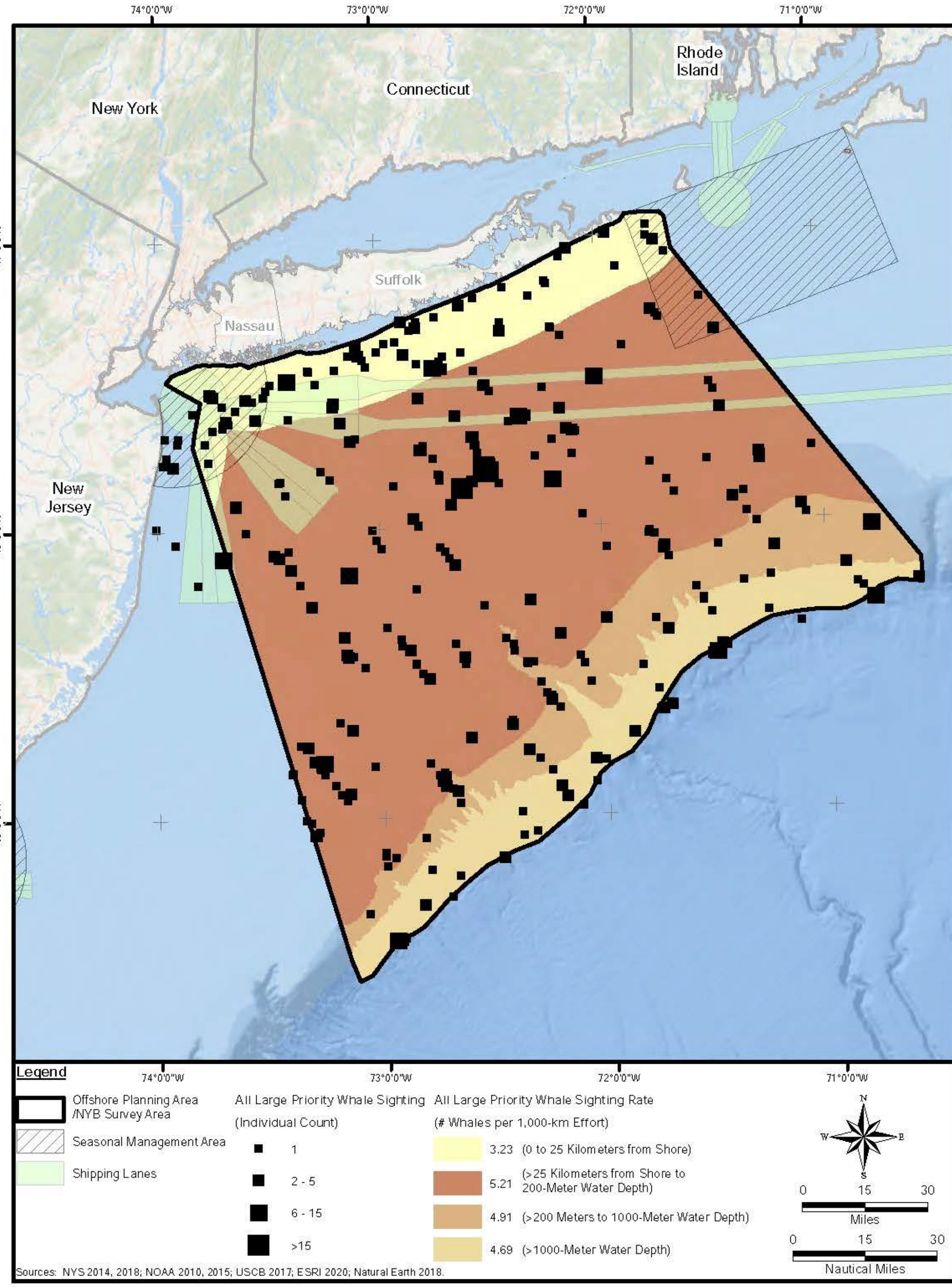

Figure 13. New York Bight Whale Monitoring: aerial survey sighting rates for all priority large whale species by habitat class, March 2017 – February 2020.
Source: NYSDEC Final Comprehensive Report for New York Bight Whale Monitoring Aerial Surveys, March 2017 – February 2020 (Tetra Tech and LGL 2020).

4.3 How the State has a Specific Interest in the Resource or Use (§ 923.84(d) (3))

This section discusses how commercial and for-hire fishing uses and recreational uses and resources that may be affected by renewable energy activities have direct connections to New York's coastal area.

Additionally, while not an analyzed coastal use or resource, it is important to acknowledge that the existing WEAs in the GLD are critical to achieving the State's ambitious offshore wind targets. New York played a pivotal role in BOEM's designation of the NY Bight WEAs. On October 2, 2017, the State of New York submitted to BOEM a document entitled State of New York's Area for Consideration. This document recommended an area of the New York Bight that the State had determined to be most desirable for future offshore wind development, based on its compilation and analysis of scientific, stakeholder and analytical data. BOEM took the State's recommendation into account in designating areas for the Call for Information and Nominations (Call), and considered the data and analyses generated by the State at subsequent stages of its planning and leasing process in the NY Bight. The areas for consideration evolved into what were designated in 2021 as the final NY Bight WEAs. Other WEAs have also become essential to New York's offshore wind project portfolio, namely projects located in the NY, RI/MA, and MA WEAs with executed power purchase agreements.

4.3.1 Commercial and For-Hire Fishing

New York has interest in optimizing and maintaining economic benefits associated with commercial and for-hire fishing industries that occur in the GLD. Because of their economic importance to fishing industries, the fisheries and associated species habitats are also of direct interest to the State.

New York's fishing and seafood-related commercial activities contributed approximately $558.1 million GDP to the State's economy in 2019.[42] Commercial fishing is an important driver of this economy, with annual commercial landings in New York State from 2011-2019 averaging approximately $53 million (Table 1). The offshore fisheries, including for-hire fisheries, support thousands of jobs and hundreds of Long Island businesses that represent a hybrid of local-serving, resource-dependent, and traded industries to New York City, regionally, and globally.

New York's commercial fishing ports are regionally and culturally significant areas, critical to preserving our small harbor areas and working waterfronts. The State's fishing ports are primarily located on Long Island, with Montauk being the largest. On average, Montauk fishermen land approximately $16 million of fish annually, representing 34% of the State's total landings by value from 2011 through 2019 (Table 5). For the same timeframe, Montauk contributed 22% of landings by pound for the State. The commercial fishing port in Hampton Bays, New York is also a significant fishing port on Long Island's South Shore that on average contributed 12% annually in landings by value and 10% annually in pounds landed during that period (Table 5).

[42] NOAA Economics: National Ocean Watch (ENOW). New York State – Living Resources. Accessed June 2, 2022. https://coast.noaa.gov/enowexplorer/#/gdp/livingresources/2016/36000.

Table 5. Commercial fish landings for available ports in New York, 2011-2019.

NYS Landings by Port/Year (Dollars)										
Port	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**% of Average**
Montauk	$18,697,554	$21,214,149	$17,778,859	$17,448,644	$16,132,208	$16,437,390	$14,977,948	$17,329,088	$17,844,009	34%
Hampton Bays	$7,032,036	$7,670,517	$6,852,703	$5,623,445	$5,025,474	$7,983,349	$6,539,362	$5,902,378	$5,668,152	12%
Shinnecock	$370,414	$1,666,860	$2,266,749	$1,746,531	$1,222,892	$1,403,837	$1,885,231	$1,335,689	$1,048,374	3%
Point Lookout	$2,815,235	$2,316,068	$1,377,495	$1,070,699	$144,272	$1,327,435	$146,809	$79,432	$74,403	2%
Freeport	$524,281	$464,819	$288,531	$278,408	$487,066	$406,809	$380,837	$471,851	$356,693	1%
Mattituck	$523,910	$711,748	$734,741	$499,632	$595,712	$460,806	$642,324	$434,650	$509,236	1%
Amagansett	$508,728	$513,145	$520,502	$473,391	$492,358	$376,339	$343,341	$333,899	$309,105	1%
Oceanside	$5,279	$6,483	$26,656	$11,660	$1,013,022	$1,048,497	$529,698	$167,527	$415,484	1%
Islip	$756,773	$750,461	$508,017	$477,299	$376,085	$442,532	$623,935	$265,698	$735,194	1%
New York Total	$50,454,598	$54,904,005	$57,225,131	$56,734,233	$69,034,587	$52,384,313	$48,674,914	$48,565,739	$39,168,658	-
NYS Landings by Port/Year (lbs)										
Port	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**% of Average**
Montauk	14,947,989	16,388,419	13,945,904	12,588,249	11,969,243	12,428,369	10,886,262	11,578,904	11,869,535	22%
Hampton Bays	6,790,396	8,711,377	6,738,944	5,451,073	4,447,812	6,533,922	4,744,994	4,295,373	4,397,910	10%
Oceanside	1,862	3,691	9,421	8,083	7,866,638	8,177,036	4,040,000	988,771	2,847,335	4%
Shinnecock	395,194	1,977,909	2,915,274	1,837,350	1,281,849	809,959	1,901,739	813,172	846,704	2%
Freeport	493,617	372,768	166,424	261,392	2,187,867	1,274,381	1,127,852	1,293,743	1,030,709	2%
Point Lookout	2,568,313	2,259,730	1,578,318	889,470	135,997	1,075,914	127,363	83,079	54,572	2%
Islip	442,408	324,664	185,012	156,830	117,359	183,971	932,753	555,680	978,467	1%
Mattituck	443,493	782,221	738,431	601,847	703,120	546,839	585,288	528,004	477,051	1%
Amagansett	493,377	433,930	439,676	409,855	344,985	317,417	300,020	310,673	276,301	1%
Riverhead	6,268	6,258	8,054	313,601	529,951	1,403,249	1,081,922	45,602	473,383	1%
New York Total	54,710,628	70,168,801	67,485,918	58,508,117	78,208,079	65,374,145	54,721,301	47,046,400	39,579,461	-

Data Source: ACCSP Federal VTR trips with landings in NYS, queried 8/21/2020.

The prevalence of New York commercial fishing activity in the GLD is supported by socioeconomic analyses of revenue exposure.

NOAA's socioeconomic analysis is available for all active lease areas in the GLD and provides consistent and routinely updated metrics for each lease area based on data from vessel trip reports and dealer reports for managed species in federal waters.[43] Figure 14 shows the total value of fish landed in New York State from 2009 to 2019 for lease areas in the GLD. NOAA's analysis confirms that lease areas within the NY WEA, NY Bight WEA, and MA WEAs present the highest economic exposure for the State, typically exceeding $200,000 over the 10-year period. The remaining lease areas in the GLD yielded lower-valued landings overall, which can be attributed to the availability of higher resolution spatial data in recent years that improved BOEM's process of deconflicting lease areas from traditional fishing grounds. When viewed in conjunction with the Communities at Sea data (Figure 5), it is apparent that the Communities at Sea data do not adequately capture the extent of New York fishing activity in the MA WEA (e.g., compare Hudson North [OCS-A 0544] to Beacon Wind [OCS-A 0520]). In turn, the Communities at Sea data demonstrate that lease areas with lower-valued landings are often proximate to higher valued fishing grounds just beyond the lease area boundary and should be considered part of New York's traditional fishing grounds.

A separate economic analysis conducted by Rhode Island Department of Environmental Management (RIDEM) presented two valuation approaches for commercial fishing economic exposure: the weighted value of portions of a trip within the WEA versus the total value inclusive of all points within a fishing trip (i.e., not adjusted to the segment of the trip within the WEA boundary).[44] The latter method acknowledges that more of a trip may be affected than just the portion that occurs within the lease area and concedes that the true economic exposure is likely somewhere between these two valuation methods. Total New York non-confidential landings from 2011-2016 were valued at between $1.0 million and $6.3 million for the MA WEA.[45] Non-confidential landings from the NY WEA were valued between $0.6 million and $3.3 million from 2011-2016. Comparable analyses from that study are not available for other lease areas in the GLD.

These commercial fishing economic exposure analyses have been informative tools for coastal managers to characterize the relative vulnerability of commercial fishing industries to offshore wind development. It is important to note that the high-valued sea scallop fishery skews these results toward states with more sea scallop landings. Another consideration to be mindful of is that the analyses were performed for the lease areas and do not consider export cable routes, installation and maintenance, or other activities that could affect fishing activity or shoreside industries, and thus underestimate the full potential impact of a project to the commercial fishing industry.

[43] https://www.fisheries.noaa.gov/resource/data/socioeconomic-impacts-atlantic-offshore-wind-development
[44] RIDEM. 2017. Spatiotemporal and economic analysis of vessel monitoring system data within wind energy areas in the Greater North Atlantic. Available at http://www.dem.ri.gov/programs/marine-fisheries/offshore-wind.php[45] *Ibid.* See Addendum 1 for more information on valuation methods of total trips, which represents the dollar maximum.
[45] *Ibid.* See Addendum 1 for more information on valuation methods of total trips, which represents the dollar maximum.

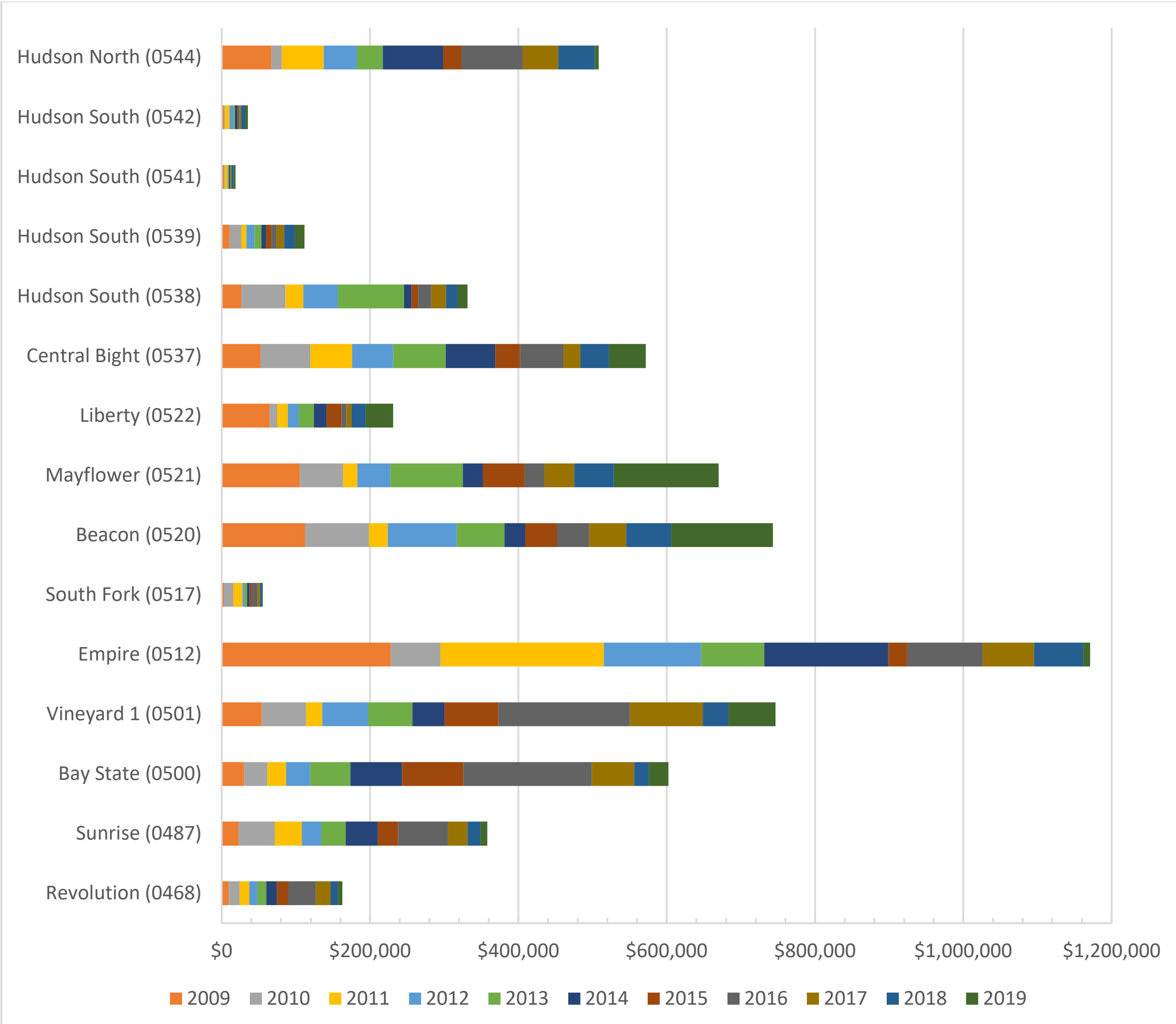

Figure 14. New York commercial fishing revenue for BOEM Lease Areas in the GLD, 2009-2019.
Notes: Values provided in 2019 dollars; parenthetical numbers correspond to BOEM Lease Areas beginning with "OCS-A"; lease areas OCS-A 0468 (Revolution Wind) and OCS-A 0522 (Liberty Wind) are included for reference despite being located outside of the GLD.

Source: NOAA Landing and Revenue Data for Wind Energy Areas, queried on 8/18/2021 from https://www.fisheries.noaa.gov/resource/data/socioeconomic-impacts-atlantic-offshore-wind-development.

In addition to protecting commercial fishing activity, the State has a specific interest in the economically valuable fishing grounds and the habitats in the GLD critical to sustaining these fisheries.

New York's top landed fishery by dollar value is longfin squid and it is of significance to fishing fleets hailing from Montauk, Shinnecock, and Hampton Bay. This species is commonly found in continental shelf and upper continental slope waters. Squid are known to lay their eggs on rocks and small boulders in sandy and muddy bottoms, making these offshore habitats critical for squid reproduction. Adult squid are also an ecologically important food source for many marine organisms including marine mammals and fish, such as bluefish and striped bass. Squid biology and behavior influence fishing practices, from the wider trawl door spread (73-99 m) to herd mobile aggregations, smaller mesh sizes for capturing small, flexible squid, to varying tow directions along bathymetric contours to maximize catch.

Annually across all Atlantic states, New York lands over 20% by value and in some years more than 30% by pound of longfin squid.[46] In the mid-Atlantic, New York and New Jersey account for almost all of the longfin squid landings. New York fishermen also harvest squid from southern New England waters. A New York-based commercial fishing organization commented to the Coast Guard in 2019 that fishing grounds in and near the MA WEA have been historically fished "for over 40 years by New York's fishermen. In fact, in some years, 90 percent of their June through September summer season has been spent in the Vineyard Wind WEA catching squid."[47] This fishery has grown significantly in recent years, experiencing more than an 80% increase in commercial revenue and landings between 2007 and 2016 in the mid-Atlantic.[48] In 2016 and 2019, annual New York squid landings totaled nearly $8 million and topped $8 million in 2012 (Table 1). While the State's squid landings fluctuate annually, due in large part to the species' short life history and high interannual variability in its geographic distributions, total landings have generally grown over the years.

Many New York squid fishermen also target silver hake using small-mesh trawl gear. Silver hake are both an important prey species and an important ocean predator in the Middle Atlantic Bight and Southern New England waters, believed to influence population dynamics of other fish species and even its own population as adults commonly cannibalize on juvenile and other adult silver hake.[49] They are also an important predator of squid, which is conducive to fishing for both species. Juvenile and adult silver hake are often found on silt-sand bottoms, with a preference for biogenic depressions or associations with amphipod mats, sand waves, and shell fragments.[50] While flat sandy-bottom habitats are common in the GLD, the species associations with biogenic depressions and sand wave troughs are anticipated to make them vulnerable to impacts resulting from offshore wind development.

New York has a strong offshore scup fishery targeted by bottom trawlers. Preferred offshore habitats for juvenile and adult scup are variable ranging from open, sandy-silty bottoms to the head of submarine canyons as well as more heterogenous habitats with topographical relief and varying sediments.[51] Scup rely on the relatively warmer waters on the outer continental shelf during the winter months principally south of the Hudson Canyon off New Jersey and along the coast from south of Long Island to North Carolina.[52] Offshore wind development is expected to occur in or near these overwintering grounds which

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[46] NOAA Fisheries, Fisheries Statistics Division data summary program. https://www.st.nmfs.noaa.gov/commercial-fisheries/commercial-landings/index
[47] See USCG-2019-0131-0027 [May 29, 2019]
[48] National Marine Fisheries Service (NMFS). 2018. Fisheries Economics of the United States, 2016. U.S. Dept. of Commerce, NOAA Tech. Memo. NMFS-F/SPO-187a, 243 p.
[49] Lock, Meredith, Packer, David B. 2004. Essential fish habitat source document. Silver hake, Merluccius bilinearis, life history and habitat characteristics. NOAA technical memorandum NMFS-NE; 186. https://repository.library.noaa.gov/view/noaa/4030.
[50] Meredith and Parker (2004)
[51] Steimle, Frank W. 1999. Essential fish habitat source document. Scup, *Stenotomus chrysops*, life history and habitat characteristics. NOAA technical memorandum NMFS-NE; 149. https://repository.library.noaa.gov/view/noaa/3154.
[52] *Ibid*

serve as a refuge for adults as well as subadults and juvenile cohorts that ultimately recruit to the harvestable stock.

The Northeast sea scallop fishery is one of the most valuable and highly organized fisheries in the United States. This fishery has vessels from New Jersey, New York, Rhode Island, and Massachusetts. Since many of the fishing grounds for sea scallop are rotational closed areas and require usage of days at sea, areas off Long Island present a unique and highly productive open access area for fishermen. Areas on the eastern side of the Hudson Valley Shelf and Canyon are some of the most highly productive open access grounds on the east coast.[53] These grounds provide vital habitat for spawners, new recruits, and likely help populate the southern portions of the sea scallop population.

Other offshore fisheries rely on New York's healthy and productive inland and coastal waters during critical life history stages, like the summer flounder (fluke) life history that is emblematic of the ecological and societal interconnections between the State's coastal area and the OCS. Summer flounder make distinct seasonal inshore-offshore movements throughout their range, often referred to as migrations.[54] They are part of an offshore overwintering guild of fish species that includes scup, black sea bass, northern sea robin, and smooth dogfish.[55] During the warmer months of late spring and summer, New York's estuaries and intracoastal bays like those in the Hudson-Raritan Estuary, Long Island Sound, and the South Shore Estuary Reserve are key to this species' growth and maturation. These nearshore waters also provide submerged aquatic vegetation, which is designated as summer flounder Habitat Areas of Particular Concern (HAPC) because they provide critical ecological functions and are vulnerable to degradation. Homing patterns have also been documented in New York waters, where summer flounder return to the same bay or nearby estuaries year after year.[56] For these reasons, fisheries managers caution that "knowledge of [summer flounder] life history and habitat requirements can vary regionally, and what affects them in one area can easily cause repercussions in the population in another area."[57]

The dynamic summer flounder life history patterns are depicted in abundance and biomass modeling for the New York Bight (Figure 15). When viewed collectively, these analyses identify areas occupied by sub-adults and adults in very high abundance on the OCS starting at depths of -60m to -70m, whereas larger summer flounder with very high biomass concentrations (presumably spawning stock) occur further east and south in the spring. These peak concentrations occur just prior to summer flounder's seasonal inshore movement during the warmer months and is especially pronounced near the Hudson South lease areas in the central and southwestern portion of the GLD. Summer flounder larvae and postlarvae that spend fall and winter months on inner and outer portions of the OCS migrate inshore to coastal nursery areas from October to May.[58] Most summer flounder life stages are anticipated to interact with offshore renewable energy construction and operation in their shoreward migrations. Given that a majority of the summer flounder population is now found in waters of the New York Bight, renewable energy development that affects critical life stages in this region has the potential to affect populations in other areas or wholesale.

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[53] New England Fishery Management Council and SMAST survey data

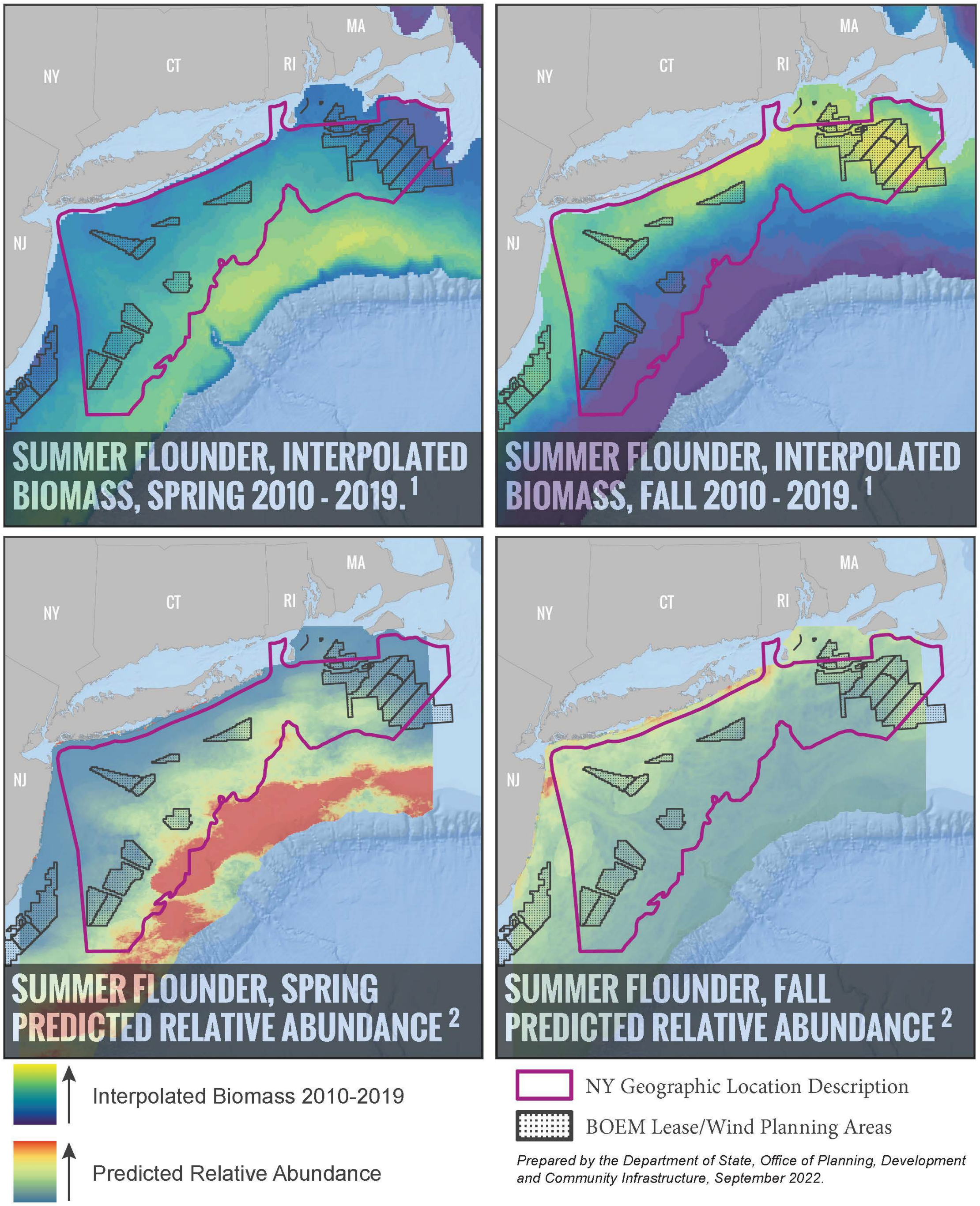
[54] Packer, D.B., S.J. Griesbach, P.L. Berrien, C.A. Zetlin, D.L. Johnson, and W.W. Morse 1999. Essential fish habitat source document. Summer flounder, *Paralichthys dentatus*, life history and habitat characteristics. NOAA technical memorandum NMFS-NE; 151. https://repository.library.noaa.gov/view/noaa/3149

[55] Steimle et al. (1999)

[56] Packer et al. (1999)

[57] *Ibid*

[58] *Ibid*



sources:

1. *Marine Geospatial Ecology Lab (MGEL) at Duke University, on behalf of MDAT, NEFSC, and TNC. http://mgelmaps.env.duke.edu/mdat/rest/services/MDAT*
2. *Predictive abundance derived from data collected from 1975-2009. NOAA Northeast Fisheries Science Center, NOAA National Center for Coastal Monitoring and Assessment, Stone Environmental, Inc.*

Figure 15. Summer flounder interpolated biomass and predicted abundance for spring and fall.

In addition to the ecological connections, New York has a direct interest in summer flounder because it represents 6% of annual commercial landings by value and is the most important flatfish fishery in the U.S. Atlantic Coast. In 2018, the commercial fishery contributed generated $259.9M in cumulative economic output (sales), over 2,300 associated jobs, and contributed an additional $159.4M in wages and other business expenses to the Atlantic region.[59] State-specific data for 2021 show that New York State had more dealers purchasing summer flounder than any other state (n=46), nearly double the amount from New Jersey and Massachusetts.[60] Top New York ports for commercial summer flounder landings include Montauk and Hampton Bays, with 95 vessels participating in this fishery in 2021.[61] Recreational summer flounder fishing is discussed in Section 4.3.2 because most occurs from private rentals rather than for-hire charters (86% private vs. 4% for-hire; 10% from shore).[62]

There are many other commercially important fish species with interconnected life histories between New York's Coastal Area and the OCS. Striped bass is one of the most important commercial and recreational fisheries on the east coast. Commercial and for-hire fisheries target migrating striped bass as they move into the various spawning areas along the East Coast, including important spawning grounds in the Hudson River. Most menhaden spawning occurs offshore during the winter, and currents bring drifting eggs and larvae into bays and estuaries along the east coast. Menhaden are an important food source for striped bass and other piscivores (e.g., bluefish, whales, birds including the osprey and bald eagle). Menhaden are also the largest fishery on the east coast in terms of the pounds of fish landed each year (New York lands more than one million pounds per year). These nearshore and inland habitats form a vital link in their life histories and have led to the success of New York's fishing industries.

A unique oceanographic feature in the GLD driving the success and productivity of these fisheries is the Cold Pool. The Cold Pool is a spatially dynamic thick band of cold, near-bottom water on the OCS of the Middle Atlantic Bight (MAB) and Southern Flank of Georges Bank comprised of remnant winter water that becomes capped by the seasonal thermocline.[63] From June to October, the coldest Cold Pool water is consistently located in the New York Bight.[64] This part of the ocean experiences one of the largest seasonal temperature changes in the world.[65] NOAA analyses have linked fluctuations in this cold-water mass to fishery recruitment, like flounder species, demonstrating how climate drivers and changes to oceanographic features like this directly influence and can be a predictor of fish stock productivity.[66] Thus, the Cold Pool influences primary productivity and fish and shellfish distributions and behavior, including spawning and migratory movements of commercially and recreationally important species.[67]

In addition to direct effects to fishing grounds and habitat requirements of key fisheries, New York also has an interest in minimizing disruptions and hazards for the commercial fishing fleet. Many of New York's fishing vessels transit over 200 nm to access fishing grounds on Georges Bank and transit similar

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[59] Murray & Associates, Inc. 2020. Economic Impacts of Reduced Uncertainty Associated with Fishery Management Actions with Summer Flounder. Prepared for SCMFIS Science Center for Marine Fisheries. Available at https://scemfis.org/wp-content/uploads/2020/06/Econ_Flounder_2020.pdf.

[60] Mid-Atlantic Fishery Management Council (MAFMC). 2022. Summer Flounder Fishery Information Document, June 2022. Available at https://static1.squarespace.com/static/511cdc7fe4b00307a2628ac6/t/629f76bc70c0bd5c746310e1/1654617790499/Fluke+AP+FPR+Info+Doc_2022.pdf

[61] *Ibid*

[62] *Ibid*

[63] Lentz, S.J. 2017. Seasonal warming of the Middle Atlantic Bight Cold Pool. J Geophys Res Ocean 122:941–954.

[64] *Ibid*

[65] Kohut, J., and J. Brodie. 2019. Partners in Science Workshop: Offshore Wind and the Mid-Atlantic Cold Pool. Final Report and White Paper. Dated July 17, 2019. Accessible at https://rucool.marine.rutgers.edu/wp-content/uploads/2020/10/PartnersWorkshop_WhitePaper_Final.pdf

[66] du Pontavice, H., T.J. Miller, B.C. Stock, Z. Chen, and V.S. Saba. 2022. Ocean model-based covariates improve a marine fish stock assessment when observations are limited. ICES Journal of Marine Science: 79, pp. 1259–1273. DOI: 10.1093/icesjms/fsac050

[67] Lentz (2017)

distances between eastern Long Island and New Jersey. During a Coast Guard public meeting in Montauk on April 29, 2019, New York fishermen identified that east-west transit routes are necessary, preferably a northerly and a southerly route, for safe and efficient access through the MA WEAs from Long Island ports to fishing grounds.[68] Similar sentiments on the need for efficient access were articulated in transit workshops held in the New York Bight (note that the cardinal direction varied).[69] Fuel is a significant operating cost for fishermen, ranging from 20% to 50% of annual operating costs, and as fishmen's fuel costs rise, profits decline thereby exacerbating the existing economic stressors on the fishing industry.[70,71] Many factors contribute to fuel cost and overall operating costs, including target species abundance, fleet size, fishing gear used (mobile gears like hydraulic dredge and trawls consistently have higher fuel costs), trip length (fuel consumption increases at higher speeds), vessel and engine size, use of navigational aids, weather conditions, and season.[72] Long transit routes are also accompanied by the higher social costs of being away from home, worker fatigue, and safety concerns. With New York fishermen already making long trips to fishing grounds and ports, any additional time on the water to re-route or detour comes at a disproportionately higher cost.

A key driver of transit patterns in the New York Bight stems from New York ports not having adequate docking and unloading facilities, seafood processing capacity, or land-based transportation networks to efficiently get the seafood to market. For example, seafood logistics and distribution systems, including last mile delivery, is often challenging due to workforce shortages and supply chain bottlenecks (e.g., access to refrigerated trucks).[73] This has resulted in New York fishermen choosing to land in other states, like surfclam fishermen who land in New Jersey because New York does not have an appropriate processing facility. Where a fisherman chooses to land their catch also depends on market price, proximity to fishing grounds, permit requirements, among other factors. As a result, actions that make it more challenging for New York fishermen to land their catch in New York place an additional burden on New York's shoreside industries.

The continued viability of New York's commercial fishing fleet depends on operating efficiently by maximizing catch per unit effort and minimizing costs such as fuel, gear losses, new/modified gear, and training. Increased costs to fishermen also include land-based components like trucking, processing, and refrigeration. The longer the fish are left on a boat, the greater the devaluation of the crop. Actions that reduce catch or affect operational efficiency have consequences for New York's fishing fleets and, in turn, our landside industries and port communities. Simply put, it is imperative that vessels can safely and efficiently navigate to and from New York ports.

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[68] See USCG-2019-0131-0021.
[69] NYS F-TWG (2019).
[70] Davie, S., C. Minto, R. Officer, C. Lordan, and E. Jackson. 2015. Modelling fuel consumption of fishing vessels for predictive use. ICES Journal of Marine Science (2015), 72(2), 708–719. doi:10.1093/icesjms/fsu084
[71] Cheilari, A., J. Guillen, D. Damalas, and T. Barbas. 2013. Effects of the fuel price crisis on the energy efficiency and the economic performance of the European Union fishing fleets. Marine Policy 40: 18-24.
[72] *Ibid.*
[73] NYS Department of Agriculture and Markets. 2019. Senate Bill S7300, Seafood Roundtable Meetings Written Report. Dated September 30, 2019. Available at https://agriculture.ny.gov/system/files/documents/2019/12/2019seafoodreport.pdf.

New York's for-hire fishing industry is also significant, both in its size and geographic coverage. A recent analysis of federal fishing data identifies that New York's for-hire industry averages over 400,000 fishing trips per year and generates over $60 million in sales.[74] According to this analysis, the State's for-hire industry had more jobs in 2016, grossed the highest sales, and generated substantially more fishing trips annually than any other mid-Atlantic or New England state. Dotting the entire southern coastline of Long Island from Brooklyn to Montauk, New York for-hire fishermen on average made over 70,000 charter trips annually to fish in federal waters between 2000 and 2021, most within the GLD and some further offshore (Figure 6, Figure 16). Total annual expenditures of these charter trips peaked in 2015 at $13.84 million. This figure grows exponentially when indirect and downstream economic growth is factored in (Figure 16). In 2017, New York's marine recreational fishing trips were estimated to support 397 full or part-time jobs, and contribute approximately $42 million in sales, $16 million in income, and $27 million in gross state product.[75] Similar to other fishing uses, New York for-hire fishing experiences high interannual variability, is trending up over time, and does not appear to have been significantly impacted by the COVID-19 pandemic (2020-2021).

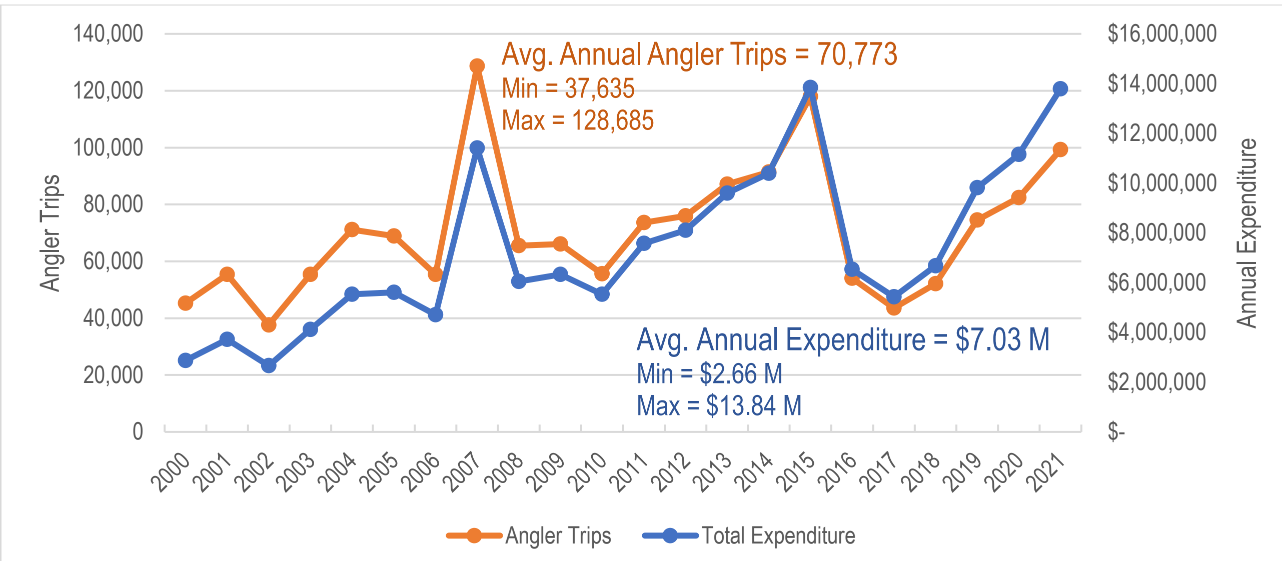

Figure 16. Total annual New York for-hire angler trips and estimated annual expenditure in federal waters, 2000-2021.
Sources: NOAA Marine Recreational Information Program (MRIP) Effort Time Series; NMFS Economic Contribution of Marine Angler Expenditures on Fishing Trips (2006 and 2017).[76]

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[74] NMFS. 2018. Fisheries Economics of the United States, 2016. U.S. Dept. of Commerce, NOAA Tech. Memo. NMFS-F/SPO-187a.
[75] Lovell, S., J.Hilger, E.Rollins, N.A.Olsen, and S.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. Available at https://spo.nmfs.noaa.gov/tm/.
[76] Preliminary 2021 data are included because NOAA reported high confidence in the data (i.e., low standard error). Annual expenditures were estimated based upon average angler fee for New York State For-Hire trips derived from periodic NOAA surveys of party/charter operators (see Lovell et al., 2020), and linear extrapolation was used to estimate average for-hire fees for years with no survey data (https://www.fisheries.noaa.gov/resource/data/socioeconomic-impacts-atlantic-offshore-wind-development).

4.3.2 Recreational Uses and Resources

New York's coastal policies afford protection for existing and future recreational opportunities and encourage increased access to a myriad of public resources along the coasts and throughout the GLD. In addition to New York's recreational uses that occur in proximity to public access points and coastal communities, New York uses extend to the seaward edge of the GLD (and beyond). Many of these recreational and tourist activities are free for public access and attract visitors that are essential contributors to the local coastal service and retail economy.

Recreational boating is a major economic driver for New York. Long Island's tourism industry accounts for over $5.9 billion annually[77] and includes a robust community of recreational divers, boaters, fishermen, and others who enjoy using the water. In 2017, recreational boating anglers generated $296 million in sales, contributed $231 million to gross state product, and supported 3,664 jobs in New York.[78] Of the approximately $3.5 billion in boating-related output generated in 2012 among the participating states in the northeast, the greatest contribution to this economic output, approximately $1.4 billion or 40%, came from New York.[79]

The State has a direct interest in supporting its recreational fisheries, like those for summer flounder, striped bass, and HMS. New York and New Jersey have the largest recreational summer flounder fisheries in the region. From 2019-2021, New York State contributed 23% on average to the total recreational summer flounder landings, behind only New Jersey (50%) and nearly equivalent to the combined landings from the remaining states from Maine to North Carolina.[80] On average, approximately 20-30% of these recreational landings occur in federal waters, and the majority of trips are made by fishermen in private or rental vessels.[81] In contrast, striped bass fishing trips represent a greater mix of for-hire and private fishing vessels, although private fishing vessels in federal waters on average still land more striped bass annually. A study that evaluated the combined economic effect to Atlantic states from the striped bass fishery estimated that New York State generated $261.3 million in GDP and supported approximately 3,105 jobs in 2016. Approximately 29% of all New York State fishing trips target striped bass (Table 6), making striped bass anglers a significant economic driver of the for-hire fishing and coastal-tourism industries.[82] Deepsea fishing is a growing industry where HMS permit holders from New York spent $23.2 million on fishing trips in 2011 with an average of $587 spent per trip over 39,440 trips.[83] These species profiles are representative of the influx of economic activity from offshore recreational fishing that is an essential part of New York's strong recreational ocean economy.

Table 6. Total striped bass anglers and angler trips in New York, 2009 and 2016.

	2009	2016
Total Anglers	716,950	921,501
Total Trips	4,824,331	4,294,058
Striped Bass Trips	1,435,947	1,263,973
Total Striped Bass Trips % of total	29%	29%

Source: Southwick Associates, Inc. 2018. "The Economic Contributions of Recreational and Commercial Striped Bass Fishing." Available at: https://mcgrawconservation.org/wp-content/uploads/2005096-Striped_Bass_2018.pdf

[77] https://www.newsday.com/business/long-island-tourism-data-1.20222695
[78] Lovell (2020)
[79] SeaPlan (2012)
[80] MAFMC (2022)
[81] *Ibid*
[82] Southwick Associates, Inc. 2005. The Economics of Recreational and Commercial Striped Bass Fishing. "The Southwick Study." Available at: https://www.southwickassociates.com/wp-content/uploads/2011/10/Striped_Bass.pdf
[83] Hutt et al. (2014). NMFS-F/SPO-147, 34 p

Commercial whale and wildlife watching tours have become an emerging and important part of New York's tourism industry. A study that analyzed the mid-Atlantic region (NY to GA), indicated that this subset of the industry has grown at an average annual rate of 3.8% and was estimated to have total expenditures of $19.8 million in 2008.[84] Most NY-based tours are day trips with tickets costing approximately between $65 and $80 for adults and $45 to $50 for children. During peak season (June, July, August), each tour company offers anywhere from 2 to 7 trips weekly, and at least two of the commercial operators offer year-round cruises. Whale watching charters and citizen scientists who collect data while aboard these cruises have helped identify an abundance and variety of marine mammals and pelagic birds in the GLD. New York's whale watching cruises operating in the GLD not only provide a tourist destination, but they also serve as floating classrooms that help educate New Yorkers about valuable coastal resources.

New York's ocean-based whale watching and wildlife tourism industry relies on healthy ecosystems to attract and sustain populations of seabirds, shorebirds, and marine mammals including the iconic large whale species that create memorable experiences for its customers. Population impacts, such as the Unusual Mortality Events (UME) on the U.S. East Coast are occurring in areas that overlap with the GLD: humpback whale (UME designated April 2017), North Atlantic right whale (UME designated June 2017), and minke whale (UME designated February 2018).[85] Under the Marine Mammal Protection Act (MMPA), an Unusual Mortality Event is defined as "a stranding that is unexpected; involves a significant die-off of any marine mammal population; and demands immediate response."[86] The waters off of New York provide important feeding and resting areas for these endangered marine mammals. Having healthy marine populations supports eco-tourism, fosters a greater appreciation of New York's coastal and marine resources, and provides important citizen science data.

Multiple recreational uses and resources converge at the Hudson Valley Shelf and Canyon complex, including NY wildlife viewing, recreational fishing, and diving. This complex is a major geologic feature originating in the GLD that provides physically complex habitat features due to dynamic conditions, like water transfer, upwellings, varied slopes, and relatively uncommon hard-bottom outcroppings along the sea floor that provide habitats for commercially important fish and other organisms.[87] The Hudson Canyon (located south of the GLD boundary) is the largest of the submarine canyons in the New York Bight and currently under review as a proposed National Marine Sanctuary in recognition of its vast resources of special regional and national significance.[88] Equally important in the mid-Atlantic region for its high ecological value is the associated Hudson Valley Shelf that extends approximately 30 nautical miles southeast along the continental shelf, between the commercial shipping lanes near the mouth of the New York and New Jersey Harbor, then widening as it approaches the Hudson Canyon.[89] Catch data from the Northeast Fisheries Science Center and empirical analyses suggest that fisheries and benthic

[84] O'Connor, S., Campbell, R., Cortez, H., & Knowles, T. 2009. Whale Watching Worldwide: tourism numbers, expenditures and expanding economic benefits, a special report from the International Fund for Animal Welfare, Yarmouth MA, USA, prepared by Economists at Large.
[85] https://www.fisheries.noaa.gov/national/marine-life-distress/2017-2019-north-atlantic-right-whale-unusual-mortality-event
[86] 16 U.S.C. 1421h
[87] Menza, C., B.P. Kinlan, D.S. Dorfman, M. Poti and C. Caldow (eds.). 2012. A Biogeographic Assessment of Seabirds, Deep Sea Corals and Ocean Habitats of the New York Bight: Science to Support Offshore Spatial Planning. NOAA Technical Memorandum NOS NCCOS 141. Silver Spring, MD. 224 pp.
[88] https://sanctuaries.noaa.gov/hudson-canyon/
[89] NYSDEC and NYSDOS (2017)

habitat within the Hudson Valley Shelf are enhanced by the physical conditions within the Canyon.[90, 91] The geographic extent of the Cold Pool is closely associated with the Hudson Valley Shelf and Canyon complex and the corresponding bathymetric contours and patterns of circulation, which in turn influences primary productivity and life histories of many species. Fishermen frequent the Hudson Valley Shelf in search of commercially and recreationally important species like squid, mackerel, butterfish, tilefish, and swordfish, and gamefish such as large tunas, billfish and sharks. This rich benthic habitat also creates a highly productive ocean environment that supports many seabird species[92] and attracts marine mammals and sea turtle species.[93]

The State's interest in these coastal uses and resources also has consistently been identified and characterized through State policy documents. New York's values and priorities are articulated in the 2017-2027 New York Ocean Action Plan.[94] In total, the plan laid out 61 strategic actions that should be implemented by New York agencies often with the help of federal partners and stakeholder groups. Many strategic actions identified in the Ocean Action Plan highlight ecologically and economically important species to New York, including commercially and recreationally important fisheries like striped bass as well as large whale species that support the State's recreational whale watching industry. New York has taken steps on the following strategic actions from the Ocean Action Plan, which underscore the State's direct interest in these resources (emphasis added):

- Action 19: Design and implement a monitoring survey to determine baseline trends for **large whales** in the New York Bight.
- Action 20: Design and implement focused, long-term monitoring surveys for **large whales** to investigate the impacts of human activities and for effective conservation planning.
- Action 38: Identify goals for environmental assessments to better understand effects of **offshore renewable energy development** on wildlife.
- Action 39: Assess the effectiveness of BMPs and other measures used to mitigate adverse effects of anthropogenic sources of **underwater noise**.

4.4 Where the Proposed Activity Overlaps with the Resources, Uses and Values (§ 923.84(d) (4))

The GLD boundary is justified by the reasonably foreseeable coastal effects to the State. That is not to say, however, that the State is arguing that impacts are homogenously distributed across the GLD area. The data demonstrates that for some uses and resources that are more prevalent closer to shore, such as recreational boating or fishing (see Figure 10 and Figure 11), the overall impacts are expected to attenuate as distance from the State's coastline increases. And in other uses, the geographic distribution relies on a combination of factors, such as commercial fishing that occurs throughout the GLD but is more concentrated based on trends in target species, gear types, regulatory restrictions, and other factors (Figure 5). While the cumulative result of overlaying these uses and the likelihood of the activity is a large area, the State's interests in a specific site within that area may be very discrete.

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[90] Pierdomenico, M., A. Gori, V. Guida, J. Gili. 2017. Megabenthic assemblages at the Hudson Canyon head (NW Atlantic margin): Habitat-faunal relationships. Progress in Oceanography: 157 (12-26).
[91] Stevenson, D., Chiarella, L., Stephan, D., Reid, R., Wilhelm, K., McCarthy J., & Pentony M. 2004. Characterization of the Fishing Practices and Marine Benthic Ecosystems of the Northeast U.S. Shelf, and an Evaluation of the Potential Effects of Fishing on Essential Fish Habitat. NOAA Technical Memorandum NMFS-NE-181.
[92] Menza, C., B.P. Kinlan, D.S. Dorfman, M. Poti and C. Caldow (eds.). 2012. A Biogeographic Assessment of Seabirds, Deep Sea Corals and Ocean Habitats of the New York Bight: Science to Support Offshore Spatial Planning. NOAA Technical Memorandum NOS NCCOS 141. Silver Spring, MD. 224 pp.
[93] NYSERDA. 2018. Offshore Wind Master Plan, Marine Mammals and Sea Turtles Study. Report 17-25 L.
[94] NYSDEC and NYSDOS (2017)

As shown in data and figures presented in Section 4.2 and Section 4.3, above, the GLD overlaps with New York's coastal uses and resources. It was also drawn according to the maximum likely depth of fixed foundation offshore wind turbines, based on technological and economic considerations of where new development is most likely to be proposed. The boundary also contemplates the potential for new electrical transmission cables connecting offshore renewable energy infrastructure to shore on project-specific and regional meshed or "backbone" scales.

The GLD boundary contemplates all forms of current and reasonably anticipated future renewable energy technologies that are likely to be used to produce energy in the offshore space. Rapidly evolving technological investments and advancements in offshore renewable energy generation could result in development that harnesses other resources beyond offshore wind, such as hydrokinetic, water column pressure, or hydrothermal properties of the marine environment or co-generation capabilities (e.g., hydrogen hubs). Ultimately, it is impossible to fully anticipate what factors will drive the locations of future offshore renewable energy development (e.g., seafloor characteristics, distance to shore, transmission, ports and supply chain, power purchase agreements), and the GLD is intended to be inclusive of a wide range of available technologies and reasonable, future build-out scenarios.

4.5 Impacts to the Resources or Uses from the Proposed Activities (§ 923.84(d) (5))

The federal waters offshore New York are increasingly busy, with new infrastructure projects proposed nearly every year. These projects seek to satisfy New York's significant population with services and resources, primarily related to energy and communication. The State's energy policies are in part responsible for the accelerated rate of new energy project proposals, as New York seeks to address the urgent need for renewable energy generation to satisfy emissions reductions targets. Federal policies, too, can impact new project development, such as the recent federal goal of 30 GW of offshore wind by 2030, which has significantly accelerated the pace of federal project reviews.

Consistent with NOAA guidance and the purpose of this GLD, this section describes impacts of the proposed activities without ascribing value or preference to a certain type of energy resource. Further, the requirements of the CZMA and its regulations, and NOAA's implementation of the statute, tilt strongly towards assessing the negative impacts of projects in identifying "reasonably foreseeable effects" and minimizes the positive impacts. As a consequence, the State must omit some of the most persuasive arguments on the prospective positive impacts of these activities in stating its case for the GLD. Therefore, this section does not recognize the intrinsic regional and even global benefit to offshore wind.

As part of the implementation of its renewable energy policy goals, New York is investing significant resources in the offshore wind industry's development. The specific purposes of the State's investment are to ensure offshore wind projects are sited, built, and operated in a responsible and efficient manner, avoiding or minimizing impacts where possible, and so that economic development and other benefits also accrue to New York. Because of the State's focus, these efforts have provided greater clarity on the potential impacts from offshore wind than other potential uses on important State uses and resources such as commercial fishing and recreation. This does not indicate a greater impact from this type of development on these resources than from others; rather it clearly indicates New York's strong commitment to fully identifying and addressing these impacts as it seeks to encourage offshore wind project development. With this significant context in mind, this section summarizes potential impacts to New York's uses and resources for each phase of development in the GLD, including pre-construction surveys, construction and operations, and decommissioning.

4.5.1 Commercial and For-Hire Fishing

Renewable energy development, including survey activities, construction, operations, and decommissioning, are anticipated to result in the following direct and indirect impacts to New York fishermen as described in this section:

- Displacement from fishing grounds during offshore wind development activities or loss of fishing areas occupied by project components, including from increased operational and maintenance vessel activity.
- Potential gear damage or loss from increased survey activity or new or additional underwater hazards.
- Necessary gear or fishing modifications for fishing near turbines.
- Reduced navigational safety due to new obstructions, increased vessel activity, and impairments to navigational tools like marine vessel radar.
- Increased transit times.
- Increased gear conflict or operational competition within and outside of wind project areas if fishing effort is shifted due to offshore wind energy projects.
- Secondary economic impacts for support businesses such as seafood dealers, vendors to the fishing industry (e.g., bait and tackle, gear supply), processors, and distributors.[95]

Additionally, project activities are anticipated to impact target species and habitats important to sustaining these fisheries:

- Availability of fish,
- Benthic habitat disturbance, and
- Long-term changes to fishing grounds.

Siting and Survey Activities

Survey and research activities cover a large area of the seafloor within the lease area and along export cable routes, often requiring that vessels and equipment operate in these areas for many weeks over the course of several years. Surveys can occur over the course of approximately five (5) years per lease area and are usually conducted during spring and summer, which results in an unavoidable overlap with commercial and recreational seasons.[96] For example, the NY WEA represents a single renewable energy lease area in the GLD and BOEM estimated between 350 to 1,000 vessel round trips could be associated with routine pre-construction siting and survey activities.[97] The number of vessel trips and overlap with productive fishing seasons increases the likelihood of interactions.

Certain surveys, including routine geotechnical surveys, require temporary exclusion areas that prevent fishermen from setting fixed gear and from fishing mobile gear in these areas or risk gear damage and/or losses. Displacement pushes fishermen to alternate areas that are less preferred (e.g., less productive, higher fishing pressure, further away) and results in lower landings and/or lower profits. Although actual exclusion areas may be on the scale of hours, this belies the true displacement as fishermen must plan to avoid the larger areas and generalized timeframes that are announced in mariner notices or stakeholder communications.

[95] *Adapted from* BOEM. 2021. Request for Information Guidance for Mitigating Impacts to Commercial and Recreational Fisheries from Offshore Wind Energy Development. Dated November 22, 2021. BOEM-2021-0083.
[96] BOEM. 2021. Commercial and Research Wind Lease and Grant Issuance and Site Assessment Activities on the Atlantic Outer Continental Shelf of the New York Bight: Final Environmental Assessment. December 2021. OCS EIS/EA BOEM 2021-073.
[97] BOEM. 2016. Commercial Wind Lease Issuance and Site Assessment Activities on the Atlantic Outer Continental Shelf Offshore New York Environmental Assessment. OCS EIS/EA BOEM 2016-042. Accessed January 29, 2018. https://www.boem.gov/NY-Public-EA-June-2016/. See p. 4-92.

Fishing gear losses occur when there are interactions between fishing gear and survey equipment, such as entanglement with towed geophysical survey equipment or moored research devices.[98, 99] Typically, developer-led awareness campaigns and USCG's Notice to Mariners can minimize interactions with fishing vessels and gear, but this has not always happened and does not eliminate the impact to fishermen's harvests or lost revenue when gear losses occur. Fishing gear is bespoke to specific fisheries and regions, such that the cost of a gear loss incident is magnified by the expense of lost fishing days and long lead-times to replace the gear. While gear loss compensation programs have become more commonplace for offshore wind developers, they do not always cover survey activities, typically do not fully compensate for lost revenue, and require documentation that some fishermen are unable to produce. Therefore, despite their temporary nature, survey and research activities impact fishermen and fishing revenues.

Construction Activities

The construction phase is anticipated to result in the greatest displacement of fishing activity, with some developers estimating 100% displacement of commercial fishing throughout the multi-year construction phase.[100] Fishermen are likely to experience cumulative losses across larger geographies due to the number of concurrent projects anticipated to be under construction during the same timeframe. Access to traditional fishing grounds and to certain port facilities and dockside services would be reduced by temporary in-water closures, increased construction vessel traffic, and physical construction activities taking place. For-hire fishermen would experience similar pre-construction and construction-level access and fishing disruptions. Electrical transmission cables, fiber optic cables, and other infrastructure required along the cable route would traverse multiple fishing grounds in the GLD to connect the offshore infrastructure to areas closer to shore, leading to temporary use conflicts during cable installation.

In southern New England waters, commercial fishermen from multiple states have devised a coordinated pattern of fishing fixed and mobile gears within a common area, referred to as "gentlemen's agreement", which established alternating fixed and mobile gear lanes of operation arranged east-west with 0.5-0.6 nm spacing.[101] The addition of wind turbine foundation infrastructure in a uniform 1 x 1 nm grid pattern is a compromise that enables fixed and mobile gear to continue fishing albeit with a loss to fishable area that is expected to impact fixed gear fishermen more acutely. To be clear, this arrangement, like other uniform turbine layouts proposed in the GLD, will not fully replicate or preserve historic fishing practices. Rather, there will continue to be impacts to fishermen from displacement and congestion.

Similarly, the construction phase is anticipated to result in the greatest impacts to offshore habitats important for fisheries and fishermen compared to other phases of development. Construction of offshore

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[98] Harrington, M. 2021, September 2. "Fisherman catches device to monitor fish for wind-farm study." *Newsday.* https://www.newsday.com/long-island/politics/sbu-cornell-orsted-south-fork-wind-farm-1.50350543#:~:text=Commercial%20fisherman%20Dan%20Warner%20estimated,out%20it%2C%22%20he%20said.

[99] Harrington, M. 2022, April 30. "Wind farm's fish monitors irk fishermen." *Newsday.* https://www.newsday.com/long-island/politics/fish-wind-miw49ug4

[100] King, DM. 2019. Economic Exposure of Massachusetts Commercial Fisheries to the Vineyard Wind Project. Available at https://static1.squarespace.com/static/5a2eae32be42d64ed467f9d1/t/5d68295e81187e00014ee5c1/1567107429061/MA+Fisheries+Economic+Exposure+final+-+April+2019.pdf. Pg. 2-1 states "… estimates of economic exposure are based on maximum potential economic impacts which, in this report, means assuming that all fishing revenues from the [work area and export cable] will be lost and not replaced by fishermen shifting fishing effort to other areas."

[101] RICRMC. 2019. "Federal Consistency review of proposed Vineyard Wind, LLC 800MW offshore wind farm Docket No. BOEM-2018-0069; CRMC File 2018-04-055." Dated February 28, 2019. Available at http://www.crmc.ri.gov/windenergy/vineyardwind/VW_FedConConcur_20190228.pdf. From pg.51-52, "Fixed gear operations set gear on the 0 and 5 [Loran] lines (i.e., 43900, 43905, 43910, etc.) and mobile gear vessels tow their gear between these numbers to avoid snagging any fixed gear. With the phasing out of Loran C navigation systems the commercial fishing industry has relied upon Wind Plot, which is a commercial fishing software program that converts Loran C coordinates to latitude and longitude coordinates on GPS chart plotter navigation systems.…Using the Loran C 0s and 5s coordinates provides for mobile gear trawling lanes of approximately 0.5 nm wide with the fixed gear creating the northern and southern lane boundaries. Loran C lines were slightly curved, thus the distance between coordinate lines is not constant and often are greater than 0.5 nm."

structures involves removal and disturbance of sediments, sediment dispersion, other localized changes to water quality, an increase in underwater noise (e.g., vessel traffic, pile driving, excavation activities), direct mortality to sessile organisms, and motile organisms vacating the area. Temporarily altered habitat quality increases stress and risks of individual mortality.

Acoustic impacts during construction affect habitat quality. For offshore wind projects, fish and invertebrates will experience the most extensive acoustic impacts during pile driving of turbine foundations.[102] Pile driving produces a high-energy impulsive sound underwater that causes mortal injury in sensitive marine fish species at distances of up to approximately 2,200 (752 m) feet; recoverable injury or temporary loss of hearing sensitivity would be more widespread.[103] For example, pile driving of monopile foundations has been modeled to cause temporary threshold shifts in fish at 6.4 mi to 10.1 mi (10.3 km to 16.3 km) from the source.[104] Larger distances indicate that a larger area and presumably more fish being mortally injured, temporarily injured, or avoiding the area being impacted by sound pressures. Even though fish may survive, temporary injuries could still compromise fishes' swimming ability increasing their risk of further injury or predation.[105]

Acoustic impacts can also vary depending on life stage and size. A study found larger striped bass experience greater injury from the same level of pile driving than smaller fish.[106] Fish and invertebrate eggs, larvae, and other sessile organisms like shellfish are also vulnerable to construction-related acoustic impacts and direct mortality due to their limited mobility.[107] Squid, which are a commercially-important invertebrate species, exhibit a behavioral response and may be injured within approximately 1,600 feet (500 m) from the pile driving source.[108] For scale, a 15-turbine project (9m diameter monopile; 4,000 kilojoule [kJ] hammer) it is estimated that 776 acres of potential squid habitat would be temporarily impacted and an estimated 2,830 acres could be exposed to lethal noise effects on invertebrate eggs and larvae.[109] Trends toward greater turbine generation capacity have led to larger diameter monopiles that require larger pile driving hammers, like a 6,600 kJ hammer to install a 16m diameter pile.[110] Larger impact hammers result in greater areas of disturbance with more lethal impacts to fish with swim bladders and behavioral disturbances to other fish and invertebrate species. Meanwhile, many offshore wind projects in the GLD are anticipated to have a hundred or more turbines each, with project schedules requiring months of pile driving during construction.

The significance of these impacts may be moderate or even major, especially given that existing sound and vibration mitigation techniques are as yet untested in the GLD and adequate evaluation and assessment will be necessary to determine their effectiveness in reducing impacts to fish and invertebrates due to the frequencies at which these abatement methods are most effective, the speed at which most fishes and invertebrates move, and/or where in the environment such efforts are directed,

[102] BOEM. 2019. Vineyard Wind Offshore Wind Energy Project Essential Fish Habitat Assessment. Final, April 2019.
[103] See Table 3.3-2 *in* BOEM. 2021. Vineyard Wind 1 Offshore Wind Energy Project Final Environmental Impact Statement. March 2021. BOEM 2021-0012.
[104] South Fork Wind COP. 2021. Appendix J1, pg. 31.
[105] Popper, Arthur N., Michele B. Halvorsen, Brandon M. Casper, and Thomas J. Carlson. 2013. U.S. Dept. of the Interior, Bureau of Ocean Energy Management, Headquarters, Herndon, VA. Effects of Pile Sounds on Non-Auditory Tissues of Fish. OCS Study BOEM 2012-105. 60 pp.
[106] Popper et. al. 2013.
[107] BOEM. 2019. Vineyard Wind Offshore Wind Energy Project Essential Fish Habitat Assessment. Final, April 2019.
[108] BOEM. 2021. South Fork Wind Farm and South Fork Export Cable: Essential Fish Habitat Assessment with NOAA Trust Resources. April 2021.
[109] *Ibid* and BOEM. 2021. South Fork Wind Farm and South Fork Export Cable Project Final Environmental Impact Statement. OCS EIS/EA BOEM 2020-057. August 2021.
[110] Denes, S.L., M.J. Weirathmueller, E.T. Küsel, K.E. Limpert, K.E. Zammit, and C.D. Pyć. 2022. Technical Report: Underwater Acoustic Modeling of Construction Sound and Animal Exposure Estimation for Mayflower Wind Energy LLC. Document 02185, Version 3.0 Revision 2. Technical report by JASCO Applied Sciences for AECOM.

especially for benthic organisms that occupy habitats beyond the reach of any current mitigation method.[111]

Operation and Maintenance Activities

The addition of wind turbines, offshore substations, and other fixed structures above the water line or just below the surface changes navigation patterns, increases navigational complexity by introducing potential obstructions, increases risk of collision and allision, and alters the efficacy of navigation tools like marine radar.[112] Transiting vessels that operate at higher speeds over greater distances are anticipated to choose to avoid certain energy development areas. This increases the travel time, trip cost, and raises safety concerns compared to a more direct route.[113] These behavioral responses by the fishing industry are attributed to barriers such as safety, legal, and insurance issues and have been documented to occur in Europe even after stakeholder input during the design phase.[114] The Coast Guard's MA/RI Port Access Route Study also cautioned that transiting vessels would avoid the wind farm and identified that "altering course around the entire WEA could require excessive additional travel, time, and distance" and goes on to say that these alternate routes "require vessels to transit either further towards open ocean, away from safe haven, or further from some of the USCG's marine communications coverage."[115] The primary safety impact is interference to on-board marine vessel radar systems, particularly where adverse weather conditions significantly increase the reliance on marine vessel radar since visual piloting is restricted.[116] The standardized grid layout proposed for most wind farms in the GLD are a significant mitigating measure to aid safe navigation; however, this alone does not ensure safe navigation.

New York's commercial fishing fleet and certainly most of the for-hire fishing vessels are not fully equipped with the sophisticated on-board equipment needed to safely operate in wind farms during low visibility conditions (foggy, rainy, nighttime). The most common impact of wind turbines on marine vessel radar is "a substantial increase in strong, reflected energy cluttering the operator's display, leading to complications in navigation decision-making", and addressing these impacts has been confounded because suitable mitigation techniques "have not been substantially investigated, implemented, matured, or deployed."[117] Long days at sea and crew fatigue do not improve decision-making abilities. Impacts will be evaluated on a case-by-case basis and appear to warrant new safety training, watchkeeping, new radar manufacturing designs, upgrading onboard radar equipment, and establishing new protocols to more safely navigate adjacent to and through areas with structures where there were none previously. There are no mechanisms to ensure New York fishermen will have the funds and time to equip themselves and readily adapt to these new conditions, resulting in near-term and long-term impacts to the commercial fishing industry.

In the GLD, impacts to transiting New York fishermen are anticipated to be greatest following a full build-out of the seven (7) adjacent lease blocks in the MA WEA that, once developed, will cover approximately 1,400 square miles of ocean. Figure 17 illustrates the developer-proposed 1x1 nm grid layout that has been included in project-specific COPs and evaluated during BOEM's environmental reviews.[118] An alternate layout with up to six (6) designated, four nautical mile wide transit lanes has been proposed by

[111] Popper et al. 2022. Offshore wind energy development: Research priorities for sound and vibration effects on fishes and aquatic invertebrates. J. Acoust. Soc. Am. 151 (1): 205-215.
[112] BOEM 2021-0012
[113] USCG (2020)
[114] Haggett,C., T.ten Brink, A.Russell, M.Roach, J.Firestone, T.Dalton, and B.J. McCay. 2020. Offshore Wind Projects and Fisheries: Conflict and Engagement in the United Kingdom and the United States. Oceanography: 33 (4): 38-47.
[115] USCG (2019)
[116] National Academies of Sciences, Engineering, and Medicine 2022. Wind Turbine Generator Impacts to Marine Vessel Radar. Washington, DC: The National Academies Press. https://doi.org/10.17226/26430.
[117] *Ibid*
[118] See https://www.vineyardwind.com/press-releases/2019/11/19/new-england-offshore-wind-leaseholders-submit-uniform-layout-proposal-to-the-us-coast-guard

the Responsible Offshore Development Alliance (RODA),[119] and while BOEM has considered transit variations, alternatives with wider transit lanes have not been selected in BOEM's COP approvals. The greatest impact to New York fishermen is for those who transit through what is currently the MA WEA and take the southerly route where the wind farm array will be widest. There is an estimated 18.7-nm detour for transit between Montauk and the Nantucket Lightship fishing grounds in a full build-out scenario (change: 113.5 nm to 132.3 nm), representing a 16.5% increase. Even minor detours of several nautical miles each way in the two well-traveled northerly routes accumulate costs (refer to yellow transit routes in Figure 7). With slim profit margins and competitive fishing often regulated, in part, by time at sea (e.g., squid), added time and higher costs – fuel costs, vessel wear-and-tear, and wages – mean that detours result in significant impacts.

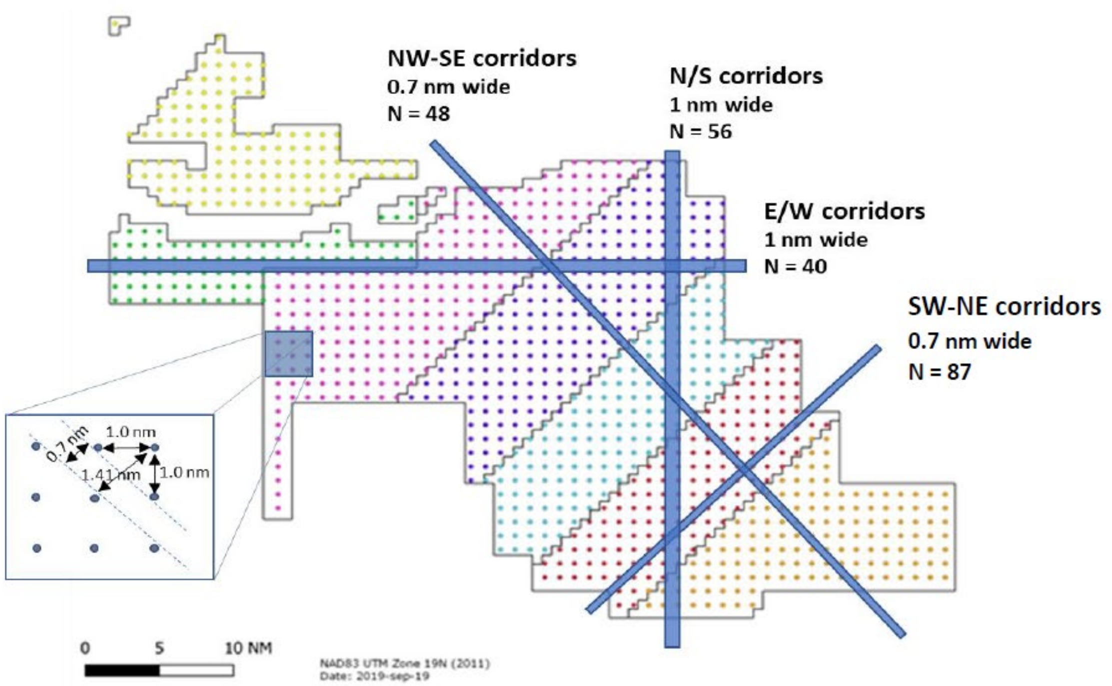

Figure 1: A full 1 X 1 nm E-W, N-S grid creates the equivalent of 231 transit lanes in four different key directions: E-W, NW-SE, N-S and SW-NE.

Figure 17. Developer proposal for a uniform layout across the RI/MA and MA WEAs.
Source: Baird (2019)

[119] RODA letter to USCG BOEM and NOAA, dated January 3, 2020. Docket ID: USCG-2019-0131-0045

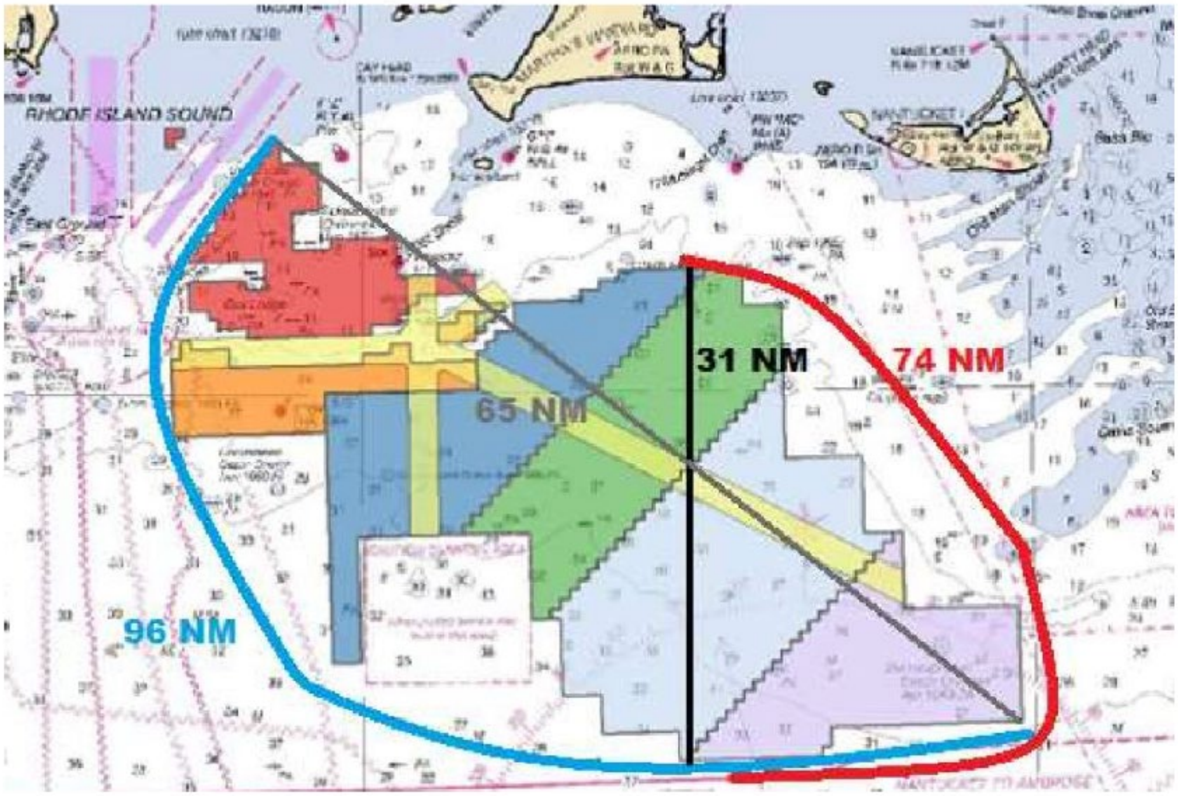

Figure 18. Example of transit distances through and around the RI/MA and MA WEAs.
Source: U.S. Coast Guard. 2019.

Shallow burial depths and improperly sited cables also create hazards for the fishing industry and cable operators. Shallow burial depths increase the risks of snags and hang-ups by bottom fishing gear and the potential for the cable to become exposed as a result of erosive forces and shear bottom stress. When subsea infrastructure cannot be buried to optimal depths either due to geophysical properties or when crossing other assets, developers often use concrete mattresses or other materials to protect the cable. Also known as secondary cable protection measures, these materials can damage fishing gear and increase the risk of hang-ups. These conditions can displace fishermen from their traditional operating areas as they try to avoid future snags. Snags are not only an inconvenience for fishers, but can be costly to repair damaged gear, replace lost gear, compensate for lost fishing time, and pay reparations in the event the infrastructure is damaged. The continued viability of New York's commercial fishing fleet depends on operating efficiently by maximizing catch per unit effort and minimizing costs. Actions that reduce catch or affect operational efficiency offshore would have consequences for New York's fishing fleets and associated ports and seafood processors.

Other disruptions to commercial fishing include increased vessel traffic, access and availability of fish, and long-term cumulative impacts. Routine visits by service vessels or boaters attracted to the area for sightseeing or recreational fishing purposes could impede commercial fishing vessels. Accessibility and availability of fish may be affected in locations where scour or cable protection is installed, where shifting sediment causes cables to become exposed, and where fixed infrastructure impacts the ability of the fishermen to operate their gear. The presence of new offshore structures is anticipated to directly displace many actively fished areas. Because commercial fishermen often have well-established, traditional fishing grounds, impacts to accessibility and availability of fish are anticipated to increase conflicts among fishermen due to a "funneling effect" and as other areas are encroached upon by offshore development. Although turbine spacing is often designed to allow most fishing activities to continue, it will likely take fishermen several seasons to adapt to altered conditions which are likely to require new fishing techniques, gear modifications, and other industry innovations. Large-scale construction or multiple energy projects being constructed in proximity to one another is expected to become a significant obstacle for commercial fishermen operating in these areas. Long-term and/or regional changes in fishing effort (duration, location, methodology) could indirectly affect how fisheries are managed, although the potential for this to occur has not been well-studied.

Habitat for commercially important fish and invertebrate species would be impacted by the long-term presence of new structures in the water, vibrations, altered hydrodynamics, and habitat conversion from installing offshore infrastructure.[120] Wind turbine arrays influence local hydrodynamics, vertical mixing, and seasonal stratification, depending on the oceanographic conditions of the area, which can change prey and forage availability and influence fish species abundance.[121] Preliminary studies indicate hydrodynamic changes and other adverse effects to the Cold Pool would affect productivity of species important to New York. The Cold Pool experiences seasonal changes beginning in the spring with the setup of the thermal stratification, then transitions to fully stratified in the summer before breaking down in the fall.[122] Research suggests that wind turbine arrays have the potential to affect the Cold Pool's seasonal stratification during the spring setup when there is the greatest overlap with the lease areas and a weaker stratification.[123] The fall breakdown could also be more vulnerable to disruption, if wind turbine development occurs further offshore. Because there are tight couplings between ocean conditions and habitat preferences of economically valuable fish and shellfish species, any impacts to the Cold Pool, should they occur, are expected to affect a range of behaviors, distribution, and habitat uses. Long-term trends show the Cold Pool is experiencing decreased persistence of approximately one week per decade, warming near-bottom temperatures,[124] and reduced aerial extent.[125] These climate change stressors to both the Cold Pool, species distributions, and ecosystem productivity create vulnerabilities to disruptions.

Habitat conversion is expected to bring both negative impacts and benefits to New York's fishing industry, with individual fisheries gaining or losing value based in part on whether their target species favor the type of reef-like hard infrastructure being installed or the bottom type that was already present. Fishermen would also be negatively affected if management measures prevent them from benefiting when certain species becomes more prevalent over others. For example, the introduction of scour protection around turbine foundations would increase the habitat availability for fisheries preferring hard-bottom habitat (i.e., Atlantic cod, American lobster).[126] Habitat conversion is also anticipated to result in unavoidable impacts to complex benthic habitats (e.g., glacial moraine, hard-bottom habitats, sand waves) that support more diverse demersal fish communities and provide shelter and foraging grounds during the most vulnerable stages of fish and invertebrate life cycles. Ultimately, long-term habitat alteration is anticipated to be

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[120] BOEM. 2020. Vineyard Wind 1 Offshore Wind Energy Project, Supplement to the Draft Environmental Impact Statement. BOEM 2020-025.
[121] Miles et al. (2001)
[122] Kohut and Brodie (2019)
[123] Miles, T., S. Murphy, J. Kohut, S. Borsetti, D. Munroe. 2021. Offshore Wind Energy and the Mid-Atlantic Cold Pool: A Review of Potential Interactions. Marine Technology Society Journal: 55 (4): 72-87.
[124] Chen, Z., & Curchitser, E. N. 2020. Interannual variability of the Mid-Atlantic Bight Cold Pool. Journal of Geophysical Research: Oceans,125, e2020JC016445. https://doi.org/10.1029/2020JC016445
[125] Friedland et al. (2022)
[126] BOEM 2021-0012

isolated to discrete areas (e.g., scour protection at each turbine, cable protection measures) and impacts would be greatest if complex benthic habitats are permanently disturbed by the activity.[127]

Disturbances to fish from post-construction and operational activities are anticipated due to detection of electromagnetic fields (EMFs).[128] Many studies describe minimal and temporary effects on marine fishes based largely upon the fact that magnetic fields diminish with distance and cable burial is typically used to reduce EMF exposure to fishes at or above the seafloor; however, researchers continue to caution that a higher encounter rate of EMF by fish and invertebrate species is certain. Many factors are attributed including siting cables where target burial depths cannot be achieved (complex habitat, existing infrastructure crossings), industry shifts toward high voltage direct current cables that emit higher EMFs, the anticipated use of larger capacity power cables over greater distances, and uncertain effects of EMF on migratory behavior, demersal invertebrates, and early life stages.[129, 130] Recent studies have cautioned that multiple transmission cables located close to each other may have an additive effect, resulting in higher EMFs being generated.[131] For these reasons, EMF must be carefully evaluated in relation to existing and planned commercial-scale subsea cables.

Other Activities

Hydrokinetic renewable energy would have similar displacement effects as other infrastructure projects and introduce new effects on commercial and for-hire fisheries, particularly related to operation and potential interactions with underwater moving parts. Obstructions in the water column would likely prevent these areas from being fished by bottom-tending and even by mid-water gears. A de facto exclusion area surrounding the hydrokinetic installation could also occur because deploying and retrieving the mobile gear can take multiple miles depending on the fishing depth, speed, and currents. There is limited data on potential impacts to commercial fishing from hydrokinetic installations in the open ocean, but they are generally thought to include vibrations or sound pressures related to the hydrokinetic infrastructure, potential disruptions to fish movement patterns, and entrainment/impingement of various life stages of fish which could affect fish populations and recruitment.[132]

The potential impacts to commercial and for-hire fisheries and their habitats from decommissioning is unclear at this time. During decommissioning, there would be noise and benthic disturbance associated with vessels and cutting bottom-founded infrastructure below the seabed that would temporarily disrupt fish and benthic communities. Cable protection and scour protection may or may not be removed. Any remaining buried infrastructure could become exposed over time, meaning that these areas could create hazards to bottom-tending mobile gear. There would also be temporary impacts to the seabed and a few months to a few years for benthic recovery.[133] It is unclear whether artificial reef-like habitats that have

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[127] Malek, A., Collie, J., LaFrance, M., and King, J. 2010. Fisheries ecology and benthic habitat in Rhode Island and Block Island Sounds. Technical Report #14 of the Ocean Special Area Management Plan. Rhode Island Coastal Resources Management Council, Wakefield, RI.

[128] Claisse, J.T., D.J. Pondella, C.M. Williams, L.A. Zahn, and J.P. Williams. 2015. Current ability to assess impacts of electromagnetic fields associated with marine and hydrokinetic technologies on marine fishes in Hawaii. Final Technical Report, OCS Study BOEM 2015-042. U.S. Department of Energy, Energy Efficiency and Renewable Energy, Golden, Colorado.

[129] Hutchinson, Z.L, D.H. Secor, A.B. Gill. 2021. The Interaction Between Resource Species and Electromagnetic Fields Associated with Electricity Production by Offshore Wind Farms. Oceanography: 33(4): 96-107. *In SPECIAL ISSUE ON UNDERSTANDING THE EFFECTS OF OFFSHORE WIND ENERGY DEVELOPMENT ON FISHERIES.*

[130] Degraer, S., Z.L. Hutchison, C. LoBue, K.A. Williams, J. Gulka, and E. Jenkins. 2021. Benthos Workgroup Report for the State of the Science Workshop on Wildlife and Offshore Wind Energy 2020: Cumulative Impacts. Report to the New York State Energy Research and Development Authority (NYSERDA). Albany, NY. 45 pp. Available at http://www.nyetwg.com/2020-workgroups.

[131] See Literature Review in Claisse, J.T., D.J. Pondella, C.M. Williams, L.A. Zahn, and J.P. Williams. 2015. Current ability to assess impacts of electromagnetic fields associated with marine and hydrokinetic technologies on marine fishes in Hawaii. Final Technical Report, OCS Study BOEM 2015-042. U.S. Department of Energy, Energy Efficiency and Renewable Energy, Golden, Colorado.

[132] U.S. Fish and Wildlife Service. 2018. Energy Technologies and Impacts – Hydrokinetic Energy. May 2, 2018. https://www.fws.gov/node/265253

[133] BOEM 2021-0012

established over the 30+ year offshore wind operation would be removed, a change which could be ecologically and economically harmful to then-established fish populations and commercial and for-hire fishermen using these areas. There may be ways to minimize impacts by using post-construction benthic recovery studies to inform decommissioning procedures.[134] Ultimately, the limited information provided in decommissioning plans makes it difficult to assess potential impacts.

4.5.2 Recreational Uses and Resources

Accessibility and quality of New York's recreational uses and resources would be impacted by proposed activities in the GLD in the following ways as described in this section:

- Displacement during offshore wind development activities or due to competition within and outside of wind project areas.
- Potential gear loss from new or additional underwater hazards.
- Reduced navigational safety due to new obstructions, increased vessel activity, and impairments to navigational tools like marine vessel radar.
- Secondary economic impacts for support businesses.
- Altered species use patterns due to habitat changes and from introducing new structures, noise, and vibrations.

Siting and Survey Activities

Survey activities are temporary but can occur throughout large areas for many weeks at a time. As described in Section 4.5.1, certain surveys require temporary exclusion areas that would prohibit vessels from operating within a specified range. These activities would be disruptive to the recreational users targeting key dive and fishing areas, like sites closer to shore where cable routing surveys converge and impact the level of enjoyment of the recreationists.

Construction Activities

Moderate impacts during construction are due to the temporary impacts of noise and vessel traffic on recreational vessel traffic, the natural environment, and species important for recreational fishing and sightseeing. Impacts will vary in intensity and extent, with impacts being greatest in New York's primary recreational areas (see Figure 10 and Figure 11).

While seasonal restrictions can minimize disruptions to the most popular recreational uses, there will still be disruption. For example, restrictions are unlikely to protect recreational activities that can be enjoyed "off-season", like fishing and winter pelagic bird watching. Construction in sensitive dive sites would have temporary impacts and potentially permanent impacts to bottom features that draw divers to offshore sites due to trenching, elevated turbidity levels, and installing cable protection like concrete mattresses (large blue areas in Figure 10). Construction activities lasting several years and multiple projects installed in proximity to each other will have cumulative impacts to the natural environment, finfish and invertebrate habitat and prey distribution and availability through benthic disturbing activities like anchoring/spudding, seabed preparation activities, cable emplacement, and increased offshore lighting. Export cables will be installed in areas closer to shore where recreational activities like boating, fishing, diving, and wildlife viewing are most dense and thus more likely to result in displacement during installation. Construction activities are anticipated to cause temporary and localized displacement that would affect visitation rates, seasonal tourism employment, and revenue within our local economies.

During construction, impacts to fish communities and offshore habitats are anticipated to also impact recreational uses (see also details in Section 4.5.1 Commercial and For-Hire Fishing). Certain species

[134] *Ibid*

groups are more vulnerable to disruption from equipment noise and vessel traffic, including marine mammals that are important to New York's whale watching industry. Noise-producing activities would occur during each project phase but are anticipated to be most intense during construction when pile driving would occur. As previously described, trends toward greater turbine generation capacity have led to larger diameter monopiles that require larger pile driving hammers and greater disturbance areas.[135] Construction noise contributes to impacts on marine mammals and their presence and abundance, with resulting impacts on marine sightseeing. Increased vessel traffic and changes in traffic patterns could also impact habitats by generating additional ocean noise and by increasing the risk of vessel collisions. Collision with marine vessels is one of the top drivers of mortality of large marine fauna, with vessel speed, size, and density all being factors in probability of collisions and extent of injury.[136] Collectively, these activities negatively affect marine mammal behavior, communication, orientation, and cause them to avoid foraging habitats and migration corridors.[137] Habitat displacement from offshore construction that indirectly leads animals into higher traffic areas would increase their risk of vessel strikes and entanglement.[138]

When construction occurs in high value habitats, the impacts to organisms using those habitats intensifies. NOAA notes that "certain animals may be motivated to remain in an area to feed or other reasons that may prolong noise exposure and increase stress levels."[139] Careful analysis of the timing and location of construction activities and vessel routes are needed to minimize impacts to seasonal feeding grounds and other seasonal occurrences by various marine mammal species.

<u>Operations and Maintenance Activities</u>

During operation, projects would attract boaters for sightseeing or fishing purposes. There is the potential for new recreational ventures to be established, like sightseeing cruises to view and experience above-water offshore facilities, particularly for facilities closer to shore. Energy infrastructure creates artificial reef-like structures that improve recreational fishing conditions and would attract fishermen targeting different species assemblages than are typically found in the open ocean and seafloor. Recreational fishing methods that require contact between fishing gear and the seafloor would be affected in locations where scour or cable protection is installed, or where shifting sediment causes cables to become exposed. New offshore structures represent new obstacles through which recreational vessels would need to navigate, increasing safety hazards because recreational vessel operators are typically less experienced and recreational vessels do not have onboard equipment required to safely navigate during adverse visibility conditions. Commercial wildlife tour operators would adjust vessel routes to avoid congested or impacted areas with high vessel traffic or when maintenance activities are underway, venturing farther distances and being displaced from traditional areas. Cumulatively, the scale of habitat alteration and increased vessel traffic and noise are anticipated to impact existing recreational uses and resources.

Changes to a place's visual landscape can impact recreational users' experiences. There are several conditions that affect the visibility of offshore installations. The most obvious is distance from shore. Energy infrastructure, such as turbines and substations placed at a distance greater than 20 miles offshore are predominantly screened by the Earth's curvature, with visibility significantly decreasing

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[135] Denes, S.L., M.J. Weirathmueller, E.T. Küsel, K.E. Limpert, K.E. Zammit, and C.D. Pyć. 2022. Technical Report: Underwater Acoustic Modeling of Construction Sound and Animal Exposure Estimation for Mayflower Wind Energy LLC. Document 02185, Version 3.0 Revision 2. Technical report by JASCO Applied Sciences for AECOM.
[136] Schoeman, R. P., Patterson-Abrolat, C., & Plön, S. 2020. A Global Review of Vessel Collisions With Marine Animals. Frontiers in Marine Science, 7, 292. https://doi.org/10.3389/fmars.2020.00292
[137] BOEM 2021-0012
[138] NOAA (2019)
[139] NOAA. 2019. Vineyard Wind Offshore Wind Energy Project Biological Assessment. Revised March 2019. Available at: https://www.boem.gov/sites/default/files/renewable-energy-program/State-Activities/MA/Vineyard-Wind/Vineyard_NOAA_BA.pdf

beyond that distance.[140] Daytime and nighttime views from points in southern New York City and along Long Island that are not obscured by topography, structures, or vegetation may be affected depending on the size of the turbines or other structures, lighting/marking schemes, and the height of the observer. Views from the open ocean in the direction of installations visible from the water's surface would also affect the visual aesthetics and recreationists enjoyment of the area. The first WEAs designated by BOEM are typically closer to shore and thus have greater visual impacts to shore-based and offshore recreational uses because they are closest to the highest density use areas.

Habitat alterations would benefit some recreationally important species and impact others, including marine mammals. Some studies have observed marine mammal habitat use returns to normal following construction, while others observe clear long-term displacement.[141] Operational noise from turbines and offshore substations would have localized and continuous habitat impacts, with periods of more-intense noise during occasional repair activities. Marine debris that collects around new foundations and scour or cable protection measures creates entanglement risks for marine mammals, which is a significant hazard and has been identified as one of the leading causes of mortality in North Atlantic Right Whales.[142] Marine debris removal programs would be implemented for each project, but details on inspection frequency and use of underwater surveys are still unclear. BOEM has noted "[t]here is considerable uncertainty as to how these broader ecological changes will affect marine mammals in the future, and how those changes will interact with other human-caused impacts."[143] Ultimately, the extent and significance of habitat changes on marine mammal use patterns and regional abundance is challenging to predict based on currently available information.

Additionally, as previously described, any impacts to the Cold Pool are expected to affect a range of species behaviors, distribution, and habitat uses. There are demonstrated tight couplings between ocean conditions and habitat preferences that have implications across trophic levels, from primary productivity to distributions and abundance of recreationally important fish, bird, and marine mammal species.

Other Activities

Hydrokinetic renewable energy would have similar effects as other renewable energy infrastructure projects and introduce some new impacts to recreational uses and resources. New bottom structures would either create de facto exclusion areas or necessitate imposing enforceable exclusion areas and safety zones, depending on the facility's location, type and extent of mooring systems, noise levels, proposed security features, vulnerability, and speed and motion of moving parts, among other factors. The size, shape, appearance, and lighting of visible development would impact aesthetics, although these may eventually be mitigatable through standardized lighting and marking controls similar to offshore wind facilities. Impacts to recreationally targeted species include altering habitat and circulation patterns and local species assemblages, injury or mortality from strikes and entrainment/impingement, and displacement or entanglement with guy wires or anchoring especially in the case of large mammal species such as whales that may be unable to negotiate complex arrays.[144] Similar to offshore wind, the cumulative effect of multiple projects is likely to exceed direct effects on any single project.

Decommissioning is anticipated to result in similar disruptions to recreational activities as construction activities and would also affect any ventures that were benefiting from the offshore installations (e.g., charter boat cruises).

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[140] NYSERDA (2018). Report 17-25s
[141] BOEM 2020-057
[142] *Ibid*
[143] *Ibid*
[144] Whittaker, D. and B.Shelby. 2010. Hydrokinetic Energy Projects and Recreation: A Guide to Assessing Impacts. Available at: http://hydroreform.org/wp-content/uploads/2020/02/Hydrokinetics_and_Recreation_Final.pdf

4.6 A Reasonable Showing of a Causal Connection to the Proposed Activity, including how the impacts from the activity results in reasonably foreseeable effects on the state's coastal uses or resources (§ 923.84(d) (6))

The scope of OCS activities subject to review in the GLD encompasses specific energy and infrastructure uses. This section demonstrates a causal connection of renewable energy and cable installations to reasonably foreseeable effects on New York's coastal uses and resources.

Renewable Energy Installations are Reasonably Foreseeable

The scale of offshore wind development in the GLD in the coming decades is unprecedented, with most projects expected to be operational by 2030 (Figure 19). BOEM's cumulative impact analysis for offshore wind development identifies many metrics to quantify the scale of offshore wind development from Maine to North Carolina. BOEM's analysis predicts major impacts to the resource categories "Navigation and Vessel Traffic" and "Commercial Fisheries and For-Hire Recreational Fishing", among other effects. Importantly, BOEM's analysis may under-represent the full scope of development in the GLD because it does not include the recently designated NY Bight WEAs that will presumably be fast-tracked to development, to the extent possible, in order for New York and New Jersey to realize their offshore wind goals. The following are key metrics from BOEM's analysis of existing WEAs [145], in the GLD (excluding the NY Bight WEAs, OCS-A 0486, and OCS-A 0522):

- Number of turbines: 1,070 (RI/MA) + 237 (NY) = 1,307 turbines
- Generating output (MW): 8,820 (RI/MA) + 2,076 (NY) = 10,896 MW
- Miles of export cable: 1,747 (RI/MA) + 109 (NY) = 1,856 miles
- Miles of inter-array cable: 2,084 (RI/MA) + 299 (NY) = 2,383 miles
- Acres of seabed disturbance due to foundations and scour protection: 1,851 (RI/MA) + 96 (NY) = 1,946 acres; and
- Acres of seabed disturbance due to export cable protection: 596 (RI/MA) + 39 (NY) = 635 acres.

State energy policies on transmission have led to renewed industry interest in merchant transmission facilities that connect offshore wind farms to onshore grids. The New York Bight has seen two unsolicited requests from transmission-only entities seeking to enter the renewable energy markets, the first called the Atlantic Wind Connection and another called the NY/NJ Ocean Grid. Each proposal describes a version of a regional network of subsea transmission cables connecting nearby offshore wind lease areas to New York and New Jersey. Northeast states' renewable energy policies are expected to foster greater penetration of renewable energy at the grid scale and greater demand for reliable and cost-effective transmission, including new high-voltage direct current (HVDC) cables that may be needed to minimize energy losses from long-distance offshore transmission, particularly as project lease areas become further from onshore grid interconnections. On January 20, 2022, the New York State Public Service Commission issued an order requiring "mesh-ready" transmission plans with new bids for NYS Offshore Renewable Energy Contracts. The mesh design allows multiple projects to interconnect to an offshore grid, which in turn is connected to the onshore grid at one or more interconnection points thereby allowing transfer of energy among individual projects and allows injection of offshore wind at multiple onshore locations. [146] The New York State Energy Research and Development Authority (NYSERDA) plans to

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[145] BOEM. 2021. South Fork Wind Farm and South Fork Export Cable Project Final Environmental Impact Statement. BOEM 2020-057. See Table E4.
[146] See https://www.perkinscoie.com/en/news-insights/record-setting-auction-flurry-of-transmission-planning-activity-demonstrate-growing-momentum-for-offshore-wind.html

procure at least 2,000 MW (and up to 4,640 MW) of offshore wind energy to help meet decarbonization goals in the New York Climate Leadership and Community Protection Act (Climate Act).

Once initial renewable energy infrastructure is in-place offshore, the evolution of other offshore renewable and low-carbon generation is expected to quickly take shape. Hydrokinetic energy has the potential to become more prevalent, with existing operational projects in Massachusetts (Bourne Tidal Test Site) and New York (Roosevelt Island Tidal Project), and the potential for projects on the OCS. Portions of undeveloped lease areas represent prime locations where developers can propose pilot-scale projects like wave and tidal energy generation, potentially tying into existing offshore transmission infrastructure. Co-generation opportunities are also being explored by lessees of the New York Bight lease areas, specifically the production of green hydrogen (hydrogen from water) that would entail installations of offshore electrolyzers, desalination equipment, and pipelines or new vessel transit to shore. The federal Infrastructure Investments and Jobs Act aligns with the mission of U.S. Department of Energy's "Hydrogen Energy Earthshot" program to reach the goal of $1 per 1 kilogram in 1 decade (the "1 1 1" goal) with awards of up to $8 billion to create new, regional hydrogen hubs (H2) anticipated in 2022.[147] The New England consortium that has formed includes State and local government partners from New York.

Reasonably Foreseeable Coastal Effects

For commercial and for-hire fishing, the reasonably foreseeable coastal effects are that NY-based fishermen could see reduced access and accessibility to fishing grounds. Thousands of new fixed turbines and other foundations (offshore substations, converter stations, etc.) will displace fishermen, alter fish habitats, and create hazards for mobile commercial fishing gear. Fishermen will need to avoid these structures and the associated scour protection or risk costly gear damage. While the layout alternatives for offshore wind could decrease impacts to the fishing community on a local scale, it is unlikely to appreciably reduce the coastal effects to New York fishermen in the near-term while they adapt to fishing in these altered areas. The New York State Coastal Management Program identifies coastal effects as including "changes or upgrades to established navigation patterns" because such adaptation takes time, has economic consequences to ocean industries, and downstream effects on working waterfronts and other shoreside industries.[148] Wider turbine spacing reduces the overall energy density of a lease area, ultimately requiring more lease areas to achieve states' goals and targets (i.e., the same number of turbines spread over a greater area). At least 5,000 miles of newly installed cables will increase the risk of snags, gear damage/losses, and lost fishing time, which would have reasonably foreseeable effects on New York-based fishing revenues, particularly because nearly 60% of the State's annual landings are fished using mobile, bottom-tending gears. Sediment conditions, hydrodynamics, and infrastructure crossings create situations where adequate cable burial depth cannot be achieved, will necessitate installing over 600 acres of secondary cable protection measures (mattresses, rock) that displace certain gear types or cause gear snags or losses during operation. The reasonably foreseeable effect of improperly sited or improperly maintained infrastructure will be a loss of fishing revenues to Long Island-based commercial fishing businesses and New York State coastal uses.

Reduced accessibility also affects recreational uses and enjoyment. Recreational fishing and wildlife viewing are often seasonal and associated with specific areas so that even temporary changes during surveys or construction causes reasonably foreseeable effects to these industries. Disruptions to fishing and recreational/tourism industries in New York include displacing fishing and boating elsewhere, which increases congestion in other areas and creates conflicts between users.[149] While recreational impacts are typically localized and short-term (1-2 construction seasons), the reasonably foreseeable effect of

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[147] See https://www.energy.gov/eere/fuelcells/hydrogen-and-fuel-cell-technologies-office-funding-opportunities
[148] See Coastal Policy 29, pg. II-6-100
[149] See USCG-2019-0131-0045. See NYS F-TWG (2019).

changes to accessibility is a reduction in business revenue and profitability that causes cascading effects to coastal communities and are easily compounded by the cumulative effect of multiple projects over time.

Noise impacts from surveys, construction, and operational activities would have reasonably foreseeable effects on commercial and recreational fisheries and marine mammals. Exclusion zones, ramp-up procedures, and similar mitigation measures do not account for other factors in the environment or overriding motives of the individuals or groups of animals that will influence behavior and affect their presence within the exclusion zone. Despite employing robust mitigation measures, acoustic impacts have the reasonably foreseeable effect of causing temporary behavioral changes, disrupting habitat use, affecting species abundance, and mortality especially for less mobile species, Trends toward greater generating capacity require larger turbines and larger impact hammers, which will lead more lethal impacts to fish with swim bladders and greater areas in the GLD impacted by sound pressure propagation. Increased vessel traffic will increase ambient ocean noise levels and increase the risk of vessel strikes for marine mammals. Research is underway to effectively evaluate cumulative impacts of sound and vibration and identify adequate mitigation measures, and in the meantime, offshore wind construction will be advancing. From 2023 to 2027, construction is anticipated to be underway for nine offshore wind projects in the MA WEA, two projects in the NY WEA, and potentially four projects in the New York Bight WEA (Figure 19), with over 1,300 square miles under construction concurrently in some years. The reasonably foreseeable effect of both the pace and scale of this development is to create cumulative acoustic impacts that cause longer-term displacement or avoidance by marine organisms within the affected areas.

Disrupted use of feeding, migratory and overwintering habitats in the GLD have the reasonably foreseeable effect of altering local species assemblages, lowering recruitment, and stressing already vulnerable populations. Benthic disruptions would have reasonably foreseeable effects on local densities and composition of marine communities and could fragment important habitat or commercially- and recreationally-important finfish migratory patterns. Benthic disturbance could also create feeding opportunities that attract or cause species to remain in an area longer, exposing them to increased noise and risk of vessel strikes.

Development activities affecting the Cold Pool would have reasonably foreseeable and significant ecological implications for the marine environment and commercially and recreationally important species productivity in the GLD. Research demonstrates that the Cold Pool has changed dramatically in recent decades, and scientists warn that this oceanographic feature has in turn become more vulnerable to external influences that could alter seasonal stratification setup and degradation.[150]

[150] Friedland, K.D, T. Miles, A.G. Goode, E.N. Powell, D.C. Brady. 2022. The Middle Atlantic Bight Cold Pool is warming and shrinking: Indices from in situ autumn seafloor temperatures. Fisheries Oceanography, 31: 217–223.

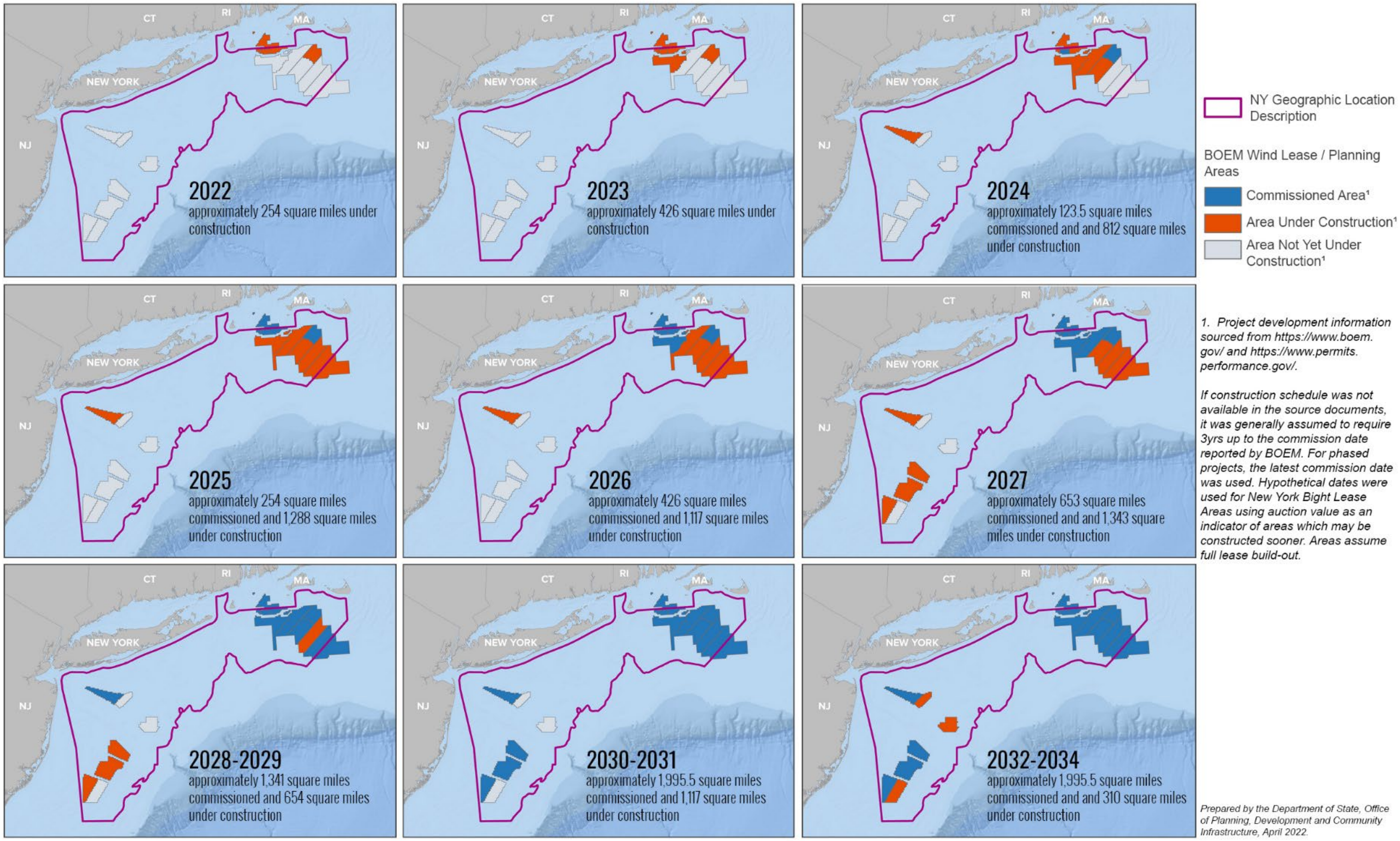

Figure 19. Cumulative build-out of renewable energy lease areas in the GLD.

4.7 Why Any Required Mitigation May Be Inadequate (§ 923.84(d) (7))

All proposed OCS development considered by this GLD is anticipated to undergo a robust review either through BOEM's existing permitting and approval processes or other federal agency review processes (e.g., USACE, NOAA, etc.). It is reasonable to infer that those future projects will adjust to lessons learned from constructed projects that could reduce long-term impacts. Through these reviews and the developers' due diligence, many site- and project-specific impacts can be avoided and, when necessary, mitigation measures are also developed to address unavoidable impacts.

BOEM has published numerous guidelines and analyses for renewable energy that typically include recommended best management practices and mitigation measures.[151] These publications have greatly expanded the state of the science and are often heavily relied upon when assessing potential impacts from OCS activities. BOEM's 2007 OCS Alternative Energy Final Programmatic EIS (FPEIS) provides for several program-level mitigation measures, but was prepared with the full knowledge that best practices were initial, minimum mitigation measures.[152] BOEM's cumulative impact analysis for offshore wind also identified best practices.[153] Presently, it appears that the program-level mitigation measures would not fully offset effects to New York's coastal uses and resources, given the cumulative scope of offshore development anticipated in the GLD.

The renewable energy siting and development process is well-intentioned but may not fully capture impacts to affected resources. Federal wind energy planning uses a "Smart from the Start" approach to deconflict areas and adjust WEA boundaries based on BOEM's analyses and comments and information it receives. Renewable energy lease blocks that are initially considered may be excluded to accommodate other offshore uses like navigation and fishing. However, at the time that the WEAs were established, the regional nature of offshore wind development in the northeast was not fully contemplated. Data were not readily available to demonstrate where and to what extent New York's coastal uses and resources may be affected by leasing and development activities in the NJ, DE, RI/MA, or MA WEAs. These data continue to be added to and refined, leading to new and previously unaccounted-for interactions. This has ripple effects later in the permitting phase. In the case of the Vineyard Wind project, BOEM and the applicant provided CZMA review opportunity to RI and MA given their proximity to the site, but not to New York, Connecticut, or New Jersey even though the COP identifies potential effects to fishermen from these states. As supporting data and information on affected uses and resources have become more accessible, New York's understanding of coastal effects has expanded beyond prior planning areas and specific projects and now supports the establishment of a GLD that recognizes the interconnectedness of the broader region's ecosystem and economic activities and provides the appropriate geographic context for the State's role in future project development.

New York's review of activities in the GLD is necessary given that standard practices for mitigation cannot currently address all site-specific variation in fishing and recreational uses and related resources across the offshore space. New York State is actively working with offshore users, environmental scientists and advocates, the wind industry, and other stakeholders to identify best practices to address use or resource-specific concerns. In our analysis and experience, uniform standards can be at times excessive or insufficient to address State needs, depending on location-specific factors. It is imperative that the State retain its ability to formally review any measures as part of its CZMA responsibilities. CZMA review is the only enforceable avenue to appropriately engage stakeholders in identifying and safeguarding State

[151] https://www.boem.gov/environment/environmental-studies/renewable-energy-research-completed-studies
[152] Section 5.2.23.6 of BOEM's FPEIS at 5-138 states, "As projects are developed and new information is collected, the MMS will update these policies and BMPs".
[153] BOEM (2020), Table A-5.

interests in federal waters and to also ensure that appropriate development can move forward. Unmitigated impacts to address access and accessibility, displacement, gear impacts, gear change-out, equipment needs and training, and transit continue to be analyzed; however, the final outcome of studies and potential rulemakings to address these impacts are years in the making. Meanwhile, federal leasing activities and industry planning and construction proceed. It is also unclear the extent to which for-hire and recreational fishermen have been included in planning efforts. New York seeks solutions that accommodate long-standing ocean industries like commercial and for-hire fishing while maximizing the potential development of offshore wind projects in existing and proposed lease areas. To date, New York has not participated in the same way because lessees may be unaware of the State's interest and are not compelled to address them.

Federal fisheries mitigation guidance for offshore wind facilities will provide recommendations for addressing impacts from offshore wind energy projects to commercial and recreational fishing communities (*under development by BOEM and NOAA*). While this is a critical step to ensuring consistency and equity across projects, there are no requirements for conformance with the guidance. BOEM is only able to enforce compliance when contributions are proposed by the lessee as part of an approved COP or when a commitment/obligation exists through other means.[154] New York State is similarly constrained as it does not have a regulatory pathway through CZMA to require financial compensation for impacts to commercial and for-hire fishing industries. However, federal consistency review and demonstrating consistency with all applicable policies in the New York State Coastal Management Program can be an effective tool for requiring economic analyses used to identify and inform minimization and mitigation measures. A GLD affords the State the opportunity to participate, as appropriate, while giving lessees a clear and accurate signal of where State interests are located.

Additionally, determining appropriate cable burial depths to avoid anchor strikes or gear snags continues to be a topic of ongoing learning for regulators and commercial and recreational users of the ocean space. Greater depths reduce the risk of strikes and damage but increase project cost and may not be possible depending on site conditions and technical limitations of the transmission cables. Many developers have agreed to implement gear loss compensation programs, and some are working together to create a common claim form (e.g., RI/MA WEAs lessees), but these programs are not standardized, and the disparities can often lead to inequities. Some programs require fishermen to sign non-disclosure agreements that restrict information sharing, making it challenging to adequately monitor and assess gear loss impacts to fishermen. In other instances, there are limitations to the number of claims that can be submitted, and others do not have third-party arbiters to resolve claims disputes. These represent burdens for fishermen trying to get compensated for legitimate losses.

Acoustic impacts to aquatic organisms are typically mitigated through a series of measures, but they have been focused primarily on the most visibly impacted, most widely studied, and federally protected marine species – the cetaceans – and to a lesser extent, pinnipeds, and sea turtles. Mitigation measures to safeguard fish and other marine biota apply the same techniques as for mammals and mitigation measures for invertebrates and zooplanktonic organisms are virtually non-existent. While research is improving in these areas, there are currently no standard mitigation measures or best practices for most fish and invertebrate species. Techniques that cause animals to avoid an area serve only a partial mitigation, intended to minimize direct injury while behavioral impacts could still be incurred, which may ultimately inhibit survival, reproduction, and alter predator-prey relationships. Such techniques are not as effective in minimizing injury for animals unable to actively or quickly avoid the source, like many fish at various life stages and invertebrates.

[154] BOEM-2021-0083

For many OCS activities, New York would have the ability to review and comment on National Environmental Policy Act (NEPA) environmental analyses and proposed mitigation measures. This role would allow New York to provide input and have it potentially implemented. However, due to the timing of federal consistency reviews (Subpart D or E), New York cannot solely rely upon the NEPA process. Therefore, the state seeks NOAA approval of the GLD to ensure that listed activities will be subject to federal consistency review.

4.8 Empirical Data and Information that Supports the Effects Analysis (§ 923.84(d) (8))

This analysis relies upon State and federal data, published studies, and other reliable sources cited herein; provides maps showing intensity of uses and resources within the GLD; and portrays multi-year datasets and trends in coastal uses and resources. Please refer to the table of contents for a detailed listing of maps and data tables included in this analysis.

Appendix A: Additional Figures

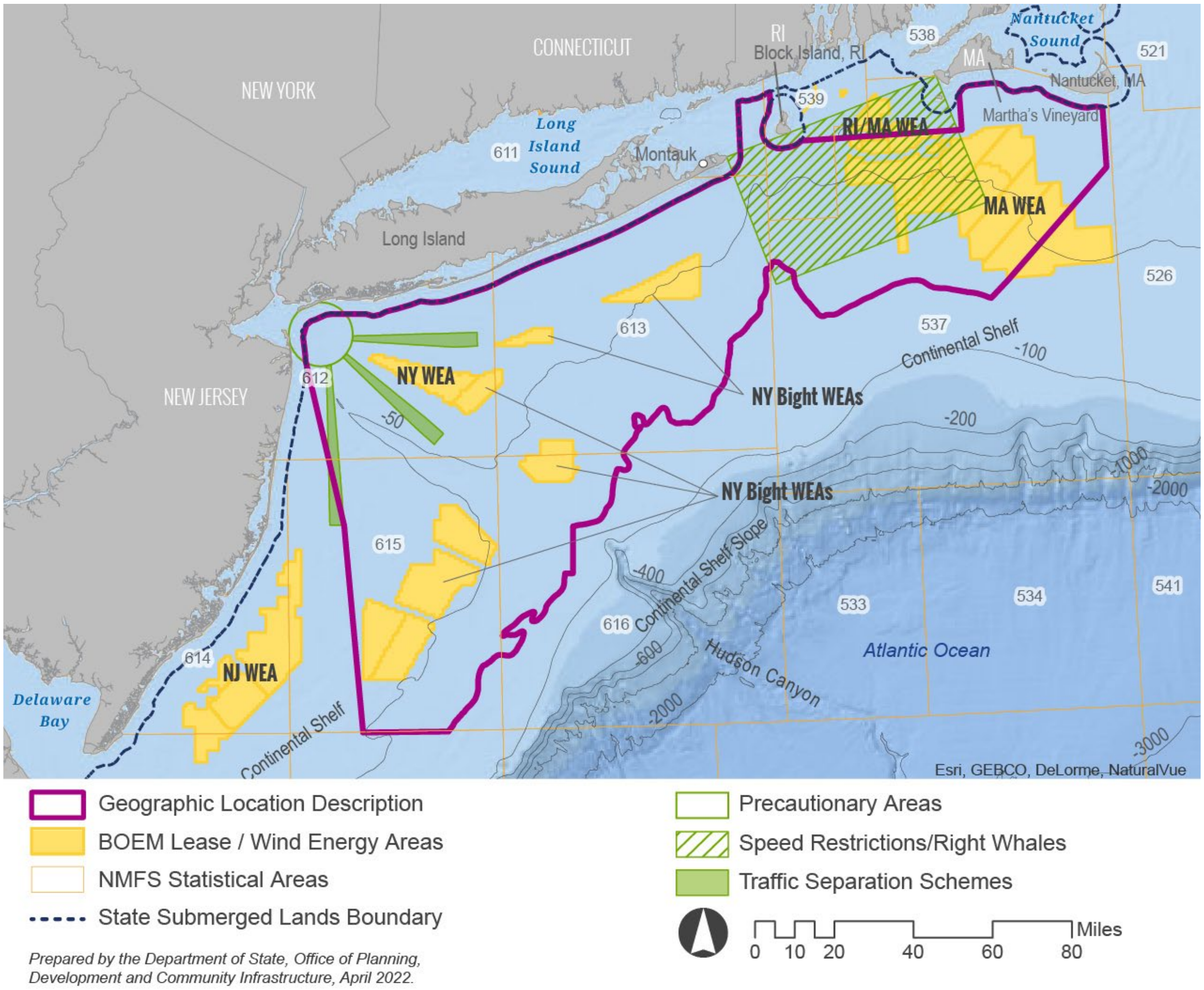

Figure A-1. Datasets featured in GLD boundary description.

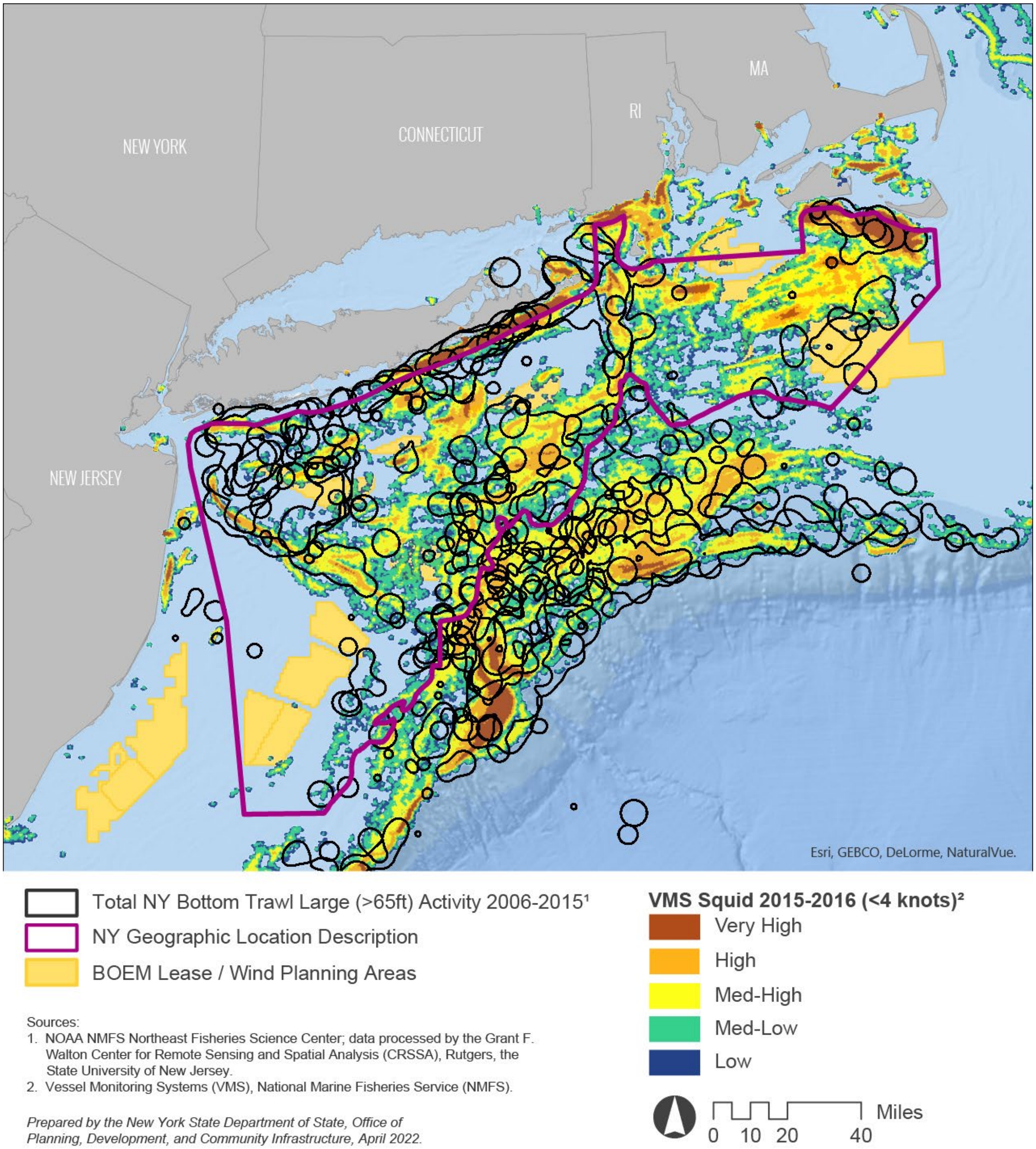

Figure A-2. Total New York bottom trawl (large vessels only) targeting longfin squid fishing grounds in the GLD.

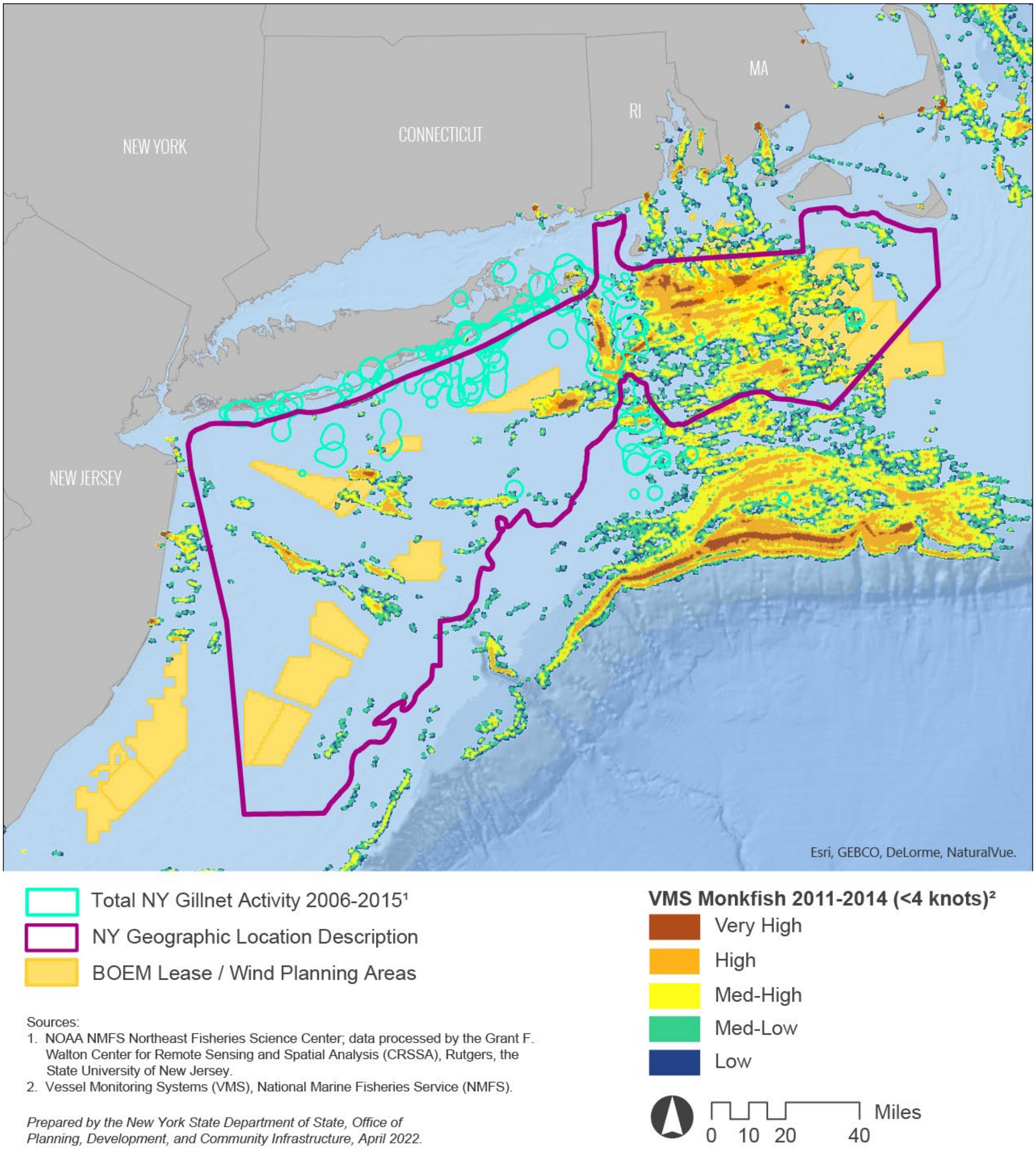

Figure A-3. New York gillnet fishing targeting monkfish fishing grounds in the GLD.

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